Computer Algebra
Independent Integration Tests

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3-Logarithms/170-3.2

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3.214 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)}\,dx$ . . . 1668
3.215 $\int \frac{a+b\log(cx^n)}{x^5(d+ex^2)}\,dx$ . . . 1674
3.216 $\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx$ . . . 1680
3.217 $\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx$ . . . 1686
3.218 $\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx$ . . . 1691
3.219 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx$ . . . 1697
3.220 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx$ . . . 1704
3.221 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$ . . . 1712
3.222 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$ . . . 1719
3.223 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$ . . . 1725
3.224 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}\,dx$ . . . 1731
3.225 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx$ . . . 1737
3.226 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$ . . . 1745
3.227 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$ . . . 1751
3.228 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx$ . . . 1757
3.229 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^2}\,dx$ . . . 1764
3.230 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^2}\,dx$ . . . 1772
3.231 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$ . . . 1781
3.232 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$ . . . 1788
3.233 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$ . . . 1794
3.234 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^3}\,dx$ . . . 1800
3.235 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^3}\,dx$ . . . 1807
3.236 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$ . . . 1815
3.237 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$ . . . 1822
3.238 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx$ . . . 1829
3.239 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx$ . . . 1839
3.240 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}\,dx$ . . . 1848
3.241 $\int \frac{x\log(cx^2)}{1-cx^2}\,dx$ . . . 1858

3.242 $\int \frac{x\log\left(\frac{x^2}{c}\right)}{c-x^2}\,dx$ 1863
3.243 $\int \frac{\log(x)}{1-x^2}\,dx$ 1869
3.244 $\int \frac{\log(x)}{1+x^2}\,dx$ 1874
3.245 $\int \frac{a+b\log(cx)}{1-ex^2}\,dx$ 1879
3.246 $\int \frac{a+b\log(cx^n)}{1-ex^2}\,dx$ 1885
3.247 $\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx$ 1890
3.248 $\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx$ 1897
3.249 $\int \frac{1}{(d+ex^2)^2(a+b\log(cx^n))}\,dx$ 1905
3.250 $\int \frac{1}{(d+ex^2)^2(a+b\log(cx^n))^2}\,dx$ 1910
3.251 $\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$ 1915
3.252 $\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$ 1924
3.253 $\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$ 1933
3.254 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}\,dx$ 1940
3.255 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx$ 1946
3.256 $\int x^4\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$ 1952
3.257 $\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$ 1959
3.258 $\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx$ 1965
3.259 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx$ 1975
3.260 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4}\,dx$ 1982
3.261 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx$ 1988
3.262 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx$ 1996
3.263 $\int x^5(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$ 2005
3.264 $\int x^3(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$ 2014
3.265 $\int x(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$ 2023
3.266 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\,dx$ 2031
3.267 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx$ 2037
3.268 $\int x^2(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$ 2044
3.269 $\int (d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$ 2051
3.270 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx$ 2063
3.271 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx$ 2070
3.272 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^6}\,dx$ 2077
3.273 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx$ 2084
3.274 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx$ 2092
3.275 $\int x\sqrt{4+x^2}\log(x)\,dx$ 2101

3.276 $\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$ . . . 2107
3.277 $\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$ . . . 2115
3.278 $\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$ . . . 2122
3.279 $\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx$ . . . 2129
3.280 $\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx$ . . . 2137
3.281 $\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$ . . . 2143
3.282 $\int \frac{a+b\log(cx^n)}{\sqrt{d+ex^2}}\,dx$ . . . 2150
3.283 $\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex^2}}\,dx$ . . . 2158
3.284 $\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx$ . . . 2164
3.285 $\int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}\,dx$ . . . 2171
3.286 $\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$ . . . 2179
3.287 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$ . . . 2187
3.288 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$ . . . 2195
3.289 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$ . . . 2202
3.290 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx$ . . . 2208
3.291 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{3/2}}\,dx$ . . . 2214
3.292 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$ . . . 2220
3.293 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^{3/2}}\,dx$ . . . 2227
3.294 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}\,dx$ . . . 2233
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3.296 $\int \frac{a+b\log(cx^n)}{x^6(d+ex^2)^{3/2}}\,dx$ . . . 2246
3.297 $\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$ . . . 2255
3.298 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$ . . . 2263
3.299 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$ . . . 2271
3.300 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$ . . . 2278
3.301 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{5/2}}\,dx$ . . . 2285
3.302 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{5/2}}\,dx$ . . . 2291
3.303 $\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$ . . . 2297
3.304 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$ . . . 2304
3.305 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$ . . . 2311

3.306 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^{5/2}}\,dx$ 2317
3.307 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{5/2}}\,dx$ 2324
3.308 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{5/2}}\,dx$ 2332
3.309 $\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$ 2341
3.310 $\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$ 2350
3.311 $\int \frac{a+b\log(cx^n)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx$ 2357
3.312 $\int \frac{a+b\log(cx^n)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx$ 2365
3.313 $\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$ 2372
3.314 $\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$ 2379
3.315 $\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx$ 2387
3.316 $\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx$ 2393
3.317 $\int \frac{x\log(x)}{\sqrt{-1+x^2}}\,dx$ 2400
3.318 $\int (fx)^m\left(d+ex^2\right)^3(a+b\log(cx^n))\,dx$ 2406
3.319 $\int (fx)^m\left(d+ex^2\right)^2(a+b\log(cx^n))\,dx$ 2416
3.320 $\int (fx)^m(d+ex^2)(a+b\log(cx^n))\,dx$ 2426
3.321 $\int (fx)^m(a+b\log(cx^n))\,dx$ 2433
3.322 $\int \frac{(fx)^m(a+b\log(cx^n))}{d+ex^2}\,dx$ 2438
3.323 $\int \frac{(fx)^m(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$ 2443
3.324 $\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx$ 2448
3.325 $\int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx$ 2457
3.326 $\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx$ 2465
3.327 $\int \frac{1}{(d+ex^3)^2(a+b\log(cx^n))}\,dx$ 2474
3.328 $\int \frac{1}{(d+ex^3)^2(a+b\log(cx^n))^2}\,dx$ 2479
3.329 $\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx$ 2484
3.330 $\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx$ 2491
3.331 $\int \frac{a+b\log(cx^n)}{d+\frac{e}{x}}\,dx$ 2497
3.332 $\int \frac{a+b\log(cx^n)}{(d+\frac{e}{x})x}\,dx$ 2503
3.333 $\int \frac{a+b\log(cx^n)}{(d+\frac{e}{x})x^2}\,dx$ 2508
3.334 $\int \frac{a+b\log(cx^n)}{(d+\frac{e}{x})x^3}\,dx$ 2514
3.335 $\int \frac{a+b\log(cx^n)}{(d+\frac{e}{x})x^4}\,dx$ 2521
3.336 $\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx$ 2528
3.337 $\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx$ 2535

3.338 $\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx$ . . . 2541
3.339 $\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x}\,dx$ . . . 2547
3.340 $\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx$ . . . 2552
3.341 $\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx$ . . . 2558
3.342 $\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx$ . . . 2565
3.343 $\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx$ . . . 2572
3.344 $\int \frac{x^{-1+n}\log\left(\frac{x^n}{d}\right)}{d-x^n}\,dx$ . . . 2577
3.345 $\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx$ . . . 2582
3.346 $\int \frac{\log\left(\frac{a}{x}\right)}{ax-x^2}\,dx$ . . . 2587
3.347 $\int \frac{\log\left(\frac{a}{x^2}\right)}{ax-x^3}\,dx$ . . . 2593
3.348 $\int \frac{\log(ax^{1-n})}{ax-x^n}\,dx$ . . . 2599
3.349 $\int (fx)^{-1+m}\left(d+ex^m\right)^3\left(a+b\log\left(cx^n\right)\right)\,dx$ . . . 2604
3.350 $\int (fx)^{-1+m}\left(d+ex^m\right)^2\left(a+b\log\left(cx^n\right)\right)\,dx$ . . . 2612
3.351 $\int (fx)^{-1+m}\left(d+ex^m\right)\left(a+b\log\left(cx^n\right)\right)\,dx$ . . . 2619
3.352 $\int (fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)\,dx$ . . . 2626
3.353 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx$ . . . 2631
3.354 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^2}\,dx$ . . . 2636
3.355 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^3}\,dx$ . . . 2641
3.356 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx$ . . . 2648
3.357 $\int (fx)^{-1+m}\left(d+ex^m\right)^3\left(a+b\log\left(cx^n\right)\right)^2\,dx$ . . . 2655
3.358 $\int (fx)^{-1+m}\left(d+ex^m\right)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx$ . . . 2665
3.359 $\int (fx)^{-1+m}\left(d+ex^m\right)\left(a+b\log\left(cx^n\right)\right)^2\,dx$ . . . 2675
3.360 $\int (fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)^2\,dx$ . . . 2684
3.361 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m}\,dx$ . . . 2690
3.362 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx$ . . . 2697
3.363 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx$ . . . 2704
3.364 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx$ . . . 2712
3.365 $\int x^5(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$ . . . 2724
3.366 $\int x^3(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$ . . . 2730
3.367 $\int x(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$ . . . 2736
3.368 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx$ . . . 2742
3.369 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^3}\,dx$ . . . 2748
3.370 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx$ . . . 2755

3.371 $\int x^4(d+ex^r)(a+b\log(cx^n))\,dx$ . . . 2762
3.372 $\int x^2(d+ex^r)(a+b\log(cx^n))\,dx$ . . . 2768
3.373 $\int (d+ex^r)(a+b\log(cx^n))\,dx$ . . . 2774
3.374 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^2}\,dx$ . . . 2780
3.375 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^4}\,dx$ . . . 2786
3.376 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^6}\,dx$ . . . 2793
3.377 $\int x^5(d+ex^r)^2(a+b\log(cx^n))\,dx$ . . . 2800
3.378 $\int x^3(d+ex^r)^2(a+b\log(cx^n))\,dx$ . . . 2808
3.379 $\int x(d+ex^r)^2(a+b\log(cx^n))\,dx$ . . . 2816
3.380 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x}\,dx$ . . . 2824
3.381 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^3}\,dx$ . . . 2830
3.382 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^5}\,dx$ . . . 2838
3.383 $\int x^4(d+ex^r)^2(a+b\log(cx^n))\,dx$ . . . 2846
3.384 $\int x^2(d+ex^r)^2(a+b\log(cx^n))\,dx$ . . . 2853
3.385 $\int (d+ex^r)^2(a+b\log(cx^n))\,dx$ . . . 2862
3.386 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^2}\,dx$ . . . 2870
3.387 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^4}\,dx$ . . . 2877
3.388 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^6}\,dx$ . . . 2885
3.389 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^8}\,dx$ . . . 2893
3.390 $\int x^5(d+ex^r)^3(a+b\log(cx^n))\,dx$ . . . 2900
3.391 $\int x^3(d+ex^r)^3(a+b\log(cx^n))\,dx$ . . . 2909
3.392 $\int x(d+ex^r)^3(a+b\log(cx^n))\,dx$ . . . 2918
3.393 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x}\,dx$ . . . 2927
3.394 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^3}\,dx$ . . . 2934
3.395 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^5}\,dx$ . . . 2942
3.396 $\int x^4(d+ex^r)^3(a+b\log(cx^n))\,dx$ . . . 2950
3.397 $\int x^2(d+ex^r)^3(a+b\log(cx^n))\,dx$ . . . 2959
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3.399 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^2}\,dx$ . . . 2977
3.400 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^4}\,dx$ . . . 2985
3.401 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^6}\,dx$ . . . 2993
3.402 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^8}\,dx$ . . . 3001
3.403 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^{10}}\,dx$ . . . 3009
3.404 $\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx$ . . . 3017
3.405 $\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx$ . . . 3022
3.406 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx$ . . . 3027

3.407 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)}\,dx$ . . . 3032
3.408 $\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx$ . . . 3037
3.409 $\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx$ . . . 3042
3.410 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}\,dx$ . . . 3047
3.411 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$ . . . 3052
3.412 $\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$ . . . 3057
3.413 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx$ . . . 3062
3.414 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}\,dx$ . . . 3069
3.415 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$ . . . 3074
3.416 $\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\,dx$ . . . 3079
3.417 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)^2}\,dx$ . . . 3084
3.418 $\int \frac{a+b\log(cx^n)}{x(c-x^{-n})}\,dx$ . . . 3089
3.419 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x}\,dx$ . . . 3095
3.420 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x}\,dx$ . . . 3102
3.421 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx$ . . . 3108
3.422 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx$ . . . 3114
3.423 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx$ . . . 3119
3.424 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^3}\,dx$ . . . 3126
3.425 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))^2}{x}\,dx$ . . . 3135
3.426 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))^2}{x}\,dx$ . . . 3143
3.427 $\int \frac{(d+ex^r)(a+b\log(cx^n))^2}{x}\,dx$ . . . 3150
3.428 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx$ . . . 3156
3.429 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx$ . . . 3162
3.430 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx$ . . . 3170
3.431 $\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x}\,dx$ . . . 3180
3.432 $\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx$ . . . 3186
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CHAPTER 1

Introduction

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This report gives the result of running the computer algebra independent integration test.The download section in on the main webpage contains links to download the problems in plain text format used for all CAS systems. The number of integrals in this report is [**454**]. This is test number [170].

1.1 Listing of CAS systems tested

The following are the CAS systems tested:

1. Mathematica 14 (January 9, 2024) on windows 10 pro.
2. Rubi 4.17.3 (Sept 25, 2023) on Mathematica 14 on windows 10m pro.
3. Maple 2024 (March 1, 2024) on windows 10 pro.
4. Maxima 5.47 (June 1, 2023) using Lisp SBCL 2.4.0 on Linux Manjaro 23.1.2 KDE via sagemath 10.3.
5. FriCAS 1.3.10 built with sbcl 2.3.11 (January 10, 2024) on Linux Manjaro 23.1.2 KDE via sagemath 10.3.
6. Giac/Xcas 1.9.0-99 on Linux via sagemath 10.3.
7. Sympy 1.12 using Python 3.11.6 (Nov 14 2023, 09:36:21) [GCC 13.2.1 20230801] on Linux Manjaro 23.1.2 KDE.
8. Mupad using Matlab 2021a with Symbolic Math Toolbox Version 8.7 on windows 10.
9. Reduce CSL rev 6687 (January 9, 2024) on Linux Manjaro 23.1.2 KDE.

Maxima and Fricas and Giac are called using Sagemath. This was done using Sagemath `integrate` command by changing the name of the algorithm to use the different CAS systems.

Sympy was run directly in Python not via sagemath.

Reduce was called directly.

1.2 Results

Important note: A number of problems in this test suite have no antiderivative in closed form. This means the antiderivative of these integrals can not be expressed in terms of elementary, special functions or `Hypergeometric2F1` functions. `RootSum` and `RootOf` are not allowed. If a CAS returns the above integral unevaluated within the time limit, then the result is counted as passed and assigned an A grade.

However, if CAS times out, then it is assigned an F grade even if the integral is not integrable, as this implies CAS could not determine that the integral is not integrable in the time limit.

If a CAS returns an antiderivative to such an integral, it is assigned an A grade automatically and this special result is listed in the introduction section of each individual test report to make it easy to identify as this can be important result to investigate.

The results given in in the table below reflects the above.

System	% solved	% Failed
Rubi	100.00 (454)	0.00 (0)
Mathematica	98.02 (445)	1.98 (9)
Maple	72.91 (331)	27.09 (123)
Fricas	61.67 (280)	38.33 (174)
Sympy	59.91 (272)	40.09 (182)
Reduce	57.05 (259)	42.95 (195)
Maxima	49.34 (224)	50.66 (230)
Giac	42.07 (191)	57.93 (263)
Mupad	32.16 (146)	67.84 (308)

Table 1.1: Percentage solved for each CAS

The table below gives additional break down of the grading of quality of the antiderivatives generated by each CAS. The grading is given using the letters A,B,C and F with A being the best quality. The grading is accomplished by comparing the antiderivative generated with the optimal antiderivatives included in the test suite. The following table describes the meaning of these grades.

grade	description
A	Integral was solved and antiderivative is optimal in quality and leaf size.
B	Integral was solved and antiderivative is optimal in quality but leaf size is larger than twice the optimal antiderivatives leaf size.
C	Integral was solved and antiderivative is non-optimal in quality. This can be due to one or more of the following reasons 1. antiderivative contains a hypergeometric function and the optimal antiderivative does not. 2. antiderivative contains a special function and the optimal antiderivative does not. 3. antiderivative contains the imaginary unit and the optimal antiderivative does not.
F	Integral was not solved. Either the integral was returned unevaluated within the time limit, or it timed out, or CAS hanged or crashed or an exception was raised.

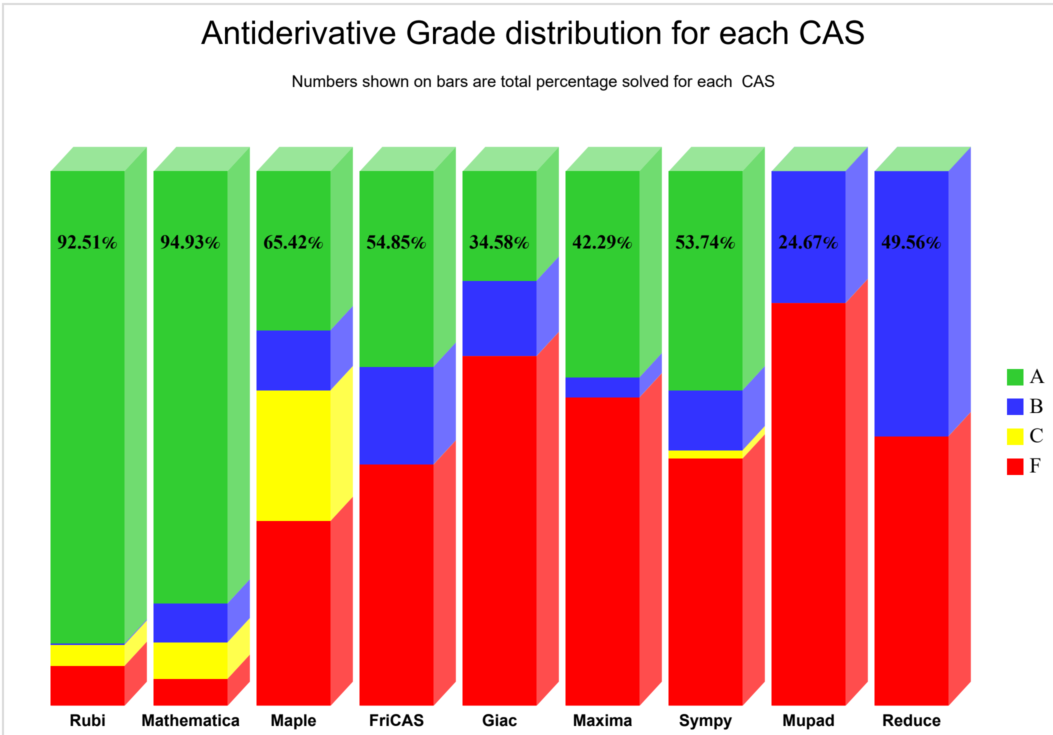
Table 1.2: Description of grading applied to integration result

Grading is implemented for all CAS systems. Based on the above, the following table summarizes the grading for this test suite.

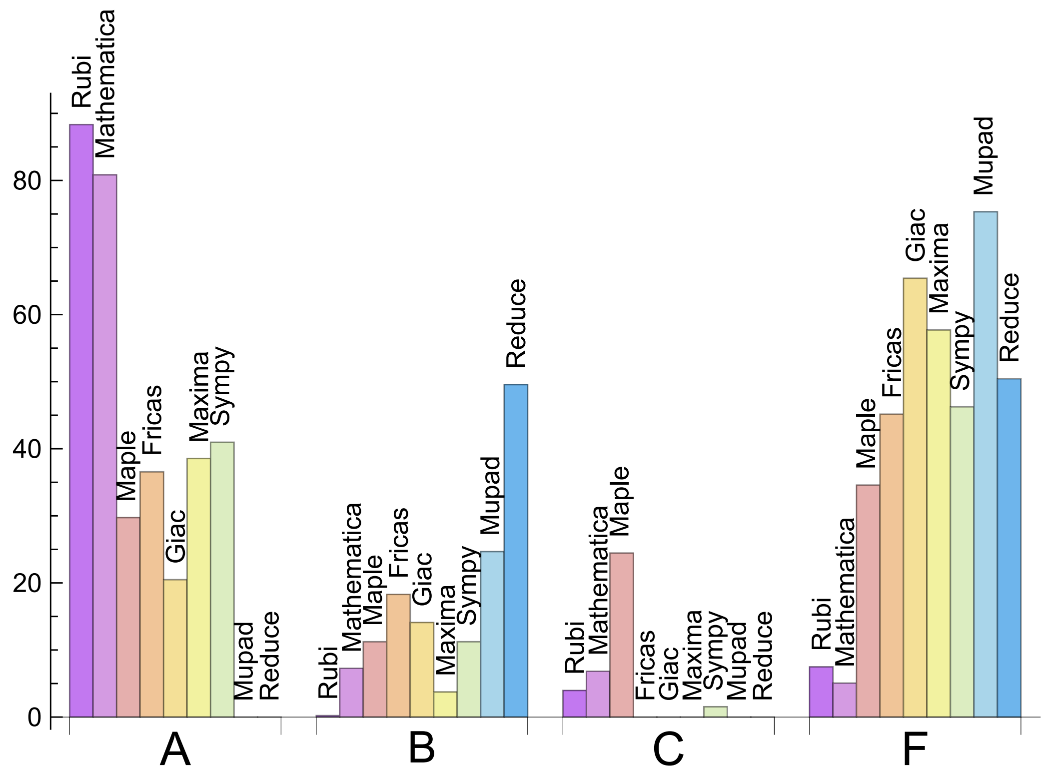
System	% A grade	% B grade	% C grade	% F grade
Rubi	88.326	0.220	3.965	7.489
Mathematica	80.837	7.269	6.828	5.066
Sympy	40.969	11.233	1.542	46.256
Maxima	38.546	3.744	0.000	57.709
Fricas	36.564	18.282	0.000	45.154
Maple	29.736	11.233	24.449	34.581
Giac	20.485	14.097	0.000	65.419
Mupad	0.000	24.670	0.000	75.330
Reduce	0.000	49.559	0.000	50.441

Table 1.3: Antiderivative Grade distribution of each CAS

The following is a Bar chart illustration of the data in the above table.



The figure below compares the grades of the CAS systems.



The following table shows the distribution of the different types of failures for each CAS. There are 3 types failures. The first is when CAS returns the input within the time limit, which means it could not solve it. This is the typical failure and given as **F**.

The second failure is due to time out. CAS could not solve the integral within the 3 minutes time limit which is assigned. This is assigned **F(-1)**.

The third is due to an exception generated, indicated as **F(-2)**. This most likely indicates an interface problem between sagemath and the CAS (applicable only to FriCAS, Maxima and Giac) or it could be an indication of an internal error in the CAS itself. This type of error requires more investigation to determine the cause.

System	Number failed	Percentage normal failure	Percentage timeout failure	Percentage exception failure
Mathematica	9	77.78	22.22	0.00
Rubi	0	0.00	0.00	0.00
Maple	123	100.00	0.00	0.00
Fricas	174	92.53	0.00	7.47
Sympy	182	68.13	28.02	3.85
Reduce	195	100.00	0.00	0.00
Maxima	230	56.52	0.00	43.48
Giac	263	100.00	0.00	0.00
Mupad	308	0.00	100.00	0.00

Table 1.4: Failure statistics for each CAS

1.3 Time and leaf size Performance

The table below summarizes the performance of each CAS system in terms of time used and leaf size of results.

Mean size is the average leaf size produced by the CAS (before any normalization). The Normalized mean is relative to the mean size of the optimal anti-derivative given in the input files.

For example, if CAS has **Normalized mean** of 3, then the mean size of its leaf size is 3 times as large as the mean size of the optimal leaf size.

Median size is value of leaf size where half the values are larger than this and half are smaller (before any normalization). i.e. The Middle value.

Similarly the **Normalized median** is relative to the median leaf size of the optimal.

For example, if a CAS has Normalized median of 1.2, then its median is 1.2 as large as the median leaf size of the optimal.

System	Mean time (sec)
Maxima	0.05
Fricas	0.09
Giac	0.13
Reduce	0.17
Rubi	0.51
Mathematica	0.60
Maple	5.42
Sympy	25.25
Mupad	26.11

Table 1.5: Time performance for each CAS

System	Mean size	Normalized mean	Median size	Normalized median
Mupad	85.30	1.11	82.00	1.09
Maxima	122.88	1.47	107.00	1.19
Rubi	144.66	0.99	116.00	1.00
Mathematica	167.76	1.31	124.00	1.03
Giac	222.66	2.12	132.00	1.44
Fricas	266.52	2.18	159.00	1.74
Reduce	295.49	2.95	139.00	1.58
Maple	344.98	2.51	174.00	1.71
Sympy	405.70	3.33	208.00	1.88

Table 1.6: Leaf size performance for each CAS

1.4 Performance based on number of rules Rubi used

This section shows how each CAS performed based on the number of rules Rubi needed to solve the same integral. One diagram is given for each CAS.

On the y axis is the percentage solved which Rubi itself needed the number of rules given the x axis. These plots show that as more rules are needed then most CAS system percentage of solving decreases which indicates the integral is becoming more complicated to solve.

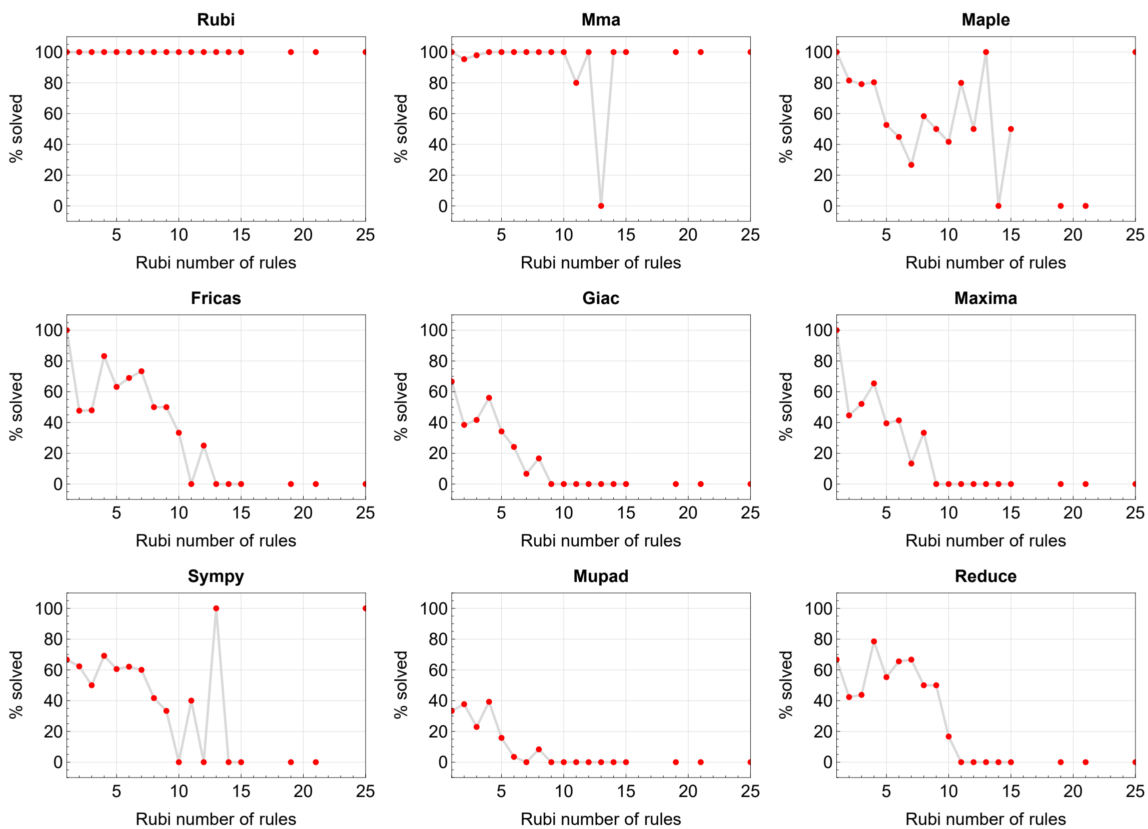


Figure 1.1: Solving statistics per number of Rubi rules used

1.5 Performance based on number of steps Rubi used

This section shows how each CAS performed based on the number of steps Rubi needed to solve the same integral. Note that the number of steps Rubi needed can be much higher than the number of rules, as the same rule could be used more than once.

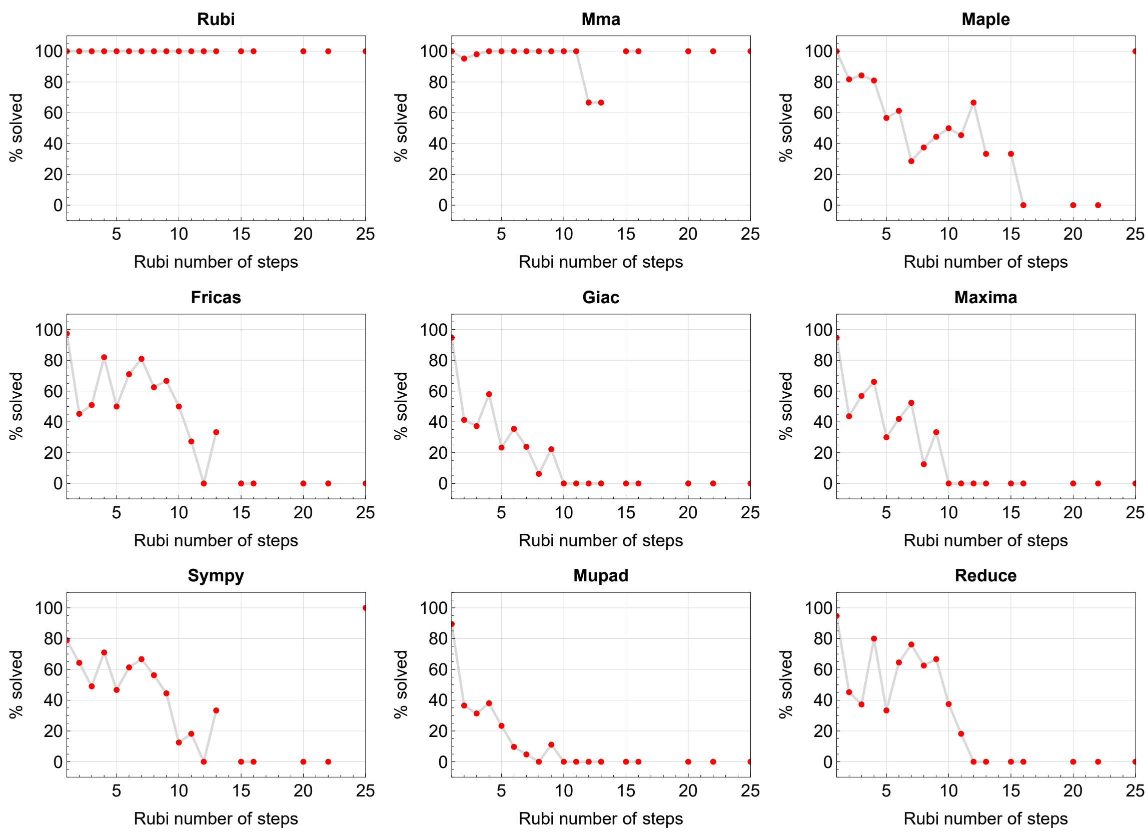


Figure 1.2: Solving statistics per number of Rubi steps used

The above diagram show that the precentage of solved intergals decreases for most CAS systems as the number of steps increases. As expected, for integrals that required less steps by Rubi, CAS systems had more success which indicates the integral was not as hard to solve. As Rubi needed more steps to solve the integral, the solved percentage decreased for most CAS systems which indicates the integral is becoming harder to solve.

1.6 Solved integrals histogram based on leaf size of result

The following shows the distribution of solved integrals for each CAS system based on leaf size of the antiderivatives produced by each CAS. It shows that most integrals solved produced leaf size less than about 100 to 150. The bin size used is 40.

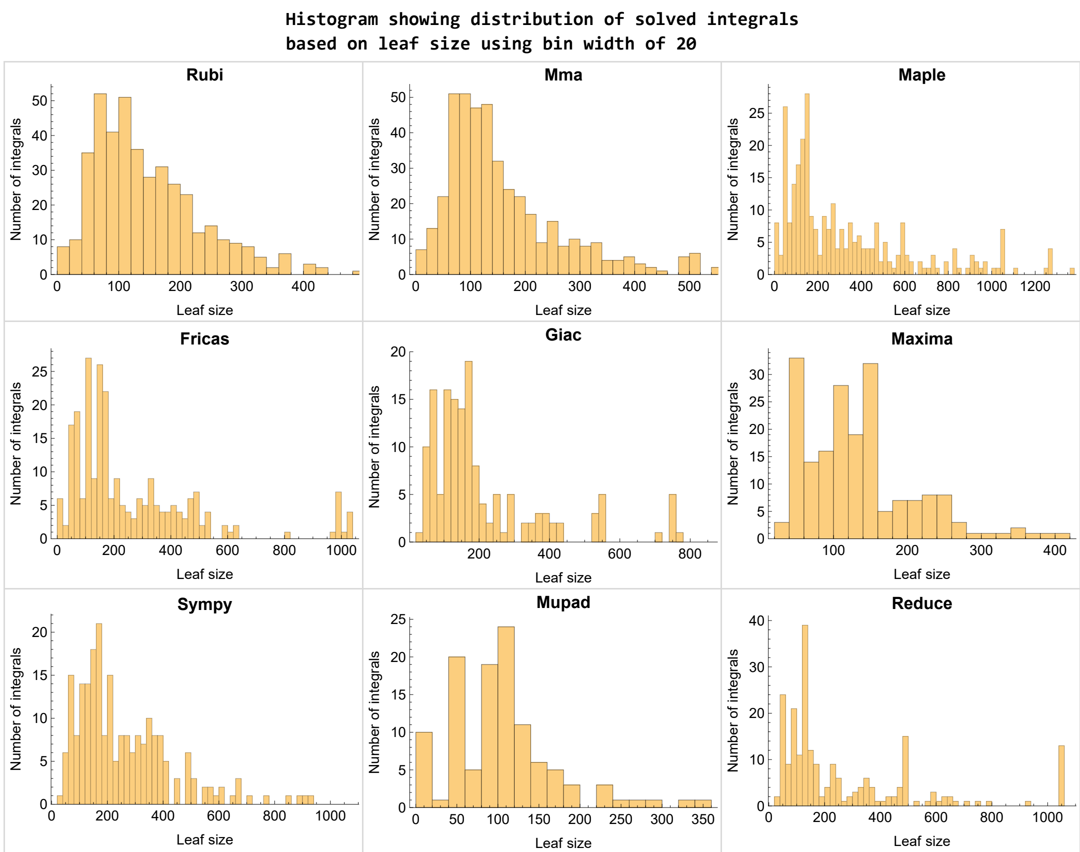


Figure 1.3: Solved integrals based on leaf size distribution

1.7 Solved integrals histogram based on CPU time used

The following shows the distribution of solved integrals for each CAS system based on CPU time used in seconds. The bin size used is 0.1 second.

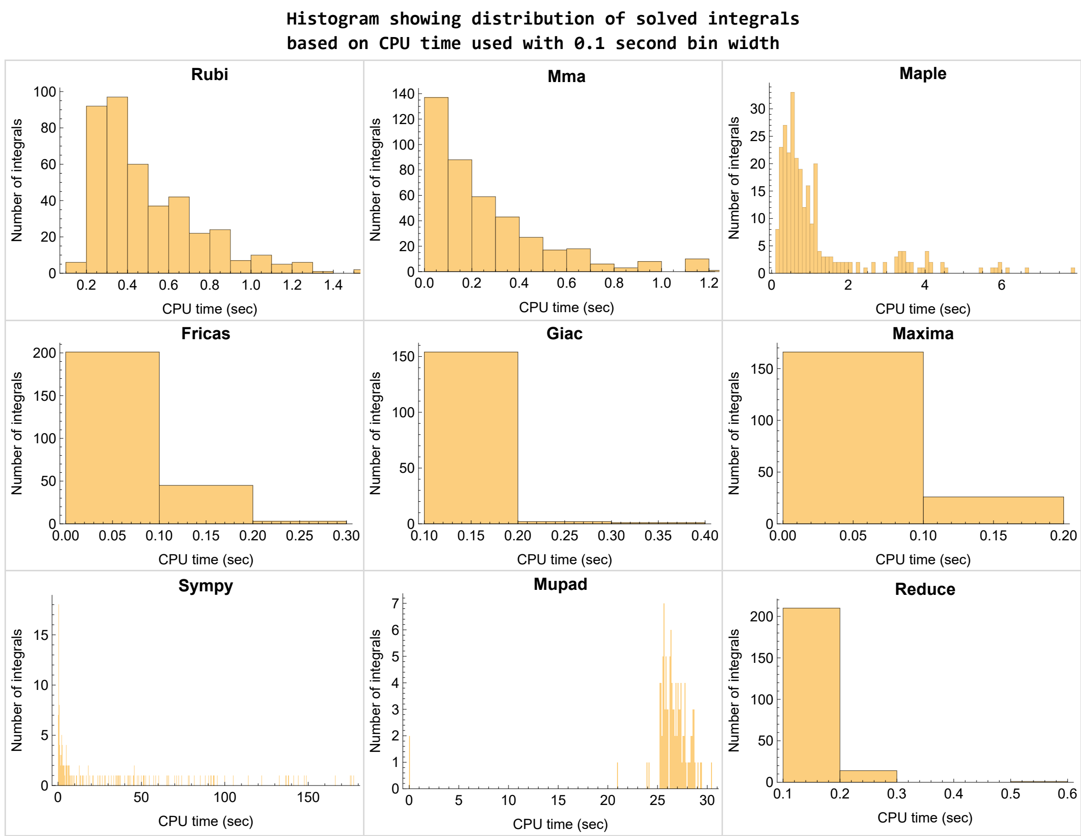


Figure 1.4: Solved integrals histogram based on CPU time used

1.8 Leaf size vs. CPU time used

The following shows the relation between the CPU time used to solve an integral and the leaf size of the antiderivative.

The result for Fricas, Maxima and Giac is shifted more to the right than the other CAS system due to the use of sagemath to call them, which causes an initial slight delay in the timing to start the integration due to overhead of starting a new process each time. This should also be taken into account when looking at the timing of these three CAS systems. Direct calls not using sagemath would result in faster timings, but current implementation uses sagemath as this makes testing much easier to do.

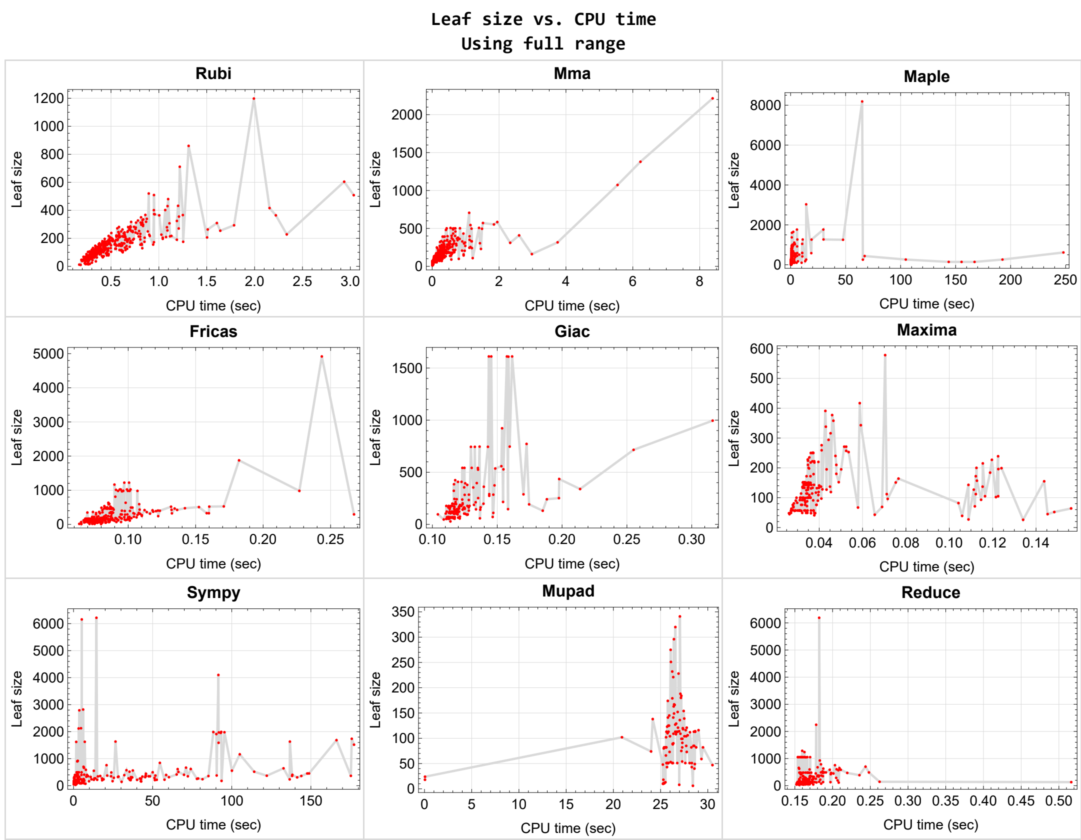


Figure 1.5: Leaf size vs. CPU time. Full range

1.9 list of integrals with no known antiderivative

{127, 128, 129, 157, 158, 159, 160, 161, 166, 167, 168, 170, 249, 250, 322, 323, 327, 328, 404, 405, 407, 408, 409, 410, 411, 412, 414, 415, 416, 417, 442, 443, 450, 451}

1.10 List of integrals solved by CAS but has no known antiderivative

Rubi {}

Mathematica {166, 167, 168, 170, 322, 323, 404, 405, 407, 408, 409, 410, 411, 412, 414, 415, 416, 417, 442, 443}

Maple {}

Maxima {}

Fricas {}

Sympy {}

Giac {}

Reduce {}

Mupad {}

1.11 list of integrals solved by CAS but failed verification

The following are integrals solved by CAS but the verification phase failed to verify the anti-derivative produced is correct. This does not necessarily mean that the anti-derivative is wrong as additional methods of verification might be needed, or more time is needed (3 minutes time limit was used). These integrals are listed here to make it possible to do further investigation to determine why the result could not be verified.

Rubi {251, 263, 276, 287, 298}

Mathematica {302, 303, 353, 361, 362, 363, 364, 406, 413, 422, 423, 424, 428, 429, 430}

Maple {31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 64, 71, 72, 73, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 121, 122, 123, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 224, 225, 226, 227, 228, 229, 230, 231, 234, 235, 236, 237, 238, 239, 240, 317, 326, 329, 330, 331, 332, 333, 334, 335, 380, 393, 406, 413, 419, 420, 422, 423, 424, 425, 426, 428, 453, 454}

Maxima Verification phase not currently implemented.

Fricas Verification phase not currently implemented.

Sympy Verification phase not currently implemented.

Giac Verification phase not currently implemented.

Reduce Verification phase not currently implemented.

Mupad Verification phase not currently implemented.

1.12 Timing

The command `AbsoluteTiming[]` was used in Mathematica to obtain the elapsed time for each integrate call. In Maple, the command `Usage` was used as in the following example

```
cpu_time := Usage(assign ('result_of_int',int(expr,x)),output='realtime'
```

For all other CAS systems, the elapsed time to complete each integral was found by taking the difference between the time after the call completed from the time before the call was made. This was done using Python's `time.time()` call.

All elapsed times shown are in seconds. A time limit of 3 CPU minutes was used for each integral. If the integrate command did not complete within this time limit, the integral was aborted and considered to have failed and assigned an F grade. The time used by failed integrals due to time out was not counted in the final statistics.

1.13 Verification

A verification phase was applied on the result of integration for `Rubi` and `Mathematica`.

Future version of this report will implement verification for the other CAS systems. For the integrals whose result was not run through a verification phase, it is assumed that the antiderivative was correct.

Verification phase also had 3 minutes time out. An integral whose result was not verified could still be correct, but further investigation is needed on those integrals. These integrals were marked in the summary table below and also in each integral separate section so they are easy to identify and locate.

1.14 Important notes about some of the results

Important note about Maxima results

Since tests were run in a batch mode, and using an automated script, then any integral where Maxima needed an interactive response from the user to answer a question during the evaluation of the integral will fail.

The exception raised is `ValueError`. Therefore Maxima results is lower than what would result if Maxima was run directly and each question was answered correctly.

The percentage of such failures were not counted for each test file, but for an example, for the `Timofeev` test file, there were about 14 such integrals out of total 705, or about 2 percent. This percentage can be higher or lower depending on the specific input test file.

Such integrals can be identified by looking at the output of the integration in each section for Maxima. The exception message will indicate the cause of error.

Maxima integrate was run using SageMath with the following settings set by default

```
'besselexpand : true'
'display2d : false'
'domain : complex'
'keepfloat : true'
'load(to_poly_solve)'
'load(simplify_sum)'
```

```
'load(abs_integrate)' 'load(diag)'
```

SageMath automatic loading of Maxima `abs_integrate` was found to cause some problems. So the following code was added to disable this effect.

```
from sage.interfaces.maxima_lib import maxima_lib
maxima_lib.set('extra_definite_integration_methods', '[]')
maxima_lib.set('extra_integration_methods', '[]')
```

See `https://ask.sagemath.org/question/43088/integrate-results-that-are-different-from-using-maxima/` for reference.

Important note about FriCAS result

There were few integrals which failed due to SageMath interface and not because FriCAS system could not do the integration.

These will fail With error `Exception raised: NotImplementedError`.

The number of such cases seems to be very small. About 1 or 2 percent of all integrals. These can be identified by looking at the exception message given in the result.

Important note about finding leaf size of antiderivative

For Mathematica, Rubi, and Maple, the builtin system function `LeafSize` was used to find the leaf size of each antiderivative.

The other CAS systems (SageMath and Sympy) do not have special builtin function for this purpose at this time. Therefore the leaf size for Fricas and Sympy antiderivative was determined using the following function, thanks to user `slelievre` at `https://ask.sagemath.org/question/57123/could-we-have-a-leaf_count-function-in-base-sagemath/`

```
def tree_size(expr):
    r"""
    Return the tree size of this expression.
    """
    if expr not in SR:
        # deal with lists, tuples, vectors
        return 1 + sum(tree_size(a) for a in expr)
    expr = SR(expr)
    x, aa = expr.operator(), expr.operands()
```

```
    if x is None:
        return 1
    else:
        return 1 + sum(tree_size(a) for a in aa)
```

For Sympy, which was called directly from Python, the following code was used to obtain the leafsize of its result

```
try:
  # 1.7 is a fudge factor since it is low side from actual leaf count
  leafCount = round(1.7*count_ops(anti))

  except Exception as ee:
       leafCount =1
```

Important note about Mupad results

Matlab's symbolic toolbox does not have a leaf count function to measure the size of the antiderivative. Maple was used to determine the leaf size of Mupad output by post processing Mupad result.

Currently no grading of the antiderivative for Mupad is implemented. If it can integrate the problem, it was assigned a B grade automatically as a placeholder. In the future, when grading function is implemented for Mupad, the tests will be rerun again.

The following is an example of using Matlab's symbolic toolbox (Mupad) to solve an integral

```
integrand = evalin(symengine,'cos(x)*sin(x)')
the_variable = evalin(symengine,'x')
anti = int(integrand,the_variable)
```

Which gives `sin(x)^2/2`

1.15 Current tree layout of integration tests

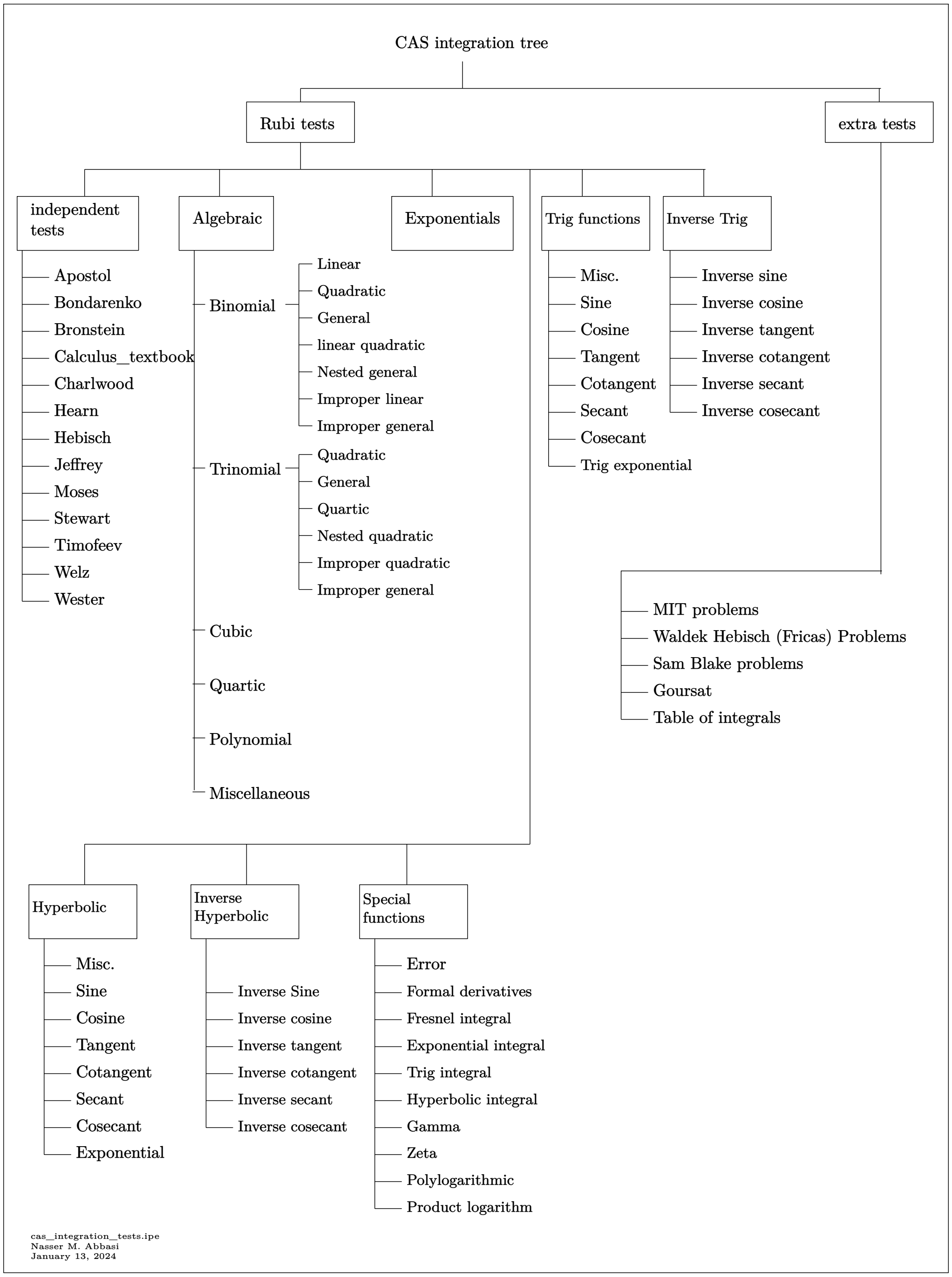
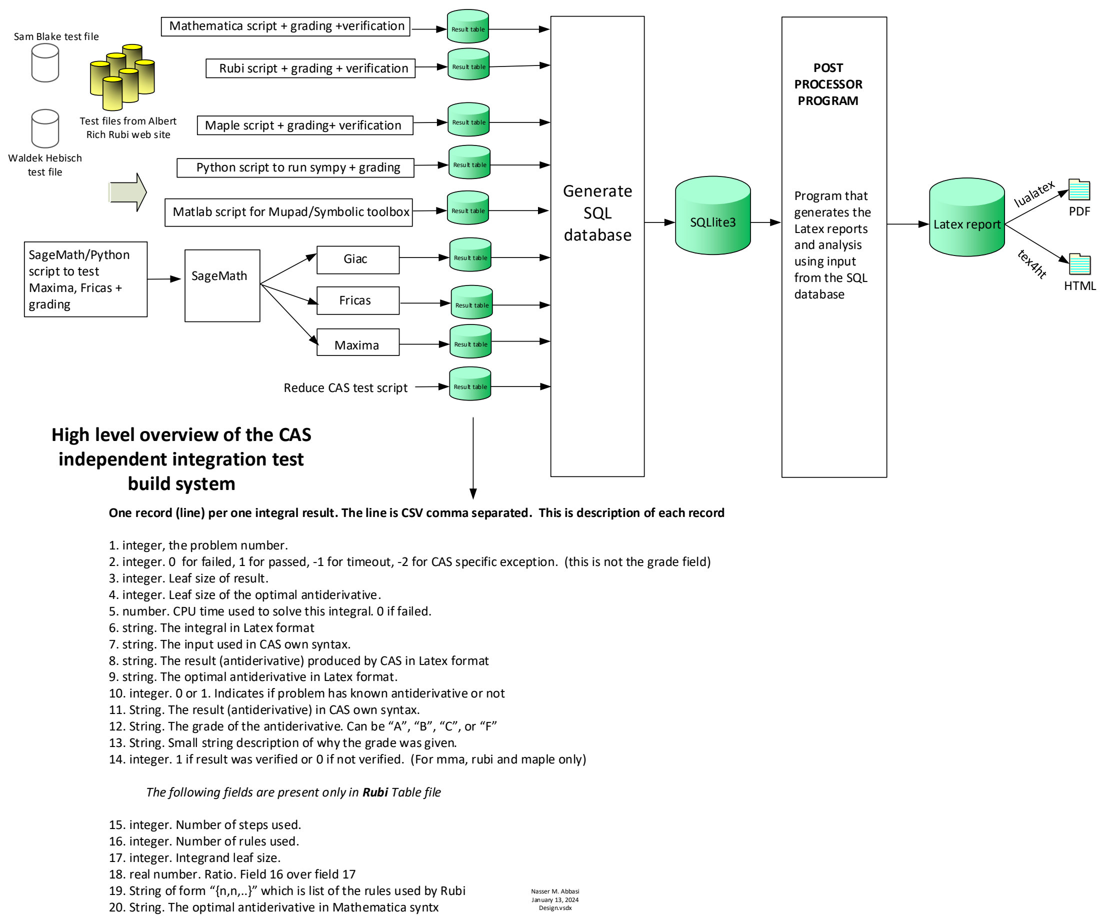


Figure 1.6: CAS integration tests tree

1.16 Design of the test system

The following diagram gives a high level view of the current test build system.



CHAPTER 2

DETAILED SUMMARY TABLES OF RESULTS

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2.1 List of integrals sorted by grade for each CAS

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Fricas 39
Maxima 40
Giac 41
Mupad 42
Sympy 43
Reduce 43

Rubi

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 162, 163, 164, 165, 169, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 221, 222, 223, 224, 225, 231, 232, 233, 234, 235, 241, 242, 243, 244, 245, 246, 247, 248, 251, 252, 253, 254, 255, 256, 257, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 324, 325, 326, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 406, 413, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 444, 445, 446, 447, 448, 449, 452, 453, 454 }

B grade { 71 }

C grade { 216, 217, 218, 219, 220, 226, 227, 228, 229, 230, 236, 237, 238, 239, 240, 258, 269, 282 }

F normal fail { }

F(-1) timedout fail { }

F(-2) exception fail { }

Mma

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 57, 58, 60, 61, 62, 63, 64, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 116, 117, 118, 119, 120, 122, 123, 124, 125, 126, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 162, 163, 164, 165, 169, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 214, 215, 216, 217, 218, 219, 220, 223, 226, 227, 228, 229, 230, 232, 233, 241, 242, 243, 245, 246, 247, 251, 252, 253, 260, 261, 262, 263, 264, 265, 272, 273, 274, 275, 276, 277, 278, 282, 283, 284, 285, 286, 287, 288, 289, 293, 294, 295, 296, 297, 298, 299, 300, 305, 306, 307, 308, 309, 310, 311, 313, 314, 315, 316, 317, 318, 319, 320, 321, 324, 325, 326, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 406, 413, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 430, 438, 439, 440, 441, 444, 445, 446, 447, 448, 449, 452, 453, 454 }

B grade { 65, 115, 121, 166, 167, 168, 170, 213, 236, 237, 238, 239, 240, 244, 322, 323, 361, 404, 405, 407, 408, 409, 410, 411, 412, 414, 415, 416, 417, 428, 429, 442, 443 }

C grade { 221, 222, 224, 225, 231, 234, 235, 248, 254, 255, 256, 257, 258, 259, 266, 267, 268, 269, 270, 271, 279, 280, 281, 290, 291, 292, 301, 302, 303, 304, 312 }

F normal fail { 431, 432, 433, 434, 435, 436, 437 }

F(-1) timedout fail { 56, 59 }

F(-2) exception fail { }

Maple

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 42, 49, 57, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 120, 147, 165, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 223, 233, 241, 243, 275, 321, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 349, 350, 351, 352, 357, 358, 359, 360, 368, 369, 370, 374, 375, 376, 380, 393, 418, 419, 420, 421, 425, 426, 427, 441 }

B grade { 48, 56, 58, 65, 66, 67, 68, 69, 70, 162, 163, 164, 232, 318, 319, 320, 365, 366, 367, 371, 372, 373, 377, 378, 379, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 438, 439, 440, 452 }

C grade { 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 64, 71, 72, 73, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 121, 122, 123, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 224, 225, 226, 227, 228, 229, 230, 231, 234, 235, 236, 237, 238, 239, 240, 242, 244, 245, 246, 317, 326, 329, 330, 331, 332, 333, 334, 335, 406, 413, 422, 423, 424, 428, 453, 454 }

F normal fail { 124, 125, 126, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 148, 149, 150, 151, 152, 153, 154, 155, 156, 169, 247, 248, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 324, 325, 348, 353, 354, 355, 356, 361, 362, 363, 364, 429, 430, 431, 432, 433, 434, 435, 436, 437, 444, 445, 446, 447, 448, 449 }

F(-1) timedout fail { }

F(-2) exception fail { }

Fricas

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 42, 49, 57, 58, 67, 68, 74, 75, 81, 82, 83, 130, 131, 132, 133, 137, 138, 139, 140, 144, 145, 146, 147, 151, 152, 153, 154, 165, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 223, 233, 241, 242, 251, 252, 253, 260, 261, 262, 263, 264, 265, 272, 273, 274, 275, 276, 277, 278, 283, 284, 285, 286, 287, 288, 289, 293, 294, 295, 296, 297, 298, 299, 300, 305, 306, 307, 308, 309, 310, 315, 316, 317, 321, 346, 347, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 368, 380, 393, 406, 418, 419, 420, 421, 422, 441 }

B grade { 22, 48, 56, 65, 66, 69, 70, 76, 77, 78, 79, 80, 84, 85, 86, 87, 88, 89, 90, 91, 162, 163, 164, 198, 232, 318, 319, 320, 343, 344, 345, 348, 363, 364, 365, 366, 367, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 413, 423, 424, 425, 426, 427, 428, 429, 430, 438, 439, 440, 452 }

C grade { }

F normal fail { 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 64, 71, 72, 73, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 134, 135, 136, 141, 142, 143, 148, 149, 150, 155, 156, 169, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 224, 225, 226, 227, 228, 229, 230, 231, 234, 235, 236, 237, 238, 239, 240, 243, 244, 245, 246, 247, 248, 254, 255, 256, 257, 258, 259, 266, 267, 268, 269, 270, 271, 279, 280, 281, 282, 290, 291, 292, 301, 302, 303, 304, 311, 312, 313, 314, 324, 325, 326, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 444, 445, 446, 447, 448, 449, 453, 454 }

F(-1) timedout fail { }

F(-2) exception fail { 124, 125, 126, 127, 128, 129, 431, 432, 433, 434, 435, 436, 437 }

Maxima

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 42, 49, 57, 58, 67, 68, 69, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 120, 130, 131, 132, 133, 137, 138, 139, 140, 144, 145, 146, 147, 151, 152, 153, 154, 162, 163, 164, 165, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 223, 233, 244, 275, 299, 309, 310, 315, 317, 318, 319, 320, 321, 336, 337, 338, 339, 340, 341, 342, 349, 350, 351, 352, 354, 355, 356, 357, 358, 359, 360, 365, 366, 367, 368, 371, 372, 373, 377, 378, 379, 380, 383, 384, 385, 390, 391, 392, 393, 396, 397, 398, 419, 420, 421, 425, 426, 427, 438, 439, 440, 441 }

B grade { 48, 56, 65, 66, 70, 74, 75, 232, 241, 242, 243, 343, 344, 345, 346, 347, 452 }

C grade { }

F normal fail { 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 64, 71, 72, 73, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 121, 122, 123, 124, 125, 126, 134, 135, 136, 141, 142, 143, 148, 149, 150, 155, 156, 169, 210, 211, 212, 213, 214, 215, 221, 222, 224, 225, 231, 234, 235, 305, 306, 311, 312, 313, 314, 316, 329, 330, 331, 332, 333, 334, 335, 348, 353, 361, 362, 363, 364, 406, 413, 418, 422, 423, 424, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 444, 445, 453, 454 }

F(-1) timedout fail { }

F(-2) exception fail { 216, 217, 218, 219, 220, 226, 227, 228, 229, 230, 236, 237, 238, 239, 240, 245, 246, 247, 248, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 300, 301, 302, 303, 304, 307, 308, 324, 325, 326, 369, 370, 374, 375, 376, 381, 382, 386, 387, 388, 389, 394, 395, 399, 400, 401, 402, 403, 446, 447, 448, 449, 450, 451 }

Giac

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 28, 29, 30, 42, 49, 57, 58, 67, 68, 69, 70, 81, 144, 145, 146, 147, 154, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 223, 233, 251, 252, 253, 275, 317, 350, 351, 352, 359, 373, 452 }

B grade { 22, 27, 48, 56, 65, 66, 76, 77, 78, 79, 80, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 162, 163, 164, 165, 198, 232, 318, 319, 320, 321, 349, 354, 355, 356, 357, 358, 360, 365, 366, 367, 369, 370, 371, 372, 374, 375, 376, 377, 378, 379, 383, 384, 385, 390, 391, 392, 396, 397, 398, 438, 439, 440, 441 }

C grade { }

F normal fail { 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 64, 71, 72, 73, 74, 75, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 148, 149, 150, 151, 152, 153, 155, 156, 169, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 224, 225, 226, 227, 228, 229, 230, 231, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 324, 325, 326, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 353, 361, 362, 363, 364, 368, 380, 381, 382, 386, 387, 388, 389, 393, 394, 395, 399, 400, 401, 402, 403, 406, 413, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 444, 445, 446, 447, 448, 449, 453, 454 }

F(-1) timedout fail { }

F(-2) exception fail { }

Mupad

A grade { }

B grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 42, 48, 49, 56, 57, 58, 65, 66, 67, 68, 69, 70, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 223, 232, 233, 241, 242, 243, 244, 343, 344, 345, 346, 347, 452 }

C grade { }

F normal fail { }

F(-1) timedout fail { 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 64, 71, 72, 73, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 162, 163, 164, 165, 169, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 224, 225, 226, 227, 228, 229, 230, 231, 234, 235, 236, 237, 238, 239, 240, 245, 246, 247, 248, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 324, 325, 326, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 406, 413, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 444, 445, 446, 447, 448, 449, 453, 454 }

F(-2) exception fail { }

Sympy

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 36, 37, 38, 39, 40, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 63, 64, 71, 72, 73, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 120, 130, 131, 132, 133, 138, 139, 140, 144, 145, 146, 147, 151, 152, 153, 154, 169, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 221, 225, 231, 234, 242, 251, 252, 253, 263, 264, 265, 275, 276, 277, 278, 286, 287, 288, 289, 297, 298, 299, 300, 317, 329, 330, 331, 334, 335, 336, 337, 338, 341, 342, 350, 351, 358, 359, 384, 385, 386, 387, 388, 392, 393, 394, 398, 399, 400, 406, 413, 419, 422, 423 }

B grade { 42, 48, 49, 56, 57, 58, 65, 66, 67, 68, 69, 70, 162, 163, 164, 165, 223, 318, 319, 320, 321, 349, 352, 357, 360, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 390, 420, 421, 425, 426, 427, 441, 452 }

C grade { 35, 241, 243, 333, 340, 346, 347 }

F normal fail { 34, 41, 43, 74, 75, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 121, 122, 123, 124, 125, 126, 134, 135, 136, 142, 143, 148, 149, 150, 155, 156, 216, 217, 218, 219, 220, 222, 226, 227, 228, 229, 230, 236, 237, 238, 244, 245, 246, 247, 248, 254, 255, 256, 258, 259, 260, 261, 262, 266, 267, 270, 271, 272, 273, 279, 280, 281, 282, 283, 284, 285, 290, 291, 292, 293, 294, 295, 304, 305, 306, 309, 310, 311, 314, 315, 316, 325, 326, 332, 339, 348, 353, 354, 355, 361, 362, 428, 429, 432, 433, 434, 435, 448, 449, 453, 454 }

F(-1) timedout fail { 62, 137, 141, 214, 215, 224, 232, 233, 235, 239, 240, 250, 257, 268, 269, 274, 296, 301, 302, 303, 307, 308, 312, 313, 323, 324, 327, 328, 356, 363, 364, 383, 389, 391, 395, 396, 397, 401, 402, 403, 414, 424, 430, 431, 436, 437, 444, 445, 446, 447, 451 }

F(-2) exception fail { 343, 344, 345, 418, 438, 439, 440 }

Reduce

A grade { }

B grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 42, 48, 49, 56, 57, 58, 65, 66, 67, 68, 69, 70, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 130, 131, 132, 133, 137, 138, 139, 140, 144, 145, 146, 147, 151, 152, 153, 154, 162, 163, 164, 165, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 223, 232, 233, 251, 252, 253, 260, 261, 262, 263, 264, 265, 272, 273, 274, 275, 276, 277, 278, 283, 284, 285, 286, 287, 288, 289, 293, 294, 295, 296, 297, 298, 299, 300, 305, 306, 307, 308, 309, 310, 315, 316, 317, 318, 319, 320, 321, 349, 350, 351, 352, 354, 355, 356, 357, 358, 359, 360, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 419, 420, 421, 425, 426, 427, 438, 439, 440, 441, 452 }

C grade { }

F normal fail { 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 64, 71, 72, 73, 74, 75, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 134, 135, 136, 141, 142, 143, 148, 149, 150, 155, 156, 169, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 224, 225, 226, 227, 228, 229, 230, 231, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 254, 255, 256, 257, 258, 259, 266, 267, 268, 269, 270, 271, 279, 280, 281, 282, 290, 291, 292, 301, 302, 303, 304, 311, 312, 313, 314, 324, 325, 326, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 353, 361, 362, 363, 364, 406, 413, 418, 422, 423, 424, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 444, 445, 446, 447, 448, 449, 453, 454 }

F(-1) timedout fail { }

F(-2) exception fail { }

2.2 Detailed conclusion table per each integral for all CAS systems

Detailed conclusion table per each integral is given by the table below. The elapsed time is in seconds. For failed result it is given as **F(-1)** if the failure was due to timeout. It is given as **F(-2)** if the failure was due to an exception being raised, which could indicate a bug in the system. If the failure was due to integral not being evaluated within the time limit, then it is given as **F**.

In this table, the column `N.S.` means **normalized size** and is defined as $\frac{\text{antiderivative leaf size}}{\text{optimal antiderivative leaf size}}$. To make the table fit the page, the name `Mathematica` was abbreviated to `MMA`.

Problem 1	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	51	48	58	57	69	66	69	47	51
N.S.	1	1.06	1.00	1.21	1.19	1.44	1.38	1.44	0.98	1.06
time (sec)	N/A	0.225	0.039	0.298	0.029	0.074	0.383	0.117	0.161	28.307

Problem 2	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	51	45	58	57	69	66	69	47	51
N.S.	1	1.06	0.94	1.21	1.19	1.44	1.38	1.44	0.98	1.06
time (sec)	N/A	0.242	0.033	0.240	0.031	0.091	0.347	0.112	0.155	28.073

Problem 3	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	51	48	58	57	69	66	69	47	51
N.S.	1	1.06	1.00	1.21	1.19	1.44	1.38	1.44	0.98	1.06
time (sec)	N/A	0.239	0.027	0.214	0.029	0.068	0.202	0.115	0.152	27.618

Problem 4	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	55	56	55	50	49	61	56	58	45	43
N.S.	1	1.02	1.00	0.91	0.89	1.11	1.02	1.05	0.82	0.78
time (sec)	N/A	0.225	0.008	0.226	0.034	0.084	0.151	0.116	0.164	28.301

Problem 5	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	43	46	41	45	65	47	50	40
N.S.	1	1.00	0.98	1.05	0.93	1.02	1.48	1.07	1.14	0.91
time (sec)	N/A	0.255	0.010	0.234	0.038	0.075	0.185	0.109	0.153	28.584

Problem 6	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	50	48	53	49	50	53	55	52	59
N.S.	1	1.04	1.00	1.10	1.02	1.04	1.10	1.15	1.08	1.23
time (sec)	N/A	0.276	0.035	0.190	0.035	0.074	1.802	0.113	0.153	29.326

Problem 7	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	60	61	41	47	57	53	58	57	47	47
N.S.	1	1.02	0.68	0.78	0.95	0.88	0.97	0.95	0.78	0.78
time (sec)	N/A	0.251	0.031	0.151	0.030	0.075	0.351	0.112	0.161	30.493

Problem 8	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	60	47	48	57	57	68	59	47	49
N.S.	1	1.05	0.82	0.84	1.00	1.00	1.19	1.04	0.82	0.86
time (sec)	N/A	0.253	0.034	0.151	0.036	0.070	0.388	0.112	0.152	28.625

Problem 9	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	75	81	101	100	118	121	123	90	82
N.S.	1	1.01	1.09	1.36	1.35	1.59	1.64	1.66	1.22	1.11
time (sec)	N/A	0.309	0.073	9.983	0.036	0.069	0.513	0.119	0.153	28.258

Problem 10	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	75	81	101	100	118	116	123	90	82
N.S.	1	1.01	1.09	1.36	1.35	1.59	1.57	1.66	1.22	1.11
time (sec)	N/A	0.296	0.058	3.430	0.031	0.068	0.373	0.116	0.161	28.768

Problem 11	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	73	81	101	100	118	121	123	90	82
N.S.	1	0.99	1.09	1.36	1.35	1.59	1.64	1.66	1.22	1.11
time (sec)	N/A	0.287	0.044	1.509	0.035	0.070	0.310	0.118	0.156	29.489

Problem 12	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	70	69	77	91	90	110	102	109	88	73
N.S.	1	0.99	1.10	1.30	1.29	1.57	1.46	1.56	1.26	1.04
time (sec)	N/A	0.239	0.049	0.440	0.033	0.081	0.201	0.114	0.166	27.770

Problem 13	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	80	81	83	97	84	98	131	96	96	75
N.S.	1	1.01	1.04	1.21	1.05	1.22	1.64	1.20	1.20	0.94
time (sec)	N/A	0.283	0.057	0.473	0.034	0.071	0.321	0.104	0.153	27.194

Problem 14	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	78	74	76	96	83	98	112	93	95	99
N.S.	1	0.95	0.97	1.23	1.06	1.26	1.44	1.19	1.22	1.27
time (sec)	N/A	0.295	0.063	0.450	0.030	0.076	0.398	0.127	0.155	27.206

Problem 15	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	84	85	84	97	90	101	99	102	96	99
N.S.	1	1.01	1.00	1.15	1.07	1.20	1.18	1.21	1.14	1.18
time (sec)	N/A	0.292	0.066	0.421	0.039	0.075	2.427	0.125	0.157	27.301

Problem 16	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	75	74	76	91	100	103	104	110	90	82
N.S.	1	0.99	1.01	1.21	1.33	1.37	1.39	1.47	1.20	1.09
time (sec)	N/A	0.287	0.053	0.375	0.036	0.071	0.374	0.113	0.169	27.288

Problem 17	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	94	80	91	100	106	122	111	90	85
N.S.	1	0.99	0.84	0.96	1.05	1.12	1.28	1.17	0.95	0.89
time (sec)	N/A	0.302	0.051	0.379	0.035	0.072	0.511	0.116	0.154	28.482

Problem 18	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	96	80	91	100	106	117	111	90	85
N.S.	1	1.01	0.84	0.96	1.05	1.12	1.23	1.17	0.95	0.89
time (sec)	N/A	0.307	0.054	0.385	0.030	0.090	0.610	0.116	0.170	28.557

Problem 19	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	100	99	133	144	143	167	170	177	133	113
N.S.	1	0.99	1.33	1.44	1.43	1.67	1.70	1.77	1.33	1.13
time (sec)	N/A	0.349	0.079	155.385	0.038	0.095	0.941	0.113	0.163	28.523

Problem 20	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	100	99	133	144	143	167	175	177	133	113
N.S.	1	0.99	1.33	1.44	1.43	1.67	1.75	1.77	1.33	1.13
time (sec)	N/A	0.352	0.065	143.705	0.036	0.069	0.526	0.114	0.157	28.676

Problem 21	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	122	110	130	142	141	167	167	174	133	112
N.S.	1	0.90	1.07	1.16	1.16	1.37	1.37	1.43	1.09	0.92
time (sec)	N/A	0.315	0.149	0.674	0.040	0.079	0.383	0.121	0.187	28.108

Problem 22	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	85	80	110	134	133	159	156	163	131	104
N.S.	1	0.94	1.29	1.58	1.56	1.87	1.84	1.92	1.54	1.22
time (sec)	N/A	0.249	0.054	0.599	0.035	0.069	0.279	0.114	0.516	27.709

Problem 23	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	122	119	123	144	127	149	199	145	143	106
N.S.	1	0.98	1.01	1.18	1.04	1.22	1.63	1.19	1.17	0.87
time (sec)	N/A	0.328	0.071	0.643	0.043	0.075	0.387	0.119	0.182	27.868

Problem 24	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	119	115	118	145	127	149	182	146	144	154
N.S.	1	0.97	0.99	1.22	1.07	1.25	1.53	1.23	1.21	1.29
time (sec)	N/A	0.331	0.088	0.609	0.035	0.100	0.461	0.119	0.262	27.443

Problem 25	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	118	114	115	143	125	150	182	141	142	139
N.S.	1	0.97	0.97	1.21	1.06	1.27	1.54	1.19	1.20	1.18
time (sec)	N/A	0.335	0.095	0.618	0.034	0.078	0.451	0.123	0.174	27.505

Problem 26	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	126	123	122	144	133	151	144	149	143	136
N.S.	1	0.98	0.97	1.14	1.06	1.20	1.14	1.18	1.13	1.08
time (sec)	N/A	0.346	0.102	0.569	0.033	0.075	2.800	0.125	0.173	27.035

Problem 27	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	85	109	134	143	152	158	162	133	118
N.S.	1	0.94	1.21	1.49	1.59	1.69	1.76	1.80	1.48	1.31
time (sec)	N/A	0.286	0.073	0.512	0.034	0.076	0.516	0.112	0.165	27.379

Problem 28	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	142	131	113	134	143	155	168	163	133	120
N.S.	1	0.92	0.80	0.94	1.01	1.09	1.18	1.15	0.94	0.85
time (sec)	N/A	0.340	0.063	0.527	0.035	0.075	0.731	0.114	0.159	27.351

Problem 29	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	133	132	113	134	143	155	177	163	133	121
N.S.	1	0.99	0.85	1.01	1.08	1.17	1.33	1.23	1.00	0.91
time (sec)	N/A	0.387	0.090	0.530	0.035	0.078	0.884	0.137	0.176	27.767

Problem 30	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	133	132	113	134	143	155	172	163	133	121
N.S.	1	0.99	0.85	1.01	1.08	1.17	1.29	1.23	1.00	0.91
time (sec)	N/A	0.371	0.070	0.527	0.035	0.092	1.178	0.124	0.161	26.843

Problem 31	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	148	148	142	272	0	0	267	0	177	0
N.S.	1	1.00	0.96	1.84	0.00	0.00	1.80	0.00	1.20	0.00
time (sec)	N/A	0.394	0.091	0.548	0.000	0.000	18.011	0.000	0.171	0.000

Problem 32	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	107	107	105	233	0	0	218	0	130	0
N.S.	1	1.00	0.98	2.18	0.00	0.00	2.04	0.00	1.21	0.00
time (sec)	N/A	0.355	0.060	0.465	0.000	0.000	14.954	0.000	0.171	0.000

Problem 33	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	66	188	0	0	163	0	85	0
N.S.	1	1.00	0.96	2.72	0.00	0.00	2.36	0.00	1.23	0.00
time (sec)	N/A	0.290	0.041	0.424	0.000	0.000	9.782	0.000	0.166	0.000

Problem 34	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	39	39	37	151	0	0	0	0	54	0
N.S.	1	1.00	0.95	3.87	0.00	0.00	0.00	0.00	1.38	0.00
time (sec)	N/A	0.228	0.012	0.387	0.000	0.000	0.000	0.000	0.172	0.000

Problem 35	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	C	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	63	181	0	0	175	0	41	0
N.S.	1	1.00	1.43	4.11	0.00	0.00	3.98	0.00	0.93	0.00
time (sec)	N/A	0.269	0.048	0.413	0.000	0.000	6.331	0.000	0.177	0.000

Problem 36	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	74	78	88	221	0	0	216	0	57	0
N.S.	1	1.05	1.19	2.99	0.00	0.00	2.92	0.00	0.77	0.00
time (sec)	N/A	0.457	0.105	0.474	0.000	0.000	40.154	0.000	0.165	0.000

Problem 37	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	110	116	124	264	0	0	265	0	78	0
N.S.	1	1.05	1.13	2.40	0.00	0.00	2.41	0.00	0.71	0.00
time (sec)	N/A	0.610	0.215	0.534	0.000	0.000	41.952	0.000	0.163	0.000

Problem 38	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	150	154	159	309	0	0	314	0	90	0
N.S.	1	1.03	1.06	2.06	0.00	0.00	2.09	0.00	0.60	0.00
time (sec)	N/A	0.822	0.210	0.623	0.000	0.000	60.284	0.000	0.184	0.000

Problem 39	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	152	157	141	298	0	0	323	0	298	0
N.S.	1	1.03	0.93	1.96	0.00	0.00	2.12	0.00	1.96	0.00
time (sec)	N/A	0.463	0.143	0.502	0.000	0.000	28.065	0.000	0.171	0.000

Problem 40	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	98	112	98	250	0	0	269	0	242	0
N.S.	1	1.14	1.00	2.55	0.00	0.00	2.74	0.00	2.47	0.00
time (sec)	N/A	0.406	0.106	0.473	0.000	0.000	13.208	0.000	0.171	0.000

Problem 41	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	65	70	71	205	0	0	0	0	185	0
N.S.	1	1.08	1.09	3.15	0.00	0.00	0.00	0.00	2.85	0.00
time (sec)	N/A	0.322	0.077	0.455	0.000	0.000	0.000	0.000	0.162	0.000

Problem 42	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	39	39	41	54	63	51	153	64	52	54
N.S.	1	1.00	1.05	1.38	1.62	1.31	3.92	1.64	1.33	1.38
time (sec)	N/A	0.197	0.036	0.444	0.027	0.081	0.720	0.115	0.169	27.283

Problem 43	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	80	94	96	229	0	0	0	0	123	0
N.S.	1	1.18	1.20	2.86	0.00	0.00	0.00	0.00	1.54	0.00
time (sec)	N/A	0.458	0.101	0.519	0.000	0.000	0.000	0.000	0.162	0.000

Problem 44	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	114	114	120	276	0	0	318	0	157	0
N.S.	1	1.00	1.05	2.42	0.00	0.00	2.79	0.00	1.38	0.00
time (sec)	N/A	0.394	0.156	0.618	0.000	0.000	36.322	0.000	0.164	0.000

Problem 45	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	154	154	165	331	0	0	376	0	178	0
N.S.	1	1.00	1.07	2.15	0.00	0.00	2.44	0.00	1.16	0.00
time (sec)	N/A	0.452	0.260	0.769	0.000	0.000	51.743	0.000	0.182	0.000

Problem 46	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	149	155	150	303	0	0	391	0	473	0
N.S.	1	1.04	1.01	2.03	0.00	0.00	2.62	0.00	3.17	0.00
time (sec)	N/A	0.538	0.161	0.602	0.000	0.000	32.087	0.000	0.173	0.000

Problem 47	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	107	116	122	258	0	0	347	0	396	0
N.S.	1	1.08	1.14	2.41	0.00	0.00	3.24	0.00	3.70	0.00
time (sec)	N/A	0.438	0.137	0.589	0.000	0.000	23.735	0.000	0.173	0.000

Problem 48	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	62	60	75	137	114	115	398	124	109	108
N.S.	1	0.97	1.21	2.21	1.84	1.85	6.42	2.00	1.76	1.74
time (sec)	N/A	0.256	0.147	0.556	0.034	0.087	2.377	0.119	0.167	26.626

Problem 49	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	76	63	53	132	99	107	415	104	118	91
N.S.	1	0.83	0.70	1.74	1.30	1.41	5.46	1.37	1.55	1.20
time (sec)	N/A	0.241	0.069	0.548	0.034	0.083	2.457	0.110	0.162	27.300

Problem 50	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	134	168	141	273	0	0	352	0	257	0
N.S.	1	1.25	1.05	2.04	0.00	0.00	2.63	0.00	1.92	0.00
time (sec)	N/A	0.723	0.166	0.733	0.000	0.000	45.711	0.000	0.182	0.000

Problem 51	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	171	171	173	324	0	0	444	0	289	0
N.S.	1	1.00	1.01	1.89	0.00	0.00	2.60	0.00	1.69	0.00
time (sec)	N/A	0.474	0.209	0.924	0.000	0.000	45.739	0.000	0.190	0.000

Problem 52	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	217	217	227	386	0	0	496	0	311	0
N.S.	1	1.00	1.05	1.78	0.00	0.00	2.29	0.00	1.43	0.00
time (sec)	N/A	0.556	0.479	1.194	0.000	0.000	50.003	0.000	0.192	0.000

Problem 53	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	229	241	249	405	0	0	617	0	750	0
N.S.	1	1.05	1.09	1.77	0.00	0.00	2.69	0.00	3.28	0.00
time (sec)	N/A	0.756	0.368	0.914	0.000	0.000	74.079	0.000	0.176	0.000

Problem 54	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	183	198	207	355	0	0	563	0	695	0
N.S.	1	1.08	1.13	1.94	0.00	0.00	3.08	0.00	3.80	0.00
time (sec)	N/A	0.692	0.275	0.893	0.000	0.000	37.463	0.000	0.171	0.000

Problem 55	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	141	158	179	310	0	0	518	0	631	0
N.S.	1	1.12	1.27	2.20	0.00	0.00	3.67	0.00	4.48	0.00
time (sec)	N/A	0.586	0.267	0.889	0.000	0.000	35.381	0.000	0.181	0.000

Problem 56	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	F(-1)	B	B	B	B	B	B	B
verified	N/A	Yes	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	79	78	0	165	179	178	677	202	149	167
N.S.	1	0.99	0.00	2.09	2.27	2.25	8.57	2.56	1.89	2.11
time (sec)	N/A	0.290	0.000	0.805	0.037	0.088	6.492	0.123	0.162	26.430

Problem 57	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	117	97	135	205	150	162	661	163	161	141
N.S.	1	0.83	1.15	1.75	1.28	1.38	5.65	1.39	1.38	1.21
time (sec)	N/A	0.305	0.119	0.806	0.036	0.080	6.538	0.117	0.166	26.342

Problem 58	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	77	66	188	144	160	700	147	176	127
N.S.	1	0.81	0.69	1.98	1.52	1.68	7.37	1.55	1.85	1.34
time (sec)	N/A	0.250	0.083	0.787	0.036	0.079	6.303	0.113	0.169	26.551

Problem 59	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	F(-1)	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	N/A	No	TBD	TBD	TBD	TBD	TBD	TBD
size	174	256	0	316	0	0	510	0	406	0
N.S.	1	1.47	0.00	1.82	0.00	0.00	2.93	0.00	2.33	0.00
time (sec)	N/A	1.089	0.000	1.171	0.000	0.000	66.278	0.000	0.164	0.000

Problem 60	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	211	211	231	370	0	0	614	0	444	0
N.S.	1	1.00	1.09	1.75	0.00	0.00	2.91	0.00	2.10	0.00
time (sec)	N/A	0.557	0.321	1.570	0.000	0.000	65.797	0.000	0.189	0.000

Problem 61	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	263	263	276	438	0	0	668	0	466	0
N.S.	1	1.00	1.05	1.67	0.00	0.00	2.54	0.00	1.77	0.00
time (sec)	N/A	0.620	0.366	1.966	0.000	0.000	71.081	0.000	0.174	0.000

Problem 62	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	329	366	403	561	0	0	0	0	0	0
N.S.	1	1.11	1.22	1.71	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.250	0.581	4.504	0.000	0.000	0.000	0.000	0.173	0.000

Problem 63	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	285	324	356	511	0	0	1632	0	1529	0
N.S.	1	1.14	1.25	1.79	0.00	0.00	5.73	0.00	5.36	0.00
time (sec)	N/A	1.188	0.617	4.473	0.000	0.000	136.735	0.000	0.178	0.000

Problem 64	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	243	279	333	466	0	0	1588	0	1465	0
N.S.	1	1.15	1.37	1.92	0.00	0.00	6.53	0.00	6.03	0.00
time (sec)	N/A	1.084	0.539	4.407	0.000	0.000	91.661	0.000	0.172	0.000

Problem 65	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	136	127	335	395	377	361	1911	424	278	341
N.S.	1	0.93	2.46	2.90	2.77	2.65	14.05	3.12	2.04	2.51
time (sec)	N/A	0.345	0.370	4.098	0.046	0.088	90.263	0.118	0.175	27.044

Problem 66	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	163	148	316	435	358	356	1972	394	335	320
N.S.	1	0.91	1.94	2.67	2.20	2.18	12.10	2.42	2.06	1.96
time (sec)	N/A	0.376	0.328	4.128	0.047	0.087	91.793	0.125	0.174	26.565

Problem 67	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	226	191	281	413	338	343	1979	361	341	296
N.S.	1	0.85	1.24	1.83	1.50	1.52	8.76	1.60	1.51	1.31
time (sec)	N/A	0.520	0.286	4.124	0.043	0.089	95.365	0.140	0.171	26.410

Problem 68	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	199	164	192	383	316	333	1986	322	346	275
N.S.	1	0.82	0.96	1.92	1.59	1.67	9.98	1.62	1.74	1.38
time (sec)	N/A	0.433	0.238	4.086	0.045	0.086	88.341	0.117	0.170	26.064

Problem 69	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	174	139	160	404	294	323	1992	283	353	251
N.S.	1	0.80	0.92	2.32	1.69	1.86	11.45	1.63	2.03	1.44
time (sec)	N/A	0.356	0.164	4.030	0.044	0.088	93.338	0.125	0.161	26.094

Problem 70	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	B	B	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	152	119	99	386	276	310	1955	252	359	232
N.S.	1	0.78	0.65	2.54	1.82	2.04	12.86	1.66	2.36	1.53
time (sec)	N/A	0.301	0.163	4.087	0.041	0.088	93.021	0.135	0.161	26.232

Problem 71	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	B	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	294	604	349	445	0	0	1518	0	997	0
N.S.	1	2.05	1.19	1.51	0.00	0.00	5.16	0.00	3.39	0.00
time (sec)	N/A	2.935	0.451	5.907	0.000	0.000	177.247	0.000	0.179	0.000

Problem 72	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	339	339	401	508	0	0	1685	0	1041	0
N.S.	1	1.00	1.18	1.50	0.00	0.00	4.97	0.00	3.07	0.00
time (sec)	N/A	0.874	0.685	7.809	0.000	0.000	166.175	0.000	0.169	0.000

Problem 73	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	401	401	486	594	0	0	1737	0	1063	0
N.S.	1	1.00	1.21	1.48	0.00	0.00	4.33	0.00	2.65	0.00
time (sec)	N/A	0.948	0.625	10.516	0.000	0.000	175.825	0.000	0.184	0.000

Problem 74	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	B	A	F	F	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	12	12	12	9	48	11	0	0	34	8
N.S.	1	1.00	1.00	0.75	4.00	0.92	0.00	0.00	2.83	0.67
time (sec)	N/A	0.168	0.007	0.285	0.026	0.065	0.000	0.000	0.158	26.975

Problem 75	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	B	A	F	F	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	10	10	11	7	45	9	0	0	33	6
N.S.	1	1.00	1.10	0.70	4.50	0.90	0.00	0.00	3.30	0.60
time (sec)	N/A	0.183	0.008	0.457	0.026	0.080	0.000	0.000	0.170	28.422

Problem 76	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	82	156	151	219	185	241	130	116
N.S.	1	1.00	0.75	1.43	1.39	2.01	1.70	2.21	1.19	1.06
time (sec)	N/A	0.364	0.082	0.420	0.033	0.075	0.410	0.119	0.170	29.017

Problem 77	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	82	155	150	219	184	238	130	116
N.S.	1	1.00	0.75	1.42	1.38	2.01	1.69	2.18	1.19	1.06
time (sec)	N/A	0.314	0.068	0.325	0.033	0.073	0.302	0.123	0.163	27.656

Problem 78	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	101	101	77	141	136	200	163	215	127	104
N.S.	1	1.00	0.76	1.40	1.35	1.98	1.61	2.13	1.26	1.03
time (sec)	N/A	0.277	0.055	0.355	0.032	0.075	0.231	0.118	0.162	27.522

Problem 79	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	70	63	59	114	101	144	138	144	113	85
N.S.	1	0.90	0.84	1.63	1.44	2.06	1.97	2.06	1.61	1.21
time (sec)	N/A	0.353	0.030	0.367	0.036	0.073	0.277	0.134	0.162	27.715

Problem 80	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	72	72	63	114	114	149	141	162	113	138
N.S.	1	1.00	0.88	1.58	1.58	2.07	1.96	2.25	1.57	1.92
time (sec)	N/A	0.317	0.046	0.362	0.032	0.071	2.149	0.128	0.208	24.167

Problem 81	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	103	103	90	130	150	179	165	192	130	109
N.S.	1	1.00	0.87	1.26	1.46	1.74	1.60	1.86	1.26	1.06
time (sec)	N/A	0.346	0.060	0.264	0.034	0.095	0.370	0.123	0.197	27.099

Problem 82	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	82	131	151	187	185	195	130	114
N.S.	1	1.00	0.75	1.20	1.39	1.72	1.70	1.79	1.19	1.05
time (sec)	N/A	0.346	0.074	0.263	0.032	0.079	0.400	0.117	0.172	28.656

Problem 83	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	82	131	151	188	187	195	130	114
N.S.	1	1.00	0.75	1.20	1.39	1.72	1.72	1.79	1.19	1.05
time (sec)	N/A	0.339	0.071	0.267	0.035	0.073	0.533	0.118	0.170	26.969

Problem 84	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	178	178	149	262	250	364	311	408	237	180
N.S.	1	1.00	0.84	1.47	1.40	2.04	1.75	2.29	1.33	1.01
time (sec)	N/A	0.458	0.108	192.589	0.037	0.078	0.547	0.120	0.166	27.152

Problem 85	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	178	178	134	262	250	363	308	408	237	179
N.S.	1	1.00	0.75	1.47	1.40	2.04	1.73	2.29	1.33	1.01
time (sec)	N/A	0.413	0.107	104.671	0.036	0.074	0.436	0.122	0.164	26.242

Problem 86	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	173	155	135	247	235	347	286	385	235	166
N.S.	1	0.90	0.78	1.43	1.36	2.01	1.65	2.23	1.36	0.96
time (sec)	N/A	0.384	0.086	0.769	0.035	0.070	0.311	0.117	0.174	26.489

Problem 87	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	137	169	114	223	198	293	269	285	222	152
N.S.	1	1.23	0.83	1.63	1.45	2.14	1.96	2.08	1.62	1.11
time (sec)	N/A	0.698	0.051	0.817	0.035	0.267	0.426	0.128	0.184	26.808

Problem 88	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	133	133	107	226	200	291	255	274	225	228
N.S.	1	1.00	0.80	1.70	1.50	2.19	1.92	2.06	1.69	1.71
time (sec)	N/A	0.382	0.052	0.748	0.035	0.076	0.638	0.144	0.165	26.899

Problem 89	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	137	137	117	217	210	291	258	290	216	221
N.S.	1	1.00	0.85	1.58	1.53	2.12	1.88	2.12	1.58	1.61
time (sec)	N/A	0.419	0.109	0.705	0.035	0.099	3.062	0.144	0.169	26.340

Problem 90	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	168	168	131	238	250	326	287	354	237	184
N.S.	1	1.00	0.78	1.42	1.49	1.94	1.71	2.11	1.41	1.10
time (sec)	N/A	0.433	0.115	0.607	0.037	0.079	0.402	0.132	0.164	27.197

Problem 91	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	178	178	134	238	251	332	309	355	237	188
N.S.	1	1.00	0.75	1.34	1.41	1.87	1.74	1.99	1.33	1.06
time (sec)	N/A	0.434	0.115	0.589	0.037	0.076	0.672	0.125	0.161	27.096

Problem 92	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	271	271	211	732	0	0	0	0	402	0
N.S.	1	1.00	0.78	2.70	0.00	0.00	0.00	0.00	1.48	0.00
time (sec)	N/A	0.566	0.201	0.930	0.000	0.000	0.000	0.000	0.175	0.000

Problem 93	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	200	200	158	637	0	0	0	0	288	0
N.S.	1	1.00	0.79	3.18	0.00	0.00	0.00	0.00	1.44	0.00
time (sec)	N/A	0.485	0.125	0.791	0.000	0.000	0.000	0.000	0.167	0.000

Problem 94	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	130	130	103	528	0	0	0	0	180	0
N.S.	1	1.00	0.79	4.06	0.00	0.00	0.00	0.00	1.38	0.00
time (sec)	N/A	0.366	0.080	0.699	0.000	0.000	0.000	0.000	0.174	0.000

Problem 95	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	72	67	68	445	0	0	0	0	100	0
N.S.	1	0.93	0.94	6.18	0.00	0.00	0.00	0.00	1.39	0.00
time (sec)	N/A	0.340	0.035	0.612	0.000	0.000	0.000	0.000	0.167	0.000

Problem 96	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	79	73	94	528	0	0	0	0	74	0
N.S.	1	0.92	1.19	6.68	0.00	0.00	0.00	0.00	0.94	0.00
time (sec)	N/A	0.405	0.068	0.645	0.000	0.000	0.000	0.000	0.167	0.000

Problem 97	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	135	129	130	615	0	0	0	0	97	0
N.S.	1	0.96	0.96	4.56	0.00	0.00	0.00	0.00	0.72	0.00
time (sec)	N/A	0.827	0.135	0.665	0.000	0.000	0.000	0.000	0.169	0.000

Problem 98	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	204	190	185	731	0	0	0	0	122	0
N.S.	1	0.93	0.91	3.58	0.00	0.00	0.00	0.00	0.60	0.00
time (sec)	N/A	1.188	0.177	0.791	0.000	0.000	0.000	0.000	0.159	0.000

Problem 99	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	273	254	237	828	0	0	0	0	136	0
N.S.	1	0.93	0.87	3.03	0.00	0.00	0.00	0.00	0.50	0.00
time (sec)	N/A	1.641	0.157	0.703	0.000	0.000	0.000	0.000	0.165	0.000

Problem 100	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	281	281	240	824	0	0	0	0	740	0
N.S.	1	1.00	0.85	2.93	0.00	0.00	0.00	0.00	2.63	0.00
time (sec)	N/A	0.583	0.252	0.924	0.000	0.000	0.000	0.000	0.166	0.000

Problem 101	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	203	203	186	700	0	0	0	0	617	0
N.S.	1	1.00	0.92	3.45	0.00	0.00	0.00	0.00	3.04	0.00
time (sec)	N/A	0.500	0.186	0.826	0.000	0.000	0.000	0.000	0.168	0.000

Problem 102	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	143	143	142	609	0	0	0	0	461	0
N.S.	1	1.00	0.99	4.26	0.00	0.00	0.00	0.00	3.22	0.00
time (sec)	N/A	0.432	0.160	0.704	0.000	0.000	0.000	0.000	0.171	0.000

Problem 103	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	77	71	81	369	0	0	0	0	199	0
N.S.	1	0.92	1.05	4.79	0.00	0.00	0.00	0.00	2.58	0.00
time (sec)	N/A	0.312	0.063	0.511	0.000	0.000	0.000	0.000	0.168	0.000

Problem 104	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	151	155	166	683	0	0	0	0	219	0
N.S.	1	1.03	1.10	4.52	0.00	0.00	0.00	0.00	1.45	0.00
time (sec)	N/A	0.940	0.196	0.717	0.000	0.000	0.000	0.000	0.162	0.000

Problem 105	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	211	211	223	790	0	0	0	0	262	0
N.S.	1	1.00	1.06	3.74	0.00	0.00	0.00	0.00	1.24	0.00
time (sec)	N/A	0.583	0.349	0.841	0.000	0.000	0.000	0.000	0.170	0.000

Problem 106	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	285	285	268	924	0	0	0	0	287	0
N.S.	1	1.00	0.94	3.24	0.00	0.00	0.00	0.00	1.01	0.00
time (sec)	N/A	0.702	0.225	0.939	0.000	0.000	0.000	0.000	0.164	0.000

Problem 107	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	296	327	258	827	0	0	0	0	1168	0
N.S.	1	1.10	0.87	2.79	0.00	0.00	0.00	0.00	3.95	0.00
time (sec)	N/A	0.782	0.316	0.972	0.000	0.000	0.000	0.000	0.169	0.000

Problem 108	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	232	262	212	738	0	0	0	0	1000	0
N.S.	1	1.13	0.91	3.18	0.00	0.00	0.00	0.00	4.31	0.00
time (sec)	N/A	0.691	0.283	0.796	0.000	0.000	0.000	0.000	0.175	0.000

Problem 109	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	112	107	155	484	0	0	0	0	464	0
N.S.	1	0.96	1.38	4.32	0.00	0.00	0.00	0.00	4.14	0.00
time (sec)	N/A	0.425	0.259	0.659	0.000	0.000	0.000	0.000	0.159	0.000

Problem 110	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	126	127	146	435	0	0	0	0	416	0
N.S.	1	1.01	1.16	3.45	0.00	0.00	0.00	0.00	3.30	0.00
time (sec)	N/A	0.549	0.128	0.632	0.000	0.000	0.000	0.000	0.166	0.000

Problem 111	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	257	293	232	793	0	0	0	0	440	0
N.S.	1	1.14	0.90	3.09	0.00	0.00	0.00	0.00	1.71	0.00
time (sec)	N/A	1.785	0.291	0.944	0.000	0.000	0.000	0.000	0.163	0.000

Problem 112	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	322	335	290	908	0	0	0	0	483	0
N.S.	1	1.04	0.90	2.82	0.00	0.00	0.00	0.00	1.50	0.00
time (sec)	N/A	0.837	0.490	1.134	0.000	0.000	0.000	0.000	0.168	0.000

Problem 113	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	398	430	344	943	0	0	0	0	0	0
N.S.	1	1.08	0.86	2.37	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.091	0.760	1.137	0.000	0.000	0.000	0.000	0.175	0.000

Problem 114	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	333	364	298	854	0	0	0	0	1568	0
N.S.	1	1.09	0.89	2.56	0.00	0.00	0.00	0.00	4.71	0.00
time (sec)	N/A	1.004	0.536	1.090	0.000	0.000	0.000	0.000	0.177	0.000

Problem 115	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	B	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	161	155	371	593	0	0	0	0	701	0
N.S.	1	0.96	2.30	3.68	0.00	0.00	0.00	0.00	4.35	0.00
time (sec)	N/A	0.591	0.585	0.971	0.000	0.000	0.000	0.000	0.171	0.000

Problem 116	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	210	213	281	508	0	0	0	0	697	0
N.S.	1	1.01	1.34	2.42	0.00	0.00	0.00	0.00	3.32	0.00
time (sec)	N/A	0.789	0.286	0.978	0.000	0.000	0.000	0.000	0.173	0.000

Problem 117	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	203	204	211	495	0	0	0	0	635	0
N.S.	1	1.00	1.04	2.44	0.00	0.00	0.00	0.00	3.13	0.00
time (sec)	N/A	0.851	0.197	0.993	0.000	0.000	0.000	0.000	0.168	0.000

Problem 118	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	351	508	318	894	0	0	0	0	698	0
N.S.	1	1.45	0.91	2.55	0.00	0.00	0.00	0.00	1.99	0.00
time (sec)	N/A	3.035	0.501	1.262	0.000	0.000	0.000	0.000	0.177	0.000

Problem 119	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	420	432	378	1015	0	0	0	0	749	0
N.S.	1	1.03	0.90	2.42	0.00	0.00	0.00	0.00	1.78	0.00
time (sec)	N/A	1.201	0.771	1.776	0.000	0.000	0.000	0.000	0.174	0.000

Problem 120	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	107	164	96	180	132	0	374	0	391	0
N.S.	1	1.53	0.90	1.68	1.23	0.00	3.50	0.00	3.65	0.00
time (sec)	N/A	0.630	0.163	0.435	0.039	0.000	21.255	0.000	0.174	0.000

Problem 121	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	B	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	113	104	243	967	0	0	0	0	105	0
N.S.	1	0.92	2.15	8.56	0.00	0.00	0.00	0.00	0.93	0.00
time (sec)	N/A	0.501	0.243	0.984	0.000	0.000	0.000	0.000	0.176	0.000

Problem 122	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	217	214	432	1373	0	0	0	0	309	0
N.S.	1	0.99	1.99	6.33	0.00	0.00	0.00	0.00	1.42	0.00
time (sec)	N/A	1.116	0.628	1.060	0.000	0.000	0.000	0.000	0.170	0.000

Problem 123	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	361	416	706	1607	0	0	0	0	613	0
N.S.	1	1.15	1.96	4.45	0.00	0.00	0.00	0.00	1.70	0.00
time (sec)	N/A	2.156	1.107	1.178	0.000	0.000	0.000	0.000	0.190	0.000

Problem 124	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	189	189	169	0	0	0	0	0	830	0
N.S.	1	1.00	0.89	0.00	0.00	0.00	0.00	0.00	4.39	0.00
time (sec)	N/A	0.553	0.351	0.000	0.000	0.000	0.000	0.000	0.191	0.000

Problem 125	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	298	298	287	0	0	0	0	0	0	0
N.S.	1	1.00	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.835	0.450	0.000	0.000	0.000	0.000	0.000	0.209	0.000

Problem 126	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	402	402	366	0	0	0	0	0	0	0
N.S.	1	1.00	0.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.066	0.742	0.000	0.000	0.000	0.000	0.000	0.244	0.000

Problem 127	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	22	0	19	22	76	22
N.S.	1	1.00	1.09	0.91	1.00	0.00	0.86	1.00	3.45	1.00
time (sec)	N/A	0.208	12.415	0.145	0.099	0.000	0.379	0.139	0.169	25.851

Problem 128	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	22	0	20	22	124	22
N.S.	1	1.00	1.09	0.91	1.00	0.00	0.91	1.00	5.64	1.00
time (sec)	N/A	0.315	9.401	0.142	0.107	0.000	0.888	0.125	0.192	26.745

Problem 129	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	22	0	20	22	551	22
N.S.	1	1.00	1.09	0.91	1.00	0.00	0.91	1.00	25.05	1.00
time (sec)	N/A	0.397	20.168	0.141	0.102	0.000	1.959	0.129	0.191	26.324

Problem 130	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	242	218	183	0	227	492	347	0	301	0
N.S.	1	0.90	0.76	0.00	0.94	2.03	1.43	0.00	1.24	0.00
time (sec)	N/A	0.571	0.307	0.000	0.120	0.103	72.239	0.000	0.170	0.000

Problem 131	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	192	188	151	0	184	393	284	0	240	0
N.S.	1	0.98	0.79	0.00	0.96	2.05	1.48	0.00	1.25	0.00
time (sec)	N/A	0.474	0.238	0.000	0.119	0.101	51.144	0.000	0.162	0.000

Problem 132	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	142	131	116	0	143	288	221	0	179	0
N.S.	1	0.92	0.82	0.00	1.01	2.03	1.56	0.00	1.26	0.00
time (sec)	N/A	0.312	0.154	0.000	0.109	0.095	57.494	0.000	0.162	0.000

Problem 133	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	94	87	77	0	93	181	144	0	114	0
N.S.	1	0.93	0.82	0.00	0.99	1.93	1.53	0.00	1.21	0.00
time (sec)	N/A	0.244	0.091	0.000	0.115	0.102	30.366	0.000	0.167	0.000

Problem 134	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	211	217	332	0	0	0	0	0	129	0
N.S.	1	1.03	1.57	0.00	0.00	0.00	0.00	0.00	0.61	0.00
time (sec)	N/A	1.131	0.272	0.000	0.000	0.000	0.000	0.000	0.173	0.000

Problem 135	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	221	215	392	0	0	0	0	0	154	0
N.S.	1	0.97	1.77	0.00	0.00	0.00	0.00	0.00	0.70	0.00
time (sec)	N/A	0.619	0.371	0.000	0.000	0.000	0.000	0.000	0.169	0.000

Problem 136	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	298	276	500	0	0	0	0	0	204	0
N.S.	1	0.93	1.68	0.00	0.00	0.00	0.00	0.00	0.68	0.00
time (sec)	N/A	0.689	0.649	0.000	0.000	0.000	0.000	0.000	0.178	0.000

Problem 137	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	F(-1)	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	263	234	187	0	239	592	0	0	362	0
N.S.	1	0.89	0.71	0.00	0.91	2.25	0.00	0.00	1.38	0.00
time (sec)	N/A	0.584	0.357	0.000	0.123	0.108	0.000	0.000	0.171	0.000

Problem 138	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	213	207	153	0	196	493	643	0	301	0
N.S.	1	0.97	0.72	0.00	0.92	2.31	3.02	0.00	1.41	0.00
time (sec)	N/A	0.492	0.277	0.000	0.123	0.102	132.696	0.000	0.164	0.000

Problem 139	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	163	147	120	0	155	388	517	0	240	0
N.S.	1	0.90	0.74	0.00	0.95	2.38	3.17	0.00	1.47	0.00
time (sec)	N/A	0.336	0.201	0.000	0.144	0.121	114.176	0.000	0.167	0.000

Problem 140	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	115	103	87	0	105	285	377	0	179	0
N.S.	1	0.90	0.76	0.00	0.91	2.48	3.28	0.00	1.56	0.00
time (sec)	N/A	0.260	0.109	0.000	0.123	0.098	90.458	0.000	0.165	0.000

Problem 141	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	255	309	391	0	0	0	0	0	178	0
N.S.	1	1.21	1.53	0.00	0.00	0.00	0.00	0.00	0.70	0.00
time (sec)	N/A	1.606	0.347	0.000	0.000	0.000	0.000	0.000	0.177	0.000

Problem 142	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	259	251	480	0	0	0	0	0	154	0
N.S.	1	0.97	1.85	0.00	0.00	0.00	0.00	0.00	0.59	0.00
time (sec)	N/A	0.676	0.412	0.000	0.000	0.000	0.000	0.000	0.174	0.000

Problem 143	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	293	280	501	0	0	0	0	0	191	0
N.S.	1	0.96	1.71	0.00	0.00	0.00	0.00	0.00	0.65	0.00
time (sec)	N/A	0.705	0.692	0.000	0.000	0.000	0.000	0.000	0.179	0.000

Problem 144	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	217	198	150	0	215	392	396	252	240	0
N.S.	1	0.91	0.69	0.00	0.99	1.81	1.82	1.16	1.11	0.00
time (sec)	N/A	0.513	0.275	0.000	0.115	0.097	58.516	0.198	0.168	0.000

Problem 145	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	169	167	118	0	172	293	337	192	179	0
N.S.	1	0.99	0.70	0.00	1.02	1.73	1.99	1.14	1.06	0.00
time (sec)	N/A	0.445	0.220	0.000	0.112	0.095	43.506	0.175	0.156	0.000

Problem 146	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	119	113	80	0	127	186	272	131	114	0
N.S.	1	0.95	0.67	0.00	1.07	1.56	2.29	1.10	0.96	0.00
time (sec)	N/A	0.301	0.122	0.000	0.111	0.091	34.759	0.185	0.160	0.000

Problem 147	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	67	55	62	82	113	131	74	66	0
N.S.	1	0.97	0.80	0.90	1.19	1.64	1.90	1.07	0.96	0.00
time (sec)	N/A	0.229	0.053	0.568	0.104	0.085	2.257	0.121	0.155	0.000

Problem 148	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	152	145	249	0	0	0	0	0	65	0
N.S.	1	0.95	1.64	0.00	0.00	0.00	0.00	0.00	0.43	0.00
time (sec)	N/A	0.662	0.140	0.000	0.000	0.000	0.000	0.000	0.171	0.000

Problem 149	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	226	220	392	0	0	0	0	0	89	0
N.S.	1	0.97	1.73	0.00	0.00	0.00	0.00	0.00	0.39	0.00
time (sec)	N/A	0.589	0.312	0.000	0.000	0.000	0.000	0.000	0.176	0.000

Problem 150	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	304	280	501	0	0	0	0	0	114	0
N.S.	1	0.92	1.65	0.00	0.00	0.00	0.00	0.00	0.38	0.00
time (sec)	N/A	0.679	0.434	0.000	0.000	0.000	0.000	0.000	0.173	0.000

Problem 151	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	194	180	159	0	200	432	369	0	188	0
N.S.	1	0.93	0.82	0.00	1.03	2.23	1.90	0.00	0.97	0.00
time (sec)	N/A	0.519	0.163	0.000	0.113	0.108	122.121	0.000	0.161	0.000

Problem 152	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	146	146	124	0	157	327	308	0	141	0
N.S.	1	1.00	0.85	0.00	1.08	2.24	2.11	0.00	0.97	0.00
time (sec)	N/A	0.441	0.121	0.000	0.113	0.104	141.320	0.000	0.165	0.000

Problem 153	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	94	92	83	0	112	220	177	0	94	0
N.S.	1	0.98	0.88	0.00	1.19	2.34	1.88	0.00	1.00	0.00
time (sec)	N/A	0.291	0.089	0.000	0.112	0.101	93.527	0.000	0.159	0.000

Problem 154	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	53	0	71	152	88	71	72	0
N.S.	1	1.00	1.00	0.00	1.34	2.87	1.66	1.34	1.36	0.00
time (sec)	N/A	0.217	0.055	0.000	0.112	0.088	3.941	0.146	0.159	0.000

Problem 155	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	201	209	295	0	0	0	0	0	108	0
N.S.	1	1.04	1.47	0.00	0.00	0.00	0.00	0.00	0.54	0.00
time (sec)	N/A	1.075	0.355	0.000	0.000	0.000	0.000	0.000	0.176	0.000

Problem 156	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	253	234	506	0	0	0	0	0	129	0
N.S.	1	0.92	2.00	0.00	0.00	0.00	0.00	0.00	0.51	0.00
time (sec)	N/A	0.777	0.549	0.000	0.000	0.000	0.000	0.000	0.168	0.000

Problem 157	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	25	23	25	31	19	25	35	25
N.S.	1	1.00	1.09	1.00	1.09	1.35	0.83	1.09	1.52	1.09
time (sec)	N/A	0.254	2.854	0.003	0.067	0.076	0.834	0.119	0.167	26.240

Problem 158	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	21	21	23	21	23	29	17	23	33	23
N.S.	1	1.00	1.10	1.00	1.10	1.38	0.81	1.10	1.57	1.10
time (sec)	N/A	0.227	2.037	0.026	0.066	0.074	0.940	0.139	0.182	26.730

Problem 159	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	22	20	22	27	17	22	64	22
N.S.	1	1.00	1.10	1.00	1.10	1.35	0.85	1.10	3.20	1.10
time (sec)	N/A	0.203	0.037	0.030	0.066	0.074	0.987	0.115	0.165	26.708

Problem 160	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	25	23	25	33	19	25	37	25
N.S.	1	1.00	1.09	1.00	1.09	1.43	0.83	1.09	1.61	1.09
time (sec)	N/A	0.253	1.566	0.135	0.070	0.074	1.438	0.111	0.170	25.838

Problem 161	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	25	23	25	37	20	25	41	25
N.S.	1	1.00	1.09	1.00	1.09	1.61	0.87	1.09	1.78	1.09
time (sec)	N/A	0.248	1.783	0.010	0.067	0.075	1.084	0.114	0.160	26.802

Problem 162	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	211	206	152	1766	271	1222	6156	536	1240	0
N.S.	1	0.98	0.72	8.37	1.28	5.79	29.18	2.54	5.88	0.00
time (sec)	N/A	0.586	0.290	5.767	0.052	0.101	5.205	0.148	0.163	0.000

Problem 163	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	153	183	108	911	195	633	2791	374	623	0
N.S.	1	1.20	0.71	5.95	1.27	4.14	18.24	2.44	4.07	0.00
time (sec)	N/A	0.491	0.176	1.842	0.043	0.085	3.652	0.148	0.156	0.000

Problem 164	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	94	64	343	119	235	899	212	214	0
N.S.	1	0.99	0.67	3.61	1.25	2.47	9.46	2.23	2.25	0.00
time (sec)	N/A	0.315	0.086	0.545	0.040	0.078	2.367	0.133	0.156	0.000

Problem 165	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	32	73	57	52	141	95	44	0
N.S.	1	1.00	0.70	1.59	1.24	1.13	3.07	2.07	0.96	0.00
time (sec)	N/A	0.198	0.019	0.201	0.035	0.076	2.008	0.127	0.160	0.000

Problem 166	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	72	23	25	31	20	25	90	25
N.S.	1	1.00	3.13	1.00	1.09	1.35	0.87	1.09	3.91	1.09
time (sec)	N/A	0.225	0.231	0.151	0.075	0.080	2.595	0.156	0.168	26.727

Problem 167	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	72	23	25	42	22	25	2064	25
N.S.	1	1.00	3.13	1.00	1.09	1.83	0.96	1.09	89.74	1.09
time (sec)	N/A	0.221	0.211	0.156	0.076	0.077	4.917	0.143	0.174	26.801

Problem 168	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	15	15	173	15	112	17	15	17	661	17
N.S.	1	1.00	11.53	1.00	7.47	1.13	1.00	1.13	44.07	1.13
time (sec)	N/A	0.174	0.280	0.146	0.125	0.076	8.011	0.134	0.166	26.673

Problem 169	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	68	68	61	0	0	0	238	0	242	0
N.S.	1	1.00	0.90	0.00	0.00	0.00	3.50	0.00	3.56	0.00
time (sec)	N/A	0.213	0.028	0.000	0.000	0.000	6.507	0.000	0.160	0.000

Problem 170	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	17	17	89	17	19	19	15	19	88	19
N.S.	1	1.00	5.24	1.00	1.12	1.12	0.88	1.12	5.18	1.12
time (sec)	N/A	0.191	0.071	0.148	0.075	0.078	5.353	0.140	0.163	26.703

Problem 171	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	49	69	58	57	69	66	69	53	51
N.S.	1	1.02	1.44	1.21	1.19	1.44	1.38	1.44	1.10	1.06
time (sec)	N/A	0.245	0.012	1.177	0.037	0.072	0.933	0.116	0.169	26.236

Problem 172	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	49	69	58	57	69	66	69	53	51
N.S.	1	1.02	1.44	1.21	1.19	1.44	1.38	1.44	1.10	1.06
time (sec)	N/A	0.232	0.010	0.575	0.031	0.069	0.472	0.114	0.156	26.764

Problem 173	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	47	47	69	58	57	67	66	69	53	51
N.S.	1	1.00	1.47	1.23	1.21	1.43	1.40	1.47	1.13	1.09
time (sec)	N/A	0.245	0.009	0.443	0.031	0.065	0.256	0.117	0.158	26.304

Problem 174	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	57	58	49	55	78	52	57	48
N.S.	1	1.00	1.10	1.12	0.94	1.06	1.50	1.00	1.10	0.92
time (sec)	N/A	0.256	0.002	0.242	0.027	0.067	0.240	0.111	0.157	25.237

Problem 175	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	55	57	58	49	59	63	56	57	66
N.S.	1	1.06	1.10	1.12	0.94	1.13	1.21	1.08	1.10	1.27
time (sec)	N/A	0.247	0.010	0.212	0.032	0.077	1.336	0.121	0.157	25.562

Problem 176	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	64	58	69	53	57	60	68	65	53	51
N.S.	1	0.91	1.08	0.83	0.89	0.94	1.06	1.02	0.83	0.80
time (sec)	N/A	0.255	0.009	0.170	0.033	0.071	0.407	0.117	0.161	25.674

Problem 177	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	49	69	58	57	69	66	69	53	51
N.S.	1	1.02	1.44	1.21	1.19	1.44	1.38	1.44	1.10	1.06
time (sec)	N/A	0.240	0.009	0.767	0.027	0.095	0.659	0.113	0.164	25.823

Problem 178	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	49	69	58	57	69	66	69	53	51
N.S.	1	1.02	1.44	1.21	1.19	1.44	1.38	1.44	1.10	1.06
time (sec)	N/A	0.235	0.009	0.476	0.027	0.074	0.350	0.111	0.157	25.699

Problem 179	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	55	50	49	61	56	58	51	43
N.S.	1	1.00	1.15	1.04	1.02	1.27	1.17	1.21	1.06	0.90
time (sec)	N/A	0.225	0.005	0.224	0.027	0.071	0.183	0.137	0.167	25.677

Problem 180	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	44	43	49	50	49	58	46	54	50	51
N.S.	1	0.98	1.11	1.14	1.11	1.32	1.05	1.23	1.14	1.16
time (sec)	N/A	0.247	0.005	0.203	0.038	0.073	0.178	0.112	0.162	25.813

Problem 181	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	56	63	53	57	59	58	65	53	51
N.S.	1	1.06	1.19	1.00	1.08	1.11	1.09	1.23	1.00	0.96
time (sec)	N/A	0.257	0.008	0.171	0.031	0.071	0.317	0.121	0.158	25.623

Problem 182	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	60	69	54	57	63	68	67	53	53
N.S.	1	1.05	1.21	0.95	1.00	1.11	1.19	1.18	0.93	0.93
time (sec)	N/A	0.259	0.008	0.214	0.027	0.076	0.558	0.115	0.170	26.064

Problem 183	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	75	84	101	100	118	116	123	96	82
N.S.	1	1.01	1.14	1.36	1.35	1.59	1.57	1.66	1.30	1.11
time (sec)	N/A	0.323	0.053	5.429	0.035	0.073	1.734	0.113	0.162	25.599

Problem 184	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	75	87	101	100	118	116	123	96	82
N.S.	1	1.01	1.18	1.36	1.35	1.59	1.57	1.66	1.30	1.11
time (sec)	N/A	0.314	0.044	2.661	0.035	0.073	0.927	0.111	0.156	25.471

Problem 185	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	76	75	85	101	100	116	116	123	96	82
N.S.	1	0.99	1.12	1.33	1.32	1.53	1.53	1.62	1.26	1.08
time (sec)	N/A	0.277	0.045	0.816	0.035	0.093	0.483	0.115	0.162	25.603

Problem 186	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	89	88	82	103	88	104	133	100	102	80
N.S.	1	0.99	0.92	1.16	0.99	1.17	1.49	1.12	1.15	0.90
time (sec)	N/A	0.310	0.064	0.789	0.034	0.071	0.485	0.117	0.158	25.331

Problem 187	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	91	92	83	104	91	108	139	106	103	110
N.S.	1	1.01	0.91	1.14	1.00	1.19	1.53	1.16	1.13	1.21
time (sec)	N/A	0.359	0.075	0.604	0.037	0.074	0.579	0.114	0.156	25.735

Problem 188	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	86	89	82	103	90	108	105	103	102	102
N.S.	1	1.03	0.95	1.20	1.05	1.26	1.22	1.20	1.19	1.19
time (sec)	N/A	0.323	0.068	0.556	0.029	0.074	1.781	0.124	0.173	25.581

Problem 189	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	73	95	101	100	118	121	123	96	82
N.S.	1	0.99	1.28	1.36	1.35	1.59	1.64	1.66	1.30	1.11
time (sec)	N/A	0.282	0.044	3.305	0.031	0.067	1.300	0.121	0.158	25.551

Problem 190	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	73	95	101	100	118	121	123	96	82
N.S.	1	0.99	1.28	1.36	1.35	1.59	1.64	1.66	1.30	1.11
time (sec)	N/A	0.291	0.048	0.937	0.032	0.068	0.686	0.117	0.166	25.366

Problem 191	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	86	84	89	93	92	112	110	112	94	74
N.S.	1	0.98	1.03	1.08	1.07	1.30	1.28	1.30	1.09	0.86
time (sec)	N/A	0.275	0.041	0.579	0.031	0.067	0.356	0.115	0.157	23.989

Problem 192	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	83	81	86	96	94	109	100	103	96	102
N.S.	1	0.98	1.04	1.16	1.13	1.31	1.20	1.24	1.16	1.23
time (sec)	N/A	0.297	0.045	0.565	0.033	0.073	0.388	0.118	0.157	20.909

Problem 193	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	82	80	80	96	92	110	100	112	96	90
N.S.	1	0.98	0.98	1.17	1.12	1.34	1.22	1.37	1.17	1.10
time (sec)	N/A	0.306	0.052	0.546	0.032	0.101	0.615	0.114	0.170	26.354

Problem 194	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	91	92	86	97	100	111	112	119	96	88
N.S.	1	1.01	0.95	1.07	1.10	1.22	1.23	1.31	1.05	0.97
time (sec)	N/A	0.344	0.053	0.513	0.033	0.076	0.617	0.119	0.167	26.288

Problem 195	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	96	95	97	100	112	122	119	96	89
N.S.	1	1.01	1.00	1.02	1.05	1.18	1.28	1.25	1.01	0.94
time (sec)	N/A	0.336	0.062	0.523	0.035	0.071	1.109	0.114	0.156	26.271

Problem 196	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	100	99	120	144	143	167	175	177	139	113
N.S.	1	0.99	1.20	1.44	1.43	1.67	1.75	1.77	1.39	1.13
time (sec)	N/A	0.367	0.066	167.196	0.035	0.070	3.184	0.111	0.166	26.732

Problem 197	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	130	120	120	144	143	167	170	177	139	113
N.S.	1	0.92	0.92	1.11	1.10	1.28	1.31	1.36	1.07	0.87
time (sec)	N/A	0.370	0.071	2.667	0.033	0.068	1.853	0.129	0.161	26.810

Problem 198	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	91	86	118	144	143	165	170	177	139	113
N.S.	1	0.95	1.30	1.58	1.57	1.81	1.87	1.95	1.53	1.24
time (sec)	N/A	0.288	0.062	1.638	0.033	0.071	0.955	0.127	0.161	26.552

Problem 199	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	130	127	116	150	133	155	212	149	149	112
N.S.	1	0.98	0.89	1.15	1.02	1.19	1.63	1.15	1.15	0.86
time (sec)	N/A	0.363	0.078	1.221	0.032	0.073	1.028	0.117	0.173	26.689

Problem 200	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	131	124	115	149	133	155	209	156	148	163
N.S.	1	0.95	0.88	1.14	1.02	1.18	1.60	1.19	1.13	1.24
time (sec)	N/A	0.427	0.103	1.354	0.035	0.075	1.147	0.125	0.154	26.385

Problem 201	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	126	124	115	149	133	157	209	154	148	149
N.S.	1	0.98	0.91	1.18	1.06	1.25	1.66	1.22	1.17	1.18
time (sec)	N/A	0.433	0.106	1.172	0.037	0.077	1.121	0.124	0.169	26.422

Problem 202	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	100	97	133	144	143	167	170	177	139	113
N.S.	1	0.97	1.33	1.44	1.43	1.67	1.70	1.77	1.39	1.13
time (sec)	N/A	0.324	0.059	3.617	0.035	0.071	2.401	0.122	0.157	25.837

Problem 203	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	100	97	133	144	143	167	175	177	139	113
N.S.	1	0.97	1.33	1.44	1.43	1.67	1.75	1.77	1.39	1.13
time (sec)	N/A	0.311	0.059	2.067	0.034	0.070	1.306	0.115	0.162	25.619

Problem 204	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	121	117	124	134	133	161	156	163	137	104
N.S.	1	0.97	1.02	1.11	1.10	1.33	1.29	1.35	1.13	0.86
time (sec)	N/A	0.301	0.057	1.178	0.040	0.069	0.754	0.112	0.161	25.991

Problem 205	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	118	114	123	140	135	159	146	151	139	145
N.S.	1	0.97	1.04	1.19	1.14	1.35	1.24	1.28	1.18	1.23
time (sec)	N/A	0.319	0.075	1.145	0.032	0.072	0.687	0.121	0.171	25.919

Problem 206	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	121	120	112	138	137	156	155	159	139	141
N.S.	1	0.99	0.93	1.14	1.13	1.29	1.28	1.31	1.15	1.17
time (sec)	N/A	0.359	0.069	1.152	0.045	0.082	0.769	0.113	0.156	25.773

Problem 207	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	118	114	115	140	135	160	146	165	139	125
N.S.	1	0.97	0.97	1.19	1.14	1.36	1.24	1.40	1.18	1.06
time (sec)	N/A	0.333	0.072	1.138	0.035	0.072	0.789	0.120	0.167	25.894

Problem 208	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	127	126	127	140	143	160	158	171	139	123
N.S.	1	0.99	1.00	1.10	1.13	1.26	1.24	1.35	1.09	0.97
time (sec)	N/A	0.393	0.079	1.102	0.034	0.085	1.020	0.117	0.168	25.694

Problem 209	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	133	130	133	140	143	161	177	171	139	125
N.S.	1	0.98	1.00	1.05	1.08	1.21	1.33	1.29	1.05	0.94
time (sec)	N/A	0.387	0.076	1.153	0.033	0.072	1.866	0.121	0.159	25.821

Problem 210	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	121	121	174	343	0	0	257	0	138	0
N.S.	1	1.00	1.44	2.83	0.00	0.00	2.12	0.00	1.14	0.00
time (sec)	N/A	0.405	0.143	0.891	0.000	0.000	36.254	0.000	0.178	0.000

Problem 211	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	83	83	135	284	0	0	202	0	93	0
N.S.	1	1.00	1.63	3.42	0.00	0.00	2.43	0.00	1.12	0.00
time (sec)	N/A	0.352	0.082	0.537	0.000	0.000	18.091	0.000	0.172	0.000

Problem 212	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	49	49	94	244	0	0	141	0	55	0
N.S.	1	1.00	1.92	4.98	0.00	0.00	2.88	0.00	1.12	0.00
time (sec)	N/A	0.251	0.042	0.417	0.000	0.000	3.513	0.000	0.174	0.000

Problem 213	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	B	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	49	49	126	274	0	0	144	0	46	0
N.S.	1	1.00	2.57	5.59	0.00	0.00	2.94	0.00	0.94	0.00
time (sec)	N/A	0.265	0.097	0.470	0.000	0.000	6.065	0.000	0.163	0.000

Problem 214	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	83	87	157	317	0	0	0	0	67	0
N.S.	1	1.05	1.89	3.82	0.00	0.00	0.00	0.00	0.81	0.00
time (sec)	N/A	0.475	0.140	0.646	0.000	0.000	0.000	0.000	0.162	0.000

Problem 215	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	121	125	196	369	0	0	0	0	82	0
N.S.	1	1.03	1.62	3.05	0.00	0.00	0.00	0.00	0.68	0.00
time (sec)	N/A	0.669	0.218	0.996	0.000	0.000	0.000	0.000	0.175	0.000

Problem 216	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	C	A	C	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	166	167	208	365	0	0	0	0	110	0
N.S.	1	1.01	1.25	2.20	0.00	0.00	0.00	0.00	0.66	0.00
time (sec)	N/A	0.408	0.179	0.685	0.000	0.000	0.000	0.000	0.174	0.000

Problem 217	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	C	A	C	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	131	132	170	317	0	0	0	0	67	0
N.S.	1	1.01	1.30	2.42	0.00	0.00	0.00	0.00	0.51	0.00
time (sec)	N/A	0.371	0.118	0.500	0.000	0.000	0.000	0.000	0.163	0.000

Problem 218	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	C	A	C	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	104	96	107	263	0	0	0	0	48	0
N.S.	1	0.92	1.03	2.53	0.00	0.00	0.00	0.00	0.46	0.00
time (sec)	N/A	0.323	0.053	0.454	0.000	0.000	0.000	0.000	0.164	0.000

Problem 219	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	C	A	C	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	133	130	173	325	0	0	0	0	60	0
N.S.	1	0.98	1.30	2.44	0.00	0.00	0.00	0.00	0.45	0.00
time (sec)	N/A	0.497	0.192	0.579	0.000	0.000	0.000	0.000	0.165	0.000

Problem 220	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	C	A	C	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	164	168	211	369	0	0	0	0	77	0
N.S.	1	1.02	1.29	2.25	0.00	0.00	0.00	0.00	0.47	0.00
time (sec)	N/A	0.709	0.221	0.829	0.000	0.000	0.000	0.000	0.168	0.000

Problem 221	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	129	129	287	351	0	0	316	0	269	0
N.S.	1	1.00	2.22	2.72	0.00	0.00	2.45	0.00	2.09	0.00
time (sec)	N/A	0.449	0.606	0.815	0.000	0.000	45.280	0.000	0.174	0.000

Problem 222	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	321	305	0	0	0	0	203	0
N.S.	1	1.00	3.38	3.21	0.00	0.00	0.00	0.00	2.14	0.00
time (sec)	N/A	0.392	0.235	0.682	0.000	0.000	0.000	0.000	0.169	0.000

Problem 223	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	50	50	74	74	71	61	292	71	67	73
N.S.	1	1.00	1.48	1.48	1.42	1.22	5.84	1.42	1.34	1.46
time (sec)	N/A	0.223	0.096	0.566	0.028	0.079	25.474	0.112	0.169	25.952

Problem 224	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	C	F	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	82	90	279	338	0	0	0	0	142	0
N.S.	1	1.10	3.40	4.12	0.00	0.00	0.00	0.00	1.73	0.00
time (sec)	N/A	0.393	0.460	0.781	0.000	0.000	0.000	0.000	0.162	0.000

Problem 225	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	126	133	334	380	0	0	364	0	172	0
N.S.	1	1.06	2.65	3.02	0.00	0.00	2.89	0.00	1.37	0.00
time (sec)	N/A	0.646	0.655	1.418	0.000	0.000	175.262	0.000	0.163	0.000

Problem 226	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	C	A	C	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	190	191	296	559	0	0	0	0	239	0
N.S.	1	1.01	1.56	2.94	0.00	0.00	0.00	0.00	1.26	0.00
time (sec)	N/A	0.516	0.718	0.711	0.000	0.000	0.000	0.000	0.174	0.000

Problem 227	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	C	A	C	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	163	164	258	516	0	0	0	0	199	0
N.S.	1	1.01	1.58	3.17	0.00	0.00	0.00	0.00	1.22	0.00
time (sec)	N/A	0.478	0.603	0.716	0.000	0.000	0.000	0.000	0.179	0.000

Problem 228	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	C	A	C	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	163	160	289	449	0	0	0	0	141	0
N.S.	1	0.98	1.77	2.75	0.00	0.00	0.00	0.00	0.87	0.00
time (sec)	N/A	0.428	0.626	0.716	0.000	0.000	0.000	0.000	0.175	0.000

Problem 229	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	C	A	C	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	182	181	328	568	0	0	0	0	159	0
N.S.	1	0.99	1.80	3.12	0.00	0.00	0.00	0.00	0.87	0.00
time (sec)	N/A	0.704	0.901	1.053	0.000	0.000	0.000	0.000	0.167	0.000

Problem 230	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	C	A	C	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	223	226	361	622	0	0	0	0	178	0
N.S.	1	1.01	1.62	2.79	0.00	0.00	0.00	0.00	0.80	0.00
time (sec)	N/A	1.026	0.820	1.695	0.000	0.000	0.000	0.000	0.163	0.000

Problem 231	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	152	152	498	359	0	0	403	0	422	0
N.S.	1	1.00	3.28	2.36	0.00	0.00	2.65	0.00	2.78	0.00
time (sec)	N/A	0.557	0.619	1.330	0.000	0.000	69.821	0.000	0.181	0.000

Problem 232	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	B	B	F(-1)	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	66	129	130	128	126	0	140	119	129
N.S.	1	0.97	1.90	1.91	1.88	1.85	0.00	2.06	1.75	1.90
time (sec)	N/A	0.293	0.143	1.082	0.041	0.089	0.000	0.119	0.179	26.649

Problem 233	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	F(-1)	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	82	71	111	143	109	118	0	116	130	109
N.S.	1	0.87	1.35	1.74	1.33	1.44	0.00	1.41	1.59	1.33
time (sec)	N/A	0.275	0.099	1.052	0.035	0.083	0.000	0.120	0.163	26.358

Problem 234	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	115	125	396	390	0	0	403	0	271	0
N.S.	1	1.09	3.44	3.39	0.00	0.00	3.50	0.00	2.36	0.00
time (sec)	N/A	0.551	1.119	1.743	0.000	0.000	138.290	0.000	0.164	0.000

Problem 235	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	C	F	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	162	175	507	440	0	0	0	0	305	0
N.S.	1	1.08	3.13	2.72	0.00	0.00	0.00	0.00	1.88	0.00
time (sec)	N/A	0.850	1.401	2.942	0.000	0.000	0.000	0.000	0.169	0.000

Problem 236	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	C	B	C	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	210	211	495	900	0	0	0	0	373	0
N.S.	1	1.00	2.36	4.29	0.00	0.00	0.00	0.00	1.78	0.00
time (sec)	N/A	0.629	1.490	1.511	0.000	0.000	0.000	0.000	0.171	0.000

Problem 237	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	C	B	C	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	186	187	497	826	0	0	0	0	377	0
N.S.	1	1.01	2.67	4.44	0.00	0.00	0.00	0.00	2.03	0.00
time (sec)	N/A	0.568	1.177	1.488	0.000	0.000	0.000	0.000	0.172	0.000

Problem 238	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	C	B	C	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	209	249	544	664	0	0	0	0	269	0
N.S.	1	1.19	2.60	3.18	0.00	0.00	0.00	0.00	1.29	0.00
time (sec)	N/A	0.606	1.145	1.477	0.000	0.000	0.000	0.000	0.167	0.000

Problem 239	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	C	B	C	F(-2)	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	218	225	552	964	0	0	0	0	288	0
N.S.	1	1.03	2.53	4.42	0.00	0.00	0.00	0.00	1.32	0.00
time (sec)	N/A	0.900	1.847	2.220	0.000	0.000	0.000	0.000	0.168	0.000

Problem 240	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	C	B	C	F(-2)	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	259	270	584	1029	0	0	0	0	307	0
N.S.	1	1.04	2.25	3.97	0.00	0.00	0.00	0.00	1.19	0.00
time (sec)	N/A	1.207	1.947	3.896	0.000	0.000	0.000	0.000	0.168	0.000

Problem 241	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	B	A	C	F	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	17	17	17	12	76	14	94	0	38	11
N.S.	1	1.00	1.00	0.71	4.47	0.82	5.53	0.00	2.24	0.65
time (sec)	N/A	0.236	0.010	0.303	0.032	0.064	5.096	0.000	0.161	25.398

Problem 242	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	B	A	A	F	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	16	16	17	53	58	13	117	0	37	10
N.S.	1	1.00	1.06	3.31	3.62	0.81	7.31	0.00	2.31	0.62
time (sec)	N/A	0.233	0.008	0.427	0.028	0.075	3.502	0.000	0.168	25.249

Problem 243	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	B	F	C	F	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	31	20	48	0	85	0	14	18
N.S.	1	1.00	1.41	0.91	2.18	0.00	3.86	0.00	0.64	0.82
time (sec)	N/A	0.225	0.012	0.276	0.036	0.000	6.731	0.000	0.158	0.051

Problem 244	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	B	C	A	F	F	F	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	32	32	65	26	26	0	0	0	12	24
N.S.	1	1.00	2.03	0.81	0.81	0.00	0.00	0.00	0.38	0.75
time (sec)	N/A	0.261	0.015	0.447	0.134	0.000	0.000	0.000	0.171	0.056

Problem 245	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	62	59	68	53	0	0	0	0	51	0
N.S.	1	0.95	1.10	0.85	0.00	0.00	0.00	0.00	0.82	0.00
time (sec)	N/A	0.270	0.042	0.324	0.000	0.000	0.000	0.000	0.160	0.000

Problem 246	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	66	62	72	55	0	0	0	0	53	0
N.S.	1	0.94	1.09	0.83	0.00	0.00	0.00	0.00	0.80	0.00
time (sec)	N/A	0.269	0.037	0.386	0.000	0.000	0.000	0.000	0.163	0.000

Problem 247	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	457	509	432	0	0	0	0	0	234	0
N.S.	1	1.11	0.95	0.00	0.00	0.00	0.00	0.00	0.51	0.00
time (sec)	N/A	0.949	0.934	0.000	0.000	0.000	0.000	0.000	0.176	0.000

Problem 248	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	659	711	1073	0	0	0	0	0	325	0
N.S.	1	1.08	1.63	0.00	0.00	0.00	0.00	0.00	0.49	0.00
time (sec)	N/A	1.218	5.543	0.000	0.000	0.000	0.000	0.000	0.197	0.000

Problem 249	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	22	24	55	20	24	65	24
N.S.	1	1.00	1.09	1.00	1.09	2.50	0.91	1.09	2.95	1.09
time (sec)	N/A	0.193	4.044	0.019	0.066	0.070	100.017	0.112	0.187	25.408

Problem 250	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	F(-1)	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	22	261	102	0	24	127	24
N.S.	1	1.00	1.09	1.00	11.86	4.64	0.00	1.09	5.77	1.09
time (sec)	N/A	0.193	17.885	0.019	0.074	0.069	0.000	0.117	0.184	25.594

Problem 251	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	A	A	B	F(-1)
verified	N/A	No	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	208	180	251	0	0	417	490	288	489	0
N.S.	1	0.87	1.21	0.00	0.00	2.00	2.36	1.38	2.35	0.00
time (sec)	N/A	0.543	0.263	0.000	0.000	0.112	23.876	0.170	0.191	0.000

Problem 252	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	154	143	204	0	0	312	343	215	374	0
N.S.	1	0.93	1.32	0.00	0.00	2.03	2.23	1.40	2.43	0.00
time (sec)	N/A	0.375	0.196	0.000	0.000	0.105	15.354	0.154	0.185	0.000

Problem 253	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	102	95	136	0	0	205	218	141	255	0
N.S.	1	0.93	1.33	0.00	0.00	2.01	2.14	1.38	2.50	0.00
time (sec)	N/A	0.283	0.133	0.000	0.000	0.106	12.824	0.137	0.169	0.000

Problem 254	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	220	213	203	0	0	0	0	0	86	0
N.S.	1	0.97	0.92	0.00	0.00	0.00	0.00	0.00	0.39	0.00
time (sec)	N/A	0.650	0.421	0.000	0.000	0.000	0.000	0.000	0.170	0.000

Problem 255	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	252	247	303	0	0	0	0	0	109	0
N.S.	1	0.98	1.20	0.00	0.00	0.00	0.00	0.00	0.43	0.00
time (sec)	N/A	0.724	0.654	0.000	0.000	0.000	0.000	0.000	0.178	0.000

Problem 256	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	469	373	276	0	0	0	0	0	110	0
N.S.	1	0.80	0.59	0.00	0.00	0.00	0.00	0.00	0.23	0.00
time (sec)	N/A	0.950	0.724	0.000	0.000	0.000	0.000	0.000	0.174	0.000

Problem 257	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	410	317	250	0	0	0	0	0	89	0
N.S.	1	0.77	0.61	0.00	0.00	0.00	0.00	0.00	0.22	0.00
time (sec)	N/A	0.710	0.547	0.000	0.000	0.000	0.000	0.000	0.175	0.000

Problem 258	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	C	C	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	330	249	237	0	0	0	0	0	63	0
N.S.	1	0.75	0.72	0.00	0.00	0.00	0.00	0.00	0.19	0.00
time (sec)	N/A	0.884	0.450	0.000	0.000	0.000	0.000	0.000	0.165	0.000

Problem 259	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	345	246	183	0	0	0	0	0	69	0
N.S.	1	0.71	0.53	0.00	0.00	0.00	0.00	0.00	0.20	0.00
time (sec)	N/A	0.672	0.635	0.000	0.000	0.000	0.000	0.000	0.169	0.000

Problem 260	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	112	104	99	0	0	212	0	0	336	0
N.S.	1	0.93	0.88	0.00	0.00	1.89	0.00	0.00	3.00	0.00
time (sec)	N/A	0.303	0.189	0.000	0.000	0.097	0.000	0.000	0.182	0.000

Problem 261	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	170	158	145	0	0	323	0	0	471	0
N.S.	1	0.93	0.85	0.00	0.00	1.90	0.00	0.00	2.77	0.00
time (sec)	N/A	0.372	0.267	0.000	0.000	0.132	0.000	0.000	0.198	0.000

Problem 262	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	230	217	180	0	0	426	0	0	586	0
N.S.	1	0.94	0.78	0.00	0.00	1.85	0.00	0.00	2.55	0.00
time (sec)	N/A	0.475	0.320	0.000	0.000	0.132	0.000	0.000	0.196	0.000

Problem 263	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	B	F(-1)
verified	N/A	No	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	231	193	256	0	0	517	1161	0	604	0
N.S.	1	0.84	1.11	0.00	0.00	2.24	5.03	0.00	2.61	0.00
time (sec)	N/A	0.570	0.433	0.000	0.000	0.132	105.050	0.000	0.205	0.000

Problem 264	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	177	161	227	0	0	412	845	0	489	0
N.S.	1	0.91	1.28	0.00	0.00	2.33	4.77	0.00	2.76	0.00
time (sec)	N/A	0.406	0.254	0.000	0.000	0.118	54.554	0.000	0.189	0.000

Problem 265	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	125	113	181	0	0	307	573	0	374	0
N.S.	1	0.90	1.45	0.00	0.00	2.46	4.58	0.00	2.99	0.00
time (sec)	N/A	0.297	0.180	0.000	0.000	0.109	33.448	0.000	0.180	0.000

Problem 266	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	260	252	301	0	0	0	0	0	328	0
N.S.	1	0.97	1.16	0.00	0.00	0.00	0.00	0.00	1.26	0.00
time (sec)	N/A	0.726	0.954	0.000	0.000	0.000	0.000	0.000	0.180	0.000

Problem 267	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	295	288	349	0	0	0	0	0	149	0
N.S.	1	0.98	1.18	0.00	0.00	0.00	0.00	0.00	0.51	0.00
time (sec)	N/A	0.834	1.119	0.000	0.000	0.000	0.000	0.000	0.200	0.000

Problem 268	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	464	371	331	0	0	0	0	0	137	0
N.S.	1	0.80	0.71	0.00	0.00	0.00	0.00	0.00	0.30	0.00
time (sec)	N/A	0.957	1.174	0.000	0.000	0.000	0.000	0.000	0.184	0.000

Problem 269	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	C	C	F	F(-2)	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	378	355	314	0	0	0	0	0	112	0
N.S.	1	0.94	0.83	0.00	0.00	0.00	0.00	0.00	0.30	0.00
time (sec)	N/A	1.210	0.985	0.000	0.000	0.000	0.000	0.000	0.186	0.000

Problem 270	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	400	313	329	0	0	0	0	0	113	0
N.S.	1	0.78	0.82	0.00	0.00	0.00	0.00	0.00	0.28	0.00
time (sec)	N/A	0.826	1.185	0.000	0.000	0.000	0.000	0.000	0.179	0.000

Problem 271	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	400	312	269	0	0	0	0	0	379	0
N.S.	1	0.78	0.67	0.00	0.00	0.00	0.00	0.00	0.95	0.00
time (sec)	N/A	0.762	0.991	0.000	0.000	0.000	0.000	0.000	0.184	0.000

Problem 272	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	138	125	114	0	0	314	0	0	471	0
N.S.	1	0.91	0.83	0.00	0.00	2.28	0.00	0.00	3.41	0.00
time (sec)	N/A	0.348	0.302	0.000	0.000	0.116	0.000	0.000	0.219	0.000

Problem 273	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	196	179	145	0	0	423	0	0	586	0
N.S.	1	0.91	0.74	0.00	0.00	2.16	0.00	0.00	2.99	0.00
time (sec)	N/A	0.410	0.356	0.000	0.000	0.136	0.000	0.000	0.211	0.000

Problem 274	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	F(-1)	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	256	238	178	0	0	526	0	0	701	0
N.S.	1	0.93	0.70	0.00	0.00	2.05	0.00	0.00	2.74	0.00
time (sec)	N/A	0.503	0.423	0.000	0.000	0.171	0.000	0.000	0.244	0.000

Problem 275	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	60	64	53	75	39	54	71	54	75	0
N.S.	1	1.07	0.88	1.25	0.65	0.90	1.18	0.90	1.25	0.00
time (sec)	N/A	0.224	0.059	0.321	0.106	0.080	7.538	0.117	0.185	0.000

Problem 276	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	B	F(-1)
verified	N/A	No	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	182	164	204	0	0	317	359	0	374	0
N.S.	1	0.90	1.12	0.00	0.00	1.74	1.97	0.00	2.05	0.00
time (sec)	N/A	0.541	0.280	0.000	0.000	0.108	16.852	0.000	0.182	0.000

Problem 277	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	129	123	145	0	0	210	236	0	255	0
N.S.	1	0.95	1.12	0.00	0.00	1.63	1.83	0.00	1.98	0.00
time (sec)	N/A	0.371	0.230	0.000	0.000	0.100	11.366	0.000	0.178	0.000

Problem 278	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	73	74	91	0	0	127	129	0	146	0
N.S.	1	1.01	1.25	0.00	0.00	1.74	1.77	0.00	2.00	0.00
time (sec)	N/A	0.265	0.133	0.000	0.000	0.093	2.199	0.000	0.164	0.000

Problem 279	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	166	154	162	0	0	0	0	0	83	0
N.S.	1	0.93	0.98	0.00	0.00	0.00	0.00	0.00	0.50	0.00
time (sec)	N/A	0.807	0.252	0.000	0.000	0.000	0.000	0.000	0.170	0.000

Problem 280	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	258	252	229	0	0	0	0	0	113	0
N.S.	1	0.98	0.89	0.00	0.00	0.00	0.00	0.00	0.44	0.00
time (sec)	N/A	0.711	1.459	0.000	0.000	0.000	0.000	0.000	0.191	0.000

Problem 281	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	359	263	205	0	0	0	0	0	71	0
N.S.	1	0.73	0.57	0.00	0.00	0.00	0.00	0.00	0.20	0.00
time (sec)	N/A	0.700	0.973	0.000	0.000	0.000	0.000	0.000	0.169	0.000

Problem 282	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	C	A	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	250	166	186	0	0	0	0	0	50	0
N.S.	1	0.66	0.74	0.00	0.00	0.00	0.00	0.00	0.20	0.00
time (sec)	N/A	0.610	0.663	0.000	0.000	0.000	0.000	0.000	0.171	0.000

Problem 283	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	81	78	77	0	0	127	0	0	225	0
N.S.	1	0.96	0.95	0.00	0.00	1.57	0.00	0.00	2.78	0.00
time (sec)	N/A	0.278	0.137	0.000	0.000	0.089	0.000	0.000	0.173	0.000

Problem 284	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	144	137	110	0	0	223	0	0	346	0
N.S.	1	0.95	0.76	0.00	0.00	1.55	0.00	0.00	2.40	0.00
time (sec)	N/A	0.340	0.191	0.000	0.000	0.104	0.000	0.000	0.180	0.000

Problem 285	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	204	196	147	0	0	326	0	0	471	0
N.S.	1	0.96	0.72	0.00	0.00	1.60	0.00	0.00	2.31	0.00
time (sec)	N/A	0.434	0.326	0.000	0.000	0.160	0.000	0.000	0.187	0.000

Problem 286	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	209	195	195	0	0	464	374	0	568	0
N.S.	1	0.93	0.93	0.00	0.00	2.22	1.79	0.00	2.72	0.00
time (sec)	N/A	0.664	0.312	0.000	0.000	0.134	45.577	0.000	0.208	0.000

Problem 287	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	B	F(-1)
verified	N/A	No	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	158	150	160	0	0	359	308	0	449	0
N.S.	1	0.95	1.01	0.00	0.00	2.27	1.95	0.00	2.84	0.00
time (sec)	N/A	0.500	0.270	0.000	0.000	0.114	37.115	0.000	0.201	0.000

Problem 288	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	100	100	118	0	0	248	167	0	325	0
N.S.	1	1.00	1.18	0.00	0.00	2.48	1.67	0.00	3.25	0.00
time (sec)	N/A	0.362	0.221	0.000	0.000	0.110	24.670	0.000	0.175	0.000

Problem 289	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	77	0	0	172	94	0	218	0
N.S.	1	1.00	1.35	0.00	0.00	3.02	1.65	0.00	3.82	0.00
time (sec)	N/A	0.271	0.199	0.000	0.000	0.101	5.245	0.000	0.163	0.000

Problem 290	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	209	206	241	0	0	0	0	0	227	0
N.S.	1	0.99	1.15	0.00	0.00	0.00	0.00	0.00	1.09	0.00
time (sec)	N/A	0.649	0.509	0.000	0.000	0.000	0.000	0.000	0.172	0.000

Problem 291	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	287	282	218	0	0	0	0	0	273	0
N.S.	1	0.98	0.76	0.00	0.00	0.00	0.00	0.00	0.95	0.00
time (sec)	N/A	0.740	0.400	0.000	0.000	0.000	0.000	0.000	0.196	0.000

Problem 292	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	328	232	217	0	0	0	0	0	183	0
N.S.	1	0.71	0.66	0.00	0.00	0.00	0.00	0.00	0.56	0.00
time (sec)	N/A	0.807	0.629	0.000	0.000	0.000	0.000	0.000	1.124	0.000

Problem 293	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	58	58	70	0	0	172	0	0	351	0
N.S.	1	1.00	1.21	0.00	0.00	2.97	0.00	0.00	6.05	0.00
time (sec)	N/A	0.223	0.132	0.000	0.000	0.091	0.000	0.000	0.187	0.000

Problem 294	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	110	107	103	0	0	241	0	0	490	0
N.S.	1	0.97	0.94	0.00	0.00	2.19	0.00	0.00	4.45	0.00
time (sec)	N/A	0.340	0.172	0.000	0.000	0.122	0.000	0.000	0.185	0.000

Problem 295	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	172	173	144	0	0	370	0	0	631	0
N.S.	1	1.01	0.84	0.00	0.00	2.15	0.00	0.00	3.67	0.00
time (sec)	N/A	0.418	0.193	0.000	0.000	0.119	0.000	0.000	0.188	0.000

Problem 296	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	F(-1)	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	232	242	180	0	0	473	0	0	756	0
N.S.	1	1.04	0.78	0.00	0.00	2.04	0.00	0.00	3.26	0.00
time (sec)	N/A	0.642	0.237	0.000	0.000	0.142	0.000	0.000	0.203	0.000

Problem 297	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	212	196	240	0	0	507	556	0	649	0
N.S.	1	0.92	1.13	0.00	0.00	2.39	2.62	0.00	3.06	0.00
time (sec)	N/A	0.738	0.356	0.000	0.000	0.152	100.085	0.000	0.209	0.000

Problem 298	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	B	F(-1)
verified	N/A	No	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	155	147	205	0	0	404	415	0	528	0
N.S.	1	0.95	1.32	0.00	0.00	2.61	2.68	0.00	3.41	0.00
time (sec)	N/A	0.556	0.283	0.000	0.000	0.122	65.167	0.000	0.187	0.000

Problem 299	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	108	104	137	0	137	328	337	0	425	0
N.S.	1	0.96	1.27	0.00	1.27	3.04	3.12	0.00	3.94	0.00
time (sec)	N/A	0.365	0.374	0.000	0.115	0.158	28.439	0.000	0.198	0.000

Problem 300	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	84	80	97	0	0	270	272	0	338	0
N.S.	1	0.95	1.15	0.00	0.00	3.21	3.24	0.00	4.02	0.00
time (sec)	N/A	0.288	0.309	0.000	0.000	0.110	13.776	0.000	0.161	0.000

Problem 301	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	251	245	273	0	0	0	0	0	439	0
N.S.	1	0.98	1.09	0.00	0.00	0.00	0.00	0.00	1.75	0.00
time (sec)	N/A	0.727	0.523	0.000	0.000	0.000	0.000	0.000	0.188	0.000

Problem 302	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	No	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	337	330	227	0	0	0	0	0	483	0
N.S.	1	0.98	0.67	0.00	0.00	0.00	0.00	0.00	1.43	0.00
time (sec)	N/A	0.829	0.355	0.000	0.000	0.000	0.000	0.000	0.215	0.000

Problem 303	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	No	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	443	367	199	0	0	0	0	0	397	0
N.S.	1	0.83	0.45	0.00	0.00	0.00	0.00	0.00	0.90	0.00
time (sec)	N/A	0.859	0.378	0.000	0.000	0.000	0.000	0.000	0.178	0.000

Problem 304	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	383	297	244	0	0	0	0	0	342	0
N.S.	1	0.78	0.64	0.00	0.00	0.00	0.00	0.00	0.89	0.00
time (sec)	N/A	0.816	1.113	0.000	0.000	0.000	0.000	0.000	0.168	0.000

Problem 305	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	A	F	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	89	84	101	0	0	277	0	0	598	0
N.S.	1	0.94	1.13	0.00	0.00	3.11	0.00	0.00	6.72	0.00
time (sec)	N/A	0.301	0.237	0.000	0.000	0.107	0.000	0.000	0.169	0.000

Problem 306	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	A	F	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	113	116	116	0	0	337	0	0	678	0
N.S.	1	1.03	1.03	0.00	0.00	2.98	0.00	0.00	6.00	0.00
time (sec)	N/A	0.303	0.181	0.000	0.000	0.108	0.000	0.000	0.180	0.000

Problem 307	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	F(-1)	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	170	161	144	0	0	399	0	0	788	0
N.S.	1	0.95	0.85	0.00	0.00	2.35	0.00	0.00	4.64	0.00
time (sec)	N/A	0.435	0.251	0.000	0.000	0.123	0.000	0.000	0.185	0.000

Problem 308	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	A	F(-1)	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	228	228	182	0	0	520	0	0	928	0
N.S.	1	1.00	0.80	0.00	0.00	2.28	0.00	0.00	4.07	0.00
time (sec)	N/A	0.642	0.284	0.000	0.000	0.160	0.000	0.000	0.183	0.000

Problem 309	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	F	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	251	192	163	0	199	125	0	0	488	0
N.S.	1	0.76	0.65	0.00	0.79	0.50	0.00	0.00	1.94	0.00
time (sec)	N/A	0.806	0.589	0.000	0.124	0.098	0.000	0.000	0.248	0.000

Problem 310	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	F	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	148	125	113	0	105	66	0	0	288	0
N.S.	1	0.84	0.76	0.00	0.71	0.45	0.00	0.00	1.95	0.00
time (sec)	N/A	0.545	0.283	0.000	0.116	0.086	0.000	0.000	0.205	0.000

Problem 311	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	301	175	310	0	0	0	0	0	151	0
N.S.	1	0.58	1.03	0.00	0.00	0.00	0.00	0.00	0.50	0.00
time (sec)	N/A	1.254	2.333	0.000	0.000	0.000	0.000	0.000	0.188	0.000

Problem 312	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	489	307	255	0	0	0	0	0	202	0
N.S.	1	0.63	0.52	0.00	0.00	0.00	0.00	0.00	0.41	0.00
time (sec)	N/A	1.111	1.144	0.000	0.000	0.000	0.000	0.000	0.194	0.000

Problem 313	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	406	217	316	0	0	0	0	0	82	0
N.S.	1	0.53	0.78	0.00	0.00	0.00	0.00	0.00	0.20	0.00
time (sec)	N/A	0.905	3.751	0.000	0.000	0.000	0.000	0.000	0.210	0.000

Problem 314	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	248	139	217	0	0	0	0	0	54	0
N.S.	1	0.56	0.88	0.00	0.00	0.00	0.00	0.00	0.22	0.00
time (sec)	N/A	0.695	0.690	0.000	0.000	0.000	0.000	0.000	0.174	0.000

Problem 315	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	F	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	142	109	70	0	102	73	0	0	193	0
N.S.	1	0.77	0.49	0.00	0.72	0.51	0.00	0.00	1.36	0.00
time (sec)	N/A	0.624	0.287	0.000	0.122	0.086	0.000	0.000	0.207	0.000

Problem 316	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	A	F	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	252	190	116	0	0	135	0	0	387	0
N.S.	1	0.75	0.46	0.00	0.00	0.54	0.00	0.00	1.54	0.00
time (sec)	N/A	0.731	0.365	0.000	0.000	0.099	0.000	0.000	0.236	0.000

Problem 317	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	A	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	34	41	27	119	27	27	29	28	29	0
N.S.	1	1.21	0.79	3.50	0.79	0.79	0.85	0.82	0.85	0.00
time (sec)	N/A	0.210	0.035	0.329	0.109	0.075	1.257	0.114	0.156	0.000

Problem 318	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	211	206	156	1766	271	1222	6217	558	1286	0
N.S.	1	0.98	0.74	8.37	1.28	5.79	29.46	2.64	6.09	0.00
time (sec)	N/A	1.503	0.299	29.749	0.052	0.097	14.471	0.153	0.160	0.000

Problem 319	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	153	183	112	921	195	633	2820	396	657	0
N.S.	1	1.20	0.73	6.02	1.27	4.14	18.43	2.59	4.29	0.00
time (sec)	N/A	0.510	0.200	5.892	0.050	0.098	6.072	0.134	0.155	0.000

Problem 320	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	94	68	353	119	235	920	234	236	0
N.S.	1	0.99	0.72	3.72	1.25	2.47	9.68	2.46	2.48	0.00
time (sec)	N/A	0.323	0.091	0.928	0.045	0.082	2.689	0.128	0.156	0.000

Problem 321	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	32	73	57	52	141	95	44	0
N.S.	1	1.00	0.70	1.59	1.24	1.13	3.07	2.07	0.96	0.00
time (sec)	N/A	0.191	0.015	0.165	0.037	0.083	2.226	0.119	0.174	0.000

Problem 322	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	108	25	27	33	22	27	45	27
N.S.	1	1.00	4.32	1.00	1.08	1.32	0.88	1.08	1.80	1.08
time (sec)	N/A	0.229	1.212	0.162	0.076	0.074	7.991	0.143	0.156	26.770

Problem 323	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	F(-1)	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	108	25	27	44	0	27	67	27
N.S.	1	1.00	4.32	1.00	1.08	1.76	0.00	1.08	2.68	1.08
time (sec)	N/A	0.228	0.247	0.169	0.080	0.074	0.000	0.175	0.166	25.285

Problem 324	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	1198	1198	2215	0	0	0	0	0	453	0
N.S.	1	1.00	1.85	0.00	0.00	0.00	0.00	0.00	0.38	0.00
time (sec)	N/A	1.992	8.386	0.000	0.000	0.000	0.000	0.000	0.190	0.000

Problem 325	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	860	860	1379	0	0	0	0	0	360	0
N.S.	1	1.00	1.60	0.00	0.00	0.00	0.00	0.00	0.42	0.00
time (sec)	N/A	1.311	6.228	0.000	0.000	0.000	0.000	0.000	0.181	0.000

Problem 326	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	520	520	571	598	0	0	0	0	257	0
N.S.	1	1.00	1.10	1.15	0.00	0.00	0.00	0.00	0.49	0.00
time (sec)	N/A	0.894	1.519	1.201	0.000	0.000	0.000	0.000	0.188	0.000

Problem 327	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	F(-1)	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	22	24	55	0	24	65	24
N.S.	1	1.00	1.09	1.00	1.09	2.50	0.00	1.09	2.95	1.09
time (sec)	N/A	0.197	6.656	0.019	0.073	0.089	0.000	0.115	0.171	25.262

Problem 328	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	F(-1)	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	22	261	102	0	24	127	24
N.S.	1	1.00	1.09	1.00	11.86	4.64	0.00	1.09	5.77	1.09
time (sec)	N/A	0.203	30.429	0.019	0.077	0.073	0.000	0.129	0.245	25.405

Problem 329	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	148	148	142	272	0	0	267	0	177	0
N.S.	1	1.00	0.96	1.84	0.00	0.00	1.80	0.00	1.20	0.00
time (sec)	N/A	0.420	0.106	0.312	0.000	0.000	78.715	0.000	0.160	0.000

Problem 330	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	107	107	105	233	0	0	218	0	130	0
N.S.	1	1.00	0.98	2.18	0.00	0.00	2.04	0.00	1.21	0.00
time (sec)	N/A	0.372	0.064	0.260	0.000	0.000	52.587	0.000	0.156	0.000

Problem 331	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	66	188	0	0	163	0	85	0
N.S.	1	1.00	0.96	2.72	0.00	0.00	2.36	0.00	1.23	0.00
time (sec)	N/A	0.283	0.042	0.229	0.000	0.000	42.521	0.000	0.168	0.000

Problem 332	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	39	39	37	151	0	0	0	0	54	0
N.S.	1	1.00	0.95	3.87	0.00	0.00	0.00	0.00	1.38	0.00
time (sec)	N/A	0.265	0.012	0.184	0.000	0.000	0.000	0.000	0.160	0.000

Problem 333	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	C	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	63	181	0	0	173	0	41	0
N.S.	1	1.00	1.43	4.11	0.00	0.00	3.93	0.00	0.93	0.00
time (sec)	N/A	0.307	0.042	0.201	0.000	0.000	5.497	0.000	0.155	0.000

Problem 334	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	74	78	88	221	0	0	216	0	57	0
N.S.	1	1.05	1.19	2.99	0.00	0.00	2.92	0.00	0.77	0.00
time (sec)	N/A	0.474	0.107	0.240	0.000	0.000	35.590	0.000	0.161	0.000

Problem 335	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	110	116	124	264	0	0	265	0	78	0
N.S.	1	1.05	1.13	2.40	0.00	0.00	2.41	0.00	0.71	0.00
time (sec)	N/A	0.652	0.239	0.293	0.000	0.000	42.451	0.000	0.156	0.000

Problem 336	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	136	136	125	168	164	0	253	0	147	0
N.S.	1	1.00	0.92	1.24	1.21	0.00	1.86	0.00	1.08	0.00
time (sec)	N/A	0.390	0.086	0.386	0.077	0.000	77.999	0.000	0.161	0.000

Problem 337	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	99	126	112	0	207	0	107	0
N.S.	1	1.00	1.01	1.29	1.14	0.00	2.11	0.00	1.09	0.00
time (sec)	N/A	0.349	0.053	0.368	0.071	0.000	51.413	0.000	0.166	0.000

Problem 338	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	64	88	69	0	156	0	69	0
N.S.	1	1.00	1.02	1.40	1.10	0.00	2.48	0.00	1.10	0.00
time (sec)	N/A	0.285	0.038	0.321	0.069	0.000	42.781	0.000	0.155	0.000

Problem 339	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	36	36	34	59	43	0	0	0	45	0
N.S.	1	1.00	0.94	1.64	1.19	0.00	0.00	0.00	1.25	0.00
time (sec)	N/A	0.236	0.012	0.322	0.066	0.000	0.000	0.000	0.162	0.000

Problem 340	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	F	C	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	41	41	54	81	67	0	170	0	39	0
N.S.	1	1.00	1.32	1.98	1.63	0.00	4.15	0.00	0.95	0.00
time (sec)	N/A	0.270	0.035	0.336	0.058	0.000	5.469	0.000	0.156	0.000

Problem 341	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	72	77	115	96	0	206	0	55	0
N.S.	1	1.06	1.13	1.69	1.41	0.00	3.03	0.00	0.81	0.00
time (sec)	N/A	0.424	0.115	0.346	0.072	0.000	36.062	0.000	0.154	0.000

Problem 342	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	101	107	110	157	151	0	252	0	76	0
N.S.	1	1.06	1.09	1.55	1.50	0.00	2.50	0.00	0.75	0.00
time (sec)	N/A	0.616	0.174	0.362	0.075	0.000	42.632	0.000	0.163	0.000

Problem 343	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	B	B	F(-2)	F	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	17	17	17	14	52	39	0	0	43	13
N.S.	1	1.00	1.00	0.82	3.06	2.29	0.00	0.00	2.53	0.76
time (sec)	N/A	0.252	0.019	0.770	0.148	0.075	0.000	0.000	0.165	25.515

Problem 344	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	B	B	F(-2)	F	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	16	16	17	13	45	50	0	0	45	12
N.S.	1	1.00	1.06	0.81	2.81	3.12	0.00	0.00	2.81	0.75
time (sec)	N/A	0.251	0.017	0.690	0.145	0.083	0.000	0.000	0.158	25.403

Problem 345	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	B	B	F(-2)	F	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	21	19	64	55	0	0	50	18
N.S.	1	1.00	1.05	0.95	3.20	2.75	0.00	0.00	2.50	0.90
time (sec)	N/A	0.264	0.018	0.690	0.156	0.077	0.000	0.000	0.162	25.295

Problem 346	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	B	A	C	F	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	14	14	16	11	72	13	82	0	20	10
N.S.	1	1.00	1.14	0.79	5.14	0.93	5.86	0.00	1.43	0.71
time (sec)	N/A	0.265	0.009	0.398	0.034	0.071	4.633	0.000	0.154	25.284

Problem 347	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	B	A	C	F	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	17	17	21	12	81	14	92	0	20	11
N.S.	1	1.00	1.24	0.71	4.76	0.82	5.41	0.00	1.18	0.65
time (sec)	N/A	0.279	0.010	0.425	0.028	0.073	5.000	0.000	0.158	25.308

Problem 348	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	B	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	23	0	0	89	0	0	24	0
N.S.	1	1.00	0.88	0.00	0.00	3.42	0.00	0.00	0.92	0.00
time (sec)	N/A	0.301	0.017	0.000	0.000	0.081	0.000	0.000	0.166	0.000

Problem 349	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	171	113	140	256	253	193	333	339	168	0
N.S.	1	0.66	0.82	1.50	1.48	1.13	1.95	1.98	0.98	0.00
time (sec)	N/A	0.471	0.196	65.670	0.054	0.084	8.093	0.214	0.157	0.000

Problem 350	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	142	100	101	181	180	135	241	241	117	0
N.S.	1	0.70	0.71	1.27	1.27	0.95	1.70	1.70	0.82	0.00
time (sec)	N/A	0.458	0.133	13.253	0.048	0.077	4.620	0.188	0.157	0.000

Problem 351	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	85	61	105	109	76	156	146	66	0
N.S.	1	0.94	0.68	1.17	1.21	0.84	1.73	1.62	0.73	0.00
time (sec)	N/A	0.383	0.087	2.071	0.040	0.075	3.025	0.158	0.158	0.000

Problem 352	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	B	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	38	38	29	48	48	42	82	64	30	0
N.S.	1	1.00	0.76	1.26	1.26	1.11	2.16	1.68	0.79	0.00
time (sec)	N/A	0.200	0.016	0.211	0.038	0.074	2.054	0.120	0.156	0.000

Problem 353	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	A	F	F	F	F(-1)
verified	N/A	Yes	No	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	77	64	141	0	0	77	0	0	68	0
N.S.	1	0.83	1.83	0.00	0.00	1.00	0.00	0.00	0.88	0.00
time (sec)	N/A	0.414	0.563	0.000	0.000	0.081	0.000	0.000	0.164	0.000

Problem 354	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	F	B	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	89	0	97	89	0	187	75	0
N.S.	1	1.00	1.29	0.00	1.41	1.29	0.00	2.71	1.09	0.00
time (sec)	N/A	0.314	0.573	0.000	0.041	0.078	0.000	0.132	0.166	0.000

Problem 355	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	F	B	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	150	92	137	0	152	167	0	525	150	0
N.S.	1	0.61	0.91	0.00	1.01	1.11	0.00	3.50	1.00	0.00
time (sec)	N/A	0.447	0.535	0.000	0.049	0.100	0.000	0.135	0.157	0.000

Problem 356	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	A	A	F(-1)	B	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	188	108	178	0	210	242	0	922	219	0
N.S.	1	0.57	0.95	0.00	1.12	1.29	0.00	4.90	1.16	0.00
time (sec)	N/A	0.464	0.594	0.000	0.048	0.085	0.000	0.154	0.164	0.000

Problem 357	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	372	252	285	617	578	592	760	995	433	0
N.S.	1	0.68	0.77	1.66	1.55	1.59	2.04	2.67	1.16	0.00
time (sec)	N/A	0.794	0.348	247.970	0.070	0.086	20.852	0.316	0.159	0.000

Problem 358	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	298	212	207	439	417	419	552	715	303	0
N.S.	1	0.71	0.69	1.47	1.40	1.41	1.85	2.40	1.02	0.00
time (sec)	N/A	0.805	0.271	67.287	0.059	0.081	12.831	0.255	0.157	0.000

Problem 359	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	226	163	125	261	257	244	352	435	172	0
N.S.	1	0.72	0.55	1.15	1.14	1.08	1.56	1.92	0.76	0.00
time (sec)	N/A	0.639	0.176	14.123	0.052	0.087	9.221	0.198	0.166	0.000

Problem 360	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	70	67	119	117	124	184	198	76	0
N.S.	1	1.01	0.97	1.72	1.70	1.80	2.67	2.87	1.10	0.00
time (sec)	N/A	0.273	0.031	0.547	0.038	0.077	6.807	0.139	0.167	0.000

Problem 361	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	B	F	F	A	F	F	F	F(-1)
verified	N/A	Yes	No	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	129	100	502	0	0	178	0	0	88	0
N.S.	1	0.78	3.89	0.00	0.00	1.38	0.00	0.00	0.68	0.00
time (sec)	N/A	0.622	0.831	0.000	0.000	0.083	0.000	0.000	0.179	0.000

Problem 362	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	A	F	F	F	F(-1)
verified	N/A	Yes	No	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	138	109	157	0	0	266	0	0	302	0
N.S.	1	0.79	1.14	0.00	0.00	1.93	0.00	0.00	2.19	0.00
time (sec)	N/A	0.612	0.939	0.000	0.000	0.083	0.000	0.000	0.163	0.000

Problem 363	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	B	F(-1)	F	F	F(-1)
verified	N/A	Yes	No	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	214	172	207	0	0	535	0	0	563	0
N.S.	1	0.80	0.97	0.00	0.00	2.50	0.00	0.00	2.63	0.00
time (sec)	N/A	0.948	0.894	0.000	0.000	0.082	0.000	0.000	0.161	0.000

Problem 364	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	B	F(-1)	F	F	F(-1)
verified	N/A	Yes	No	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	346	263	240	0	0	810	0	0	825	0
N.S.	1	0.76	0.69	0.00	0.00	2.34	0.00	0.00	2.38	0.00
time (sec)	N/A	1.510	1.188	0.000	0.000	0.090	0.000	0.000	0.166	0.000

Problem 365	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	62	73	174	76	159	398	132	136	0
N.S.	1	1.05	1.24	2.95	1.29	2.69	6.75	2.24	2.31	0.00
time (sec)	N/A	0.322	0.109	6.676	0.039	0.079	8.526	0.120	0.161	0.000

Problem 366	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	62	73	169	76	159	398	132	136	0
N.S.	1	1.05	1.24	2.86	1.29	2.69	6.75	2.24	2.31	0.00
time (sec)	N/A	0.307	0.105	1.938	0.039	0.081	2.787	0.117	0.157	0.000

Problem 367	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	62	73	169	76	159	398	132	136	0
N.S.	1	1.05	1.24	2.86	1.29	2.69	6.75	2.24	2.31	0.00
time (sec)	N/A	0.307	0.114	0.540	0.028	0.083	0.889	0.128	0.164	0.000

Problem 368	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	B	F	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	54	68	56	64	131	0	67	0
N.S.	1	1.00	1.02	1.28	1.06	1.21	2.47	0.00	1.26	0.00
time (sec)	N/A	0.291	0.108	0.388	0.032	0.076	2.173	0.000	0.157	0.000

Problem 369	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F(-2)	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	72	135	0	140	495	541	135	0
N.S.	1	1.00	1.01	1.90	0.00	1.97	6.97	7.62	1.90	0.00
time (sec)	N/A	0.296	0.126	0.388	0.000	0.078	1.973	0.135	0.153	0.000

Problem 370	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F(-2)	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	72	130	0	140	495	542	135	0
N.S.	1	1.00	1.01	1.83	0.00	1.97	6.97	7.63	1.90	0.00
time (sec)	N/A	0.301	0.128	0.571	0.000	0.078	3.413	0.125	0.163	0.000

Problem 371	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	62	73	169	76	159	398	132	136	0
N.S.	1	1.05	1.24	2.86	1.29	2.69	6.75	2.24	2.31	0.00
time (sec)	N/A	0.297	0.108	3.237	0.034	0.081	5.013	0.117	0.159	0.000

Problem 372	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	62	73	174	76	159	398	132	136	0
N.S.	1	1.05	1.24	2.95	1.29	2.69	6.75	2.24	2.31	0.00
time (sec)	N/A	0.302	0.102	1.007	0.032	0.087	1.516	0.118	0.160	0.000

Problem 373	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	B	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	64	53	144	68	138	323	110	124	0
N.S.	1	1.12	0.93	2.53	1.19	2.42	5.67	1.93	2.18	0.00
time (sec)	N/A	0.244	0.135	0.346	0.028	0.085	0.474	0.147	0.162	0.000

Problem 374	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F(-2)	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	67	79	67	127	0	130	348	186	132	0
N.S.	1	1.18	1.00	1.90	0.00	1.94	5.19	2.78	1.97	0.00
time (sec)	N/A	0.319	0.126	0.365	0.000	0.080	2.150	0.121	0.156	0.000

Problem 375	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F(-2)	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	72	135	0	140	495	542	135	0
N.S.	1	1.00	1.01	1.90	0.00	1.97	6.97	7.63	1.90	0.00
time (sec)	N/A	0.282	0.125	0.373	0.000	0.097	2.602	0.123	0.156	0.000

Problem 376	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F(-2)	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	72	135	0	140	495	542	135	0
N.S.	1	1.00	1.01	1.90	0.00	1.97	6.97	7.63	1.90	0.00
time (sec)	N/A	0.289	0.103	0.926	0.000	0.082	5.084	0.130	0.169	0.000

Problem 377	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	103	104	118	583	148	489	1634	744	481	0
N.S.	1	1.01	1.15	5.66	1.44	4.75	15.86	7.22	4.67	0.00
time (sec)	N/A	0.408	0.314	18.801	0.034	0.087	26.523	0.143	0.158	0.000

Problem 378	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	103	101	118	588	148	488	1625	744	481	0
N.S.	1	0.98	1.15	5.71	1.44	4.74	15.78	7.22	4.67	0.00
time (sec)	N/A	0.419	0.310	5.954	0.034	0.088	7.107	0.133	0.172	0.000

Problem 379	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	102	103	116	577	148	488	1622	744	481	0
N.S.	1	1.01	1.14	5.66	1.45	4.78	15.90	7.29	4.72	0.00
time (sec)	N/A	0.370	0.284	1.878	0.035	0.080	1.687	0.130	0.161	0.000

Problem 380	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	B	F	B	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	104	106	90	122	114	115	216	0	121	0
N.S.	1	1.02	0.87	1.17	1.10	1.11	2.08	0.00	1.16	0.00
time (sec)	N/A	0.390	0.240	1.095	0.037	0.077	2.278	0.000	0.157	0.000

Problem 381	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	F(-2)	B	B	F	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	135	166	120	474	0	457	2118	0	480	0
N.S.	1	1.23	0.89	3.51	0.00	3.39	15.69	0.00	3.56	0.00
time (sec)	N/A	0.486	0.365	1.161	0.000	0.086	3.215	0.000	0.166	0.000

Problem 382	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	F(-2)	B	B	F	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	135	164	121	475	0	457	2127	0	480	0
N.S.	1	1.21	0.90	3.52	0.00	3.39	15.76	0.00	3.56	0.00
time (sec)	N/A	0.447	0.358	1.164	0.000	0.084	4.723	0.000	0.168	0.000

Problem 383	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	F(-1)	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	105	106	124	591	152	497	0	746	481	0
N.S.	1	1.01	1.18	5.63	1.45	4.73	0.00	7.10	4.58	0.00
time (sec)	N/A	0.385	0.300	10.582	0.033	0.083	0.000	0.160	0.161	0.000

Problem 384	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	A	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	105	106	124	581	152	497	240	746	481	0
N.S.	1	1.01	1.18	5.53	1.45	4.73	2.29	7.10	4.58	0.00
time (sec)	N/A	0.404	0.301	3.293	0.033	0.084	81.506	0.136	0.168	0.000

Problem 385	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	A	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	113	110	107	509	144	466	211	244	475	0
N.S.	1	0.97	0.95	4.50	1.27	4.12	1.87	2.16	4.20	0.00
time (sec)	N/A	0.307	0.199	1.135	0.034	0.089	2.178	0.117	0.169	0.000

Problem 386	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	F(-2)	B	A	F	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	123	121	121	471	0	455	209	0	481	0
N.S.	1	0.98	0.98	3.83	0.00	3.70	1.70	0.00	3.91	0.00
time (sec)	N/A	0.460	0.354	1.151	0.000	0.087	3.426	0.000	0.156	0.000

Problem 387	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	F(-2)	B	A	F	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	127	128	127	478	0	466	233	0	482	0
N.S.	1	1.01	1.00	3.76	0.00	3.67	1.83	0.00	3.80	0.00
time (sec)	N/A	0.472	0.347	1.171	0.000	0.082	18.946	0.000	0.166	0.000

Problem 388	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	F(-2)	B	A	F	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	127	128	127	478	0	466	233	0	482	0
N.S.	1	1.01	1.00	3.76	0.00	3.67	1.83	0.00	3.80	0.00
time (sec)	N/A	0.449	0.353	1.146	0.000	0.085	136.586	0.000	0.157	0.000

Problem 389	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	F(-2)	B	F(-1)	F	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	127	128	127	478	0	466	0	0	482	0
N.S.	1	1.01	1.00	3.76	0.00	3.67	0.00	0.00	3.80	0.00
time (sec)	N/A	0.429	0.360	3.308	0.000	0.083	0.000	0.000	0.164	0.000

Problem 390	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	147	146	172	1254	218	1011	4100	1609	1052	0
N.S.	1	0.99	1.17	8.53	1.48	6.88	27.89	10.95	7.16	0.00
time (sec)	N/A	0.600	0.426	47.641	0.036	0.091	91.547	0.159	0.161	0.000

Problem 391	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	F(-1)	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	149	146	178	1262	222	1022	0	1611	1052	0
N.S.	1	0.98	1.19	8.47	1.49	6.86	0.00	10.81	7.06	0.00
time (sec)	N/A	0.609	0.431	19.014	0.038	0.094	0.000	0.144	0.160	0.000

Problem 392	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	A	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	149	148	178	1267	222	1024	357	1611	1052	0
N.S.	1	0.99	1.19	8.50	1.49	6.87	2.40	10.81	7.06	0.00
time (sec)	N/A	0.578	0.401	6.136	0.037	0.102	85.262	0.157	0.170	0.000

Problem 393	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	152	153	132	177	172	169	299	0	176	0
N.S.	1	1.01	0.87	1.16	1.13	1.11	1.97	0.00	1.16	0.00
time (sec)	N/A	0.459	0.404	3.523	0.036	0.073	2.739	0.000	0.163	0.000

Problem 394	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	F(-2)	B	A	F	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	191	190	181	1044	0	981	347	0	1053	0
N.S.	1	0.99	0.95	5.47	0.00	5.14	1.82	0.00	5.51	0.00
time (sec)	N/A	0.655	0.492	3.458	0.000	0.101	47.472	0.000	0.156	0.000

Problem 395	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	F(-2)	B	F(-1)	F	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	191	188	181	1044	0	980	0	0	1053	0
N.S.	1	0.98	0.95	5.47	0.00	5.13	0.00	0.00	5.51	0.00
time (sec)	N/A	0.648	0.513	3.476	0.000	0.096	0.000	0.000	0.166	0.000

Problem 396	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	F(-1)	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	151	150	184	1269	228	1023	0	1611	1052	0
N.S.	1	0.99	1.22	8.40	1.51	6.77	0.00	10.67	6.97	0.00
time (sec)	N/A	0.618	0.433	29.893	0.035	0.099	0.000	0.145	0.160	0.000

Problem 397	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	F(-1)	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	148	147	176	1267	224	1022	0	1611	1052	0
N.S.	1	0.99	1.19	8.56	1.51	6.91	0.00	10.89	7.11	0.00
time (sec)	N/A	0.614	0.428	10.987	0.035	0.094	0.000	0.161	0.163	0.000

Problem 398	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	A	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	169	164	159	1113	220	983	325	379	1046	0
N.S.	1	0.97	0.94	6.59	1.30	5.82	1.92	2.24	6.19	0.00
time (sec)	N/A	0.379	0.289	3.322	0.040	0.096	3.639	0.127	0.165	0.000

Problem 399	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	F(-2)	B	A	F	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	179	175	181	1040	0	967	323	0	1052	0
N.S.	1	0.98	1.01	5.81	0.00	5.40	1.80	0.00	5.88	0.00
time (sec)	N/A	0.670	0.437	3.392	0.000	0.095	10.831	0.000	0.154	0.000

Problem 400	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	F(-2)	B	A	F	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	191	190	180	1044	0	980	347	0	1053	0
N.S.	1	0.99	0.94	5.47	0.00	5.13	1.82	0.00	5.51	0.00
time (sec)	N/A	0.657	0.466	3.420	0.000	0.092	48.330	0.000	0.158	0.000

Problem 401	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	F(-2)	B	F(-1)	F	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	183	182	187	1046	0	981	0	0	1053	0
N.S.	1	0.99	1.02	5.72	0.00	5.36	0.00	0.00	5.75	0.00
time (sec)	N/A	0.674	0.484	3.625	0.000	0.227	0.000	0.000	0.158	0.000

Problem 402	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	F(-2)	B	F(-1)	F	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	183	182	188	1046	0	981	0	0	1053	0
N.S.	1	0.99	1.03	5.72	0.00	5.36	0.00	0.00	5.75	0.00
time (sec)	N/A	0.670	0.472	3.540	0.000	0.100	0.000	0.000	0.154	0.000

Problem 403	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	F(-2)	B	F(-1)	F	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	191	188	182	1049	0	981	0	0	1053	0
N.S.	1	0.98	0.95	5.49	0.00	5.14	0.00	0.00	5.51	0.00
time (sec)	N/A	0.677	0.496	10.490	0.000	0.107	0.000	0.000	0.163	0.000

Problem 404	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	87	23	25	29	20	25	41	25
N.S.	1	1.00	3.78	1.00	1.09	1.26	0.87	1.09	1.78	1.09
time (sec)	N/A	0.235	0.167	0.161	0.087	0.072	7.905	0.111	0.167	26.174

Problem 405	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	21	21	87	21	23	25	19	23	37	23
N.S.	1	1.00	4.14	1.00	1.10	1.19	0.90	1.10	1.76	1.10
time (sec)	N/A	0.222	0.152	0.148	0.075	0.093	2.583	0.119	0.162	25.310

Problem 406	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	A	A	F	F	F(-1)
verified	N/A	Yes	No	No	TBD	TBD	TBD	TBD	TBD	TBD
size	54	54	108	246	0	93	452	0	49	0
N.S.	1	1.00	2.00	4.56	0.00	1.72	8.37	0.00	0.91	0.00
time (sec)	N/A	0.289	0.199	0.641	0.000	0.074	148.830	0.000	0.164	0.000

Problem 407	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	86	23	25	29	20	25	48	25
N.S.	1	1.00	3.74	1.00	1.09	1.26	0.87	1.09	2.09	1.09
time (sec)	N/A	0.233	0.175	0.154	0.085	0.078	6.700	0.115	0.162	25.001

Problem 408	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	87	23	25	29	20	25	41	25
N.S.	1	1.00	3.78	1.00	1.09	1.26	0.87	1.09	1.78	1.09
time (sec)	N/A	0.229	0.165	0.155	0.083	0.074	4.458	0.116	0.160	24.970

Problem 409	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	69	20	22	22	17	22	34	22
N.S.	1	1.00	3.45	1.00	1.10	1.10	0.85	1.10	1.70	1.10
time (sec)	N/A	0.183	0.119	0.152	0.074	0.071	1.702	0.118	0.166	25.093

Problem 410	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	83	23	25	29	20	25	48	25
N.S.	1	1.00	3.61	1.00	1.09	1.26	0.87	1.09	2.09	1.09
time (sec)	N/A	0.222	0.155	0.162	0.091	0.067	4.309	0.206	0.159	24.835

Problem 411	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	140	23	25	42	22	25	67	25
N.S.	1	1.00	6.09	1.00	1.09	1.83	0.96	1.09	2.91	1.09
time (sec)	N/A	0.228	0.296	0.165	0.086	0.071	99.085	0.124	0.164	25.054

Problem 412	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	21	21	140	21	23	38	20	23	63	23
N.S.	1	1.00	6.67	1.00	1.10	1.81	0.95	1.10	3.00	1.10
time (sec)	N/A	0.206	0.300	0.153	0.078	0.078	13.584	0.127	0.161	25.020

Problem 413	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	B	A	F	F	F(-1)
verified	N/A	Yes	No	No	TBD	TBD	TBD	TBD	TBD	TBD
size	102	116	132	342	0	214	360	0	152	0
N.S.	1	1.14	1.29	3.35	0.00	2.10	3.53	0.00	1.49	0.00
time (sec)	N/A	0.603	0.385	1.367	0.000	0.082	143.955	0.000	0.161	0.000

Problem 414	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	F(-1)	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	139	23	25	45	0	25	80	25
N.S.	1	1.00	6.04	1.00	1.09	1.96	0.00	1.09	3.48	1.09
time (sec)	N/A	0.225	0.295	0.175	0.087	0.073	0.000	0.122	0.167	24.909

Problem 415	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	140	23	25	42	22	25	67	25
N.S.	1	1.00	6.09	1.00	1.09	1.83	0.96	1.09	2.91	1.09
time (sec)	N/A	0.228	0.304	0.161	0.088	0.072	35.835	0.138	0.170	25.561

Problem 416	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	161	20	22	35	19	22	60	22
N.S.	1	1.00	8.05	1.00	1.10	1.75	0.95	1.10	3.00	1.10
time (sec)	N/A	0.182	2.981	0.158	0.092	0.075	11.754	0.126	0.161	25.535

Problem 417	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	135	23	25	45	22	25	80	25
N.S.	1	1.00	5.87	1.00	1.09	1.96	0.96	1.09	3.48	1.09
time (sec)	N/A	0.228	0.271	0.156	0.087	0.072	86.222	0.138	0.167	25.505

Problem 418	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	A	F(-2)	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	37	35	37	33	0	45	0	0	55	0
N.S.	1	0.95	1.00	0.89	0.00	1.22	0.00	0.00	1.49	0.00
time (sec)	N/A	0.342	0.029	0.580	0.000	0.077	0.000	0.000	0.158	0.000

Problem 419	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	152	153	132	177	172	169	299	0	176	0
N.S.	1	1.01	0.87	1.16	1.13	1.11	1.97	0.00	1.16	0.00
time (sec)	N/A	0.454	0.322	2.998	0.034	0.084	2.598	0.000	0.156	0.000

Problem 420	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	B	F	B	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	104	106	90	122	114	115	216	0	121	0
N.S.	1	1.02	0.87	1.17	1.10	1.11	2.08	0.00	1.16	0.00
time (sec)	N/A	0.393	0.169	0.966	0.034	0.079	2.224	0.000	0.161	0.000

Problem 421	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	B	F	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	54	68	56	64	131	0	67	0
N.S.	1	1.00	1.02	1.28	1.06	1.21	2.47	0.00	1.26	0.00
time (sec)	N/A	0.277	0.063	0.207	0.029	0.081	1.984	0.000	0.160	0.000

Problem 422	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	A	A	F	F	F(-1)
verified	N/A	Yes	No	No	TBD	TBD	TBD	TBD	TBD	TBD
size	54	54	108	246	0	93	452	0	49	0
N.S.	1	1.00	2.00	4.56	0.00	1.72	8.37	0.00	0.91	0.00
time (sec)	N/A	0.285	0.062	0.505	0.000	0.070	147.721	0.000	0.155	0.000

Problem 423	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	B	A	F	F	F(-1)
verified	N/A	Yes	No	No	TBD	TBD	TBD	TBD	TBD	TBD
size	102	116	132	342	0	214	360	0	152	0
N.S.	1	1.14	1.29	3.35	0.00	2.10	3.53	0.00	1.49	0.00
time (sec)	N/A	0.589	0.274	1.196	0.000	0.077	138.127	0.000	0.162	0.000

Problem 424	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	B	F(-1)	F	F	F(-1)
verified	N/A	Yes	No	No	TBD	TBD	TBD	TBD	TBD	TBD
size	169	204	170	473	0	401	0	0	311	0
N.S.	1	1.21	1.01	2.80	0.00	2.37	0.00	0.00	1.84	0.00
time (sec)	N/A	1.040	0.325	3.926	0.000	0.095	0.000	0.000	0.163	0.000

Problem 425	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	B	B	F	B	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	245	245	262	418	391	521	588	0	417	0
N.S.	1	1.00	1.07	1.71	1.60	2.13	2.40	0.00	1.70	0.00
time (sec)	N/A	0.577	0.458	10.654	0.043	0.087	7.783	0.000	0.158	0.000

Problem 426	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	B	B	F	B	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	161	161	179	281	259	353	408	0	280	0
N.S.	1	1.00	1.11	1.75	1.61	2.19	2.53	0.00	1.74	0.00
time (sec)	N/A	0.479	0.326	3.267	0.041	0.081	6.744	0.000	0.165	0.000

Problem 427	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	B	B	F	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	80	80	109	149	131	193	245	0	148	0
N.S.	1	1.00	1.36	1.86	1.64	2.41	3.06	0.00	1.85	0.00
time (sec)	N/A	0.341	0.173	1.039	0.036	0.081	6.203	0.000	0.155	0.000

Problem 428	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	B	C	F	B	F	F	F	F(-1)
verified	N/A	Yes	No	No	TBD	TBD	TBD	TBD	TBD	TBD
size	94	91	270	580	0	228	0	0	84	0
N.S.	1	0.97	2.87	6.17	0.00	2.43	0.00	0.00	0.89	0.00
time (sec)	N/A	0.452	0.352	0.895	0.000	0.087	0.000	0.000	0.165	0.000

Problem 429	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	B	F	F	B	F	F	F	F(-1)
verified	N/A	Yes	No	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	182	196	397	0	0	600	0	0	260	0
N.S.	1	1.08	2.18	0.00	0.00	3.30	0.00	0.00	1.43	0.00
time (sec)	N/A	1.041	0.460	0.000	0.000	0.086	0.000	0.000	0.165	0.000

Problem 430	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	B	F(-1)	F	F	F(-1)
verified	N/A	Yes	No	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	267	364	459	0	0	1165	0	0	522	0
N.S.	1	1.36	1.72	0.00	0.00	4.36	0.00	0.00	1.96	0.00
time (sec)	N/A	2.222	0.696	0.000	0.000	0.090	0.000	0.000	0.166	0.000

Problem 431	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	F	F	F	F(-2)	F(-1)	F	F	F(-1)
verified	N/A	Yes	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	327	318	0	0	0	0	0	0	281	0
N.S.	1	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.86	0.00
time (sec)	N/A	0.866	0.000	0.000	0.000	0.000	0.000	0.000	0.180	0.000

Problem 432	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	F	F	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	284	277	0	0	0	0	0	0	206	0
N.S.	1	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.00
time (sec)	N/A	0.759	0.000	0.000	0.000	0.000	0.000	0.000	0.185	0.000

Problem 433	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	F	F	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	240	235	0	0	0	0	0	0	140	0
N.S.	1	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.58	0.00
time (sec)	N/A	0.633	0.000	0.000	0.000	0.000	0.000	0.000	0.169	0.000

Problem 434	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	F	F	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	174	161	0	0	0	0	0	0	57	0
N.S.	1	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00
time (sec)	N/A	0.819	0.000	0.000	0.000	0.000	0.000	0.000	0.170	0.000

Problem 435	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	F	F	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	225	222	0	0	0	0	0	0	85	0
N.S.	1	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00
time (sec)	N/A	0.642	0.000	0.000	0.000	0.000	0.000	0.000	0.171	0.000

Problem 436	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	F	F	F	F(-2)	F(-1)	F	F	F(-1)
verified	N/A	Yes	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	271	266	0	0	0	0	0	0	113	0
N.S.	1	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.00
time (sec)	N/A	0.756	0.000	0.000	0.000	0.000	0.000	0.000	0.174	0.000

Problem 437	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	F	F	F	F(-2)	F(-1)	F	F	F(-1)
verified	N/A	Yes	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	314	307	0	0	0	0	0	0	141	0
N.S.	1	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.00
time (sec)	N/A	0.822	0.000	0.000	0.000	0.000	0.000	0.000	0.180	0.000

Problem 438	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	F(-2)	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	242	228	178	8188	343	4918	0	772	6189	0
N.S.	1	0.94	0.74	33.83	1.42	20.32	0.00	3.19	25.57	0.00
time (sec)	N/A	2.336	0.551	65.036	0.059	0.243	0.000	0.173	0.182	0.000

Problem 439	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	F(-2)	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	177	162	124	3031	240	1875	0	528	2246	0
N.S.	1	0.92	0.70	17.12	1.36	10.59	0.00	2.98	12.69	0.00
time (sec)	N/A	0.489	0.316	14.141	0.047	0.182	0.000	0.155	0.178	0.000

Problem 440	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	B	F(-2)	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	103	96	70	679	137	431	0	285	452	0
N.S.	1	0.93	0.68	6.59	1.33	4.18	0.00	2.77	4.39	0.00
time (sec)	N/A	0.333	0.138	2.274	0.041	0.089	0.000	0.147	0.178	0.000

Problem 441	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	32	73	57	52	141	95	44	0
N.S.	1	1.00	0.70	1.59	1.24	1.13	3.07	2.07	0.96	0.00
time (sec)	N/A	0.195	0.014	0.159	0.034	0.076	2.051	0.126	0.162	0.000

Problem 442	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	111	25	27	33	22	27	45	27
N.S.	1	1.00	4.44	1.00	1.08	1.32	0.88	1.08	1.80	1.08
time (sec)	N/A	0.231	0.297	0.184	0.108	0.076	6.582	0.137	0.181	24.716

Problem 443	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	177	25	27	46	24	27	71	27
N.S.	1	1.00	7.08	1.00	1.08	1.84	0.96	1.08	2.84	1.08
time (sec)	N/A	0.234	0.540	0.161	0.110	0.098	26.065	0.152	0.166	24.922

Problem 444	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	94	94	143	0	0	0	0	0	205	0
N.S.	1	1.00	1.52	0.00	0.00	0.00	0.00	0.00	2.18	0.00
time (sec)	N/A	0.295	0.941	0.000	0.000	0.000	0.000	0.000	0.173	0.000

Problem 445	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	111	111	98	0	0	0	0	0	259	0
N.S.	1	1.00	0.88	0.00	0.00	0.00	0.00	0.00	2.33	0.00
time (sec)	N/A	0.408	0.797	0.000	0.000	0.000	0.000	0.000	0.173	0.000

Problem 446	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	480	480	408	0	0	0	0	0	0	0
N.S.	1	1.00	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.097	2.600	0.000	0.000	0.000	0.000	0.000	1.697	0.000

Problem 447	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	F	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	350	350	304	0	0	0	0	0	0	0
N.S.	1	1.00	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.814	1.428	0.000	0.000	0.000	0.000	0.000	0.643	0.000

Problem 448	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	220	220	200	0	0	0	0	0	0	0
N.S.	1	1.00	0.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.555	0.663	0.000	0.000	0.000	0.000	0.000	0.206	0.000

Problem 449	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	106	106	107	0	0	0	0	0	272	0
N.S.	1	1.00	1.01	0.00	0.00	0.00	0.00	0.00	2.57	0.00
time (sec)	N/A	0.277	0.195	0.000	0.000	0.000	0.000	0.000	0.169	0.000

Problem 450	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	27	27	29	27	0	29	24	29	31	29
N.S.	1	1.00	1.07	1.00	0.00	1.07	0.89	1.07	1.15	1.07
time (sec)	N/A	0.258	1.935	0.236	0.000	0.074	96.701	0.151	0.180	25.346

Problem 451	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	N/A	F(-1)	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	27	27	29	27	0	42	0	29	44	29
N.S.	1	1.00	1.07	1.00	0.00	1.56	0.00	1.07	1.63	1.07
time (sec)	N/A	0.260	2.347	0.458	0.000	0.069	0.000	0.163	0.191	25.502

Problem 452	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	B	B	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	115	113	108	284	218	215	908	199	247	174
N.S.	1	0.98	0.94	2.47	1.90	1.87	7.90	1.73	2.15	1.51
time (sec)	N/A	0.317	0.209	1.027	0.038	0.094	2.441	0.115	0.161	25.765

Problem 453	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	202	210	244	740	0	0	0	0	976	0
N.S.	1	1.04	1.21	3.66	0.00	0.00	0.00	0.00	4.83	0.00
time (sec)	N/A	0.594	0.286	1.266	0.000	0.000	0.000	0.000	0.164	0.000

Problem 454	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD	TBD
size	295	312	339	1652	0	0	0	0	0	0
N.S.	1	1.06	1.15	5.60	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.810	0.442	2.441	0.000	0.000	0.000	0.000	0.182	0.000

2.3 Detailed conclusion table specific for Rubi results

The following table is specific to Rubi only. It gives additional statistics for each integral. the column **steps** is the number of steps used by Rubi to obtain the antiderivative. The **rules** column is the number of unique rules used. The **integrand size** column is the leaf size of the integrand. Finally the ratio $\frac{\text{number of rules}}{\text{integrand size}}$ is also given. The larger this ratio is, the harder the integral is to solve. In this test file, problem number [71] had the largest ratio of [1.19047999999999998]

Table 2.1: Rubi specific breakdown of results for each integral

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
1	A	4	4	1.06	19	0.211
2	A	4	4	1.06	19	0.211
3	A	4	4	1.06	17	0.235
4	A	4	4	1.02	16	0.250
5	A	3	3	1.00	19	0.158
6	A	4	4	1.04	19	0.211
7	A	4	4	1.02	19	0.211
8	A	4	4	1.05	19	0.211
9	A	4	4	1.01	21	0.190
10	A	4	4	1.01	21	0.190
11	A	4	4	0.99	19	0.211
12	A	4	4	0.99	18	0.222
13	A	2	2	1.01	21	0.095
14	A	2	2	0.95	21	0.095
15	A	2	2	1.01	21	0.095
16	A	4	4	0.99	21	0.190
17	A	4	4	0.99	21	0.190
18	A	4	4	1.01	21	0.190
19	A	4	4	0.99	21	0.190
20	A	4	4	0.99	21	0.190
21	A	5	5	0.90	19	0.263

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
22	A	4	4	0.94	18	0.222
23	A	2	2	0.98	21	0.095
24	A	2	2	0.97	21	0.095
25	A	2	2	0.97	21	0.095
26	A	2	2	0.98	21	0.095
27	A	4	4	0.94	21	0.190
28	A	5	5	0.92	21	0.238
29	A	4	4	0.99	21	0.190
30	A	4	4	0.99	21	0.190
31	A	2	2	1.00	21	0.095
32	A	2	2	1.00	21	0.095
33	A	2	2	1.00	19	0.105
34	A	2	2	1.00	18	0.111
35	A	2	2	1.00	21	0.095
36	A	4	4	1.05	21	0.190
37	A	6	6	1.05	21	0.286
38	A	8	8	1.03	21	0.381
39	A	3	3	1.03	21	0.143
40	A	3	3	1.14	21	0.143
41	A	3	3	1.08	19	0.158
42	A	2	2	1.00	18	0.111
43	A	5	5	1.18	21	0.238
44	A	2	2	1.00	21	0.095
45	A	2	2	1.00	21	0.095
46	A	4	4	1.04	21	0.190
47	A	4	4	1.08	21	0.190
48	A	3	3	0.97	19	0.158
49	A	3	3	0.83	18	0.167
50	A	9	9	1.25	21	0.429
51	A	2	2	1.00	21	0.095
52	A	2	2	1.00	21	0.095
53	A	5	5	1.05	21	0.238

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
54	A	6	6	1.08	21	0.286
55	A	5	5	1.12	21	0.238
56	A	3	3	0.99	21	0.143
57	A	4	4	0.83	19	0.211
58	A	3	3	0.81	18	0.167
59	A	13	13	1.47	21	0.619
60	A	2	2	1.00	21	0.095
61	A	2	2	1.00	21	0.095
62	A	11	11	1.11	21	0.524
63	A	11	11	1.14	21	0.524
64	A	11	11	1.15	21	0.524
65	A	3	3	0.93	21	0.143
66	A	5	5	0.91	21	0.238
67	A	4	4	0.85	21	0.190
68	A	4	4	0.82	21	0.190
69	A	4	4	0.80	19	0.211
70	A	3	3	0.78	18	0.167
71	B	25	25	2.05	21	1.190
72	A	2	2	1.00	21	0.095
73	A	2	2	1.00	21	0.095
74	A	1	1	1.00	13	0.077
75	A	1	1	1.00	14	0.071
76	A	2	2	1.00	21	0.095
77	A	2	2	1.00	19	0.105
78	A	2	2	1.00	18	0.111
79	A	6	5	0.90	21	0.238
80	A	2	2	1.00	21	0.095
81	A	2	2	1.00	21	0.095
82	A	2	2	1.00	21	0.095
83	A	2	2	1.00	21	0.095
84	A	2	2	1.00	23	0.087
85	A	2	2	1.00	21	0.095

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
86	A	3	3	0.90	20	0.150
87	A	9	8	1.23	23	0.348
88	A	2	2	1.00	23	0.087
89	A	2	2	1.00	23	0.087
90	A	2	2	1.00	23	0.087
91	A	2	2	1.00	23	0.087
92	A	2	2	1.00	23	0.087
93	A	2	2	1.00	23	0.087
94	A	2	2	1.00	21	0.095
95	A	3	3	0.93	20	0.150
96	A	3	3	0.92	23	0.130
97	A	6	6	0.96	23	0.261
98	A	9	9	0.93	23	0.391
99	A	12	12	0.93	23	0.522
100	A	2	2	1.00	23	0.087
101	A	2	2	1.00	23	0.087
102	A	2	2	1.00	21	0.095
103	A	3	3	0.92	20	0.150
104	A	7	7	1.03	23	0.304
105	A	2	2	1.00	23	0.087
106	A	2	2	1.00	23	0.087
107	A	2	2	1.10	23	0.087
108	A	2	2	1.13	23	0.087
109	A	4	4	0.96	21	0.190
110	A	6	6	1.01	20	0.300
111	A	11	11	1.14	23	0.478
112	A	2	2	1.04	23	0.087
113	A	2	2	1.08	23	0.087
114	A	2	2	1.09	23	0.087
115	A	5	5	0.96	23	0.217
116	A	8	8	1.01	21	0.381
117	A	10	10	1.00	20	0.500

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
118	A	15	15	1.45	23	0.652
119	A	2	2	1.03	23	0.087
120	A	8	8	1.53	13	0.615
121	A	4	4	0.92	23	0.174
122	A	7	7	0.99	23	0.304
123	A	10	10	1.15	23	0.435
124	A	2	2	1.00	20	0.100
125	A	2	2	1.00	22	0.091
126	A	2	2	1.00	22	0.091
127	N/A	1	0	1.00	22	0.000
128	N/A	2	0	1.00	22	0.000
129	N/A	2	0	1.00	22	0.000
130	A	4	4	0.90	23	0.174
131	A	7	6	0.98	23	0.261
132	A	8	7	0.92	21	0.333
133	A	6	5	0.93	20	0.250
134	A	16	15	1.03	23	0.652
135	A	4	4	0.97	23	0.174
136	A	4	4	0.93	23	0.174
137	A	4	4	0.89	23	0.174
138	A	7	6	0.97	23	0.261
139	A	9	8	0.90	21	0.381
140	A	7	6	0.90	20	0.300
141	A	22	21	1.21	23	0.913
142	A	4	4	0.97	23	0.174
143	A	4	4	0.96	23	0.174
144	A	4	4	0.91	23	0.174
145	A	7	6	0.99	23	0.261
146	A	7	6	0.95	21	0.286
147	A	5	4	0.97	20	0.200
148	A	11	10	0.95	23	0.435
149	A	4	4	0.97	23	0.174

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
150	A	4	4	0.92	23	0.174
151	A	4	4	0.93	23	0.174
152	A	7	6	1.00	23	0.261
153	A	6	5	0.98	21	0.238
154	A	4	3	1.00	20	0.150
155	A	15	14	1.04	23	0.609
156	A	5	5	0.92	23	0.217
157	N/A	1	0	1.00	23	0.000
158	N/A	1	0	1.00	21	0.000
159	N/A	1	0	1.00	20	0.000
160	N/A	1	0	1.00	23	0.000
161	N/A	1	0	1.00	23	0.000
162	A	3	3	0.98	23	0.130
163	A	4	4	1.20	23	0.174
164	A	3	3	0.99	21	0.143
165	A	1	1	1.00	16	0.062
166	N/A	1	0	1.00	23	0.000
167	N/A	1	0	1.00	23	0.000
168	N/A	1	0	1.00	15	0.000
169	A	2	2	1.00	14	0.143
170	N/A	1	0	1.00	17	0.000
171	A	2	2	1.02	21	0.095
172	A	2	2	1.02	21	0.095
173	A	4	4	1.00	19	0.211
174	A	2	2	1.00	21	0.095
175	A	2	2	1.06	21	0.095
176	A	4	4	0.91	21	0.190
177	A	2	2	1.02	21	0.095
178	A	2	2	1.02	21	0.095
179	A	2	2	1.00	18	0.111
180	A	2	2	0.98	21	0.095

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
181	A	4	4	1.06	21	0.190
182	A	4	4	1.05	21	0.190
183	A	4	4	1.01	23	0.174
184	A	4	4	1.01	23	0.174
185	A	6	5	0.99	21	0.238
186	A	2	2	0.99	23	0.087
187	A	4	4	1.01	23	0.174
188	A	2	2	1.03	23	0.087
189	A	2	2	0.99	23	0.087
190	A	2	2	0.99	23	0.087
191	A	2	2	0.98	20	0.100
192	A	2	2	0.98	23	0.087
193	A	2	2	0.98	23	0.087
194	A	4	4	1.01	23	0.174
195	A	4	4	1.01	23	0.174
196	A	4	4	0.99	23	0.174
197	A	7	6	0.92	23	0.261
198	A	6	5	0.95	21	0.238
199	A	2	2	0.98	23	0.087
200	A	4	4	0.95	23	0.174
201	A	4	4	0.98	23	0.174
202	A	2	2	0.97	23	0.087
203	A	2	2	0.97	23	0.087
204	A	2	2	0.97	20	0.100
205	A	2	2	0.97	23	0.087
206	A	3	3	0.99	23	0.130
207	A	2	2	0.97	23	0.087
208	A	4	4	0.99	23	0.174
209	A	4	4	0.98	23	0.174
210	A	2	2	1.00	23	0.087
211	A	2	2	1.00	23	0.087
212	A	2	2	1.00	21	0.095

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
213	A	2	2	1.00	23	0.087
214	A	4	4	1.05	23	0.174
215	A	6	6	1.03	23	0.261
216	C	2	2	1.01	23	0.087
217	C	2	2	1.01	23	0.087
218	C	4	4	0.92	20	0.200
219	C	6	6	0.98	23	0.261
220	C	8	8	1.02	23	0.348
221	A	2	2	1.00	23	0.087
222	A	2	2	1.00	23	0.087
223	A	2	2	1.00	21	0.095
224	A	4	4	1.10	23	0.174
225	A	6	6	1.06	23	0.261
226	C	2	2	1.01	23	0.087
227	C	2	2	1.01	23	0.087
228	C	6	6	0.98	20	0.300
229	C	8	8	0.99	23	0.348
230	C	10	10	1.01	23	0.435
231	A	2	2	1.00	23	0.087
232	A	5	4	0.97	23	0.174
233	A	5	4	0.87	21	0.190
234	A	6	6	1.09	23	0.261
235	A	8	8	1.08	23	0.348
236	C	2	2	1.00	23	0.087
237	C	2	2	1.01	23	0.087
238	C	9	9	1.19	20	0.450
239	C	10	10	1.03	23	0.435
240	C	12	12	1.04	23	0.522
241	A	3	2	1.00	18	0.111
242	A	3	2	1.00	19	0.105
243	A	2	2	1.00	12	0.167
244	A	3	3	1.00	10	0.300

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
245	A	3	3	0.95	19	0.158
246	A	3	3	0.94	21	0.143
247	A	2	2	1.11	22	0.091
248	A	2	2	1.08	22	0.091
249	N/A	1	0	1.00	22	0.000
250	N/A	1	0	1.00	22	0.000
251	A	8	7	0.87	25	0.280
252	A	9	8	0.93	25	0.320
253	A	7	6	0.93	23	0.261
254	A	2	2	0.97	25	0.080
255	A	4	4	0.98	25	0.160
256	A	5	5	0.80	25	0.200
257	A	3	3	0.77	25	0.120
258	C	15	14	0.75	22	0.636
259	A	5	5	0.71	25	0.200
260	A	6	5	0.93	25	0.200
261	A	8	7	0.93	25	0.280
262	A	10	9	0.94	25	0.360
263	A	8	7	0.84	25	0.280
264	A	10	9	0.91	25	0.360
265	A	8	7	0.90	23	0.304
266	A	2	2	0.97	25	0.080
267	A	4	4	0.98	25	0.160
268	A	5	5	0.80	25	0.200
269	C	20	19	0.94	22	0.864
270	A	5	5	0.78	25	0.200
271	A	3	3	0.78	25	0.120
272	A	7	6	0.91	25	0.240
273	A	9	8	0.91	25	0.320
274	A	11	10	0.93	25	0.400
275	A	7	6	1.07	13	0.462
276	A	8	7	0.90	25	0.280

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
277	A	8	7	0.95	25	0.280
278	A	6	5	1.01	23	0.217
279	A	13	12	0.93	25	0.480
280	A	4	4	0.98	25	0.160
281	A	5	5	0.73	25	0.200
282	C	11	10	0.66	22	0.455
283	A	5	4	0.96	25	0.160
284	A	7	6	0.95	25	0.240
285	A	9	8	0.96	25	0.320
286	A	6	5	0.93	25	0.200
287	A	8	7	0.95	25	0.280
288	A	7	6	1.00	25	0.240
289	A	5	4	1.00	23	0.174
290	A	2	2	0.99	25	0.080
291	A	2	2	0.98	25	0.080
292	A	5	5	0.71	25	0.200
293	A	4	3	1.00	22	0.136
294	A	7	6	0.97	25	0.240
295	A	8	7	1.01	25	0.280
296	A	11	10	1.04	25	0.400
297	A	6	5	0.92	25	0.200
298	A	7	6	0.95	25	0.240
299	A	7	6	0.96	25	0.240
300	A	6	5	0.95	23	0.217
301	A	2	2	0.98	25	0.080
302	A	2	2	0.98	25	0.080
303	A	3	3	0.83	25	0.120
304	A	3	3	0.78	25	0.120
305	A	5	4	0.94	25	0.160
306	A	6	5	1.03	22	0.227
307	A	8	7	0.95	25	0.280
308	A	10	9	1.00	25	0.360

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
309	A	9	8	0.76	33	0.242
310	A	7	6	0.84	31	0.194
311	A	11	10	0.58	33	0.303
312	A	3	3	0.63	33	0.091
313	A	5	5	0.53	33	0.152
314	A	11	10	0.56	30	0.333
315	A	4	4	0.77	33	0.121
316	A	6	6	0.75	33	0.182
317	A	6	5	1.21	13	0.385
318	A	3	3	0.98	25	0.120
319	A	4	4	1.20	25	0.160
320	A	3	3	0.99	23	0.130
321	A	1	1	1.00	16	0.062
322	N/A	1	0	1.00	25	0.000
323	N/A	1	0	1.00	25	0.000
324	A	2	2	1.00	22	0.091
325	A	2	2	1.00	22	0.091
326	A	2	2	1.00	20	0.100
327	N/A	1	0	1.00	22	0.000
328	N/A	1	0	1.00	22	0.000
329	A	3	3	1.00	23	0.130
330	A	3	3	1.00	21	0.143
331	A	2	2	1.00	20	0.100
332	A	3	3	1.00	23	0.130
333	A	3	3	1.00	23	0.130
334	A	5	5	1.05	23	0.217
335	A	7	7	1.05	23	0.304
336	A	3	3	1.00	21	0.143
337	A	3	3	1.00	19	0.158
338	A	2	2	1.00	18	0.111
339	A	3	3	1.00	21	0.143
340	A	3	3	1.00	21	0.143

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
341	A	5	5	1.06	21	0.238
342	A	7	7	1.06	21	0.333
343	A	3	2	1.00	22	0.091
344	A	3	2	1.00	23	0.087
345	A	3	2	1.00	25	0.080
346	A	5	4	1.00	18	0.222
347	A	5	4	1.00	18	0.222
348	A	5	4	1.00	22	0.182
349	A	6	5	0.66	27	0.185
350	A	6	5	0.70	27	0.185
351	A	6	5	0.94	25	0.200
352	A	1	1	1.00	18	0.056
353	A	3	3	0.83	27	0.111
354	A	3	3	1.00	27	0.111
355	A	6	5	0.61	27	0.185
356	A	6	5	0.57	27	0.185
357	A	4	4	0.68	29	0.138
358	A	6	6	0.71	29	0.207
359	A	6	6	0.72	27	0.222
360	A	2	2	1.01	20	0.100
361	A	4	4	0.78	29	0.138
362	A	4	4	0.79	29	0.138
363	A	7	7	0.80	29	0.241
364	A	13	12	0.76	29	0.414
365	A	4	4	1.05	21	0.190
366	A	4	4	1.05	21	0.190
367	A	4	4	1.05	19	0.211
368	A	2	2	1.00	21	0.095
369	A	2	2	1.00	21	0.095
370	A	2	2	1.00	21	0.095
371	A	4	4	1.05	21	0.190
372	A	4	4	1.05	21	0.190

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
373	A	3	3	1.12	18	0.167
374	A	5	5	1.18	21	0.238
375	A	2	2	1.00	21	0.095
376	A	2	2	1.00	21	0.095
377	A	4	4	1.01	23	0.174
378	A	4	4	0.98	23	0.174
379	A	4	4	1.01	21	0.190
380	A	4	4	1.02	23	0.174
381	A	4	4	1.23	23	0.174
382	A	4	4	1.21	23	0.174
383	A	4	4	1.01	23	0.174
384	A	4	4	1.01	23	0.174
385	A	2	2	0.97	20	0.100
386	A	4	4	0.98	23	0.174
387	A	4	4	1.01	23	0.174
388	A	4	4	1.01	23	0.174
389	A	4	4	1.01	23	0.174
390	A	4	4	0.99	23	0.174
391	A	4	4	0.98	23	0.174
392	A	4	4	0.99	21	0.190
393	A	4	4	1.01	23	0.174
394	A	4	4	0.99	23	0.174
395	A	4	4	0.98	23	0.174
396	A	4	4	0.99	23	0.174
397	A	4	4	0.99	23	0.174
398	A	2	2	0.97	20	0.100
399	A	4	4	0.98	23	0.174
400	A	4	4	0.99	23	0.174
401	A	4	4	0.99	23	0.174
402	A	4	4	0.99	23	0.174
403	A	4	4	0.98	23	0.174
404	N/A	1	0	1.00	23	0.000

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
405	N/A	1	0	1.00	21	0.000
406	A	2	2	1.00	23	0.087
407	N/A	1	0	1.00	23	0.000
408	N/A	1	0	1.00	23	0.000
409	N/A	1	0	1.00	20	0.000
410	N/A	1	0	1.00	23	0.000
411	N/A	1	0	1.00	23	0.000
412	N/A	1	0	1.00	21	0.000
413	A	5	5	1.14	23	0.217
414	N/A	1	0	1.00	23	0.000
415	N/A	1	0	1.00	23	0.000
416	N/A	1	0	1.00	20	0.000
417	N/A	1	0	1.00	23	0.000
418	A	6	5	0.95	25	0.200
419	A	4	4	1.01	23	0.174
420	A	4	4	1.02	23	0.174
421	A	2	2	1.00	21	0.095
422	A	2	2	1.00	23	0.087
423	A	5	5	1.14	23	0.217
424	A	11	10	1.21	23	0.435
425	A	2	2	1.00	25	0.080
426	A	2	2	1.00	25	0.080
427	A	2	2	1.00	23	0.087
428	A	3	3	0.97	25	0.120
429	A	6	6	1.08	25	0.240
430	A	10	10	1.36	25	0.400
431	A	2	2	0.97	25	0.080
432	A	2	2	0.98	25	0.080
433	A	2	2	0.98	25	0.080
434	A	12	11	0.93	25	0.440
435	A	2	2	0.99	25	0.080

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
436	A	2	2	0.98	25	0.080
437	A	2	2	0.98	25	0.080
438	A	3	3	0.94	25	0.120
439	A	3	3	0.92	25	0.120
440	A	3	3	0.93	23	0.130
441	A	1	1	1.00	16	0.062
442	N/A	1	0	1.00	25	0.000
443	N/A	1	0	1.00	25	0.000
444	A	4	3	1.00	26	0.115
445	A	5	4	1.00	32	0.125
446	A	2	2	1.00	27	0.074
447	A	2	2	1.00	27	0.074
448	A	2	2	1.00	25	0.080
449	A	3	2	1.00	18	0.111
450	N/A	1	0	1.00	27	0.000
451	N/A	1	0	1.00	27	0.000
452	A	3	3	0.98	23	0.130
453	A	3	3	1.04	25	0.120
454	A	3	3	1.06	25	0.120

CHAPTER 3

LISTING OF INTEGRALS

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3.215 $\int \frac{a+b\log(cx^n)}{x^5(d+ex^2)}\,dx$ 1674
3.216 $\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx$ 1680
3.217 $\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx$ 1686
3.218 $\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx$ 1691
3.219 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx$ 1697
3.220 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx$ 1704
3.221 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$ 1712
3.222 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$ 1719
3.223 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$ 1725
3.224 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}\,dx$ 1731
3.225 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx$ 1737
3.226 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$ 1745
3.227 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$ 1751

3.228 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx$ 1757
3.229 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^2}\,dx$ 1764
3.230 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^2}\,dx$ 1772
3.231 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$ 1781
3.232 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$ 1788
3.233 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$ 1794
3.234 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^3}\,dx$ 1800
3.235 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^3}\,dx$ 1807
3.236 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$ 1815
3.237 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$ 1822
3.238 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx$ 1829
3.239 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx$ 1839
3.240 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}\,dx$ 1848
3.241 $\int \frac{x\log(cx^2)}{1-cx^2}\,dx$ 1858
3.242 $\int \frac{x\log\left(\frac{x^2}{c}\right)}{c-x^2}\,dx$ 1863
3.243 $\int \frac{\log(x)}{1-x^2}\,dx$ 1869
3.244 $\int \frac{\log(x)}{1+x^2}\,dx$ 1874
3.245 $\int \frac{a+b\log(cx)}{1-ex^2}\,dx$ 1879
3.246 $\int \frac{a+b\log(cx^n)}{1-ex^2}\,dx$ 1885
3.247 $\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx$ 1890
3.248 $\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx$ 1897
3.249 $\int \frac{1}{(d+ex^2)^2(a+b\log(cx^n))}\,dx$ 1905
3.250 $\int \frac{1}{(d+ex^2)^2(a+b\log(cx^n))^2}\,dx$ 1910
3.251 $\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$ 1915
3.252 $\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$ 1924
3.253 $\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$ 1933
3.254 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}\,dx$ 1940
3.255 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx$ 1946
3.256 $\int x^4\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$ 1952
3.257 $\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$ 1959
3.258 $\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx$ 1965
3.259 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx$ 1975
3.260 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4}\,dx$ 1982

3.261 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx$ 1988
3.262 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx$ 1996
3.263 $\int x^5(d+ex^2)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx$ 2005
3.264 $\int x^3(d+ex^2)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx$ 2014
3.265 $\int x(d+ex^2)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx$ 2023
3.266 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\,dx$ 2031
3.267 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx$ 2037
3.268 $\int x^2(d+ex^2)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx$ 2044
3.269 $\int (d+ex^2)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx$ 2051
3.270 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx$ 2063
3.271 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx$ 2070
3.272 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^6}\,dx$ 2077
3.273 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx$ 2084
3.274 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx$ 2092
3.275 $\int x\sqrt{4+x^2}\log(x)\,dx$ 2101
3.276 $\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$ 2107
3.277 $\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$ 2115
3.278 $\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$ 2122
3.279 $\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx$ 2129
3.280 $\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx$ 2137
3.281 $\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$ 2143
3.282 $\int \frac{a+b\log(cx^n)}{\sqrt{d+ex^2}}\,dx$ 2150
3.283 $\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex^2}}\,dx$ 2158
3.284 $\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx$ 2164
3.285 $\int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}\,dx$ 2171
3.286 $\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$ 2179
3.287 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$ 2187
3.288 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$ 2195
3.289 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$ 2202
3.290 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx$ 2208
3.291 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{3/2}}\,dx$ 2214
3.292 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$ 2220

3.293 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^{3/2}}\,dx$ . . . 2227
3.294 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}\,dx$ . . . 2233
3.295 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}\,dx$ . . . 2239
3.296 $\int \frac{a+b\log(cx^n)}{x^6(d+ex^2)^{3/2}}\,dx$ . . . 2246
3.297 $\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$ . . . 2255
3.298 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$ . . . 2263
3.299 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$ . . . 2271
3.300 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$ . . . 2278
3.301 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{5/2}}\,dx$ . . . 2285
3.302 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{5/2}}\,dx$ . . . 2291
3.303 $\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$ . . . 2297
3.304 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$ . . . 2304
3.305 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$ . . . 2311
3.306 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^{5/2}}\,dx$ . . . 2317
3.307 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{5/2}}\,dx$ . . . 2324
3.308 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{5/2}}\,dx$ . . . 2332
3.309 $\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$ . . . 2341
3.310 $\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$ . . . 2350
3.311 $\int \frac{a+b\log(cx^n)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx$ . . . 2357
3.312 $\int \frac{a+b\log(cx^n)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx$ . . . 2365
3.313 $\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$ . . . 2372
3.314 $\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$ . . . 2379
3.315 $\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx$ . . . 2387
3.316 $\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx$ . . . 2393
3.317 $\int \frac{x\log(x)}{\sqrt{-1+x^2}}\,dx$ . . . 2400
3.318 $\int (fx)^m\left(d+ex^2\right)^3\left(a+b\log\left(cx^n\right)\right)\,dx$ . . . 2406
3.319 $\int (fx)^m\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)\,dx$ . . . 2416
3.320 $\int (fx)^m\left(d+ex^2\right)\left(a+b\log\left(cx^n\right)\right)\,dx$ . . . 2426
3.321 $\int (fx)^m\left(a+b\log\left(cx^n\right)\right)\,dx$ . . . 2433
3.322 $\int \frac{(fx)^m(a+b\log(cx^n))}{d+ex^2}\,dx$ . . . 2438
3.323 $\int \frac{(fx)^m(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$ . . . 2443
3.324 $\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx$ . . . 2448

3.325 $\int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx$ . . . 2457
3.326 $\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx$ . . . 2465
3.327 $\int \frac{1}{(d+ex^3)^2(a+b\log(cx^n))}\,dx$ . . . 2474
3.328 $\int \frac{1}{(d+ex^3)^2(a+b\log(cx^n))^2}\,dx$ . . . 2479
3.329 $\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx$ . . . 2484
3.330 $\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx$ . . . 2491
3.331 $\int \frac{a+b\log(cx^n)}{d+\frac{e}{x}}\,dx$ . . . 2497
3.332 $\int \frac{a+b\log(cx^n)}{(d+\frac{e}{x})x}\,dx$ . . . 2503
3.333 $\int \frac{a+b\log(cx^n)}{(d+\frac{e}{x})x^2}\,dx$ . . . 2508
3.334 $\int \frac{a+b\log(cx^n)}{(d+\frac{e}{x})x^3}\,dx$ . . . 2514
3.335 $\int \frac{a+b\log(cx^n)}{(d+\frac{e}{x})x^4}\,dx$ . . . 2521
3.336 $\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx$ . . . 2528
3.337 $\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx$ . . . 2535
3.338 $\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx$ . . . 2541
3.339 $\int \frac{a+b\log(cx)}{(d+\frac{e}{x})x}\,dx$ . . . 2547
3.340 $\int \frac{a+b\log(cx)}{(d+\frac{e}{x})x^2}\,dx$ . . . 2552
3.341 $\int \frac{a+b\log(cx)}{(d+\frac{e}{x})x^3}\,dx$ . . . 2558
3.342 $\int \frac{a+b\log(cx)}{(d+\frac{e}{x})x^4}\,dx$ . . . 2565
3.343 $\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx$ . . . 2572
3.344 $\int \frac{x^{-1+n}\log\left(\frac{x^n}{d}\right)}{d-x^n}\,dx$ . . . 2577
3.345 $\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx$ . . . 2582
3.346 $\int \frac{\log\left(\frac{a}{x}\right)}{ax-x^2}\,dx$ . . . 2587
3.347 $\int \frac{\log\left(\frac{a}{x^2}\right)}{ax-x^3}\,dx$ . . . 2593
3.348 $\int \frac{\log(ax^{1-n})}{ax-x^n}\,dx$ . . . 2599
3.349 $\int (fx)^{-1+m}\left(d+ex^m\right)^3\left(a+b\log\left(cx^n\right)\right)\,dx$ . . . 2604
3.350 $\int (fx)^{-1+m}\left(d+ex^m\right)^2\left(a+b\log\left(cx^n\right)\right)\,dx$ . . . 2612
3.351 $\int (fx)^{-1+m}\left(d+ex^m\right)\left(a+b\log\left(cx^n\right)\right)\,dx$ . . . 2619
3.352 $\int (fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)\,dx$ . . . 2626
3.353 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx$ . . . 2631
3.354 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^2}\,dx$ . . . 2636
3.355 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^3}\,dx$ . . . 2641

3.356 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx$ . . . 2648
3.357 $\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))^2\,dx$ . . . 2655
3.358 $\int (fx)^{-1+m}(d+ex^m)^2(a+b\log(cx^n))^2\,dx$ . . . 2665
3.359 $\int (fx)^{-1+m}(d+ex^m)(a+b\log(cx^n))^2\,dx$ . . . 2675
3.360 $\int (fx)^{-1+m}(a+b\log(cx^n))^2\,dx$ . . . 2684
3.361 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m}\,dx$ . . . 2690
3.362 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx$ . . . 2697
3.363 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx$ . . . 2704
3.364 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx$ . . . 2712
3.365 $\int x^5(d+ex^r)(a+b\log(cx^n))\,dx$ . . . 2724
3.366 $\int x^3(d+ex^r)(a+b\log(cx^n))\,dx$ . . . 2730
3.367 $\int x(d+ex^r)(a+b\log(cx^n))\,dx$ . . . 2736
3.368 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx$ . . . 2742
3.369 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^3}\,dx$ . . . 2748
3.370 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx$ . . . 2755
3.371 $\int x^4(d+ex^r)(a+b\log(cx^n))\,dx$ . . . 2762
3.372 $\int x^2(d+ex^r)(a+b\log(cx^n))\,dx$ . . . 2768
3.373 $\int (d+ex^r)(a+b\log(cx^n))\,dx$ . . . 2774
3.374 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^2}\,dx$ . . . 2780
3.375 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^4}\,dx$ . . . 2786
3.376 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^6}\,dx$ . . . 2793
3.377 $\int x^5(d+ex^r)^2(a+b\log(cx^n))\,dx$ . . . 2800
3.378 $\int x^3(d+ex^r)^2(a+b\log(cx^n))\,dx$ . . . 2808
3.379 $\int x(d+ex^r)^2(a+b\log(cx^n))\,dx$ . . . 2816
3.380 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x}\,dx$ . . . 2824
3.381 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^3}\,dx$ . . . 2830
3.382 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^5}\,dx$ . . . 2838
3.383 $\int x^4(d+ex^r)^2(a+b\log(cx^n))\,dx$ . . . 2846
3.384 $\int x^2(d+ex^r)^2(a+b\log(cx^n))\,dx$ . . . 2853
3.385 $\int (d+ex^r)^2(a+b\log(cx^n))\,dx$ . . . 2862
3.386 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^2}\,dx$ . . . 2870
3.387 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^4}\,dx$ . . . 2877
3.388 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^6}\,dx$ . . . 2885
3.389 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^8}\,dx$ . . . 2893
3.390 $\int x^5(d+ex^r)^3(a+b\log(cx^n))\,dx$ . . . 2900
3.391 $\int x^3(d+ex^r)^3(a+b\log(cx^n))\,dx$ . . . 2909

3.392 $\int x(d+ex^r)^3 (a+b\log(cx^n))\, dx$ . . . 2918
3.393 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x}\, dx$ . . . 2927
3.394 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^3}\, dx$ . . . 2934
3.395 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^5}\, dx$ . . . 2942
3.396 $\int x^4(d+ex^r)^3 (a+b\log(cx^n))\, dx$ . . . 2950
3.397 $\int x^2(d+ex^r)^3 (a+b\log(cx^n))\, dx$ . . . 2959
3.398 $\int (d+ex^r)^3 (a+b\log(cx^n))\, dx$ . . . 2968
3.399 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^2}\, dx$ . . . 2977
3.400 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^4}\, dx$ . . . 2985
3.401 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^6}\, dx$ . . . 2993
3.402 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^8}\, dx$ . . . 3001
3.403 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^{10}}\, dx$ . . . 3009
3.404 $\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\, dx$ . . . 3017
3.405 $\int \frac{x(a+b\log(cx^n))}{d+ex^r}\, dx$ . . . 3022
3.406 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\, dx$ . . . 3027
3.407 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)}\, dx$ . . . 3032
3.408 $\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\, dx$ . . . 3037
3.409 $\int \frac{a+b\log(cx^n)}{d+ex^r}\, dx$ . . . 3042
3.410 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}\, dx$ . . . 3047
3.411 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\, dx$ . . . 3052
3.412 $\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\, dx$ . . . 3057
3.413 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\, dx$ . . . 3062
3.414 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}\, dx$ . . . 3069
3.415 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\, dx$ . . . 3074
3.416 $\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\, dx$ . . . 3079
3.417 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)^2}\, dx$ . . . 3084
3.418 $\int \frac{a+b\log(cx^n)}{x(c-x^{-n})}\, dx$ . . . 3089
3.419 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x}\, dx$ . . . 3095
3.420 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x}\, dx$ . . . 3102
3.421 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\, dx$ . . . 3108
3.422 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\, dx$ . . . 3114
3.423 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\, dx$ . . . 3119
3.424 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^3}\, dx$ . . . 3126
3.425 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))^2}{x}\, dx$ . . . 3135

3.426 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))^2}{x}\,dx$ 3143
3.427 $\int \frac{(d+ex^r)(a+b\log(cx^n))^2}{x}\,dx$ 3150
3.428 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx$ 3156
3.429 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx$ 3162
3.430 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx$ 3170
3.431 $\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x}\,dx$ 3180
3.432 $\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx$ 3186
3.433 $\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx$ 3191
3.434 $\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx$ 3196
3.435 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx$ 3204
3.436 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{5/2}}\,dx$ 3209
3.437 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx$ 3214
3.438 $\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))\,dx$ 3220
3.439 $\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))\,dx$ 3228
3.440 $\int (fx)^m (d+ex^r) (a+b\log(cx^n))\,dx$ 3237
3.441 $\int (fx)^m (a+b\log(cx^n))\,dx$ 3245
3.442 $\int \frac{(fx)^m(a+b\log(cx^n))}{d+ex^r}\,dx$ 3250
3.443 $\int \frac{(fx)^m(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$ 3255
3.444 $\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx$ 3260
3.445 $\int (fx)^{-1-(1+q)r} (d+ex^r)^q (a+b\log(cx^n))\,dx$ 3266
3.446 $\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p\,dx$ 3272
3.447 $\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p\,dx$ 3279
3.448 $\int (fx)^m (d+ex^r) (a+b\log(cx^n))^p\,dx$ 3286
3.449 $\int (fx)^m (a+b\log(cx^n))^p\,dx$ 3292
3.450 $\int \frac{(fx)^m(a+b\log(cx^n))^p}{d+ex^r}\,dx$ 3297
3.451 $\int \frac{(fx)^m(a+b\log(cx^n))^p}{(d+ex^r)^2}\,dx$ 3302
3.452 $\int \frac{(f+gx)(a+b\log(cx^n))}{(d+ex)^3}\,dx$ 3307
3.453 $\int \frac{(f+gx)(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$ 3314
3.454 $\int \frac{(f+gx)(a+b\log(cx^n))^3}{(d+ex)^3}\,dx$ 3321

3.1 $\int x^3(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx$

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Optimal result

Integrand size = 19, antiderivative size = 48

$$\int x^3(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{16}bdnx^4-\frac{1}{25}benx^5+\frac{1}{20}\left(5dx^4+4ex^5\right)\left(a+b\log\left(cx^n\right)\right)$$

output
```
-1/16*b*d*n*x^4-1/25*b*e*n*x^5+1/20*(4*e*x^5+5*d*x^4)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.00

$$\int x^3(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{1}{400}x^4(20a(5d+4ex)-bn(25d+16ex)+20b(5d+4ex)\log\left(cx^n\right))$$

input
```
Integrate[x^3*(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
(x^4*(20*a*(5*d + 4*e*x) - b*n*(25*d + 16*e*x) + 20*b*(5*d + 4*e*x)*Log[c*
x^n]))/400
```

Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.211, Rules used = {2771, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3(d+ex)\left(a+b\log\left(cx^n\right)\right)dx$$

$$\Big\downarrow \ 2771$$

$$\frac{1}{20}\left(5dx^4+4ex^5\right)\left(a+b\log\left(cx^n\right)\right)-bn\int \frac{1}{20}x^3(5d+4ex)dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{20}\left(5dx^4+4ex^5\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{20}bn\int x^3(5d+4ex)dx$$

$$\Big\downarrow \ 49$$

$$\frac{1}{20}\left(5dx^4+4ex^5\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{20}bn\int \left(4ex^4+5dx^3\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{20}\left(5dx^4+4ex^5\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{20}bn\left(\frac{5dx^4}{4}+\frac{4ex^5}{5}\right)$$

input
```
Int[x^3*(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
-1/20*(b*n*((5*d*x^4)/4 + (4*e*x^5)/5)) + ((5*d*x^4 + 4*e*x^5)*(a + b*Log[
c*x^n]))/20
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.30 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.21

method	result
parallelrisch	$\frac{x^5 \ln(c\,x^n) be}{5}-\frac{ben\,x^5}{25}+\frac{ea\,x^5}{5}+\frac{x^4 \ln(c\,x^n) bd}{4}-\frac{bdn\,x^4}{16}+\frac{da\,x^4}{4}$
risch	$\frac{b\,x^4(4ex+5d)\ln(x^n)}{20}+\frac{i\pi be\,x^5 \operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2}{10}-\frac{i\pi be\,x^5 \operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)\operatorname{csgn}(ic)}{10}-\frac{i\pi be\,x^5 \operatorname{csgn}(ic\,x^n)^3}{10}$

input
```
int(x^3*(e*x+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/5*x^5*ln(c*x^n)*b*e-1/25*b*e*n*x^5+1/5*e*a*x^5+1/4*x^4*ln(c*x^n)*b*d-1/1
6*b*d*n*x^4+1/4*d*a*x^4
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^3(d+ex)\,(a+b\log{(cx^n)})\;dx = -\frac{1}{25}\,(ben-5\,ae)x^5 - \frac{1}{16}\,(bdn-4\,ad)x^4 + \frac{1}{20}\left(4\,bex^5+5\,bdx^4\right)\log{(c)} + \frac{1}{20}\left(4\,benx^5+5\,bdnx^4\right)\log{(x)}$$

input
```
integrate(x^3*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/25*(b*e*n - 5*a*e)*x^5 - 1/16*(b*d*n - 4*a*d)*x^4 + 1/20*(4*b*e*x^5 + 5
*b*d*x^4)*log(c) + 1/20*(4*b*e*n*x^5 + 5*b*d*n*x^4)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.38

$$\int x^3(d+ex)\,(a+b\log{(cx^n)})\;dx = \frac{adx^4}{4} + \frac{aex^5}{5} - \frac{bdnx^4}{16} + \frac{bdx^4\log{(cx^n)}}{4} - \frac{benx^5}{25} + \frac{bex^5\log{(cx^n)}}{5}$$

input
```
integrate(x**3*(e*x+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x**4/4 + a*e*x**5/5 - b*d*n*x**4/16 + b*d*x**4*log(c*x**n)/4 - b*e*n*x
**5/25 + b*e*x**5*log(c*x**n)/5
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.19

$$\int x^3(d+ex)(a+b\log(cx^n))\,dx = -\frac{1}{25}benx^5 + \frac{1}{5}bex^5\log(cx^n) - \frac{1}{16}bdnx^4 + \frac{1}{5}aex^5 + \frac{1}{4}bdx^4\log(cx^n) + \frac{1}{4}adx^4$$

input
```
integrate(x^3*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/25*b*e*n*x^5 + 1/5*b*e*x^5*log(c*x^n) - 1/16*b*d*n*x^4 + 1/5*a*e*x^5 +
1/4*b*d*x^4*log(c*x^n) + 1/4*a*d*x^4
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^3(d+ex)(a+b\log(cx^n))\,dx = \frac{1}{5}benx^5\log(x) - \frac{1}{25}benx^5 + \frac{1}{5}bex^5\log(c) + \frac{1}{4}bdnx^4\log(x) - \frac{1}{16}bdnx^4 + \frac{1}{5}aex^5 + \frac{1}{4}bdx^4\log(c) + \frac{1}{4}adx^4$$

input
```
integrate(x^3*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/5*b*e*n*x^5*log(x) - 1/25*b*e*n*x^5 + 1/5*b*e*x^5*log(c) + 1/4*b*d*n*x^4
*log(x) - 1/16*b*d*n*x^4 + 1/5*a*e*x^5 + 1/4*b*d*x^4*log(c) + 1/4*a*d*x^4
```

Mupad [B] (verification not implemented)

Time = 28.31 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06

$$\int x^3(d+ex)\,(a+b\log\left(cx^n\right))\;dx=\ln\left(c\,x^n\right)\,\left(\frac{b\,e\,x^5}{5}+\frac{b\,d\,x^4}{4}\right)+\frac{d\,x^4\,\left(4\,a-b\,n\right)}{16}+\frac{e\,x^5\,\left(5\,a-b\,n\right)}{25}$$

input
```
int(x^3*(a + b*log(c*x^n))*(d + e*x),x)
```

output
```
log(c*x^n)*((b*d*x^4)/4 + (b*e*x^5)/5) + (d*x^4*(4*a - b*n))/16 + (e*x^5*(
5*a - b*n))/25
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 47, normalized size of antiderivative = 0.98

$$\int x^3(d+ex)\,(a+b\log\left(cx^n\right))\;dx=\frac{x^4(100\log(x^nc)\,bd+80\log(x^nc)\,bex+100ad+80aex-25bdn-16benx)}{400}$$

input
```
int(x^3*(e*x+d)*(a+b*log(c*x^n)),x)
```

output
```
(x**4*(100*log(x**n*c)*b*d + 80*log(x**n*c)*b*e*x + 100*a*d + 80*a*e*x - 2
5*b*d*n - 16*b*e*n*x))/400
```

3.2 $\int x^2(d+ex)(a+b\log(cx^n))\,dx$

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Giac [A] (verification not implemented) 198
Mupad [B] (verification not implemented) 199
Reduce [B] (verification not implemented) 199

Optimal result

Integrand size = 19, antiderivative size = 48

$$\int x^2(d+ex)(a+b\log(cx^n))\,dx=-\frac{1}{9}bdnx^3-\frac{1}{16}benx^4+\frac{1}{12}\left(4dx^3+3ex^4\right)(a+b\log(cx^n))$$

output
```
-1/9*b*d*n*x^3-1/16*b*e*n*x^4+1/12*(3*e*x^4+4*d*x^3)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 45, normalized size of antiderivative = 0.94

$$\int x^2(d+ex)(a+b\log(cx^n))\,dx=\frac{1}{144}x^3(48ad-16bdn+36aex-9benx+12b(4d+3ex)\log(cx^n))$$

input
```
Integrate[x^2*(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
(x^3*(48*a*d - 16*b*d*n + 36*a*e*x - 9*b*e*n*x + 12*b*(4*d + 3*e*x)*Log[c*
x^n]))/144
```

Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.211$, Rules used = {2771, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{12}\left(4dx^3+3ex^4\right)\left(a+b\log\left(cx^n\right)\right)-bn\int\frac{1}{12}x^2(4d+3ex)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{12}\left(4dx^3+3ex^4\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{12}bn\int x^2(4d+3ex)dx$$

$$\Big\downarrow \text{49}$$

$$\frac{1}{12}\left(4dx^3+3ex^4\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{12}bn\int\left(3ex^3+4dx^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{12}\left(4dx^3+3ex^4\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{12}bn\left(\frac{4dx^3}{3}+\frac{3ex^4}{4}\right)$$

input
```
Int[x^2*(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
-1/12*(b*n*((4*d*x^3)/3 + (3*e*x^4)/4)) + ((4*d*x^3 + 3*e*x^4)*(a + b*Log[
c*x^n]))/12
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.24 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.21

method	result
parallelrisch	$\frac{x^{4} b e \ln \left(c \,x^{n}\right)}{4}-\frac{b e n \,x^{4}}{16}+\frac{x^{4} a e}{4}+\frac{x^{3} \ln \left(c \,x^{n}\right) b d}{3}-\frac{b d n \,x^{3}}{9}+\frac{x^{3} d a}{3}$
risch	$\frac{b \,x^{3} \left(3 e x +4 d \right) \ln \left(x^{n}\right)}{12}+\frac{i \pi b e \,x^{4} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right)^{2}}{8}-\frac{i \pi b e \,x^{4} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right) \operatorname{csgn}\left(i c \right)}{8}-\frac{i \pi b e \,x^{4} \operatorname{csgn}\left(i c \,x^{n}\right)^{3}}{8}$

input
```
int(x^2*(e*x+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/4*x^4*b*e*ln(c*x^n)-1/16*b*e*n*x^4+1/4*x^4*a*e+1/3*x^3*ln(c*x^n)*b*d-1/9
*b*d*n*x^3+1/3*x^3*d*a
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{16}\,(ben-4\,ae)x^4-\frac{1}{9}\,(bdn-3\,ad)x^3+\frac{1}{12}\,\left(3\,bex^4+4\,bdx^3\right)\log\left(c\right)+\frac{1}{12}\,\left(3\,benx^4+4\,bdnx^3\right)\log\left(x\right)$$

input
```
integrate(x^2*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/16*(b*e*n - 4*a*e)*x^4 - 1/9*(b*d*n - 3*a*d)*x^3 + 1/12*(3*b*e*x^4 + 4*
b*d*x^3)*log(c) + 1/12*(3*b*e*n*x^4 + 4*b*d*n*x^3)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.38

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{adx^3}{3}+\frac{aex^4}{4}-\frac{bdnx^3}{9}+\frac{bdx^3\log\left(cx^n\right)}{3}-\frac{benx^4}{16}+\frac{bex^4\log\left(cx^n\right)}{4}$$

input
```
integrate(x**2*(e*x+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x**3/3 + a*e*x**4/4 - b*d*n*x**3/9 + b*d*x**3*log(c*x**n)/3 - b*e*n*x*
*4/16 + b*e*x**4*log(c*x**n)/4
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.19

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{16}\,benx^4+\frac{1}{4}\,bex^4\log\left(cx^n\right)-\frac{1}{9}\,bdnx^3+\frac{1}{4}\,aex^4+\frac{1}{3}\,bdx^3\log\left(cx^n\right)+\frac{1}{3}\,adx^3$$

input
```
integrate(x^2*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/16*b*e*n*x^4 + 1/4*b*e*x^4*log(c*x^n) - 1/9*b*d*n*x^3 + 1/4*a*e*x^4 + 1
/3*b*d*x^3*log(c*x^n) + 1/3*a*d*x^3
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{1}{4}\,benx^4\log\left(x\right)-\frac{1}{16}\,benx^4+\frac{1}{4}\,bex^4\log\left(c\right)+\frac{1}{3}\,bdnx^3\log\left(x\right)-\frac{1}{9}\,bdnx^3+\frac{1}{4}\,aex^4+\frac{1}{3}\,bdx^3\log\left(c\right)+\frac{1}{3}\,adx^3$$

input
```
integrate(x^2*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/4*b*e*n*x^4*log(x) - 1/16*b*e*n*x^4 + 1/4*b*e*x^4*log(c) + 1/3*b*d*n*x^3
*log(x) - 1/9*b*d*n*x^3 + 1/4*a*e*x^4 + 1/3*b*d*x^3*log(c) + 1/3*a*d*x^3
```

Mupad [B] (verification not implemented)

Time = 28.07 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=\ln\left(c\,x^n\right)\,\left(\frac{b\,e\,x^4}{4}+\frac{b\,d\,x^3}{3}\right)+\frac{d\,x^3\,\left(3\,a-b\,n\right)}{9}+\frac{e\,x^4\,\left(4\,a-b\,n\right)}{16}$$

input
```
int(x^2*(a + b*log(c*x^n))*(d + e*x),x)
```

output
```
log(c*x^n)*((b*d*x^3)/3 + (b*e*x^4)/4) + (d*x^3*(3*a - b*n))/9 + (e*x^4*(4
*a - b*n))/16
```

Reduce [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 47, normalized size of antiderivative = 0.98

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{x^3\left(48\log\left(x^n c\right)bd+36\log\left(x^n c\right)bex+48ad+36aex-16bdn-9benx\right)}{144}$$

input
```
int(x^2*(e*x+d)*(a+b*log(c*x^n)),x)
```

output
```
(x**3*(48*log(x**n*c)*b*d + 36*log(x**n*c)*b*e*x + 48*a*d + 36*a*e*x - 16*
b*d*n - 9*b*e*n*x))/144
```

3.3 $\int x(d+ex)(a+b\log(cx^n))\,dx$

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Reduce [B] (verification not implemented) 205

Optimal result

Integrand size = 17, antiderivative size = 48

$$\int x(d+ex)(a+b\log(cx^n))\,dx=-\frac{1}{4}bdnx^2-\frac{1}{9}benx^3+\frac{1}{6}\left(3dx^2+2ex^3\right)(a+b\log(cx^n))$$

output
```
-1/4*b*d*n*x^2-1/9*b*e*n*x^3+1/6*(2*e*x^3+3*d*x^2)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.00

$$\int x(d+ex)(a+b\log(cx^n))\,dx=\frac{1}{36}x^2(6a(3d+2ex)-bn(9d+4ex)+6b(3d+2ex)\log(cx^n))$$

input
```
Integrate[x*(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
(x^2*(6*a*(3*d + 2*e*x) - b*n*(9*d + 4*e*x) + 6*b*(3*d + 2*e*x)*Log[c*x^n]
))/36
```

Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.235$, Rules used = {2771, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx$$

$$\Big\downarrow \text{ 2771}$$

$$\frac{1}{6}\left(3dx^2+2ex^3\right)\left(a+b\log\left(cx^n\right)\right)-bn\int\frac{1}{6}x(3d+2ex)dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{6}\left(3dx^2+2ex^3\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{6}bn\int x(3d+2ex)dx$$

$$\Big\downarrow \text{ 49}$$

$$\frac{1}{6}\left(3dx^2+2ex^3\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{6}bn\int\left(2ex^2+3dx\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{6}\left(3dx^2+2ex^3\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{6}bn\left(\frac{3dx^2}{2}+\frac{2ex^3}{3}\right)$$

input
```
Int[x*(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
-1/6*(b*n*((3*d*x^2)/2 + (2*e*x^3)/3)) + ((3*d*x^2 + 2*e*x^3)*(a + b*Log[c
*x^n]))/6
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.21

method	result
parallelrisch	$\frac{x^{3} b e \ln \left(c \,x^{n}\right)}{3}-\frac{b e n \,x^{3}}{9}+\frac{x^{3} a e}{3}+\frac{x^{2} \ln \left(c \,x^{n}\right) b d}{2}-\frac{b d n \,x^{2}}{4}+\frac{d a \,x^{2}}{2}$
risch	$\frac{b \,x^{2} \left(2 e x +3 d \right) \ln \left(x^{n}\right)}{6}+\frac{i \pi b e \,x^{3} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right)^{2}}{6}-\frac{i \pi b e \,x^{3} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right) \operatorname{csgn}\left(i c \right)}{6}-\frac{i \pi b e \,x^{3} \operatorname{csgn}\left(i c \,x^{n}\right)^{3}}{6}$

input
```
int(x*(e*x+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/3*x^3*b*e*ln(c*x^n)-1/9*b*e*n*x^3+1/3*x^3*a*e+1/2*x^2*ln(c*x^n)*b*d-1/4*
b*d*n*x^2+1/2*d*a*x^2
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{9}\,(ben-3\,ae)x^3-\frac{1}{4}\,(bdn-2\,ad)x^2+\frac{1}{6}\,\left(2\,bex^3+3\,bdx^2\right)\log\left(c\right)+\frac{1}{6}\,\left(2\,benx^3+3\,bdnx^2\right)\log\left(x\right)$$

input
```
integrate(x*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/9*(b*e*n - 3*a*e)*x^3 - 1/4*(b*d*n - 2*a*d)*x^2 + 1/6*(2*b*e*x^3 + 3*b*
d*x^2)*log(c) + 1/6*(2*b*e*n*x^3 + 3*b*d*n*x^2)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.38

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{adx^2}{2}+\frac{aex^3}{3}-\frac{bdnx^2}{4}+\frac{bdx^2\log\left(cx^n\right)}{2}-\frac{benx^3}{9}+\frac{bex^3\log\left(cx^n\right)}{3}$$

input
```
integrate(x*(e*x+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x**2/2 + a*e*x**3/3 - b*d*n*x**2/4 + b*d*x**2*log(c*x**n)/2 - b*e*n*x*
*3/9 + b*e*x**3*log(c*x**n)/3
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.19

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{9}\,benx^3+\frac{1}{3}\,bex^3\log\left(cx^n\right)-\frac{1}{4}\,bdnx^2+\frac{1}{3}\,aex^3+\frac{1}{2}\,bdx^2\log\left(cx^n\right)+\frac{1}{2}\,adx^2$$

input
```
integrate(x*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/9*b*e*n*x^3 + 1/3*b*e*x^3*log(c*x^n) - 1/4*b*d*n*x^2 + 1/3*a*e*x^3 + 1/
2*b*d*x^2*log(c*x^n) + 1/2*a*d*x^2
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{1}{3}\,benx^3\log\left(x\right)-\frac{1}{9}\,benx^3+\frac{1}{3}\,bex^3\log\left(c\right)+\frac{1}{2}\,bdnx^2\log\left(x\right)-\frac{1}{4}\,bdnx^2+\frac{1}{3}\,aex^3+\frac{1}{2}\,bdx^2\log\left(c\right)+\frac{1}{2}\,adx^2$$

input
```
integrate(x*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/3*b*e*n*x^3*log(x) - 1/9*b*e*n*x^3 + 1/3*b*e*x^3*log(c) + 1/2*b*d*n*x^2*
log(x) - 1/4*b*d*n*x^2 + 1/3*a*e*x^3 + 1/2*b*d*x^2*log(c) + 1/2*a*d*x^2
```

Mupad [B] (verification not implemented)

Time = 27.62 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=\ln\left(c\,x^n\right)\,\left(\frac{b\,e\,x^3}{3}+\frac{b\,d\,x^2}{2}\right)+\frac{d\,x^2\,\left(2\,a-b\,n\right)}{4}+\frac{e\,x^3\,\left(3\,a-b\,n\right)}{9}$$

input
```
int(x*(a + b*log(c*x^n))*(d + e*x),x)
```

output
```
log(c*x^n)*((b*d*x^2)/2 + (b*e*x^3)/3) + (d*x^2*(2*a - b*n))/4 + (e*x^3*(3
*a - b*n))/9
```

Reduce [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 47, normalized size of antiderivative = 0.98

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{x^2(18\log(x^nc)\,bd+12\log(x^nc)\,bex+18ad+12aex-9bdn-4benx)}{36}$$

input
```
int(x*(e*x+d)*(a+b*log(c*x^n)),x)
```

output
```
(x**2*(18*log(x**n*c)*b*d + 12*log(x**n*c)*b*e*x + 18*a*d + 12*a*e*x - 9*b
*d*n - 4*b*e*n*x))/36
```

3.4 $\int (d+ex)\,(a+b\log(cx^n))\;dx$

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Giac [A] (verification not implemented) . . . 210
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Optimal result

Integrand size = 16, antiderivative size = 55

$$\int (d+ex)\,(a+b\log(cx^n))\;dx = -bdnx-\frac{1}{4}benx^2-\frac{bd^2n\log(x)}{2e}+\frac{(d+ex)^2\,(a+b\log(cx^n))}{2e}$$

output
```
-b*d*n*x-1/4*b*e*n*x^2-1/2*b*d^2*n*ln(x)/e+1/2*(e*x+d)^2*(a+b*ln(c*x^n))/e
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.00

$$\int (d+ex)\,(a+b\log(cx^n))\;dx = adx-bdnx+\frac{1}{2}aex^2-\frac{1}{4}benx^2+bdx\log(cx^n)+\frac{1}{2}bex^2\log(cx^n)$$

input
```
Integrate[(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
a*d*x - b*d*n*x + (a*e*x^2)/2 - (b*e*n*x^2)/4 + b*d*x*Log[c*x^n] + (b*e*x^
2*Log[c*x^n])/2
```

Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.02, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {2750, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2750}$$

$$\frac{(d+ex)^2(a+b\log(cx^n))}{2e}-bn\int \frac{(d+ex)^2}{2ex}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{(d+ex)^2(a+b\log(cx^n))}{2e}-\frac{bn\int \frac{(d+ex)^2}{x}dx}{2e}$$

$$\Big\downarrow \text{49}$$

$$\frac{(d+ex)^2(a+b\log(cx^n))}{2e}-\frac{bn\int \left(\frac{d^2}{x}+2ed+e^2x\right)dx}{2e}$$

$$\Big\downarrow \text{2009}$$

$$\frac{(d+ex)^2(a+b\log(cx^n))}{2e}-\frac{bn\left(d^2\log(x)+2dex+\frac{e^2x^2}{2}\right)}{2e}$$

input
```
Int[(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
-1/2*(b*n*(2*d*e*x + (e^2*x^2)/2 + d^2*Log[x]))/e + ((d + e*x)^2*(a + b*Lo
g[c*x^n]))/(2*e)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2750
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Simp[(a + b*Log[c*x^n])
  u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b,
 c, d, e, n, r}, x] && IGtQ[q, 0]
```

Maple [A] (verified)

Time = 0.23 (sec) , antiderivative size = 50, normalized size of antiderivative = 0.91

method	result
parallelrisch	$\frac{b e\,x^{2} \ln \left(c\,x^{n}\right)}{2}-\frac{b e n\,x^{2}}{4}+\frac{a e\,x^{2}}{2}+x \ln \left(c\,x^{n}\right) b d -b d n x +x d a$
default	$x d a +\frac{a e\,x^{2}}{2}+b d \left(x \ln \left(c\,x^{n}\right)-x n \right)+\frac{b e\,x^{2} \ln \left(c\,{\mathrm e}^{n \ln \left(x \right)}\right)}{2}-\frac{b e n\,x^{2}}{4}$
parts	$a \left(\frac{1}{2} e\,x^{2}+d x \right)+b \left(x \ln \left(c\,x^{n}\right) d -x d n +\frac{x^{2} e \ln \left(c\,{\mathrm e}^{n \ln \left(x \right)}\right)}{2}-\frac{e n\,x^{2}}{4}\right)$
norman	$\left(-\frac{1}{4} b e n +\frac{1}{2} e a \right) x^{2}+\left(-b d n +d a \right) x +b d x \ln \left(c\,{\mathrm e}^{n \ln \left(x \right)}\right)+\frac{b e\,x^{2} \ln \left(c\,{\mathrm e}^{n \ln \left(x \right)}\right)}{2}$
risch	$\frac{b x \left(e x +2 d \right) \ln \left(x^{n}\right)}{2}+\frac{i \pi \,\operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c\,x^{n}\right)^{2} b e\,x^{2}}{4}-\frac{i \pi \,\operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c\,x^{n}\right) \operatorname{csgn}\left(i c \right) b e\,x^{2}}{4}-\frac{i \pi \operatorname{csgn}\left(i c\,x^{n}\right)^{3} b e\,x^{2}}{4}+$

input
```
int((e*x+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/2*b*e*x^2*ln(c*x^n)-1/4*b*e*n*x^2+1/2*a*e*x^2+x*ln(c*x^n)*b*d-b*d*n*x+x*
d*a
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.11

$$\int (d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{4}\,(ben-2\,ae)x^2-(bdn-ad)x+\frac{1}{2}\,\left(bex^2+2\,bdx\right)\log\left(c\right)+\frac{1}{2}\,\left(benx^2+2\,bdnx\right)\log\left(x\right)$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/4*(b*e*n - 2*a*e)*x^2 - (b*d*n - a*d)*x + 1/2*(b*e*x^2 + 2*b*d*x)*log(c
) + 1/2*(b*e*n*x^2 + 2*b*d*n*x)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.02

$$\int (d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx = adx+\frac{aex^2}{2}-bdnx+bdx\log\left(cx^n\right)-\frac{benx^2}{4}+\frac{bex^2\log\left(cx^n\right)}{2}$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x + a*e*x**2/2 - b*d*n*x + b*d*x*log(c*x**n) - b*e*n*x**2/4 + b*e*x**2
*log(c*x**n)/2
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 49, normalized size of antiderivative = 0.89

$$\int (d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{4}\,benx^2+\frac{1}{2}\,bex^2\log\left(cx^n\right)-bdnx+\frac{1}{2}\,aex^2+bdx\log\left(cx^n\right)+adx$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/4*b*e*n*x^2 + 1/2*b*e*x^2*log(c*x^n) - b*d*n*x + 1/2*a*e*x^2 + b*d*x*lo
g(c*x^n) + a*d*x
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.05

$$\int (d+ex)(a+b\log(cx^n))\,dx = \frac{1}{2}\,benx^2\log(x) - \frac{1}{4}\,benx^2 + \frac{1}{2}\,bex^2\log(c) + bdnx\log(x) - bdnx + \frac{1}{2}\,aex^2 + bdx\log(c) + adx$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/2*b*e*n*x^2*log(x) - 1/4*b*e*n*x^2 + 1/2*b*e*x^2*log(c) + b*d*n*x*log(x)
 - b*d*n*x + 1/2*a*e*x^2 + b*d*x*log(c) + a*d*x
```

Mupad [B] (verification not implemented)

Time = 28.30 (sec) , antiderivative size = 43, normalized size of antiderivative = 0.78

$$\int (d+ex)(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,e\,x^2}{2}+b\,d\,x\right)+d\,x\,(a-b\,n)+\frac{e\,x^2\,(2\,a-b\,n)}{4}$$

input
```
int((a + b*log(c*x^n))*(d + e*x),x)
```

output
```
log(c*x^n)*(b*d*x + (b*e*x^2)/2) + d*x*(a - b*n) + (e*x^2*(2*a - b*n))/4
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 45, normalized size of antiderivative = 0.82

$$\int (d+ex)\,(a+b\log(cx^n))\;dx = \frac{x(4\log(x^nc)\,bd+2\log(x^nc)\,bex+4ad+2aex-4bdn-benx)}{4}$$

input
```
int((e*x+d)*(a+b*log(c*x^n)),x)
```

output
```
(x*(4*log(x**n*c)*b*d + 2*log(x**n*c)*b*e*x + 4*a*d + 2*a*e*x - 4*b*d*n -
b*e*n*x))/4
```

3.5 $\int \frac{(d+ex)(a+b\log(cx^n))}{x} \, dx$

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Optimal result

Integrand size = 19, antiderivative size = 44

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x} \, dx = aex - benx + bex\log(cx^n) + \frac{d(a+b\log(cx^n))^2}{2bn}$$

output
```
a*e*x-b*e*n*x+b*e*x*ln(c*x^n)+1/2*d*(a+b*ln(c*x^n))^2/b/n
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 43, normalized size of antiderivative = 0.98

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x} \, dx = aex - benx + ad\log(x) + bex\log(cx^n) + \frac{bd\log^2(cx^n)}{2n}$$

input
```
Integrate[((d + e*x)*(a + b*Log[c*x^n]))/x,x]
```

output
```
a*e*x - b*e*n*x + a*d*Log[x] + b*e*x*Log[c*x^n] + (b*d*Log[c*x^n]^2)/(2*n)
```

Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$, Rules used = {2788, 2009, 2738}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x}dx$$
$$\Big\downarrow \text{2788}$$
$$d\int \frac{a+b\log(cx^n)}{x}dx+e\int (a+b\log(cx^n))\,dx$$
$$\Big\downarrow \text{2009}$$
$$d\int \frac{a+b\log(cx^n)}{x}dx+e(ax+bx\log(cx^n)-bnx)$$
$$\Big\downarrow \text{2738}$$
$$\frac{d(a+b\log(cx^n))^2}{2bn}+e(ax+bx\log(cx^n)-bnx)$$

input
```
Int[((d + e*x)*(a + b*Log[c*x^n]))/x,x]
```

output
```
(d*(a + b*Log[c*x^n])^2)/(2*b*n) + e*(a*x - b*n*x + b*x*Log[c*x^n])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2738
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

rule 2788
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.))
/(x_), x_Symbol] :> Simp[d   Int[(d + e*x)^(q - 1)*((a + b*Log[c*x^n])^p/x)
, x], x] + Simp[e   Int[(d + e*x)^(q - 1)*(a + b*Log[c*x^n])^p, x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && GtQ[q, 0] && IntegerQ[2*q]
```

Maple [A] (verified)

Time = 0.23 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.05

method	result
default	$\ln(x)\,ad + aex + bex\ln\left(c\,e^{n\ln(x)}\right) + \frac{bd\ln\left(c\,e^{n\ln(x)}\right)^2}{2n} - benx$
parts	$\ln(x)\,ad + aex + bex\ln\left(c\,e^{n\ln(x)}\right) + \frac{bd\ln\left(c\,e^{n\ln(x)}\right)^2}{2n} - benx$
parallelrisch	$\frac{2x\ln(c\,x^n)ben - 2xbe\,n^2 + 2\ln(x)adn + 2xaen + bd\ln(c\,x^n)^2}{2n}$
norman	$(-ben + ea)\,x + \frac{da\ln\left(c\,e^{n\ln(x)}\right)}{n} + bex\ln\left(c\,e^{n\ln(x)}\right) + \frac{bd\ln\left(c\,e^{n\ln(x)}\right)^2}{2n}$
risch	$(bex + bd\ln(x))\ln(x^n) - \frac{bdn\ln(x)^2}{2} + \frac{i\pi bex\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2}{2} - \frac{i\pi bex\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)\,\mathrm{csgn}(ic)}{2}$

input
```
int((e*x+d)*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
ln(x)*a*d+a*e*x+b*e*x*ln(c*exp(n*ln(x)))+1/2*b*d/n*ln(c*exp(n*ln(x)))^2-b*
e*n*x
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.02

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{1}{2}\,bdn\log(x)^2 + bex\log(c) - (ben - ae)x + (benx + bd\log(c) + ad)\log(x)$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/2*b*d*n*log(x)^2 + b*e*x*log(c) - (b*e*n - a*e)*x + (b*e*n*x + b*d*log(c
) + a*d)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 65, normalized size of antiderivative = 1.48

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x}\,dx = \begin{cases} \frac{ad\log(cx^n)}{n} + aex + \frac{bd\log(cx^n)^2}{2n} - benx + bex\log(cx^n) & \text{for } n \neq 0 \\ (a+b\log(c))(d\log(x)+ex) & \text{otherwise} \end{cases}$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise((a*d*log(c*x**n)/n + a*e*x + b*d*log(c*x**n)**2/(2*n) - b*e*n*x
+ b*e*x*log(c*x**n), Ne(n, 0)), ((a + b*log(c))*(d*log(x) + e*x), True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 41, normalized size of antiderivative = 0.93

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x}\,dx = -benx + bex\log(cx^n) + aex + \frac{bd\log(cx^n)^2}{2\,n} + ad\log(x)$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
-b*e*n*x + b*e*x*log(c*x^n) + a*e*x + 1/2*b*d*log(c*x^n)^2/n + a*d*log(x)
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.07

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x}\,dx = benx\log(x) + \frac{1}{2}bdn\log(x)^2 - (ben - be\log(c) - ae)x + (bd\log(c) + ad)\log(x)$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
b*e*n*x*log(x) + 1/2*b*d*n*log(x)^2 - (b*e*n - b*e*log(c) - a*e)*x + (b*d*
log(c) + a*d)*log(x)
```

Mupad [B] (verification not implemented)

Time = 28.58 (sec) , antiderivative size = 40, normalized size of antiderivative = 0.91

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x}\,dx = a\,d\,\ln(x) + e\,x\,(a-b\,n) + b\,e\,x\,\ln(c\,x^n) + \frac{b\,d\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x))/x,x)
```

output
```
a*d*log(x) + e*x*(a - b*n) + b*e*x*log(c*x^n) + (b*d*log(c*x^n)^2)/(2*n)
```

Reduce [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.14

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x}\,dx = \frac{\log(x^nc)^2\,bd + 2\log(x^nc)\,benx + 2\log(x)\,adn + 2aenx - 2be\,n^2x}{2n}$$

input
```
int((e*x+d)*(a+b*log(c*x^n))/x,x)
```

output
```
(log(x**n*c)**2*b*d + 2*log(x**n*c)*b*e*n*x + 2*log(x)*a*d*n + 2*a*e*n*x -
 2*b*e*n**2*x)/(2*n)
```

3.6 $\int \frac{(d+ex)(a+b\log(cx^n))}{x^2}\,dx$

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Optimal result

Integrand size = 19, antiderivative size = 48

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx = -\frac{bdn}{x}-\frac{d(a+b\log\left(cx^n\right))}{x}+\frac{e(a+b\log\left(cx^n\right))^2}{2bn}$$

output
```
-b*d*n/x-d*(a+b*ln(c*x^n))/x+1/2*e*(a+b*ln(c*x^n))^2/b/n
```

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx = -\frac{bdn}{x}-\frac{d(a+b\log\left(cx^n\right))}{x}+\frac{e(a+b\log\left(cx^n\right))^2}{2bn}$$

input
```
Integrate[((d + e*x)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-((b*d*n)/x) - (d*(a + b*Log[c*x^n]))/x + (e*(a + b*Log[c*x^n])^2)/(2*b*n)
```

Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.04, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.211, Rules used = {2772, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^2}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{d-ex\log(x)}{x^2}dx-\frac{d(a+b\log(cx^n))}{x}+e\log(x)(a+b\log(cx^n))$$

$$\Big\downarrow \text{25}$$

$$bn\int \frac{d-ex\log(x)}{x^2}dx-\frac{d(a+b\log(cx^n))}{x}+e\log(x)(a+b\log(cx^n))$$

$$\Big\downarrow \text{2010}$$

$$bn\int \left(\frac{d}{x^2}-\frac{e\log(x)}{x}\right)dx-\frac{d(a+b\log(cx^n))}{x}+e\log(x)(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d(a+b\log(cx^n))}{x}+e\log(x)(a+b\log(cx^n))+bn\left(-\frac{d}{x}-\frac{1}{2}e\log^2(x)\right)$$

input
```
Int[((d + e*x)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
b*n*(-(d/x) - (e*Log[x]^2)/2) - (d*(a + b*Log[c*x^n]))/x + e*Log[x]*(a + b
*Log[c*x^n])
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.10

method	result
parallelrisch	$\frac{2\ln(x)xaen+be\ln(c\,x^n)^2x-2\ln(c\,x^n)bdn-2bd\,n^2-2adn}{2xn}$
risch	$-\frac{b(-ex\ln(x)+d)\ln(x^n)}{x}-\frac{-i\ln(x)\pi be\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2x+i\ln(x)\pi be\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)\,\mathrm{csgn}(ic)x+i\ln(x)\pi be\ \mathrm{cs}}{}$

input
```
int((e*x+d)*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

output
```
1/2/x*(2*ln(x)*x*a*e*n+b*e*ln(c*x^n)^2*x-2*ln(c*x^n)*b*d*n-2*b*d*n^2-2*a*d
*n)/n
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.04

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^2}\,dx = \frac{benx\log(x)^2 - 2\,bdn - 2\,bd\log(c) - 2\,ad + 2\,(bex\log(c) - bdn + aex)\log(x)}{2\,x}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
1/2*(b*e*n*x*log(x)^2 - 2*b*d*n - 2*b*d*log(c) - 2*a*d + 2*(b*e*x*log(c) -
 b*d*n + a*e*x)*log(x))/x
```

Sympy [A] (verification not implemented)

Time = 1.80 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.10

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^2}\,dx = -\frac{ad}{x} + ae\log(x) + bd\left(-\frac{n}{x} - \frac{\log(cx^n)}{x}\right) - be\left(\begin{cases} -\log(c)\log(x) & \text{for } n=0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right)$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))/x**2,x)
```

output
```
-a*d/x + a*e*log(x) + b*d*(-n/x - log(c*x**n)/x) - b*e*Piecewise((-log(c)*
log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.02

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^2}\,dx = \frac{be\log(cx^n)^2}{2n} + ae\log(x) - \frac{bdn}{x} - \frac{bd\log(cx^n)}{x} - \frac{ad}{x}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
1/2*b*e*log(c*x^n)^2/n + a*e*log(x) - b*d*n/x - b*d*log(c*x^n)/x - a*d/x
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.15

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^2}\,dx = \frac{1}{2}ben\log(x)^2 - bdn\left(\frac{\log(x)}{x} + \frac{1}{x}\right) + be\log(c)\log(|x|) + ae\log(|x|) - \frac{bd\log(c)}{x} - \frac{ad}{x}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
1/2*b*e*n*log(x)^2 - b*d*n*(log(x)/x + 1/x) + b*e*log(c)*log(abs(x)) + a*e
*log(abs(x)) - b*d*log(c)/x - a*d/x
```

Mupad [B] (verification not implemented)

Time = 29.33 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^2}\,dx = \ln(x)\,(a\,e + b\,e\,n) - \frac{a\,d + b\,d\,n}{x} - \frac{\ln(c\,x^n)\,(b\,d + b\,e\,x)}{x} + \frac{b\,e\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x))/x^2,x)
```

output
```
log(x)*(a*e + b*e*n) - (a*d + b*d*n)/x - (log(c*x^n)*(b*d + b*e*x))/x + (b
*e*log(c*x^n)^2)/(2*n)
```

Reduce [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.08

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx$$
$$=\frac{\log(x^n c)^2\,bex-2\log(x^n c)\,bdn+2\log(x)\,aenx-2adn-2bd\,n^2}{2nx}$$

input
```
int((e*x+d)*(a+b*log(c*x^n))/x^2,x)
```

output
```
(log(x**n*c)**2*b*e*x - 2*log(x**n*c)*b*d*n + 2*log(x)*a*e*n*x - 2*a*d*n -
 2*b*d*n**2)/(2*n*x)
```

3.7 $\int \frac{(d+ex)(a+b\log(cx^n))}{x^3}\,dx$

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Optimal result

Integrand size = 19, antiderivative size = 60

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx=-\frac{bdn}{4x^2}-\frac{ben}{x}+\frac{be^2n\log(x)}{2d}-\frac{(d+ex)^2\left(a+b\log\left(cx^n\right)\right)}{2dx^2}$$

output
```
-1/4*b*d*n/x^2-b*e*n/x+1/2*b*e^2*n*ln(x)/d-1/2*(e*x+d)^2*(a+b*ln(c*x^n))/d
/x^2
```

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 41, normalized size of antiderivative = 0.68

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx=-\frac{2a(d+2ex)+bn(d+4ex)+2b(d+2ex)\log\left(cx^n\right)}{4x^2}$$

input
```
Integrate[((d + e*x)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-1/4*(2*a*(d + 2*e*x) + b*n*(d + 4*e*x) + 2*b*(d + 2*e*x)*Log[c*x^n])/x^2
```

Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.02, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.211, Rules used = {2772, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^3}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{(d+ex)^2}{2dx^3}dx-\frac{(d+ex)^2(a+b\log(cx^n))}{2dx^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(d+ex)^2}{x^3}dx}{2d}-\frac{(d+ex)^2(a+b\log(cx^n))}{2dx^2}$$

$$\Big\downarrow \text{49}$$

$$\frac{bn\int \left(\frac{d^2}{x^3}+\frac{2ed}{x^2}+\frac{e^2}{x}\right)dx}{2d}-\frac{(d+ex)^2(a+b\log(cx^n))}{2dx^2}$$

$$\Big\downarrow \text{2009}$$

$$\frac{bn\left(-\frac{d^2}{2x^2}-\frac{2de}{x}+e^2\log(x)\right)}{2d}-\frac{(d+ex)^2(a+b\log(cx^n))}{2dx^2}$$

input
```
Int[((d + e*x)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(b*n*(-1/2*d^2/x^2 - (2*d*e)/x + e^2*Log[x]))/(2*d) - ((d + e*x)^2*(a + b*
Log[c*x^n]))/(2*d*x^2)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 47, normalized size of antiderivative = 0.78

method	result
parallelrisch	$-\frac{4bex\ln(c\,x^n)+4benx+4aex+2\ln(c\,x^n)bd+bdn+2da}{4x^2}$
risch	$-\frac{b(2ex+d)\ln(x^n)}{2x^2}-\frac{2i\pi bex\ \operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2-2i\pi bex\ \operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)\operatorname{csgn}(ic)-2i\pi bex\operatorname{csgn}(ic\,x^n)^3+2i\pi bex$

input
```
int((e*x+d)*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

output
```
-1/4/x^2*(4*b*e*x*ln(c*x^n)+4*b*e*n*x+4*a*e*x+2*ln(c*x^n)*b*d+b*d*n+2*d*a)
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 53, normalized size of antiderivative = 0.88

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^3}\,dx = -\frac{bdn+2\,ad+4\,(ben+ae)x+2\,(2\,bex+bd)\log(c)+2\,(2\,benx+bdn)\log(x)}{4\,x^2}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
-1/4*(b*d*n + 2*a*d + 4*(b*e*n + a*e)*x + 2*(2*b*e*x + b*d)*log(c) + 2*(2*
b*e*n*x + b*d*n)*log(x))/x^2
```

Sympy [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 58, normalized size of antiderivative = 0.97

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^3}\,dx = -\frac{ad}{2x^2}-\frac{ae}{x}-\frac{bdn}{4x^2}-\frac{bd\log(cx^n)}{2x^2}-\frac{ben}{x}-\frac{be\log(cx^n)}{x}$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))/x**3,x)
```

output
```
-a*d/(2*x**2) - a*e/x - b*d*n/(4*x**2) - b*d*log(c*x**n)/(2*x**2) - b*e*n/
x - b*e*log(c*x**n)/x
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 57, normalized size of antiderivative = 0.95

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^3}\,dx = -\frac{ben}{x}-\frac{be\log(cx^n)}{x}-\frac{bdn}{4\,x^2}-\frac{ae}{x}-\frac{bd\log(cx^n)}{2\,x^2}-\frac{ad}{2\,x^2}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
-b*e*n/x - b*e*log(c*x^n)/x - 1/4*b*d*n/x^2 - a*e/x - 1/2*b*d*log(c*x^n)/x
^2 - 1/2*a*d/x^2
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 57, normalized size of antiderivative = 0.95

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx$$
$$= -\frac{(2\,benx+bdn)\log\left(x\right)}{2\,x^2} - \frac{4\,benx+4\,bex\log\left(c\right)+bdn+4\,aex+2\,bd\log\left(c\right)+2\,ad}{4\,x^2}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
-1/2*(2*b*e*n*x + b*d*n)*log(x)/x^2 - 1/4*(4*b*e*n*x + 4*b*e*x*log(c) + b*
d*n + 4*a*e*x + 2*b*d*log(c) + 2*a*d)/x^2
```

Mupad [B] (verification not implemented)

Time = 30.49 (sec) , antiderivative size = 47, normalized size of antiderivative = 0.78

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx = -\frac{a\,d+x\,(2\,a\,e+2\,b\,e\,n)+\frac{b\,d\,n}{2}}{2\,x^2} - \frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d}{2}+b\,e\,x\right)}{x^2}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x))/x^3,x)
```

output
```
- (a*d + x*(2*a*e + 2*b*e*n) + (b*d*n)/2)/(2*x^2) - (log(c*x^n)*((b*d)/2 +
 b*e*x))/x^2
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 47, normalized size of antiderivative = 0.78

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^3}\,dx$$
$$= \frac{-2\log(x^n c)\,bd-4\log(x^n c)\,bex-2ad-4aex-bdn-4benx}{4x^2}$$

input
```
int((e*x+d)*(a+b*log(c*x^n))/x^3,x)
```

output
```
( - 2*log(x**n*c)*b*d - 4*log(x**n*c)*b*e*x - 2*a*d - 4*a*e*x - b*d*n - 4*
b*e*n*x)/(4*x**2)
```

3.8 $\int \frac{(d+ex)(a+b\log(cx^n))}{x^4}\,dx$

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Reduce [B] (verification not implemented) 235

Optimal result

Integrand size = 19, antiderivative size = 57

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^4}\,dx = -\frac{bdn}{9x^3}-\frac{ben}{4x^2}-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{2x^2}$$

output
```
-1/9*b*d*n/x^3-1/4*b*e*n/x^2-1/3*d*(a+b*ln(c*x^n))/x^3-1/2*e*(a+b*ln(c*x^n
))/x^2
```

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 47, normalized size of antiderivative = 0.82

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^4}\,dx = -\frac{6a(2d+3ex)+bn(4d+9ex)+6b(2d+3ex)\log(cx^n)}{36x^3}$$

input
```
Integrate[((d + e*x)*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-1/36*(6*a*(2*d + 3*e*x) + b*n*(4*d + 9*e*x) + 6*b*(2*d + 3*e*x)*Log[c*x^n
])/x^3
```

Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 60, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.211, Rules used = {2772, 27, 53, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^4}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{2d+3ex}{6x^4}dx-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{6}bn\int \frac{2d+3ex}{x^4}dx-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{53}$$

$$\frac{1}{6}bn\int \left(\frac{2d}{x^4}+\frac{3e}{x^3}\right)dx-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{2x^2}+\frac{1}{6}bn\left(-\frac{2d}{3x^3}-\frac{3e}{2x^2}\right)$$

input
```
Int[((d + e*x)*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(b*n*((-2*d)/(3*x^3) - (3*e)/(2*x^2)))/6 - (d*(a + b*Log[c*x^n]))/(3*x^3)
- (e*(a + b*Log[c*x^n]))/(2*x^2)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 53
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && LeQ[7*m + 4*n + 4, 0])
|| LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 48, normalized size of antiderivative = 0.84

method	result
parallelrisch	$-\frac{18 b e x \ln\left(c \,x^{n}\right)+9 b e n x +18 a e x +12 \ln\left(c \,x^{n}\right) b d +4 b d n +12 d a}{36 x^{3}}$
risch	$-\frac{b \left(3 e x +2 d \right) \ln\left(x^{n}\right)}{6 x^{3}}-\frac{9 i \pi b e x \,\operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right)^{2}-9 i \pi b e x \,\operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right) \operatorname{csgn}\left(i c \right)-9 i \pi b e x \operatorname{csgn}\left(i c \,x^{n}\right)^{3}+9 i \pi b e}{}$

input
```
int((e*x+d)*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/36/x^3*(18*b*e*x*ln(c*x^n)+9*b*e*n*x+18*a*e*x+12*ln(c*x^n)*b*d+4*b*d*n+
12*d*a)
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^4}\,dx = -\frac{4\,bdn + 12\,ad + 9\,(ben + 2\,ae)x + 6\,(3\,bex + 2\,bd)\log(c) + 6\,(3\,benx + 2\,bdn)\log(x)}{36\,x^3}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
-1/36*(4*b*d*n + 12*a*d + 9*(b*e*n + 2*a*e)*x + 6*(3*b*e*x + 2*b*d)*log(c)
 + 6*(3*b*e*n*x + 2*b*d*n)*log(x))/x^3
```

Sympy [A] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^4}\,dx = -\frac{ad}{3x^3} - \frac{ae}{2x^2} - \frac{bdn}{9x^3} - \frac{bd\log(cx^n)}{3x^3} - \frac{ben}{4x^2} - \frac{be\log(cx^n)}{2x^2}$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))/x**4,x)
```

output
```
-a*d/(3*x**3) - a*e/(2*x**2) - b*d*n/(9*x**3) - b*d*log(c*x**n)/(3*x**3) -
 b*e*n/(4*x**2) - b*e*log(c*x**n)/(2*x**2)
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^4}\,dx = -\frac{ben}{4\,x^2} - \frac{be\log(cx^n)}{2\,x^2} - \frac{bdn}{9\,x^3} - \frac{ae}{2\,x^2} - \frac{bd\log(cx^n)}{3\,x^3} - \frac{ad}{3\,x^3}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
-1/4*b*e*n/x^2 - 1/2*b*e*log(c*x^n)/x^2 - 1/9*b*d*n/x^3 - 1/2*a*e/x^2 - 1/
3*b*d*log(c*x^n)/x^3 - 1/3*a*d/x^3
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.04

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^4}\,dx = -\frac{(3\,benx+2\,bdn)\log(x)}{6\,x^3} - \frac{9\,benx+18\,bex\log(c)+4\,bdn+18\,aex+12\,bd\log(c)+12\,ad}{36\,x^3}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
-1/6*(3*b*e*n*x + 2*b*d*n)*log(x)/x^3 - 1/36*(9*b*e*n*x + 18*b*e*x*log(c)
+ 4*b*d*n + 18*a*e*x + 12*b*d*log(c) + 12*a*d)/x^3
```

Mupad [B] (verification not implemented)

Time = 28.62 (sec) , antiderivative size = 49, normalized size of antiderivative = 0.86

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^4}\,dx = -\frac{2\,a\,d+x\left(3\,a\,e+\frac{3\,b\,e\,n}{2}\right)+\frac{2\,b\,d\,n}{3}}{6\,x^3} - \frac{\ln\left(c\,x^n\right)\left(\frac{b\,d}{3}+\frac{b\,e\,x}{2}\right)}{x^3}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x))/x^4,x)
```

output
```
- (2*a*d + x*(3*a*e + (3*b*e*n)/2) + (2*b*d*n)/3)/(6*x^3) - (log(c*x^n)*((
b*d)/3 + (b*e*x)/2))/x^3
```

Reduce [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 47, normalized size of antiderivative = 0.82

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^4}\,dx = \frac{-12\log(x^n c)\,bd-18\log(x^n c)\,bex-12ad-18aex-4bdn-9benx}{36x^3}$$

input
```
int((e*x+d)*(a+b*log(c*x^n))/x^4,x)
```

output
```
( - 12*log(x**n*c)*b*d - 18*log(x**n*c)*b*e*x - 12*a*d - 18*a*e*x - 4*b*d*
n - 9*b*e*n*x)/(36*x**3)
```

3.9 $\int x^3(d+ex)^2\,(a+b\log(cx^n))\;dx$

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Giac [A] (verification not implemented) . . . 240
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Reduce [B] (verification not implemented) . . . 241

Optimal result

Integrand size = 21, antiderivative size = 74

$$\int x^3(d+ex)^2\,(a+b\log(cx^n))\;dx = -\frac{1}{16}bd^2nx^4-\frac{2}{25}bdenx^5-\frac{1}{36}be^2nx^6 + \frac{1}{60}\left(15d^2x^4+24dex^5+10e^2x^6\right)(a+b\log(cx^n))$$

output
```
-1/16*b*d^2*n*x^4-2/25*b*d*e*n*x^5-1/36*b*e^2*n*x^6+1/60*(10*e^2*x^6+24*d*
e*x^5+15*d^2*x^4)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 81, normalized size of antiderivative = 1.09

$$\int x^3(d+ex)^2\,(a+b\log(cx^n))\;dx = \frac{x^4(60a(15d^2+24dex+10e^2x^2)-bn(225d^2+288dex+100e^2x^2)+60b(15d^2+24dex+10e^2x^2)\log(cx}{3600}$$

input
```
Integrate[x^3*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^4*(60*a*(15*d^2 + 24*d*e*x + 10*e^2*x^2) - b*n*(225*d^2 + 288*d*e*x + 1
00*e^2*x^2) + 60*b*(15*d^2 + 24*d*e*x + 10*e^2*x^2)*Log[c*x^n]))/3600
```

Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 75, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2771, 27, 1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3 (d+ex)^2 (a+b\log(cx^n)) \, dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{60}\left(15d^2x^4+24dex^5+10e^2x^6\right)(a+b\log(cx^n))-bn\int \frac{1}{60}x^3\left(15d^2+24exd+10e^2x^2\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{60}\left(15d^2x^4+24dex^5+10e^2x^6\right)(a+b\log(cx^n))-\frac{1}{60}bn\int x^3\left(15d^2+24exd+10e^2x^2\right)dx$$

$$\Big\downarrow \text{1140}$$

$$\frac{1}{60}\left(15d^2x^4+24dex^5+10e^2x^6\right)(a+b\log(cx^n))-\frac{1}{60}bn\int \left(10e^2x^5+24dex^4+15d^2x^3\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{60}\left(15d^2x^4+24dex^5+10e^2x^6\right)(a+b\log(cx^n))-\frac{1}{60}bn\left(\frac{15d^2x^4}{4}+\frac{24}{5}dex^5+\frac{5e^2x^6}{3}\right)$$

input
```
Int[x^3*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/60*(b*n*((15*d^2*x^4)/4 + (24*d*e*x^5)/5 + (5*e^2*x^6)/3)) + ((15*d^2*x
^4 + 24*d*e*x^5 + 10*e^2*x^6)*(a + b*Log[c*x^n]))/60
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 9.98 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.36

method	result
parallelrisch	$\frac{x^{6} \ln \left(c \,x^{n}\right) b \,e^{2}}{6}-\frac{b \,e^{2} n \,x^{6}}{36}+\frac{a \,e^{2} x^{6}}{6}+\frac{2 x^{5} \ln \left(c \,x^{n}\right) b d e}{5}-\frac{2 b d e n \,x^{5}}{25}+\frac{2 a d e \,x^{5}}{5}+\frac{x^{4} \ln \left(c \,x^{n}\right) b \,d^{2}}{4}-\frac{b \,d^{2} n \,x^{4}}{16}+a d$
risch	$\frac{b \,x^{4} \left(10 e^{2} x^{2}+24 e x d +15 d^{2}\right) \ln \left(x^{n}\right)}{60}+\frac{i \pi b \,e^{2} x^{6} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right)^{2}}{12}-\frac{i \pi b \,e^{2} x^{6} \operatorname{csgn}\left(i c \,x^{n}\right)^{3}}{12}+\frac{i \pi b d e \,x^{5} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csg}}{5}$

input
```
int(x^3*(e*x+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/6*x^6*ln(c*x^n)*b*e^2-1/36*b*e^2*n*x^6+1/6*a*e^2*x^6+2/5*x^5*ln(c*x^n)*b
*d*e-2/25*b*d*e*n*x^5+2/5*a*d*e*x^5+1/4*x^4*ln(c*x^n)*b*d^2-1/16*b*d^2*n*x
^4+1/4*a*d^2*x^4
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.59

$$\int x^3(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{36}\left(be^2n-6\,ae^2\right)x^6-\frac{2}{25}\left(bden-5\,ade\right)x^5-\frac{1}{16}\left(bd^2n-4\,ad^2\right)x^4+\frac{1}{60}\left(10\,be^2x^6+24\,bdex^5+15\,bd^2x^4\right)\log\left(c\right)+\frac{1}{60}\left(10\,be^2nx^6+24\,bdenx^5+15\,bd^2nx^4\right)\log\left(x\right)$$

input
```
integrate(x^3*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/36*(b*e^2*n - 6*a*e^2)*x^6 - 2/25*(b*d*e*n - 5*a*d*e)*x^5 - 1/16*(b*d^2
*n - 4*a*d^2)*x^4 + 1/60*(10*b*e^2*x^6 + 24*b*d*e*x^5 + 15*b*d^2*x^4)*log(
c) + 1/60*(10*b*e^2*n*x^6 + 24*b*d*e*n*x^5 + 15*b*d^2*n*x^4)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.51 (sec) , antiderivative size = 121, normalized size of antiderivative = 1.64

$$\int x^3(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{ad^2x^4}{4}+\frac{2adex^5}{5}+\frac{ae^2x^6}{6}-\frac{bd^2nx^4}{16}+\frac{bd^2x^4\log\left(cx^n\right)}{4}-\frac{2bdenx^5}{25}+\frac{2bdex^5\log\left(cx^n\right)}{5}-\frac{be^2nx^6}{36}+\frac{be^2x^6\log\left(cx^n\right)}{6}$$

input
```
integrate(x**3*(e*x+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x**4/4 + 2*a*d*e*x**5/5 + a*e**2*x**6/6 - b*d**2*n*x**4/16 + b*d**2
*x**4*log(c*x**n)/4 - 2*b*d*e*n*x**5/25 + 2*b*d*e*x**5*log(c*x**n)/5 - b*e
**2*n*x**6/36 + b*e**2*x**6*log(c*x**n)/6
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.35

$$\int x^3(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{36}\,be^2nx^6+\frac{1}{6}\,be^2x^6\log\left(cx^n\right)-\frac{2}{25}\,bdenx^5+\frac{1}{6}\,ae^2x^6+\frac{2}{5}\,bdex^5\log\left(cx^n\right)-\frac{1}{16}\,bd^2nx^4+\frac{2}{5}\,adex^5+\frac{1}{4}\,bd^2x^4\log\left(cx^n\right)+\frac{1}{4}\,ad^2x^4$$

input
```
integrate(x^3*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/36*b*e^2*n*x^6 + 1/6*b*e^2*x^6*log(c*x^n) - 2/25*b*d*e*n*x^5 + 1/6*a*e^
2*x^6 + 2/5*b*d*e*x^5*log(c*x^n) - 1/16*b*d^2*n*x^4 + 2/5*a*d*e*x^5 + 1/4*
b*d^2*x^4*log(c*x^n) + 1/4*a*d^2*x^4
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.66

$$\int x^3(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{1}{6}\,be^2nx^6\log\left(x\right)-\frac{1}{36}\,be^2nx^6+\frac{1}{6}\,be^2x^6\log\left(c\right)+\frac{2}{5}\,bdenx^5\log\left(x\right)-\frac{2}{25}\,bdenx^5+\frac{1}{6}\,ae^2x^6+\frac{2}{5}\,bdex^5\log\left(c\right)+\frac{1}{4}\,bd^2nx^4\log\left(x\right)-\frac{1}{16}\,bd^2nx^4+\frac{2}{5}\,adex^5+\frac{1}{4}\,bd^2x^4\log\left(c\right)+\frac{1}{4}\,ad^2x^4$$

input
```
integrate(x^3*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/6*b*e^2*n*x^6*log(x) - 1/36*b*e^2*n*x^6 + 1/6*b*e^2*x^6*log(c) + 2/5*b*d
*e*n*x^5*log(x) - 2/25*b*d*e*n*x^5 + 1/6*a*e^2*x^6 + 2/5*b*d*e*x^5*log(c)
+ 1/4*b*d^2*n*x^4*log(x) - 1/16*b*d^2*n*x^4 + 2/5*a*d*e*x^5 + 1/4*b*d^2*x^
4*log(c) + 1/4*a*d^2*x^4
```

Mupad [B] (verification not implemented)

Time = 28.26 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.11

$$\int x^3(d+ex)^2(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,d^2\,x^4}{4}+\frac{2\,b\,d\,e\,x^5}{5}+\frac{b\,e^2\,x^6}{6}\right)+\frac{d^2\,x^4\,(4\,a-b\,n)}{16}+\frac{e^2\,x^6\,(6\,a-b\,n)}{36}+\frac{2\,d\,e\,x^5\,(5\,a-b\,n)}{25}$$

input
```
int(x^3*(a + b*log(c*x^n))*(d + e*x)^2,x)
```

output
```
log(c*x^n)*((b*d^2*x^4)/4 + (b*e^2*x^6)/6 + (2*b*d*e*x^5)/5) + (d^2*x^4*(4
*a - b*n))/16 + (e^2*x^6*(6*a - b*n))/36 + (2*d*e*x^5*(5*a - b*n))/25
```

Reduce [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 90, normalized size of antiderivative = 1.22

$$\int x^3(d+ex)^2(a+b\log(cx^n))\,dx = \frac{x^4(900\log(x^nc)\,b\,d^2+1440\log(x^nc)\,bdex+600\log(x^nc)\,b\,e^2x^2+900a\,d^2+1440adex+600a\,e^2x^2-225}{3600}$$

input
```
int(x^3*(e*x+d)^2*(a+b*log(c*x^n)),x)
```

output
```
(x**4*(900*log(x**n*c)*b*d**2 + 1440*log(x**n*c)*b*d*e*x + 600*log(x**n*c)
*b*e**2*x**2 + 900*a*d**2 + 1440*a*d*e*x + 600*a*e**2*x**2 - 225*b*d**2*n
- 288*b*d*e*n*x - 100*b*e**2*n*x**2))/3600
```

3.10 $\int x^2(d+ex)^2 (a+b\log(cx^n))\,dx$

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Optimal result

Integrand size = 21, antiderivative size = 74

$$\int x^2(d+ex)^2 (a+b\log(cx^n))\,dx = -\frac{1}{9}bd^2nx^3-\frac{1}{8}bdenx^4-\frac{1}{25}be^2nx^5 + \frac{1}{30}\left(10d^2x^3+15dex^4+6e^2x^5\right)(a+b\log(cx^n))$$

output
```
-1/9*b*d^2*n*x^3-1/8*b*d*e*n*x^4-1/25*b*e^2*n*x^5+1/30*(6*e^2*x^5+15*d*e*x
^4+10*d^2*x^3)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 81, normalized size of antiderivative = 1.09

$$\int x^2(d+ex)^2 (a+b\log(cx^n))\,dx = \frac{x^3(60a(10d^2+15dex+6e^2x^2)-bn(200d^2+225dex+72e^2x^2)+60b(10d^2+15dex+6e^2x^2)\log(cx^n))}{1800}$$

input
```
Integrate[x^2*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^3*(60*a*(10*d^2 + 15*d*e*x + 6*e^2*x^2) - b*n*(200*d^2 + 225*d*e*x + 72
*e^2*x^2) + 60*b*(10*d^2 + 15*d*e*x + 6*e^2*x^2)*Log[c*x^n]))/1800
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 75, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2771, 27, 1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{30}\left(10d^2x^3+15dex^4+6e^2x^5\right)\left(a+b\log\left(cx^n\right)\right)-bn\int \frac{1}{30}x^2\left(10d^2+15exd+6e^2x^2\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{30}\left(10d^2x^3+15dex^4+6e^2x^5\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{30}bn\int x^2\left(10d^2+15exd+6e^2x^2\right)dx$$

$$\Big\downarrow \text{1140}$$

$$\frac{1}{30}\left(10d^2x^3+15dex^4+6e^2x^5\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{30}bn\int \left(6e^2x^4+15dex^3+10d^2x^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{30}\left(10d^2x^3+15dex^4+6e^2x^5\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{30}bn\left(\frac{10d^2x^3}{3}+\frac{15}{4}dex^4+\frac{6e^2x^5}{5}\right)$$

input
```
Int[x^2*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/30*(b*n*((10*d^2*x^3)/3 + (15*d*e*x^4)/4 + (6*e^2*x^5)/5)) + ((10*d^2*x
^3 + 15*d*e*x^4 + 6*e^2*x^5)*(a + b*Log[c*x^n]))/30
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 3.43 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.36

method	result
parallelrisch	$\frac{x^5 b \ln(c\,x^n) e^2}{5} - \frac{b\,e^2 n\,x^5}{25} + \frac{x^5 a\,e^2}{5} + \frac{x^4 b \ln(c\,x^n) e d}{2} - \frac{b d e n\,x^4}{8} + \frac{x^4 a e d}{2} + \frac{x^3 b \ln(c\,x^n) d^2}{3} - \frac{b\,d^2 n\,x^3}{9} + \frac{d^2 a\,x^3}{3}$
risch	$\frac{b\,x^3 (6e^2x^2+15exd+10d^2) \ln(x^n)}{30} - \frac{i\pi b d e\,x^4 \operatorname{csgn}(ix^n) \operatorname{csgn}(ic\,x^n) \operatorname{csgn}(ic)}{4} - \frac{i\pi b\,e^2 x^5 \operatorname{csgn}(ix^n) \operatorname{csgn}(ic\,x^n) \operatorname{csgn}(ic)}{10} +$

input
```
int(x^2*(e*x+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/5*x^5*b*ln(c*x^n)*e^2-1/25*b*e^2*n*x^5+1/5*x^5*a*e^2+1/2*x^4*b*ln(c*x^n)
*e*d-1/8*b*d*e*n*x^4+1/2*x^4*a*e*d+1/3*x^3*b*ln(c*x^n)*d^2-1/9*b*d^2*n*x^3
+1/3*d^2*a*x^3
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.59

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{25}\left(be^2n-5\,ae^2\right)x^5-\frac{1}{8}\left(bden-4\,ade\right)x^4-\frac{1}{9}\left(bd^2n-3\,ad^2\right)x^3+\frac{1}{30}\left(6\,be^2x^5+15\,bdex^4+10\,bd^2x^3\right)\log\left(c\right)+\frac{1}{30}\left(6\,be^2nx^5+15\,bdenx^4+10\,bd^2nx^3\right)\log\left(x\right)$$

input
```
integrate(x^2*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/25*(b*e^2*n - 5*a*e^2)*x^5 - 1/8*(b*d*e*n - 4*a*d*e)*x^4 - 1/9*(b*d^2*n
 - 3*a*d^2)*x^3 + 1/30*(6*b*e^2*x^5 + 15*b*d*e*x^4 + 10*b*d^2*x^3)*log(c)
+ 1/30*(6*b*e^2*n*x^5 + 15*b*d*e*n*x^4 + 10*b*d^2*n*x^3)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.57

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{ad^2x^3}{3}+\frac{adex^4}{2}+\frac{ae^2x^5}{5}-\frac{bd^2nx^3}{9}+\frac{bd^2x^3\log\left(cx^n\right)}{3}-\frac{bdenx^4}{8}+\frac{bdex^4\log\left(cx^n\right)}{2}-\frac{be^2nx^5}{25}+\frac{be^2x^5\log\left(cx^n\right)}{5}$$

input
```
integrate(x**2*(e*x+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x**3/3 + a*d*e*x**4/2 + a*e**2*x**5/5 - b*d**2*n*x**3/9 + b*d**2*x*
*3*log(c*x**n)/3 - b*d*e*n*x**4/8 + b*d*e*x**4*log(c*x**n)/2 - b*e**2*n*x*
*5/25 + b*e**2*x**5*log(c*x**n)/5
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.35

$$\int x^2(d+ex)^2(a+b\log(cx^n))\,dx = -\frac{1}{25}be^2nx^5 + \frac{1}{5}be^2x^5\log(cx^n) - \frac{1}{8}bdenx^4 + \frac{1}{5}ae^2x^5 + \frac{1}{2}bdex^4\log(cx^n) - \frac{1}{9}bd^2nx^3 + \frac{1}{2}adex^4 + \frac{1}{3}bd^2x^3\log(cx^n) + \frac{1}{3}ad^2x^3$$

input
```
integrate(x^2*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/25*b*e^2*n*x^5 + 1/5*b*e^2*x^5*log(c*x^n) - 1/8*b*d*e*n*x^4 + 1/5*a*e^2
*x^5 + 1/2*b*d*e*x^4*log(c*x^n) - 1/9*b*d^2*n*x^3 + 1/2*a*d*e*x^4 + 1/3*b*
d^2*x^3*log(c*x^n) + 1/3*a*d^2*x^3
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.66

$$\int x^2(d+ex)^2(a+b\log(cx^n))\,dx = \frac{1}{5}be^2nx^5\log(x) - \frac{1}{25}be^2nx^5 + \frac{1}{5}be^2x^5\log(c) + \frac{1}{2}bdenx^4\log(x) - \frac{1}{8}bdenx^4 + \frac{1}{5}ae^2x^5 + \frac{1}{2}bdex^4\log(c) + \frac{1}{3}bd^2nx^3\log(x) - \frac{1}{9}bd^2nx^3 + \frac{1}{2}adex^4 + \frac{1}{3}bd^2x^3\log(c) + \frac{1}{3}ad^2x^3$$

input
```
integrate(x^2*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/5*b*e^2*n*x^5*log(x) - 1/25*b*e^2*n*x^5 + 1/5*b*e^2*x^5*log(c) + 1/2*b*d
*e*n*x^4*log(x) - 1/8*b*d*e*n*x^4 + 1/5*a*e^2*x^5 + 1/2*b*d*e*x^4*log(c) +
 1/3*b*d^2*n*x^3*log(x) - 1/9*b*d^2*n*x^3 + 1/2*a*d*e*x^4 + 1/3*b*d^2*x^3*
log(c) + 1/3*a*d^2*x^3
```

Mupad [B] (verification not implemented)

Time = 28.77 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.11

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2\,x^3}{3}+\frac{b\,d\,e\,x^4}{2}+\frac{b\,e^2\,x^5}{5}\right)+\frac{d^2\,x^3\,\left(3\,a-b\,n\right)}{9}+\frac{e^2\,x^5\,\left(5\,a-b\,n\right)}{25}+\frac{d\,e\,x^4\,\left(4\,a-b\,n\right)}{8}$$

input
```
int(x^2*(a + b*log(c*x^n))*(d + e*x)^2,x)
```

output
```
log(c*x^n)*((b*d^2*x^3)/3 + (b*e^2*x^5)/5 + (b*d*e*x^4)/2) + (d^2*x^3*(3*a
 - b*n))/9 + (e^2*x^5*(5*a - b*n))/25 + (d*e*x^4*(4*a - b*n))/8
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 90, normalized size of antiderivative = 1.22

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$=\frac{x^3(600\log(x^nc)\,b\,d^2+900\log(x^nc)\,bdex+360\log(x^nc)\,b\,e^2x^2+600a\,d^2+900adex+360a\,e^2x^2-200b}{1800}$$

input
```
int(x^2*(e*x+d)^2*(a+b*log(c*x^n)),x)
```

output
```
(x**3*(600*log(x**n*c)*b*d**2 + 900*log(x**n*c)*b*d*e*x + 360*log(x**n*c)*
b*e**2*x**2 + 600*a*d**2 + 900*a*d*e*x + 360*a*e**2*x**2 - 200*b*d**2*n -
225*b*d*e*n*x - 72*b*e**2*n*x**2))/1800
```

3.11 $\int x(d+ex)^2 (a+b\log(cx^n))\,dx$

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Optimal result

Integrand size = 19, antiderivative size = 74

$$\int x(d+ex)^2 (a+b\log(cx^n))\,dx = -\frac{1}{4}bd^2nx^2 - \frac{2}{9}bdenx^3 - \frac{1}{16}be^2nx^4 + \frac{1}{12}(6d^2x^2+8dex^3+3e^2x^4)(a+b\log(cx^n))$$

output
```
-1/4*b*d^2*n*x^2-2/9*b*d*e*n*x^3-1/16*b*e^2*n*x^4+1/12*(3*e^2*x^4+8*d*e*x^
3+6*d^2*x^2)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 81, normalized size of antiderivative = 1.09

$$\int x(d+ex)^2 (a+b\log(cx^n))\,dx = \frac{1}{144}x^2\left(12a\left(6d^2+8dex+3e^2x^2\right) - bn\left(36d^2+32dex+9e^2x^2\right) + 12b\left(6d^2+8dex+3e^2x^2\right)\log(cx^n)\right)$$

input
```
Integrate[x*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^2*(12*a*(6*d^2 + 8*d*e*x + 3*e^2*x^2) - b*n*(36*d^2 + 32*d*e*x + 9*e^2*
x^2) + 12*b*(6*d^2 + 8*d*e*x + 3*e^2*x^2)*Log[c*x^n]))/144
```

Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 73, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.211$, Rules used = {2771, 27, 1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex)^2 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{12}\left(6d^2x^2+8dex^3+3e^2x^4\right)(a+b\log(cx^n))-bn\int \frac{1}{12}x\left(6d^2+8exd+3e^2x^2\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{12}\left(6d^2x^2+8dex^3+3e^2x^4\right)(a+b\log(cx^n))-\frac{1}{12}bn\int x\left(6d^2+8exd+3e^2x^2\right)dx$$

$$\Big\downarrow \text{1140}$$

$$\frac{1}{12}\left(6d^2x^2+8dex^3+3e^2x^4\right)(a+b\log(cx^n))-\frac{1}{12}bn\int \left(3e^2x^3+8dex^2+6d^2x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{12}\left(6d^2x^2+8dex^3+3e^2x^4\right)(a+b\log(cx^n))-\frac{1}{12}bn\left(3d^2x^2+\frac{8}{3}dex^3+\frac{3e^2x^4}{4}\right)$$

input
```
Int[x*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/12*(b*n*(3*d^2*x^2 + (8*d*e*x^3)/3 + (3*e^2*x^4)/4)) + ((6*d^2*x^2 + 8*
d*e*x^3 + 3*e^2*x^4)*(a + b*Log[c*x^n]))/12
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 1.51 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.36

method	result
parallelrisch	$\frac{x^{4} b \ln \left(c \,x^{n}\right) e^{2}}{4}-\frac{b \,e^{2} n \,x^{4}}{16}+\frac{x^{4} a \,e^{2}}{4}+\frac{2 x^{3} b \ln \left(c \,x^{n}\right) e d}{3}-\frac{2 b d e n \,x^{3}}{9}+\frac{2 x^{3} a e d}{3}+\frac{x^{2} b \ln \left(c \,x^{n}\right) d^{2}}{2}-\frac{b \,d^{2} n \,x^{2}}{4}+\frac{x^{2} a}{2}$
risch	$\frac{b \,x^{2} \left(3 e^{2} x^{2}+8 e x d +6 d^{2}\right) \ln \left(x^{n}\right)}{12}-\frac{i \pi b \,d^{2} x^{2} \operatorname{csgn}\left(i c \,x^{n}\right)^{3}}{4}-\frac{i \pi b \,e^{2} x^{4} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right) \operatorname{csgn}\left(i c \right)}{8}+\frac{i \pi b \,d^{2} x^{2} \operatorname{csgn}\left(i x^{n}\right)}{4}$

input
```
int(x*(e*x+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/4*x^4*b*ln(c*x^n)*e^2-1/16*b*e^2*n*x^4+1/4*x^4*a*e^2+2/3*x^3*b*ln(c*x^n)
*e*d-2/9*b*d*e*n*x^3+2/3*x^3*a*e*d+1/2*x^2*b*ln(c*x^n)*d^2-1/4*b*d^2*n*x^2
+1/2*x^2*a*d^2
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.59

$$\int x(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{16}\left(be^2n-4\,ae^2\right)x^4-\frac{2}{9}\left(bden-3\,ade\right)x^3-\frac{1}{4}\left(bd^2n-2\,ad^2\right)x^2+\frac{1}{12}\left(3\,be^2x^4+8\,bdex^3+6\,bd^2x^2\right)\log\left(c\right)+\frac{1}{12}\left(3\,be^2nx^4+8\,bdenx^3+6\,bd^2nx^2\right)\log\left(x\right)$$

input
```
integrate(x*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/16*(b*e^2*n - 4*a*e^2)*x^4 - 2/9*(b*d*e*n - 3*a*d*e)*x^3 - 1/4*(b*d^2*n
 - 2*a*d^2)*x^2 + 1/12*(3*b*e^2*x^4 + 8*b*d*e*x^3 + 6*b*d^2*x^2)*log(c) +
1/12*(3*b*e^2*n*x^4 + 8*b*d*e*n*x^3 + 6*b*d^2*n*x^2)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 121, normalized size of antiderivative = 1.64

$$\int x(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{ad^2x^2}{2}+\frac{2adex^3}{3}+\frac{ae^2x^4}{4}-\frac{bd^2nx^2}{4}+\frac{bd^2x^2\log\left(cx^n\right)}{2}-\frac{2bdenx^3}{9}+\frac{2bdex^3\log\left(cx^n\right)}{3}-\frac{be^2nx^4}{16}+\frac{be^2x^4\log\left(cx^n\right)}{4}$$

input
```
integrate(x*(e*x+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x**2/2 + 2*a*d*e*x**3/3 + a*e**2*x**4/4 - b*d**2*n*x**2/4 + b*d**2*
x**2*log(c*x**n)/2 - 2*b*d*e*n*x**3/9 + 2*b*d*e*x**3*log(c*x**n)/3 - b*e**
2*n*x**4/16 + b*e**2*x**4*log(c*x**n)/4
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.35

$$\int x(d+ex)^2(a+b\log(cx^n))\,dx = -\frac{1}{16}be^2nx^4 + \frac{1}{4}be^2x^4\log(cx^n) - \frac{2}{9}bdenx^3 + \frac{1}{4}ae^2x^4 + \frac{2}{3}bdex^3\log(cx^n) - \frac{1}{4}bd^2nx^2 + \frac{2}{3}adex^3 + \frac{1}{2}bd^2x^2\log(cx^n) + \frac{1}{2}ad^2x^2$$

input
```
integrate(x*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/16*b*e^2*n*x^4 + 1/4*b*e^2*x^4*log(c*x^n) - 2/9*b*d*e*n*x^3 + 1/4*a*e^2
*x^4 + 2/3*b*d*e*x^3*log(c*x^n) - 1/4*b*d^2*n*x^2 + 2/3*a*d*e*x^3 + 1/2*b*
d^2*x^2*log(c*x^n) + 1/2*a*d^2*x^2
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.66

$$\int x(d+ex)^2(a+b\log(cx^n))\,dx = \frac{1}{4}be^2nx^4\log(x) - \frac{1}{16}be^2nx^4 + \frac{1}{4}be^2x^4\log(c) + \frac{2}{3}bdenx^3\log(x) - \frac{2}{9}bdenx^3 + \frac{1}{4}ae^2x^4 + \frac{2}{3}bdex^3\log(c) + \frac{1}{2}bd^2nx^2\log(x) - \frac{1}{4}bd^2nx^2 + \frac{2}{3}adex^3 + \frac{1}{2}bd^2x^2\log(c) + \frac{1}{2}ad^2x^2$$

input
```
integrate(x*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/4*b*e^2*n*x^4*log(x) - 1/16*b*e^2*n*x^4 + 1/4*b*e^2*x^4*log(c) + 2/3*b*d
*e*n*x^3*log(x) - 2/9*b*d*e*n*x^3 + 1/4*a*e^2*x^4 + 2/3*b*d*e*x^3*log(c) +
 1/2*b*d^2*n*x^2*log(x) - 1/4*b*d^2*n*x^2 + 2/3*a*d*e*x^3 + 1/2*b*d^2*x^2*
log(c) + 1/2*a*d^2*x^2
```

Mupad [B] (verification not implemented)

Time = 29.49 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.11

$$\int x(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2\,x^2}{2}+\frac{2\,b\,d\,e\,x^3}{3}+\frac{b\,e^2\,x^4}{4}\right)+\frac{d^2\,x^2\,\left(2\,a-b\,n\right)}{4}+\frac{e^2\,x^4\,\left(4\,a-b\,n\right)}{16}+\frac{2\,d\,e\,x^3\,\left(3\,a-b\,n\right)}{9}$$

input
```
int(x*(a + b*log(c*x^n))*(d + e*x)^2,x)
```

output
```
log(c*x^n)*((b*d^2*x^2)/2 + (b*e^2*x^4)/4 + (2*b*d*e*x^3)/3) + (d^2*x^2*(2
*a - b*n))/4 + (e^2*x^4*(4*a - b*n))/16 + (2*d*e*x^3*(3*a - b*n))/9
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 90, normalized size of antiderivative = 1.22

$$\int x(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{x^2(72\log(x^nc)\,b\,d^2+96\log(x^nc)\,bdex+36\log(x^nc)\,b\,e^2x^2+72a\,d^2+96adex+36a\,e^2x^2-36b\,d^2n-32}{144}$$

input
```
int(x*(e*x+d)^2*(a+b*log(c*x^n)),x)
```

output
```
(x**2*(72*log(x**n*c)*b*d**2 + 96*log(x**n*c)*b*d*e*x + 36*log(x**n*c)*b*e
**2*x**2 + 72*a*d**2 + 96*a*d*e*x + 36*a*e**2*x**2 - 36*b*d**2*n - 32*b*d*
e*n*x - 9*b*e**2*n*x**2))/144
```

3.12 $\int (d+ex)^2 (a+b\log(cx^n))\,dx$

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Optimal result

Integrand size = 18, antiderivative size = 70

$$\int (d+ex)^2 (a+b\log(cx^n))\,dx = -bd^2nx-\frac{1}{2}bdenx^2-\frac{1}{9}be^2nx^3-\frac{bd^3n\log(x)}{3e}+\frac{(d+ex)^3(a+b\log(cx^n))}{3e}$$

output
```
-b*d^2*n*x-1/2*b*d*e*n*x^2-1/9*b*e^2*n*x^3-1/3*b*d^3*n*ln(x)/e+1/3*(e*x+d)
^3*(a+b*ln(c*x^n))/e
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 77, normalized size of antiderivative = 1.10

$$\int (d+ex)^2 (a+b\log(cx^n))\,dx = \frac{1}{18}x\left(6a\left(3d^2+3dex+e^2x^2\right)-bn\left(18d^2+9dex+2e^2x^2\right)+6b\left(3d^2+3dex+e^2x^2\right)\log(cx^n)\right)$$

input
```
Integrate[(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x*(6*a*(3*d^2 + 3*d*e*x + e^2*x^2) - b*n*(18*d^2 + 9*d*e*x + 2*e^2*x^2) +
 6*b*(3*d^2 + 3*d*e*x + e^2*x^2)*Log[c*x^n]))/18
```

Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 69, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.222$, Rules used = {2750, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)^2 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2750}$$

$$\frac{(d+ex)^3 (a+b\log(cx^n))}{3e}-bn\int \frac{(d+ex)^3}{3ex}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{(d+ex)^3 (a+b\log(cx^n))}{3e}-\frac{bn\int \frac{(d+ex)^3}{x}dx}{3e}$$

$$\Big\downarrow \text{49}$$

$$\frac{(d+ex)^3 (a+b\log(cx^n))}{3e}-\frac{bn\int \left(\frac{d^3}{x}+3ed^2+3e^2xd+e^3x^2\right)dx}{3e}$$

$$\Big\downarrow \text{2009}$$

$$\frac{(d+ex)^3 (a+b\log(cx^n))}{3e}-\frac{bn\left(d^3\log(x)+3d^2ex+\frac{3}{2}de^2x^2+\frac{e^3x^3}{3}\right)}{3e}$$

input
```
Int[(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/3*(b*n*(3*d^2*e*x + (3*d*e^2*x^2)/2 + (e^3*x^3)/3 + d^3*Log[x]))/e + ((
d + e*x)^3*(a + b*Log[c*x^n]))/(3*e)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2750
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Simp[(a + b*Log[c*x^n])
  u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b,
 c, d, e, n, r}, x] && IGtQ[q, 0]
```

Maple [A] (verified)

Time = 0.44 (sec) , antiderivative size = 91, normalized size of antiderivative = 1.30

method	result
parallelrisch	$\frac{b\ln(c\,x^n)e^2x^3}{3}-\frac{b\,e^2n\,x^3}{9}+\frac{a\,e^2x^3}{3}+b\ln\left(c\,x^n\right)e\,x^2d-\frac{bden\,x^2}{2}+ae\,x^2d+xb\ln\left(c\,x^n\right)d^2-b\,d^2nx$
risch	$\frac{(ex+d)^3b\ln(x^n)}{3e}-\frac{ie^2\pi b\,x^3\,\mathrm{csgn}(ic\,x^n)^3}{6}-\frac{ie\pi bd\,x^2\,\mathrm{csgn}(ic\,x^n)^3}{2}-\frac{ie\pi bd\,x^2\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)\,\mathrm{csgn}(ic)}{2}+\frac{ie\pi bd\,x}{}$

input
```
int((e*x+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/3*b*ln(c*x^n)*e^2*x^3-1/9*b*e^2*n*x^3+1/3*a*e^2*x^3+b*ln(c*x^n)*e*x^2*d-
1/2*b*d*e*n*x^2+a*e*x^2*d+x*b*ln(c*x^n)*d^2-b*d^2*n*x+a*d^2*x
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 110, normalized size of antiderivative = 1.57

$$\int (d+ex)^2 (a+b\log(cx^n))\,dx = -\frac{1}{9}\left(be^2n-3\,ae^2\right)x^3 - \frac{1}{2}\left(bden-2\,ade\right)x^2 - \left(bd^2n-ad^2\right)x + \frac{1}{3}\left(be^2x^3+3\,bdex^2+3\,bd^2x\right)\log(c) + \frac{1}{3}\left(be^2nx^3+3\,bdenx^2+3\,bd^2nx\right)\log(x)$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/9*(b*e^2*n - 3*a*e^2)*x^3 - 1/2*(b*d*e*n - 2*a*d*e)*x^2 - (b*d^2*n - a*
d^2)*x + 1/3*(b*e^2*x^3 + 3*b*d*e*x^2 + 3*b*d^2*x)*log(c) + 1/3*(b*e^2*n*x
^3 + 3*b*d*e*n*x^2 + 3*b*d^2*n*x)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 102, normalized size of antiderivative = 1.46

$$\int (d+ex)^2 (a+b\log(cx^n))\,dx = ad^2x + adex^2 + \frac{ae^2x^3}{3} - bd^2nx + bd^2x\log(cx^n) - \frac{bdenx^2}{2} + bdex^2\log(cx^n) - \frac{be^2nx^3}{9} + \frac{be^2x^3\log(cx^n)}{3}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x + a*d*e*x**2 + a*e**2*x**3/3 - b*d**2*n*x + b*d**2*x*log(c*x**n)
- b*d*e*n*x**2/2 + b*d*e*x**2*log(c*x**n) - b*e**2*n*x**3/9 + b*e**2*x**3*
log(c*x**n)/3
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 90, normalized size of antiderivative = 1.29

$$\int (d+ex)^2 (a+b\log(cx^n)) \, dx = -\frac{1}{9}be^2nx^3 + \frac{1}{3}be^2x^3\log(cx^n) - \frac{1}{2}bdenx^2 + \frac{1}{3}ae^2x^3 + bdex^2\log(cx^n) - bd^2nx + adex^2 + bd^2x\log(cx^n) + ad^2x$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/9*b*e^2*n*x^3 + 1/3*b*e^2*x^3*log(c*x^n) - 1/2*b*d*e*n*x^2 + 1/3*a*e^2*
x^3 + b*d*e*x^2*log(c*x^n) - b*d^2*n*x + a*d*e*x^2 + b*d^2*x*log(c*x^n) +
a*d^2*x
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.56

$$\int (d+ex)^2 (a+b\log(cx^n)) \, dx = \frac{1}{3}be^2nx^3\log(x) - \frac{1}{9}be^2nx^3 + \frac{1}{3}be^2x^3\log(c) + bdenx^2\log(x) - \frac{1}{2}bdenx^2 + \frac{1}{3}ae^2x^3 + bdex^2\log(c) + bd^2nx\log(x) - bd^2nx + adex^2 + bd^2x\log(c) + ad^2x$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/3*b*e^2*n*x^3*log(x) - 1/9*b*e^2*n*x^3 + 1/3*b*e^2*x^3*log(c) + b*d*e*n*
x^2*log(x) - 1/2*b*d*e*n*x^2 + 1/3*a*e^2*x^3 + b*d*e*x^2*log(c) + b*d^2*n*
x*log(x) - b*d^2*n*x + a*d*e*x^2 + b*d^2*x*log(c) + a*d^2*x
```

Mupad [B] (verification not implemented)

Time = 27.77 (sec) , antiderivative size = 73, normalized size of antiderivative = 1.04

$$\int (d+ex)^2 (a+b\log(cx^n))\,dx = \ln(c\,x^n)\,\left(b\,d^2\,x+b\,d\,e\,x^2+\frac{b\,e^2\,x^3}{3}\right) + \frac{e^2\,x^3\,(3\,a-b\,n)}{9} + d^2\,x\,(a-b\,n) + \frac{d\,e\,x^2\,(2\,a-b\,n)}{2}$$

input
```
int((a + b*log(c*x^n))*(d + e*x)^2,x)
```

output
```
log(c*x^n)*((b*e^2*x^3)/3 + b*d^2*x + b*d*e*x^2) + (e^2*x^3*(3*a - b*n))/9
 + d^2*x*(a - b*n) + (d*e*x^2*(2*a - b*n))/2
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 88, normalized size of antiderivative = 1.26

$$\int (d+ex)^2 (a+b\log(cx^n))\,dx = \frac{x(18\log(x^n c)\,b\,d^2+18\log(x^n c)\,bdex+6\log(x^n c)\,b\,e^2x^2+18a\,d^2+18adex+6a\,e^2x^2-18b\,d^2n-9bden}{18}$$

input
```
int((e*x+d)^2*(a+b*log(c*x^n)),x)
```

output
```
(x*(18*log(x**n*c)*b*d**2 + 18*log(x**n*c)*b*d*e*x + 6*log(x**n*c)*b*e**2*
x**2 + 18*a*d**2 + 18*a*d*e*x + 6*a*e**2*x**2 - 18*b*d**2*n - 9*b*d*e*n*x
- 2*b*e**2*n*x**2))/18
```

3.13 $\int \frac{(d+ex)^2(a+b\log(cx^n))}{x}\,dx$

Optimal result 260
Mathematica [A] (verified) 260
Rubi [A] (verified) 261
Maple [A] (verified) 262
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Sympy [A] (verification not implemented) 263
Maxima [A] (verification not implemented) 263
Giac [A] (verification not implemented) 264
Mupad [B] (verification not implemented) 264
Reduce [B] (verification not implemented) 265

Optimal result

Integrand size = 21, antiderivative size = 80

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x}\,dx = -\frac{1}{4}bn(4d+ex)^2-\frac{1}{2}bd^2n\log^2(x)+2dex(a+b\log(cx^n)) + \frac{1}{2}e^2x^2(a+b\log(cx^n))+d^2\log(x)\,(a+b\log(cx^n))$$

output
```
-1/4*b*n*(e*x+4*d)^2-1/2*b*d^2*n*ln(x)^2+2*d*e*x*(a+b*ln(c*x^n))+1/2*e^2*x
^2*(a+b*ln(c*x^n))+d^2*ln(x)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 83, normalized size of antiderivative = 1.04

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x}\,dx = 2adex-2bdenx-\frac{1}{4}be^2nx^2+2bdex\log(cx^n) + \frac{1}{2}e^2x^2(a+b\log(cx^n))+\frac{d^2(a+b\log(cx^n))^2}{2bn}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n]))/x,x]
```

output
```
2*a*d*e*x - 2*b*d*e*n*x - (b*e^2*n*x^2)/4 + 2*b*d*e*x*Log[c*x^n] + (e^2*x^
2*(a + b*Log[c*x^n]))/2 + (d^2*(a + b*Log[c*x^n])^2)/(2*b*n)
```

Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 81, normalized size of antiderivative = 1.01, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x} dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(\frac{\log(x)d^2}{x}+\frac{1}{2}e(4d+ex)\right)dx+d^2\log(x)(a+b\log(cx^n))+2dex(a+b\log(cx^n))+\frac{1}{2}e^2x^2(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$d^2\log(x)(a+b\log(cx^n))+2dex(a+b\log(cx^n))+\frac{1}{2}e^2x^2(a+b\log(cx^n))-bn\left(\frac{1}{2}d^2\log^2(x)+\frac{1}{4}(4d+ex)^2\right)$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n]))/x,x]
```

output
```
-(b*n*((4*d + e*x)^2/4 + (d^2*Log[x]^2)/2)) + 2*d*e*x*(a + b*Log[c*x^n]) +
 (e^2*x^2*(a + b*Log[c*x^n]))/2 + d^2*Log[x]*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.47 (sec) , antiderivative size = 97, normalized size of antiderivative = 1.21

method	result
parallelrisch	$\frac{2x^2\ln(c\,x^n)b\,e^2n-x^2b\,e^2n^2+2x^2a\,e^2n+8x\ln(c\,x^n)bden-8xbde\,n^2+4\ln(x)a\,d^2n+8xaden+2b\,d^2\ln(c\,x^n)^2}{4n}$
risch	$\left(\frac{x^2b\,e^2}{2}+2bdex+b\,d^2\ln\left(x\right)\right)\ln\left(x^n\right)-\frac{b\,d^2n\ln(x)^2}{2}+i\pi bdex\ \mathrm{csgn}\left(ix^n\right)\mathrm{csgn}\left(ic\,x^n\right)^2+\frac{i\ln(x)\pi}{}$

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/4*(2*x^2*ln(c*x^n)*b*e^2*n-x^2*b*e^2*n^2+2*x^2*a*e^2*n+8*x*ln(c*x^n)*b*d
*e*n-8*x*b*d*e*n^2+4*ln(x)*a*d^2*n+8*x*a*d*e*n+2*b*d^2*ln(c*x^n)^2)/n
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 98, normalized size of antiderivative = 1.22

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x}\,dx = \frac{1}{2}\,bd^2n\log(x)^2-\frac{1}{4}\,(be^2n-2\,ae^2)x^2 - 2\,(bden-ade)x+\frac{1}{2}\,(be^2x^2+4\,bdex)\log(c) + \frac{1}{2}\,(be^2nx^2+4\,bdenx+2\,bd^2\log(c)+2\,ad^2)\log(x)$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/2*b*d^2*n*log(x)^2 - 1/4*(b*e^2*n - 2*a*e^2)*x^2 - 2*(b*d*e*n - a*d*e)*x
 + 1/2*(b*e^2*x^2 + 4*b*d*e*x)*log(c) + 1/2*(b*e^2*n*x^2 + 4*b*d*e*n*x + 2
*b*d^2*log(c) + 2*a*d^2)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 131, normalized size of antiderivative = 1.64

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x}\,dx = \begin{cases} \frac{ad^2\log(cx^n)}{n} + 2adex + \frac{ae^2x^2}{2} + \frac{bd^2\log(cx^n)^2}{2n} - 2bdenx + 2bdex\log(cx^n) - \frac{be^2nx^2}{4} + \frac{be^2x^2\log(cx^n)}{2} & \text{for } n \neq \\ (a+b\log(c))\left(d^2\log(x) + 2dex + \frac{e^2x^2}{2}\right) & \text{otherwis} \end{cases}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise((a*d**2*log(c*x**n)/n + 2*a*d*e*x + a*e**2*x**2/2 + b*d**2*log(c
*x**n)**2/(2*n) - 2*b*d*e*n*x + 2*b*d*e*x*log(c*x**n) - b*e**2*n*x**2/4 +
b*e**2*x**2*log(c*x**n)/2, Ne(n, 0)), ((a + b*log(c))*(d**2*log(x) + 2*d*e
*x + e**2*x**2/2), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 84, normalized size of antiderivative = 1.05

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x}\,dx = -\frac{1}{4}\,be^2nx^2 + \frac{1}{2}\,be^2x^2\log(cx^n) - 2\,bdenx + \frac{1}{2}\,ae^2x^2 + 2\,bdex\log(cx^n) + 2\,adex + \frac{bd^2\log(cx^n)^2}{2\,n} + ad^2\log(x)$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
-1/4*b*e^2*n*x^2 + 1/2*b*e^2*x^2*log(c*x^n) - 2*b*d*e*n*x + 1/2*a*e^2*x^2
+ 2*b*d*e*x*log(c*x^n) + 2*a*d*e*x + 1/2*b*d^2*log(c*x^n)^2/n + a*d^2*log(
x)
```

Giac [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.20

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x}\,dx = \frac{1}{2}bd^2n\log(x)^2 - \frac{1}{4}\left(be^2n - 2\,be^2\log(c) - 2\,ae^2\right)x^2 - 2\left(bden - bde\log(c) - ade\right)x + \frac{1}{2}\left(be^2nx^2 + 4\,bdenx\right)\log(x) + \left(bd^2\log(c) + ad^2\right)\log(x)$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
1/2*b*d^2*n*log(x)^2 - 1/4*(b*e^2*n - 2*b*e^2*log(c) - 2*a*e^2)*x^2 - 2*(b
*d*e*n - b*d*e*log(c) - a*d*e)*x + 1/2*(b*e^2*n*x^2 + 4*b*d*e*n*x)*log(x)
+ (b*d^2*log(c) + a*d^2)*log(x)
```

Mupad [B] (verification not implemented)

Time = 27.19 (sec) , antiderivative size = 75, normalized size of antiderivative = 0.94

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x}\,dx = \ln\left(c\,x^n\right)\left(\frac{b\,e^2\,x^2}{2} + 2\,b\,d\,e\,x\right) + \frac{e^2\,x^2\,(2\,a - b\,n)}{4} + a\,d^2\,\ln(x) + \frac{b\,d^2\ln\left(c\,x^n\right)^2}{2\,n} + 2\,d\,e\,x\,(a - b\,n)$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^2)/x,x)
```

output
```
log(c*x^n)*((b*e^2*x^2)/2 + 2*b*d*e*x) + (e^2*x^2*(2*a - b*n))/4 + a*d^2*l
og(x) + (b*d^2*log(c*x^n)^2)/(2*n) + 2*d*e*x*(a - b*n)
```

Reduce [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.20

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x}\,dx$$
$$= \frac{2\log(x^n c)^2 b d^2 + 8\log(x^n c) bdenx + 2\log(x^n c) b e^2 n x^2 + 4\log(x) a d^2 n + 8adenx + 2a e^2 n x^2 - 8bde n^2}{4n}$$

input
```
int((e*x+d)^2*(a+b*log(c*x^n))/x,x)
```

output
```
(2*log(x**n*c)**2*b*d**2 + 8*log(x**n*c)*b*d*e*n*x + 2*log(x**n*c)*b*e**2*
n*x**2 + 4*log(x)*a*d**2*n + 8*a*d*e*n*x + 2*a*e**2*n*x**2 - 8*b*d*e*n**2*
x - b*e**2*n**2*x**2)/(4*n)
```

3.14 $\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^2}\,dx$

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Mathematica [A] (verified) 266
Rubi [A] (verified) 267
Maple [A] (verified) 268
Fricas [A] (verification not implemented) 268
Sympy [A] (verification not implemented) 269
Maxima [A] (verification not implemented) 269
Giac [A] (verification not implemented) 270
Mupad [B] (verification not implemented) 270
Reduce [B] (verification not implemented) 271

Optimal result

Integrand size = 21, antiderivative size = 78

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^2}\,dx = -\frac{bd^2n}{x} - be^2nx - bden\log^2(x) - \frac{d^2(a+b\log(cx^n))}{x} + e^2x(a+b\log(cx^n)) + 2de\log(x)(a+b\log(cx^n))$$

output
```
-b*d^2*n/x-b*e^2*n*x-b*d*e*n*ln(x)^2-d^2*(a+b*ln(c*x^n))/x+e^2*x*(a+b*ln(c
*x^n))+2*d*e*ln(x)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 76, normalized size of antiderivative = 0.97

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^2}\,dx = -\frac{bd^2n}{x} + ae^2x - be^2nx + be^2x\log(cx^n) - \frac{d^2(a+b\log(cx^n))}{x} + \frac{de(a+b\log(cx^n))^2}{bn}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-((b*d^2*n)/x) + a*e^2*x - b*e^2*n*x + b*e^2*x*Log[c*x^n] - (d^2*(a + b*Lo
g[c*x^n]))/x + (d*e*(a + b*Log[c*x^n])^2)/(b*n)
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 74, normalized size of antiderivative = 0.95, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^2} dx$$

$$\Big\downarrow \text{ 2772}$$

$$-bn\int \left(-\frac{d^2}{x^2}+\frac{2e\log(x)d}{x}+e^2\right)dx-\frac{d^2(a+b\log(cx^n))}{x}+2de\log(x)(a+b\log(cx^n))+e^2x(a+b\log(cx^n))$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{x}+2de\log(x)(a+b\log(cx^n))+e^2x(a+b\log(cx^n))-bn\left(\frac{d^2}{x}+de\log^2(x)+e^2x\right)$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-(b*n*(d^2/x + e^2*x + d*e*Log[x]^2)) - (d^2*(a + b*Log[c*x^n]))/x + e^2*x
*(a + b*Log[c*x^n]) + 2*d*e*Log[x]*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.45 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.23

method	result
parallelrisch	$\frac{x^{2} \ln \left(c \,x^{n}\right) b \,e^{2} n -x^{2} b \,e^{2} n^{2}+2 \ln \left(x \right) x a d e n +x^{2} a \,e^{2} n +b d e \ln \left(c \,x^{n}\right)^{2} x -\ln \left(c \,x^{n}\right) b \,d^{2} n -b \,d^{2} n^{2}-a \,d^{2} n}{x n}$
risch	$-\frac{b \left(-2 d e x \ln \left(x \right)-e^{2} x^{2}+d^{2}\right) \ln \left(x^{n}\right)}{x}-\frac{-i \pi b \,e^{2} x^{2} \operatorname{csgn}\left(i c \,x^{n}\right)^{2} \operatorname{csgn}\left(i c \right)-i \pi b \,d^{2} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right) \operatorname{csgn}\left(i c \right)+i \pi b \,e^{2} x^{2} \operatorname{csg}$

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

output
```
1/x*(x^2*ln(c*x^n)*b*e^2*n-x^2*b*e^2*n^2+2*ln(x)*x*a*d*e*n+x^2*a*e^2*n+b*d
*e*ln(c*x^n)^2*x-ln(c*x^n)*b*d^2*n-b*d^2*n^2-a*d^2*n)/n
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 98, normalized size of antiderivative = 1.26

$$\int \frac{(d+ex)^2 (a+b\log (cx^n))}{x^2}\,dx = \frac{bdenx\log (x)^2 - bd^2n - ad^2 - (be^2n - ae^2)x^2 + (be^2x^2 - bd^2)\log (c) + (be^2nx^2 + 2\,bdex\log (c) - bd^2n}{x}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
(b*d*e*n*x*log(x)^2 - b*d^2*n - a*d^2 - (b*e^2*n - a*e^2)*x^2 + (b*e^2*x^2
 - b*d^2)*log(c) + (b*e^2*n*x^2 + 2*b*d*e*x*log(c) - b*d^2*n + 2*a*d*e*x)*
log(x))/x
```

Sympy [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.44

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x^2}\,dx = \begin{cases} -\frac{ad^2}{x} + \frac{2ade\log(cx^n)}{n} + ae^2x - \frac{bd^2n}{x} - \frac{bd^2\log(cx^n)}{x} + \frac{bde\log(cx^n)^2}{n} - be^2nx + be^2x\log(cx^n) & \text{for } n\neq 0 \\ (a+b\log(c))\left(-\frac{d^2}{x} + 2de\log(x) + e^2x\right) & \text{otherwise} \end{cases}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))/x**2,x)
```

output
```
Piecewise((-a*d**2/x + 2*a*d*e*log(c*x**n)/n + a*e**2*x - b*d**2*n/x - b*d
**2*log(c*x**n)/x + b*d*e*log(c*x**n)**2/n - b*e**2*n*x + b*e**2*x*log(c*x
**n), Ne(n, 0)), ((a + b*log(c))*(-d**2/x + 2*d*e*log(x) + e**2*x), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 83, normalized size of antiderivative = 1.06

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x^2}\,dx = -be^2nx + be^2x\log(cx^n) + ae^2x + \frac{bde\log(cx^n)^2}{n} + 2\,ade\log(x) - \frac{bd^2n}{x} - \frac{bd^2\log(cx^n)}{x} - \frac{ad^2}{x}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
-b*e^2*n*x + b*e^2*x*log(c*x^n) + a*e^2*x + b*d*e*log(c*x^n)^2/n + 2*a*d*e
*log(x) - b*d^2*n/x - b*d^2*log(c*x^n)/x - a*d^2/x
```

Giac [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 93, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^2}\,dx = bden\log(x)^2 + (x\log(x)-x)be^2n - bd^2n\left(\frac{\log(x)}{x}+\frac{1}{x}\right) + be^2x\log(c) + 2\,bde\log(c)\log(|x|) + ae^2x + 2\,ade\log(|x|) - \frac{bd^2\log(c)}{x} - \frac{ad^2}{x}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
b*d*e*n*log(x)^2 + (x*log(x) - x)*b*e^2*n - b*d^2*n*(log(x)/x + 1/x) + b*e
^2*x*log(c) + 2*b*d*e*log(c)*log(abs(x)) + a*e^2*x + 2*a*d*e*log(abs(x)) -
 b*d^2*log(c)/x - a*d^2/x
```

Mupad [B] (verification not implemented)

Time = 27.21 (sec) , antiderivative size = 99, normalized size of antiderivative = 1.27

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^2}\,dx = \ln(x)\,\left(2\,a\,d\,e+2\,b\,d\,e\,n\right) - \frac{a\,d^2+b\,d^2\,n}{x} - \ln\left(c\,x^n\right)\,\left(\frac{b\,d^2+2\,b\,d\,e\,x+b\,e^2\,x^2}{x}-2\,b\,e^2\,x\right) + e^2\,x\,\left(a-b\,n\right) + \frac{b\,d\,e\,\ln\left(c\,x^n\right)^2}{n}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^2)/x^2,x)
```

output
```
log(x)*(2*a*d*e + 2*b*d*e*n) - (a*d^2 + b*d^2*n)/x - log(c*x^n)*((b*d^2 +
b*e^2*x^2 + 2*b*d*e*x)/x - 2*b*e^2*x) + e^2*x*(a - b*n) + (b*d*e*log(c*x^n
)^2)/n
```

Reduce [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 95, normalized size of antiderivative = 1.22

$$\int \frac{(d+ex)^2\,(a+b\log{(cx^n)})}{x^2}\,dx$$
$$= \frac{\log(x^nc)^2\,bdex - \log(x^nc)\,b\,d^2n + \log(x^nc)\,b\,e^2n\,x^2 + 2\log(x)\,adenx - a\,d^2n + a\,e^2n\,x^2 - b\,d^2n^2 - b\,e^2n}{nx}$$

input
```
int((e*x+d)^2*(a+b*log(c*x^n))/x^2,x)
```

output
```
(log(x**n*c)**2*b*d*e*x - log(x**n*c)*b*d**2*n + log(x**n*c)*b*e**2*n*x**2
 + 2*log(x)*a*d*e*n*x - a*d**2*n + a*e**2*n*x**2 - b*d**2*n**2 - b*e**2*n*
*2*x**2)/(n*x)
```

3.15 $\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^3}\,dx$

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Optimal result

Integrand size = 21, antiderivative size = 84

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x^3}\,dx = -\frac{bn(d+4ex)^2}{4x^2} - \frac{1}{2}be^2n\log^2(x) - \frac{d^2(a+b\log(cx^n))}{2x^2} - \frac{2de(a+b\log(cx^n))}{x} + e^2\log(x)\,(a+b\log(cx^n))$$

output
```
-1/4*b*n*(4*e*x+d)^2/x^2-1/2*b*e^2*n*ln(x)^2-1/2*d^2*(a+b*ln(c*x^n))/x^2-2
*d*e*(a+b*ln(c*x^n))/x+e^2*ln(x)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 84, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x^3}\,dx = -\frac{bd^2n}{4x^2} - \frac{2bden}{x} - \frac{d^2(a+b\log(cx^n))}{2x^2} - \frac{2de(a+b\log(cx^n))}{x} + \frac{e^2(a+b\log(cx^n))^2}{2bn}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-1/4*(b*d^2*n)/x^2 - (2*b*d*e*n)/x - (d^2*(a + b*Log[c*x^n]))/(2*x^2) - (2
*d*e*(a + b*Log[c*x^n]))/x + (e^2*(a + b*Log[c*x^n])^2)/(2*b*n)
```

Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 85, normalized size of antiderivative = 1.01, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^3}\,dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(\frac{e^2\log(x)}{x}-\frac{d(d+4ex)}{2x^3}\right)dx-\frac{d^2(a+b\log(cx^n))}{2x^2}-\frac{2de(a+b\log(cx^n))}{x}+e^2\log(x)(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{2x^2}-\frac{2de(a+b\log(cx^n))}{x}+e^2\log(x)(a+b\log(cx^n))-bn\left(\frac{(d+4ex)^2}{4x^2}+\frac{1}{2}e^2\log^2(x)\right)$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-(b*n*((d + 4*e*x)^2/(4*x^2) + (e^2*Log[x]^2)/2)) - (d^2*(a + b*Log[c*x^n]
))/(2*x^2) - (2*d*e*(a + b*Log[c*x^n]))/x + e^2*Log[x]*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.42 (sec) , antiderivative size = 97, normalized size of antiderivative = 1.15

method	result
parallelrisch	$\frac{4\ln(x)x^2 a e^2 n+2e^2 b\ln(c x^n)^2 x^2-8x\ln(c x^n)bden-8xbde n^2-8xaden-2\ln(c x^n)b d^2 n-b d^2 n^2-2a d^2 n}{4x^2 n}$
risch	$-\frac{b(-2e^2\ln(x)x^2+4exd+d^2)\ln(x^n)}{2x^2}-\frac{-2i\ln(x)\pi b e^2\operatorname{csgn}(icx^n)^2\operatorname{csgn}(ic)x^2+4i\pi bdex\operatorname{csgn}(icx^n)^2\operatorname{csgn}(ic)+2i\ln(x)\pi b e$

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

output
```
1/4/x^2*(4*ln(x)*x^2*a*e^2*n+2*e^2*b*ln(c*x^n)^2*x^2-8*x*ln(c*x^n)*b*d*e*n
-8*x*b*d*e*n^2-8*x*a*d*e*n-2*ln(c*x^n)*b*d^2*n-b*d^2*n^2-2*a*d^2*n)/n
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.20

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^3}\,dx$$
$$=\frac{2\,be^2nx^2\log(x)^2-bd^2n-2\,ad^2-8\,(bden+ade)x-2\,(4\,bdex+bd^2)\log(c)+2\,(2\,be^2x^2\log(c)-4\,bden}{4\,x^2}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
1/4*(2*b*e^2*n*x^2*log(x)^2 - b*d^2*n - 2*a*d^2 - 8*(b*d*e*n + a*d*e)*x -
2*(4*b*d*e*x + b*d^2)*log(c) + 2*(2*b*e^2*x^2*log(c) - 4*b*d*e*n*x + 2*a*e
^2*x^2 - b*d^2*n)*log(x))/x^2
```

Sympy [A] (verification not implemented)

Time = 2.43 (sec) , antiderivative size = 99, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^3}\,dx = -\frac{ad^2}{2x^2} - \frac{2ade}{x} + ae^2\log(x) + bd^2\left(-\frac{n}{4x^2} - \frac{\log(cx^n)}{2x^2}\right) + 2bde\left(-\frac{n}{x} - \frac{\log(cx^n)}{x}\right) - be^2\left(\begin{cases} -\log(c)\log(x) & \text{for } n=0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right)$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))/x**3,x)
```

output
```
-a*d**2/(2*x**2) - 2*a*d*e/x + a*e**2*log(x) + b*d**2*(-n/(4*x**2) - log(c
*x**n)/(2*x**2)) + 2*b*d*e*(-n/x - log(c*x**n)/x) - b*e**2*Piecewise((-log
(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 90, normalized size of antiderivative = 1.07

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^3}\,dx = \frac{be^2\log(cx^n)^2}{2n} + ae^2\log(x) - \frac{2bden}{x} - \frac{2bde\log(cx^n)}{x} - \frac{bd^2n}{4x^2} - \frac{2ade}{x} - \frac{bd^2\log(cx^n)}{2x^2} - \frac{ad^2}{2x^2}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
1/2*b*e^2*log(c*x^n)^2/n + a*e^2*log(x) - 2*b*d*e*n/x - 2*b*d*e*log(c*x^n)
/x - 1/4*b*d^2*n/x^2 - 2*a*d*e/x - 1/2*b*d^2*log(c*x^n)/x^2 - 1/2*a*d^2/x^
2
```

Giac [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 102, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^3}\,dx = \frac{1}{2}\,be^2n\log(x)^2 - 2\,bden\left(\frac{\log(x)}{x}+\frac{1}{x}\right) - \frac{1}{4}\,bd^2n\left(\frac{2\,\log(x)}{x^2}+\frac{1}{x^2}\right) + be^2\log(c)\log(|x|) + ae^2\log(|x|) - \frac{2\,bde\log(c)}{x} - \frac{2\,ade}{x} - \frac{bd^2\log(c)}{2\,x^2} - \frac{ad^2}{2\,x^2}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
1/2*b*e^2*n*log(x)^2 - 2*b*d*e*n*(log(x)/x + 1/x) - 1/4*b*d^2*n*(2*log(x)/
x^2 + 1/x^2) + b*e^2*log(c)*log(abs(x)) + a*e^2*log(abs(x)) - 2*b*d*e*log(
c)/x - 2*a*d*e/x - 1/2*b*d^2*log(c)/x^2 - 1/2*a*d^2/x^2
```

Mupad [B] (verification not implemented)

Time = 27.30 (sec) , antiderivative size = 99, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^3}\,dx = \ln(x)\,\left(a\,e^2+\frac{3\,b\,e^2\,n}{2}\right) - \frac{a\,d^2+x\,(4\,a\,d\,e+4\,b\,d\,e\,n)+\frac{b\,d^2\,n}{2}}{2\,x^2} - \frac{\ln(c\,x^n)\,\left(\frac{b\,d^2}{2}+2\,b\,d\,e\,x+\frac{3\,b\,e^2\,x^2}{2}\right)}{x^2} + \frac{b\,e^2\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^2)/x^3,x)
```

output
```
log(x)*(a*e^2 + (3*b*e^2*n)/2) - (a*d^2 + x*(4*a*d*e + 4*b*d*e*n) + (b*d^2
*n)/2)/(2*x^2) - (log(c*x^n)*((b*d^2)/2 + (3*b*e^2*x^2)/2 + 2*b*d*e*x))/x^
2 + (b*e^2*log(c*x^n)^2)/(2*n)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.14

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^3} \, dx$$
$$= \frac{2\log(x^n c)^2 b e^2 x^2 - 2\log(x^n c) b d^2 n - 8\log(x^n c) bdenx + 4\log(x) a e^2 n x^2 - 2a d^2 n - 8adenx - b d^2 n^2 -}{4n x^2}$$

input
```
int((e*x+d)^2*(a+b*log(c*x^n))/x^3,x)
```

output
```
(2*log(x**n*c)**2*b*e**2*x**2 - 2*log(x**n*c)*b*d**2*n - 8*log(x**n*c)*b*d
*e*n*x + 4*log(x)*a*e**2*n*x**2 - 2*a*d**2*n - 8*a*d*e*n*x - b*d**2*n**2 -
 8*b*d*e*n**2*x)/(4*n*x**2)
```

3.16 $\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^4}\,dx$

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Rubi [A] (verified) 279
Maple [A] (verified) 280
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Sympy [A] (verification not implemented) 281
Maxima [A] (verification not implemented) 282
Giac [A] (verification not implemented) 282
Mupad [B] (verification not implemented) 283
Reduce [B] (verification not implemented) 283

Optimal result

Integrand size = 21, antiderivative size = 75

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x^4}\,dx = -\frac{bd^2n}{9x^3}-\frac{bden}{2x^2}-\frac{be^2n}{x}+\frac{be^3n\log(x)}{3d} - \frac{(d+ex)^3\,(a+b\log(cx^n))}{3dx^3}$$

output
```
-1/9*b*d^2*n/x^3-1/2*b*d*e*n/x^2-b*e^2*n/x+1/3*b*e^3*n*ln(x)/d-1/3*(e*x+d)
^3*(a+b*ln(c*x^n))/d/x^3
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 76, normalized size of antiderivative = 1.01

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x^4}\,dx = -\frac{6a(d^2+3dex+3e^2x^2)+bn(2d^2+9dex+18e^2x^2)+6b(d^2+3dex+3e^2x^2)\log(cx^n)}{18x^3}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-1/18*(6*a*(d^2 + 3*d*e*x + 3*e^2*x^2) + b*n*(2*d^2 + 9*d*e*x + 18*e^2*x^2
) + 6*b*(d^2 + 3*d*e*x + 3*e^2*x^2)*Log[c*x^n])/x^3
```

Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 74, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2772, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^4} dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{(d+ex)^3}{3dx^4}dx-\frac{(d+ex)^3 (a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(d+ex)^3}{x^4}dx}{3d}-\frac{(d+ex)^3 (a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{49}$$

$$\frac{bn\int \left(\frac{d^3}{x^4}+\frac{3ed^2}{x^3}+\frac{3e^2d}{x^2}+\frac{e^3}{x}\right)dx}{3d}-\frac{(d+ex)^3 (a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{bn\left(-\frac{d^3}{3x^3}-\frac{3d^2e}{2x^2}-\frac{3de^2}{x}+e^3\log(x)\right)}{3d}-\frac{(d+ex)^3 (a+b\log(cx^n))}{3dx^3}$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(b*n*(-1/3*d^3/x^3 - (3*d^2*e)/(2*x^2) - (3*d*e^2)/x + e^3*Log[x]))/(3*d)
- ((d + e*x)^3*(a + b*Log[c*x^n]))/(3*d*x^3)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.38 (sec) , antiderivative size = 91, normalized size of antiderivative = 1.21

method	result
parallelrisch	$-\frac{18 b \ln \left(c \,x^{n}\right) e^{2} x^{2}+18 b \,e^{2} n \,x^{2}+18 a \,e^{2} x^{2}+18 b \ln \left(c \,x^{n}\right) e x d +9 b d e n x +18 a e x d +6 b \ln \left(c \,x^{n}\right) d^{2}+2 b \,d^{2} n +6 a \,d^{2}}{18 x^{3}}$
risch	$-\frac{b \left(3 e^{2} x^{2}+3 e x d +d^{2}\right) \ln \left(x^{n}\right)}{3 x^{3}}-\frac{-3 i \pi b \,d^{2} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right) \operatorname{csgn}\left(i c \right)-9 i \pi b \,e^{2} x^{2} \operatorname{csgn}\left(i c \,x^{n}\right)^{3}-9 i \pi b d e x \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}(}{}$

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/18/x^3*(18*b*ln(c*x^n)*e^2*x^2+18*b*e^2*n*x^2+18*a*e^2*x^2+18*b*ln(c*x^
n)*e*x*d+9*b*d*e*n*x+18*a*e*x*d+6*b*ln(c*x^n)*d^2+2*b*d^2*n+6*a*d^2)
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 103, normalized size of antiderivative = 1.37

$$\int \frac{(d+ex)^2\,(a+b\log\left(cx^n\right))}{x^4}\,dx =$$
$$-\frac{2\,bd^2n+6\,ad^2+18\,(be^2n+ae^2)x^2+9\,(bden+2\,ade)x+6\,(3\,be^2x^2+3\,bdex+bd^2)\log\left(c\right)+6\,(3\,be^2n}{18\,x^3}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
-1/18*(2*b*d^2*n + 6*a*d^2 + 18*(b*e^2*n + a*e^2)*x^2 + 9*(b*d*e*n + 2*a*d
*e)*x + 6*(3*b*e^2*x^2 + 3*b*d*e*x + b*d^2)*log(c) + 6*(3*b*e^2*n*x^2 + 3*
b*d*e*n*x + b*d^2*n)*log(x))/x^3
```

Sympy [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 104, normalized size of antiderivative = 1.39

$$\int \frac{(d+ex)^2\,(a+b\log\left(cx^n\right))}{x^4}\,dx = -\frac{ad^2}{3x^3}-\frac{ade}{x^2}-\frac{ae^2}{x}-\frac{bd^2n}{9x^3}-\frac{bd^2\log\left(cx^n\right)}{3x^3}-\frac{bden}{2x^2}-\frac{bde\log\left(cx^n\right)}{x^2}-\frac{be^2n}{x}-\frac{be^2\log\left(cx^n\right)}{x}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))/x**4,x)
```

output
```
-a*d**2/(3*x**3) - a*d*e/x**2 - a*e**2/x - b*d**2*n/(9*x**3) - b*d**2*log(
c*x**n)/(3*x**3) - b*d*e*n/(2*x**2) - b*d*e*log(c*x**n)/x**2 - b*e**2*n/x
- b*e**2*log(c*x**n)/x
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.33

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^4}\,dx = -\frac{be^2n}{x} - \frac{be^2\log(cx^n)}{x} - \frac{bden}{2\,x^2} - \frac{ae^2}{x} - \frac{bde\log(cx^n)}{x^2} - \frac{bd^2n}{9\,x^3} - \frac{ade}{x^2} - \frac{bd^2\log(cx^n)}{3\,x^3} - \frac{ad^2}{3\,x^3}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
-b*e^2*n/x - b*e^2*log(c*x^n)/x - 1/2*b*d*e*n/x^2 - a*e^2/x - b*d*e*log(c*
x^n)/x^2 - 1/9*b*d^2*n/x^3 - a*d*e/x^2 - 1/3*b*d^2*log(c*x^n)/x^3 - 1/3*a*
d^2/x^3
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 110, normalized size of antiderivative = 1.47

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^4}\,dx = -\frac{(3\,be^2nx^2+3\,bdenx+bd^2n)\log(x)}{3\,x^3} - \frac{18\,be^2nx^2+18\,be^2x^2\log(c)+9\,bdenx+18\,ae^2x^2+18\,bdex\log(c)+2\,bd^2n+18\,adex+6\,bd^2\log(c)+}{18\,x^3}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
-1/3*(3*b*e^2*n*x^2 + 3*b*d*e*n*x + b*d^2*n)*log(x)/x^3 - 1/18*(18*b*e^2*n
*x^2 + 18*b*e^2*x^2*log(c) + 9*b*d*e*n*x + 18*a*e^2*x^2 + 18*b*d*e*x*log(c
) + 2*b*d^2*n + 18*a*d*e*x + 6*b*d^2*log(c) + 6*a*d^2)/x^3
```

Mupad [B] (verification not implemented)

Time = 27.29 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.09

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^4}\,dx$$
$$= -\frac{x^2\,(3\,a\,e^2+3\,b\,e^2\,n)+a\,d^2+x\,\left(3\,a\,d\,e+\frac{3\,b\,d\,e\,n}{2}\right)+\frac{b\,d^2\,n}{3}}{3\,x^3}$$
$$-\frac{\ln(c\,x^n)\,\left(\frac{b\,d^2}{3}+b\,d\,e\,x+b\,e^2\,x^2\right)}{x^3}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^2)/x^4,x)
```

output
```
- (x^2*(3*a*e^2 + 3*b*e^2*n) + a*d^2 + x*(3*a*d*e + (3*b*d*e*n)/2) + (b*d^
2*n)/3)/(3*x^3) - (log(c*x^n)*((b*d^2)/3 + b*e^2*x^2 + b*d*e*x))/x^3
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 90, normalized size of antiderivative = 1.20

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^4}\,dx$$
$$= \frac{-6\log(x^nc)\,b\,d^2-18\log(x^nc)\,bdex-18\log(x^nc)\,b\,e^2x^2-6a\,d^2-18adex-18a\,e^2x^2-2b\,d^2n-9bdenx}{18x^3}$$

input
```
int((e*x+d)^2*(a+b*log(c*x^n))/x^4,x)
```

output
```
( - 6*log(x**n*c)*b*d**2 - 18*log(x**n*c)*b*d*e*x - 18*log(x**n*c)*b*e**2*
x**2 - 6*a*d**2 - 18*a*d*e*x - 18*a*e**2*x**2 - 2*b*d**2*n - 9*b*d*e*n*x -
 18*b*e**2*n*x**2)/(18*x**3)
```

3.17 $\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^5}\,dx$

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Optimal result

Integrand size = 21, antiderivative size = 95

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^5}\,dx = -\frac{bd^2n}{16x^4}-\frac{2bden}{9x^3}-\frac{be^2n}{4x^2}-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{2x^2}$$

output
```
-1/16*b*d^2*n/x^4-2/9*b*d*e*n/x^3-1/4*b*e^2*n/x^2-1/4*d^2*(a+b*ln(c*x^n))/
x^4-2/3*d*e*(a+b*ln(c*x^n))/x^3-1/2*e^2*(a+b*ln(c*x^n))/x^2
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 80, normalized size of antiderivative = 0.84

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^5}\,dx = -\frac{12a(3d^2+8dex+6e^2x^2)+bn(9d^2+32dex+36e^2x^2)+12b(3d^2+8dex+6e^2x^2)\log(cx^n)}{144x^4}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
-1/144*(12*a*(3*d^2 + 8*d*e*x + 6*e^2*x^2) + b*n*(9*d^2 + 32*d*e*x + 36*e^
2*x^2) + 12*b*(3*d^2 + 8*d*e*x + 6*e^2*x^2)*Log[c*x^n])/x^4
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 94, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2772, 27, 1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^5} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{3d^2+8exd+6e^2x^2}{12x^5}dx-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{12}bn\int \frac{3d^2+8exd+6e^2x^2}{x^5}dx-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{1140}$$

$$\frac{1}{12}bn\int \left(\frac{3d^2}{x^5}+\frac{8ed}{x^4}+\frac{6e^2}{x^3}\right)dx-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{2x^2}+\frac{1}{12}bn\left(-\frac{3d^2}{4x^4}-\frac{8de}{3x^3}-\frac{3e^2}{x^2}\right)$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(b*n*((-3*d^2)/(4*x^4) - (8*d*e)/(3*x^3) - (3*e^2)/x^2))/12 - (d^2*(a + b*
Log[c*x^n]))/(4*x^4) - (2*d*e*(a + b*Log[c*x^n]))/(3*x^3) - (e^2*(a + b*Lo
g[c*x^n]))/(2*x^2)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.38 (sec) , antiderivative size = 91, normalized size of antiderivative = 0.96

method	result
parallelrisch	$-\frac{72b\ln(c\,x^{n})e^{2}x^{2}+36b\,e^{2}n\,x^{2}+72a\,e^{2}x^{2}+96b\ln(c\,x^{n})exd+32bdenx+96aexd+36b\ln(c\,x^{n})d^{2}+9b\,d^{2}n+36a\,d^{2}}{144x^{4}}$
risch	$-\frac{b\left(6e^{2}x^{2}+8exd+3d^{2}\right)\ln(x^{n})}{12x^{4}}-\frac{48i\pi bdex\,\mathrm{csgn}(ic\,x^{n})^{2}\,\mathrm{csgn}(ic)-18i\pi b\,d^{2}\,\mathrm{csgn}(ic\,x^{n})^{3}+18i\pi b\,d^{2}\,\mathrm{csgn}(ic\,x^{n})^{2}\,\mathrm{csgn}(ic)+3}{}$

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

output
```
-1/144/x^4*(72*b*ln(c*x^n)*e^2*x^2+36*b*e^2*n*x^2+72*a*e^2*x^2+96*b*ln(c*x
^n)*e*x*d+32*b*d*e*n*x+96*a*e*x*d+36*b*ln(c*x^n)*d^2+9*b*d^2*n+36*a*d^2)
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 106, normalized size of antiderivative = 1.12

$$\int \frac{(d+ex)^2\,(a+b\log{(cx^n)})}{x^5}\,dx = -\frac{9\,bd^2n+36\,ad^2+36\,(be^2n+2\,ae^2)x^2+32\,(bden+3\,ade)x+12\,(6\,be^2x^2+8\,bdex+3\,bd^2)\log{(c)}+1}{144\,x^4}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

output
```
-1/144*(9*b*d^2*n + 36*a*d^2 + 36*(b*e^2*n + 2*a*e^2)*x^2 + 32*(b*d*e*n +
3*a*d*e)*x + 12*(6*b*e^2*x^2 + 8*b*d*e*x + 3*b*d^2)*log(c) + 12*(6*b*e^2*n
*x^2 + 8*b*d*e*n*x + 3*b*d^2*n)*log(x))/x^4
```

Sympy [A] (verification not implemented)

Time = 0.51 (sec) , antiderivative size = 122, normalized size of antiderivative = 1.28

$$\int \frac{(d+ex)^2\,(a+b\log{(cx^n)})}{x^5}\,dx = -\frac{ad^2}{4x^4}-\frac{2ade}{3x^3}-\frac{ae^2}{2x^2}-\frac{bd^2n}{16x^4}-\frac{bd^2\log{(cx^n)}}{4x^4}-\frac{2bden}{9x^3}-\frac{2bde\log{(cx^n)}}{3x^3}-\frac{be^2n}{4x^2}-\frac{be^2\log{(cx^n)}}{2x^2}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))/x**5,x)
```

output
```
-a*d**2/(4*x**4) - 2*a*d*e/(3*x**3) - a*e**2/(2*x**2) - b*d**2*n/(16*x**4)
 - b*d**2*log(c*x**n)/(4*x**4) - 2*b*d*e*n/(9*x**3) - 2*b*d*e*log(c*x**n)/
(3*x**3) - b*e**2*n/(4*x**2) - b*e**2*log(c*x**n)/(2*x**2)
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.05

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^5}\,dx = -\frac{be^2n}{4\,x^2} - \frac{be^2\log(cx^n)}{2\,x^2} - \frac{2\,bden}{9\,x^3} - \frac{ae^2}{2\,x^2} - \frac{2\,bde\log(cx^n)}{3\,x^3} - \frac{bd^2n}{16\,x^4} - \frac{2\,ade}{3\,x^3} - \frac{bd^2\log(cx^n)}{4\,x^4} - \frac{ad^2}{4\,x^4}$$

input

```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

output

```
-1/4*b*e^2*n/x^2 - 1/2*b*e^2*log(c*x^n)/x^2 - 2/9*b*d*e*n/x^3 - 1/2*a*e^2/
x^2 - 2/3*b*d*e*log(c*x^n)/x^3 - 1/16*b*d^2*n/x^4 - 2/3*a*d*e/x^3 - 1/4*b*
d^2*log(c*x^n)/x^4 - 1/4*a*d^2/x^4
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 111, normalized size of antiderivative = 1.17

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^5}\,dx = -\frac{(6\,be^2nx^2+8\,bdenx+3\,bd^2n)\log(x)}{12\,x^4} - \frac{36\,be^2nx^2+72\,be^2x^2\log(c)+32\,bdenx+72\,ae^2x^2+96\,bdex\log(c)+9\,bd^2n+96\,adex+36\,bd^2\log (c}{144\,x^4}$$

input

```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

output

```
-1/12*(6*b*e^2*n*x^2 + 8*b*d*e*n*x + 3*b*d^2*n)*log(x)/x^4 - 1/144*(36*b*e
^2*n*x^2 + 72*b*e^2*x^2*log(c) + 32*b*d*e*n*x + 72*a*e^2*x^2 + 96*b*d*e*x*
log(c) + 9*b*d^2*n + 96*a*d*e*x + 36*b*d^2*log(c) + 36*a*d^2)/x^4
```

Mupad [B] (verification not implemented)

Time = 28.48 (sec) , antiderivative size = 85, normalized size of antiderivative = 0.89

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^5} dx = -\frac{x^2 (6 a e^2 + 3 b e^2 n) + 3 a d^2 + x \left(8 a d e + \frac{8 b d e n}{3}\right) + \frac{3 b d^2 n}{4}}{12 x^4} - \frac{\ln(c x^n) \left(\frac{b d^2}{4} + \frac{2 b d e x}{3} + \frac{b e^2 x^2}{2}\right)}{x^4}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^2)/x^5,x)
```

output
```
- (x^2*(6*a*e^2 + 3*b*e^2*n) + 3*a*d^2 + x*(8*a*d*e + (8*b*d*e*n)/3) + (3*
b*d^2*n)/4)/(12*x^4) - (log(c*x^n)*((b*d^2)/4 + (b*e^2*x^2)/2 + (2*b*d*e*x
)/3))/x^4
```

Reduce [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 90, normalized size of antiderivative = 0.95

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^5} dx = \frac{-36 \log(x^n c) b d^2 - 96 \log(x^n c) bdex - 72 \log(x^n c) b e^2 x^2 - 36a d^2 - 96adex - 72a e^2 x^2 - 9b d^2 n - 32bd}{144x^4}$$

input
```
int((e*x+d)^2*(a+b*log(c*x^n))/x^5,x)
```

output
```
( - 36*log(x**n*c)*b*d**2 - 96*log(x**n*c)*b*d*e*x - 72*log(x**n*c)*b*e**2
*x**2 - 36*a*d**2 - 96*a*d*e*x - 72*a*e**2*x**2 - 9*b*d**2*n - 32*b*d*e*n*
x - 36*b*e**2*n*x**2)/(144*x**4)
```

3.18 $\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^6}\,dx$

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Optimal result

Integrand size = 21, antiderivative size = 95

$$\int \frac{(d+ex)^2\left(a+b\log\left(cx^n\right)\right)}{x^6}\,dx=-\frac{bd^2n}{25x^5}-\frac{bden}{8x^4}-\frac{be^2n}{9x^3}-\frac{d^2(a+b\log\left(cx^n\right))}{5x^5}-\frac{de(a+b\log\left(cx^n\right))}{2x^4}-\frac{e^2(a+b\log\left(cx^n\right))}{3x^3}$$

output
```
-1/25*b*d^2*n/x^5-1/8*b*d*e*n/x^4-1/9*b*e^2*n/x^3-1/5*d^2*(a+b*ln(c*x^n))/
x^5-1/2*d*e*(a+b*ln(c*x^n))/x^4-1/3*e^2*(a+b*ln(c*x^n))/x^3
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 80, normalized size of antiderivative = 0.84

$$\int \frac{(d+ex)^2\left(a+b\log\left(cx^n\right)\right)}{x^6}\,dx=-\frac{60a(6d^2+15dex+10e^2x^2)+bn(72d^2+225dex+200e^2x^2)+60b(6d^2+15dex+10e^2x^2)\log\left(cx^n\right)}{1800x^5}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-1/1800*(60*a*(6*d^2 + 15*d*e*x + 10*e^2*x^2) + b*n*(72*d^2 + 225*d*e*x +
200*e^2*x^2) + 60*b*(6*d^2 + 15*d*e*x + 10*e^2*x^2)*Log[c*x^n])/x^5
```

Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2772, 27, 1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^6}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{6d^2+15exd+10e^2x^2}{30x^6}dx-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{de(a+b\log(cx^n))}{2x^4}-\frac{e^2(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{30}bn\int \frac{6d^2+15exd+10e^2x^2}{x^6}dx-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{de(a+b\log(cx^n))}{2x^4}-\frac{e^2(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{1140}$$

$$\frac{1}{30}bn\int \left(\frac{6d^2}{x^6}+\frac{15ed}{x^5}+\frac{10e^2}{x^4}\right)dx-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{de(a+b\log(cx^n))}{2x^4}-\frac{e^2(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{de(a+b\log(cx^n))}{2x^4}-\frac{e^2(a+b\log(cx^n))}{3x^3}+\frac{1}{30}bn\left(-\frac{6d^2}{5x^5}-\frac{15de}{4x^4}-\frac{10e^2}{3x^3}\right)$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*((-6*d^2)/(5*x^5) - (15*d*e)/(4*x^4) - (10*e^2)/(3*x^3)))/30 - (d^2*(
a + b*Log[c*x^n]))/(5*x^5) - (d*e*(a + b*Log[c*x^n]))/(2*x^4) - (e^2*(a +
b*Log[c*x^n]))/(3*x^3)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.38 (sec) , antiderivative size = 91, normalized size of antiderivative = 0.96

method	result
parallelrisch	$-\frac{600 b \ln(c\,x^{n}) e^{2} x^{2}+200 b\,e^{2} n\,x^{2}+600 a\,e^{2} x^{2}+900 b \ln(c\,x^{n}) e x d+225 b d e n x+900 a e x d+360 b \ln(c\,x^{n}) d^{2}+72 b\,d^{2} n+360 a\,d^{2}}{1800 x^{5}}$
risch	$-\frac{b\left(10 e^{2} x^{2}+15 e x d+6 d^{2}\right) \ln\left(x^{n}\right)}{30 x^{5}}-\frac{300 i \pi b\,e^{2} x^{2} \operatorname{csgn}\left(i c\,x^{n}\right)^{2} \operatorname{csgn}\left(i c\right)-300 i \pi b\,e^{2} x^{2} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c\,x^{n}\right) \operatorname{csgn}\left(i c\right)-450 i \pi b$

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

output
```
-1/1800/x^5*(600*b*ln(c*x^n)*e^2*x^2+200*b*e^2*n*x^2+600*a*e^2*x^2+900*b*l
n(c*x^n)*e*x*d+225*b*d*e*n*x+900*a*e*x*d+360*b*ln(c*x^n)*d^2+72*b*d^2*n+36
0*a*d^2)
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 106, normalized size of antiderivative = 1.12

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x^6}\,dx = -\frac{72\,bd^2n+360\,ad^2+200\,(be^2n+3\,ae^2)x^2+225\,(bden+4\,ade)x+60\,(10\,be^2x^2+15\,bdex+6\,bd^2)\log}{1800\,x^5}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
-1/1800*(72*b*d^2*n + 360*a*d^2 + 200*(b*e^2*n + 3*a*e^2)*x^2 + 225*(b*d*e
*n + 4*a*d*e)*x + 60*(10*b*e^2*x^2 + 15*b*d*e*x + 6*b*d^2)*log(c) + 60*(10
*b*e^2*n*x^2 + 15*b*d*e*n*x + 6*b*d^2*n)*log(x))/x^5
```

Sympy [A] (verification not implemented)

Time = 0.61 (sec) , antiderivative size = 117, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x^6}\,dx = -\frac{ad^2}{5x^5}-\frac{ade}{2x^4}-\frac{ae^2}{3x^3}-\frac{bd^2n}{25x^5}-\frac{bd^2\log(cx^n)}{5x^5}-\frac{bden}{8x^4}-\frac{bde\log(cx^n)}{2x^4}-\frac{be^2n}{9x^3}-\frac{be^2\log(cx^n)}{3x^3}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))/x**6,x)
```

output
```
-a*d**2/(5*x**5) - a*d*e/(2*x**4) - a*e**2/(3*x**3) - b*d**2*n/(25*x**5) -
 b*d**2*log(c*x**n)/(5*x**5) - b*d*e*n/(8*x**4) - b*d*e*log(c*x**n)/(2*x**
4) - b*e**2*n/(9*x**3) - b*e**2*log(c*x**n)/(3*x**3)
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.05

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^6} \, dx = -\frac{be^2n}{9\,x^3} - \frac{be^2\log(cx^n)}{3\,x^3} - \frac{bden}{8\,x^4} - \frac{ae^2}{3\,x^3} - \frac{bde\log(cx^n)}{2\,x^4} - \frac{bd^2n}{25\,x^5} - \frac{ade}{2\,x^4} - \frac{bd^2\log(cx^n)}{5\,x^5} - \frac{ad^2}{5\,x^5}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
-1/9*b*e^2*n/x^3 - 1/3*b*e^2*log(c*x^n)/x^3 - 1/8*b*d*e*n/x^4 - 1/3*a*e^2/
x^3 - 1/2*b*d*e*log(c*x^n)/x^4 - 1/25*b*d^2*n/x^5 - 1/2*a*d*e/x^4 - 1/5*b*
d^2*log(c*x^n)/x^5 - 1/5*a*d^2/x^5
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 111, normalized size of antiderivative = 1.17

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^6} \, dx = -\frac{(10\,be^2nx^2 + 15\,bdenx + 6\,bd^2n)\log(x)}{30\,x^5} - \frac{200\,be^2nx^2 + 600\,be^2x^2\log(c) + 225\,bdenx + 600\,ae^2x^2 + 900\,bdex\log(c) + 72\,bd^2n + 900\,adex + 360}{1800\,x^5}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
-1/30*(10*b*e^2*n*x^2 + 15*b*d*e*n*x + 6*b*d^2*n)*log(x)/x^5 - 1/1800*(200
*b*e^2*n*x^2 + 600*b*e^2*x^2*log(c) + 225*b*d*e*n*x + 600*a*e^2*x^2 + 900*
b*d*e*x*log(c) + 72*b*d^2*n + 900*a*d*e*x + 360*b*d^2*log(c) + 360*a*d^2)/
x^5
```

Mupad [B] (verification not implemented)

Time = 28.56 (sec) , antiderivative size = 85, normalized size of antiderivative = 0.89

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^6} dx = -\frac{x^2 \left(10\,a\,e^2+\frac{10\,b\,e^2\,n}{3}\right)+6\,a\,d^2+x\,\left(15\,a\,d\,e+\frac{15\,b\,d\,e\,n}{4}\right)+\frac{6\,b\,d^2\,n}{5}}{30\,x^5} - \frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2}{5}+\frac{b\,d\,e\,x}{2}+\frac{b\,e^2\,x^2}{3}\right)}{x^5}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^2)/x^6,x)
```

output
```
- (x^2*(10*a*e^2 + (10*b*e^2*n)/3) + 6*a*d^2 + x*(15*a*d*e + (15*b*d*e*n)/
4) + (6*b*d^2*n)/5)/(30*x^5) - (log(c*x^n)*((b*d^2)/5 + (b*e^2*x^2)/3 + (b
*d*e*x)/2))/x^5
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 90, normalized size of antiderivative = 0.95

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^6} dx = \frac{-360\log(x^n c)\,b\,d^2-900\log(x^n c)\,bdex-600\log(x^n c)\,b\,e^2x^2-360a\,d^2-900adex-600a\,e^2x^2-72b\,d^2n}{1800x^5}$$

input
```
int((e*x+d)^2*(a+b*log(c*x^n))/x^6,x)
```

output
```
( - 360*log(x**n*c)*b*d**2 - 900*log(x**n*c)*b*d*e*x - 600*log(x**n*c)*b*e
**2*x**2 - 360*a*d**2 - 900*a*d*e*x - 600*a*e**2*x**2 - 72*b*d**2*n - 225*
b*d*e*n*x - 200*b*e**2*n*x**2)/(1800*x**5)
```

3.19 $\int x^3(d+ex)^3 (a+b\log(cx^n))\, dx$

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Optimal result

Integrand size = 21, antiderivative size = 100

$$\int x^3(d+ex)^3 (a+b\log(cx^n))\, dx = -\frac{1}{16}bd^3nx^4 - \frac{3}{25}bd^2enx^5 - \frac{1}{12}bde^2nx^6 - \frac{1}{49}be^3nx^7 + \frac{1}{140}\left(35d^3x^4 + 84d^2ex^5 + 70de^2x^6 + 20e^3x^7\right)(a + b\log(cx^n))$$

output
```
-1/16*b*d^3*n*x^4-3/25*b*d^2*e*n*x^5-1/12*b*d*e^2*n*x^6-1/49*b*e^3*n*x^7+1
/140*(20*e^3*x^7+70*d*e^2*x^6+84*d^2*e*x^5+35*d^3*x^4)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.33

$$\int x^3(d+ex)^3 (a+b\log(cx^n))\, dx = -\frac{1}{16}bd^3nx^4 - \frac{3}{25}bd^2enx^5 - \frac{1}{12}bde^2nx^6 - \frac{1}{49}be^3nx^7 + \frac{1}{4}d^3x^4(a+b\log(cx^n)) + \frac{3}{5}d^2ex^5(a+b\log(cx^n)) + \frac{1}{2}de^2x^6(a+b\log(cx^n)) + \frac{1}{7}e^3x^7(a+b\log(cx^n))$$

input
```
Integrate[x^3*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/16*(b*d^3*n*x^4) - (3*b*d^2*e*n*x^5)/25 - (b*d*e^2*n*x^6)/12 - (b*e^3*n
*x^7)/49 + (d^3*x^4*(a + b*Log[c*x^n]))/4 + (3*d^2*e*x^5*(a + b*Log[c*x^n]
))/5 + (d*e^2*x^6*(a + b*Log[c*x^n]))/2 + (e^3*x^7*(a + b*Log[c*x^n]))/7
```

Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 99, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2771, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3(d+ex)^3(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{140}\left(35d^3x^4+84d^2ex^5+70de^2x^6+20e^3x^7\right)(a+b\log(cx^n))-bn\int \frac{1}{140}x^3\left(35d^3+84exd^2+70e^2x^2d+20e^3x^3\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{140}\left(35d^3x^4+84d^2ex^5+70de^2x^6+20e^3x^7\right)(a+b\log(cx^n))-\frac{1}{140}bn\int x^3\left(35d^3+84exd^2+70e^2x^2d+20e^3x^3\right)dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{140}\left(35d^3x^4+84d^2ex^5+70de^2x^6+20e^3x^7\right)(a+b\log(cx^n))-\frac{1}{140}bn\int \left(20e^3x^6+70de^2x^5+84d^2ex^4+35d^3x^3\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{140}\left(35d^3x^4+84d^2ex^5+70de^2x^6+20e^3x^7\right)(a+b\log(cx^n))-\frac{1}{140}bn\left(\frac{35d^3x^4}{4}+\frac{84}{5}d^2ex^5+\frac{35}{3}de^2x^6+\frac{20e^3x^7}{7}\right)$$

input
```
Int[x^3*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/140*(b*n*((35*d^3*x^4)/4 + (84*d^2*e*x^5)/5 + (35*d*e^2*x^6)/3 + (20*e^
3*x^7)/7)) + ((35*d^3*x^4 + 84*d^2*e*x^5 + 70*d*e^2*x^6 + 20*e^3*x^7)*(a +
 b*Log[c*x^n]))/140
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 155.38 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.44

method	result
parallelrisch	$\frac{x^{7} \ln \left(c \,x^{n}\right) b \,e^{3}}{7}-\frac{b \,e^{3} n \,x^{7}}{49}+\frac{a \,e^{3} x^{7}}{7}+\frac{x^{6} \ln \left(c \,x^{n}\right) b d \,e^{2}}{2}-\frac{b d \,e^{2} n \,x^{6}}{12}+\frac{a d \,e^{2} x^{6}}{2}+\frac{3 x^{5} \ln \left(c \,x^{n}\right) b \,d^{2} e}{5}-\frac{3 b \,d^{2} e n \,x^{5}}{25}-$
risch	$-\frac{3 i \pi b \,d^{2} e \,x^{5} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right) \operatorname{csgn}\left(i c\right)}{10}-\frac{i \pi b d \,e^{2} x^{6} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right) \operatorname{csgn}\left(i c\right)}{4}+\frac{3 a \,d^{2} e \,x^{5}}{5}+\frac{b \,x^{4} \left(20 e^{3} x^{3}+70\right.}{}$

input
```
int(x^3*(e*x+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/7*x^7*ln(c*x^n)*b*e^3-1/49*b*e^3*n*x^7+1/7*a*e^3*x^7+1/2*x^6*ln(c*x^n)*b
*d*e^2-1/12*b*d*e^2*n*x^6+1/2*a*d*e^2*x^6+3/5*x^5*ln(c*x^n)*b*d^2*e-3/25*b
*d^2*e*n*x^5+3/5*a*d^2*e*x^5+1/4*x^4*ln(c*x^n)*b*d^3-1/16*b*d^3*n*x^4+1/4*
a*d^3*x^4
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.67

$$\int x^3(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{49}\left(be^3n-7\,ae^3\right)x^7-\frac{1}{12}\left(bde^2n-6\,ade^2\right)x^6-\frac{3}{25}\left(bd^2en-5\,ad^2e\right)x^5 - \frac{1}{16}\left(bd^3n-4\,ad^3\right)x^4+\frac{1}{140}\left(20\,be^3x^7+70\,bde^2x^6+84\,bd^2ex^5+35\,bd^3x^4\right)\log\left(c\right) + \frac{1}{140}\left(20\,be^3nx^7+70\,bde^2nx^6+84\,bd^2enx^5+35\,bd^3nx^4\right)\log\left(x\right)$$

input
```
integrate(x^3*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/49*(b*e^3*n - 7*a*e^3)*x^7 - 1/12*(b*d*e^2*n - 6*a*d*e^2)*x^6 - 3/25*(b
*d^2*e*n - 5*a*d^2*e)*x^5 - 1/16*(b*d^3*n - 4*a*d^3)*x^4 + 1/140*(20*b*e^3
*x^7 + 70*b*d*e^2*x^6 + 84*b*d^2*e*x^5 + 35*b*d^3*x^4)*log(c) + 1/140*(20*
b*e^3*n*x^7 + 70*b*d*e^2*n*x^6 + 84*b*d^2*e*n*x^5 + 35*b*d^3*n*x^4)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.94 (sec) , antiderivative size = 170, normalized size of antiderivative = 1.70

$$\int x^3(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{ad^3x^4}{4}+\frac{3ad^2ex^5}{5}+\frac{ade^2x^6}{2}+\frac{ae^3x^7}{7} - \frac{bd^3nx^4}{16}+\frac{bd^3x^4\log\left(cx^n\right)}{4}-\frac{3bd^2enx^5}{25} + \frac{3bd^2ex^5\log\left(cx^n\right)}{5}-\frac{bde^2nx^6}{12} + \frac{bde^2x^6\log\left(cx^n\right)}{2}-\frac{be^3nx^7}{49}+\frac{be^3x^7\log\left(cx^n\right)}{7}$$

input
```
integrate(x**3*(e*x+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x**4/4 + 3*a*d**2*e*x**5/5 + a*d*e**2*x**6/2 + a*e**3*x**7/7 - b*d*
*3*n*x**4/16 + b*d**3*x**4*log(c*x**n)/4 - 3*b*d**2*e*n*x**5/25 + 3*b*d**2
*e*x**5*log(c*x**n)/5 - b*d*e**2*n*x**6/12 + b*d*e**2*x**6*log(c*x**n)/2 -
 b*e**3*n*x**7/49 + b*e**3*x**7*log(c*x**n)/7
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.43

$$\int x^3(d+ex)^3 (a+b\log(cx^n))\,dx = -\frac{1}{49}\,be^3nx^7 + \frac{1}{7}\,be^3x^7\log(cx^n) - \frac{1}{12}\,bde^2nx^6 + \frac{1}{7}\,ae^3x^7 + \frac{1}{2}\,bde^2x^6\log(cx^n) - \frac{3}{25}\,bd^2enx^5 + \frac{1}{2}\,ade^2x^6 + \frac{3}{5}\,bd^2ex^5\log(cx^n) - \frac{1}{16}\,bd^3nx^4 + \frac{3}{5}\,ad^2ex^5 + \frac{1}{4}\,bd^3x^4\log(cx^n) + \frac{1}{4}\,ad^3x^4$$

input
```
integrate(x^3*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/49*b*e^3*n*x^7 + 1/7*b*e^3*x^7*log(c*x^n) - 1/12*b*d*e^2*n*x^6 + 1/7*a*
e^3*x^7 + 1/2*b*d*e^2*x^6*log(c*x^n) - 3/25*b*d^2*e*n*x^5 + 1/2*a*d*e^2*x^
6 + 3/5*b*d^2*e*x^5*log(c*x^n) - 1/16*b*d^3*n*x^4 + 3/5*a*d^2*e*x^5 + 1/4*
b*d^3*x^4*log(c*x^n) + 1/4*a*d^3*x^4
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.77

$$\int x^3(d+ex)^3(a+b\log(cx^n))\,dx = \frac{1}{7}be^3nx^7\log(x) - \frac{1}{49}be^3nx^7 + \frac{1}{7}be^3x^7\log(c) + \frac{1}{2}bde^2nx^6\log(x) - \frac{1}{12}bde^2nx^6 + \frac{1}{7}ae^3x^7 + \frac{1}{2}bde^2x^6\log(c) + \frac{3}{5}bd^2enx^5\log(x) - \frac{3}{25}bd^2enx^5 + \frac{1}{2}ade^2x^6 + \frac{3}{5}bd^2ex^5\log(c) + \frac{1}{4}bd^3nx^4\log(x) - \frac{1}{16}bd^3nx^4 + \frac{3}{5}ad^2ex^5 + \frac{1}{4}bd^3x^4\log(c) + \frac{1}{4}ad^3x^4$$

input
```
integrate(x^3*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/7*b*e^3*n*x^7*log(x) - 1/49*b*e^3*n*x^7 + 1/7*b*e^3*x^7*log(c) + 1/2*b*d
*e^2*n*x^6*log(x) - 1/12*b*d*e^2*n*x^6 + 1/7*a*e^3*x^7 + 1/2*b*d*e^2*x^6*l
og(c) + 3/5*b*d^2*e*n*x^5*log(x) - 3/25*b*d^2*e*n*x^5 + 1/2*a*d*e^2*x^6 +
3/5*b*d^2*e*x^5*log(c) + 1/4*b*d^3*n*x^4*log(x) - 1/16*b*d^3*n*x^4 + 3/5*a
*d^2*e*x^5 + 1/4*b*d^3*x^4*log(c) + 1/4*a*d^3*x^4
```

Mupad [B] (verification not implemented)

Time = 28.52 (sec) , antiderivative size = 113, normalized size of antiderivative = 1.13

$$\int x^3(d+ex)^3(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,d^3\,x^4}{4} + \frac{3\,b\,d^2\,e\,x^5}{5} + \frac{b\,d\,e^2\,x^6}{2} + \frac{b\,e^3\,x^7}{7}\right) + \frac{d^3\,x^4\,(4\,a-b\,n)}{16} + \frac{e^3\,x^7\,(7\,a-b\,n)}{49} + \frac{3\,d^2\,e\,x^5\,(5\,a-b\,n)}{25} + \frac{d\,e^2\,x^6\,(6\,a-b\,n)}{12}$$

input
```
int(x^3*(a + b*log(c*x^n))*(d + e*x)^3,x)
```

output
```
log(c*x^n)*((b*d^3*x^4)/4 + (b*e^3*x^7)/7 + (3*b*d^2*e*x^5)/5 + (b*d*e^2*x
^6)/2) + (d^3*x^4*(4*a - b*n))/16 + (e^3*x^7*(7*a - b*n))/49 + (3*d^2*e*x^
5*(5*a - b*n))/25 + (d*e^2*x^6*(6*a - b*n))/12
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.33

$$\int x^3(d+ex)^3\,(a+b\log\left(cx^n\right))\,dx$$
$$=\frac{x^4(14700\log(x^nc)\,b\,d^3+35280\log(x^nc)\,b\,d^2ex+29400\log(x^nc)\,bd\,e^2x^2+8400\log(x^nc)\,b\,e^3x^3+14700a}{5}$$

input
```
int(x^3*(e*x+d)^3*(a+b*log(c*x^n)),x)
```

output
```
(x**4*(14700*log(x**n*c)*b*d**3 + 35280*log(x**n*c)*b*d**2*e*x + 29400*log
(x**n*c)*b*d*e**2*x**2 + 8400*log(x**n*c)*b*e**3*x**3 + 14700*a*d**3 + 352
80*a*d**2*e*x + 29400*a*d*e**2*x**2 + 8400*a*e**3*x**3 - 3675*b*d**3*n - 7
056*b*d**2*e*n*x - 4900*b*d*e**2*n*x**2 - 1200*b*e**3*n*x**3))/58800
```

3.20 $\int x^2(d+ex)^3\,(a+b\log\left(cx^n\right))\,dx$

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Rubi [A] (verified) . . . 304
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Giac [A] (verification not implemented) . . . 308
Mupad [B] (verification not implemented) . . . 308
Reduce [B] (verification not implemented) . . . 309

Optimal result

Integrand size = 21, antiderivative size = 100

$$\int x^2(d+ex)^3\,(a+b\log\left(cx^n\right))\,dx=-\frac{1}{9}bd^3nx^3-\frac{3}{16}bd^2enx^4-\frac{3}{25}bde^2nx^5-\frac{1}{36}be^3nx^6+\frac{1}{60}\left(20d^3x^3+45d^2ex^4+36de^2x^5+10e^3x^6\right)(a+b\log\left(cx^n\right))$$

output
```
-1/9*b*d^3*n*x^3-3/16*b*d^2*e*n*x^4-3/25*b*d*e^2*n*x^5-1/36*b*e^3*n*x^6+1/
60*(10*e^3*x^6+36*d*e^2*x^5+45*d^2*e*x^4+20*d^3*x^3)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.33

$$\int x^2(d+ex)^3\,(a+b\log\left(cx^n\right))\,dx=-\frac{1}{9}bd^3nx^3-\frac{3}{16}bd^2enx^4-\frac{3}{25}bde^2nx^5-\frac{1}{36}be^3nx^6+\frac{1}{3}d^3x^3(a+b\log\left(cx^n\right))+\frac{3}{4}d^2ex^4(a+b\log\left(cx^n\right))+\frac{3}{5}de^2x^5(a+b\log\left(cx^n\right))+\frac{1}{6}e^3x^6(a+b\log\left(cx^n\right))$$

input
```
Integrate[x^2*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/9*(b*d^3*n*x^3) - (3*b*d^2*e*n*x^4)/16 - (3*b*d*e^2*n*x^5)/25 - (b*e^3*
n*x^6)/36 + (d^3*x^3*(a + b*Log[c*x^n]))/3 + (3*d^2*e*x^4*(a + b*Log[c*x^n
]))/4 + (3*d*e^2*x^5*(a + b*Log[c*x^n]))/5 + (e^3*x^6*(a + b*Log[c*x^n]))/
6
```

Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 99, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2771, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2(d+ex)^3 (a+b\log (cx^n)) \, dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{60}\left(20d^3x^3+45d^2ex^4+36de^2x^5+10e^3x^6\right)(a+b\log (cx^n))-bn\int \frac{1}{60}x^2\left(20d^3+45exd^2+36e^2x^2d+10e^3x^3\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{60}\left(20d^3x^3+45d^2ex^4+36de^2x^5+10e^3x^6\right)(a+b\log (cx^n))-\frac{1}{60}bn\int x^2\left(20d^3+45exd^2+36e^2x^2d+10e^3x^3\right)dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{60}\left(20d^3x^3+45d^2ex^4+36de^2x^5+10e^3x^6\right)(a+b\log (cx^n))-\frac{1}{60}bn\int \left(10e^3x^5+36de^2x^4+45d^2ex^3+20d^3x^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{60}\left(20d^3x^3+45d^2ex^4+36de^2x^5+10e^3x^6\right)(a+b\log (cx^n))-\frac{1}{60}bn\left(\frac{20d^3x^3}{3}+\frac{45}{4}d^2ex^4+\frac{36}{5}de^2x^5+\frac{5e^3x^6}{3}\right)$$

input
```
Int[x^2*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/60*(b*n*((20*d^3*x^3)/3 + (45*d^2*e*x^4)/4 + (36*d*e^2*x^5)/5 + (5*e^3*
x^6)/3)) + ((20*d^3*x^3 + 45*d^2*e*x^4 + 36*d*e^2*x^5 + 10*e^3*x^6)*(a + b
*Log[c*x^n]))/60
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 143.70 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.44

method	result
parallelrisch	$\frac{x^{6} b \ln\left(c\,x^{n}\right) e^{3}}{6}-\frac{b\,e^{3} n\,x^{6}}{36}+\frac{x^{6} a\,e^{3}}{6}+\frac{3 x^{5} b \ln\left(c\,x^{n}\right) d\,e^{2}}{5}-\frac{3 b d\,e^{2} n\,x^{5}}{25}+\frac{3 x^{5} a\,e^{2} d}{5}+\frac{3 x^{4} b \ln\left(c\,x^{n}\right) d^{2} e}{4}-\frac{3 b\,d^{2} e n\,x^{4}}{16}\ldots$
risch	$\frac{3 x^{5} a\,e^{2} d}{5}+\frac{3 x^{4} a\,d^{2} e}{4}+\frac{x^{3} a\,d^{3}}{3}+\frac{x^{6} a\,e^{3}}{6}+\frac{i \pi b\,d^{3} x^{3} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c\,x^{n}\right)^{2}}{6}+\frac{i \pi b\,d^{3} x^{3} \operatorname{csgn}\left(i c\,x^{n}\right)^{2} \operatorname{csgn}\left(i c\right)}{6}+i \pi b\ldots$

input
```
int(x^2*(e*x+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/6*x^6*b*ln(c*x^n)*e^3-1/36*b*e^3*n*x^6+1/6*x^6*a*e^3+3/5*x^5*b*ln(c*x^n)
*d*e^2-3/25*b*d*e^2*n*x^5+3/5*x^5*a*e^2*d+3/4*x^4*b*ln(c*x^n)*d^2*e-3/16*b
*d^2*e*n*x^4+3/4*x^4*a*d^2*e+1/3*x^3*b*ln(c*x^n)*d^3-1/9*b*d^3*n*x^3+1/3*x
^3*a*d^3
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.67

$$\int x^2(d+ex)^3\,(a+b\log{(cx^n)})\ dx = -\frac{1}{36}\left(be^3n-6\,ae^3\right)x^6-\frac{3}{25}\left(bde^2n-5\,ade^2\right)x^5-\frac{3}{16}\left(bd^2en-4\,ad^2e\right)x^4 -\frac{1}{9}\left(bd^3n-3\,ad^3\right)x^3+\frac{1}{60}\left(10\,be^3x^6+36\,bde^2x^5+45\,bd^2ex^4+20\,bd^3x^3\right)\log{(c)} +\frac{1}{60}\left(10\,be^3nx^6+36\,bde^2nx^5+45\,bd^2enx^4+20\,bd^3nx^3\right)\log{(x)}$$

input
```
integrate(x^2*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/36*(b*e^3*n - 6*a*e^3)*x^6 - 3/25*(b*d*e^2*n - 5*a*d*e^2)*x^5 - 3/16*(b
*d^2*e*n - 4*a*d^2*e)*x^4 - 1/9*(b*d^3*n - 3*a*d^3)*x^3 + 1/60*(10*b*e^3*x
^6 + 36*b*d*e^2*x^5 + 45*b*d^2*e*x^4 + 20*b*d^3*x^3)*log(c) + 1/60*(10*b*e
^3*n*x^6 + 36*b*d*e^2*n*x^5 + 45*b*d^2*e*n*x^4 + 20*b*d^3*n*x^3)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.53 (sec) , antiderivative size = 175, normalized size of antiderivative = 1.75

$$\int x^2(d+ex)^3\,(a+b\log{(cx^n)})\ dx = \frac{ad^3x^3}{3}+\frac{3ad^2ex^4}{4}+\frac{3ade^2x^5}{5}+\frac{ae^3x^6}{6} -\frac{bd^3nx^3}{9}+\frac{bd^3x^3\log{(cx^n)}}{3}-\frac{3bd^2enx^4}{16} +\frac{3bd^2ex^4\log{(cx^n)}}{4}-\frac{3bde^2nx^5}{25} +\frac{3bde^2x^5\log{(cx^n)}}{5}-\frac{be^3nx^6}{36}+\frac{be^3x^6\log{(cx^n)}}{6}$$

input
```
integrate(x**2*(e*x+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x**3/3 + 3*a*d**2*e*x**4/4 + 3*a*d*e**2*x**5/5 + a*e**3*x**6/6 - b*
d**3*n*x**3/9 + b*d**3*x**3*log(c*x**n)/3 - 3*b*d**2*e*n*x**4/16 + 3*b*d**
2*e*x**4*log(c*x**n)/4 - 3*b*d*e**2*n*x**5/25 + 3*b*d*e**2*x**5*log(c*x**n
)/5 - b*e**3*n*x**6/36 + b*e**3*x**6*log(c*x**n)/6
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.43

$$\int x^2(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{36}\,be^3nx^6 + \frac{1}{6}\,be^3x^6\log\left(cx^n\right) - \frac{3}{25}\,bde^2nx^5 + \frac{1}{6}\,ae^3x^6 + \frac{3}{5}\,bde^2x^5\log\left(cx^n\right) - \frac{3}{16}\,bd^2enx^4 + \frac{3}{5}\,ade^2x^5 + \frac{3}{4}\,bd^2ex^4\log\left(cx^n\right) - \frac{1}{9}\,bd^3nx^3 + \frac{3}{4}\,ad^2ex^4 + \frac{1}{3}\,bd^3x^3\log\left(cx^n\right) + \frac{1}{3}\,ad^3x^3$$

input
```
integrate(x^2*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/36*b*e^3*n*x^6 + 1/6*b*e^3*x^6*log(c*x^n) - 3/25*b*d*e^2*n*x^5 + 1/6*a*
e^3*x^6 + 3/5*b*d*e^2*x^5*log(c*x^n) - 3/16*b*d^2*e*n*x^4 + 3/5*a*d*e^2*x^
5 + 3/4*b*d^2*e*x^4*log(c*x^n) - 1/9*b*d^3*n*x^3 + 3/4*a*d^2*e*x^4 + 1/3*b
*d^3*x^3*log(c*x^n) + 1/3*a*d^3*x^3
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.77

$$\int x^2(d+ex)^3(a+b\log(cx^n))\,dx = \frac{1}{6}be^3nx^6\log(x) - \frac{1}{36}be^3nx^6 + \frac{1}{6}be^3x^6\log(c) + \frac{3}{5}bde^2nx^5\log(x) - \frac{3}{25}bde^2nx^5 + \frac{1}{6}ae^3x^6 + \frac{3}{5}bde^2x^5\log(c) + \frac{3}{4}bd^2enx^4\log(x) - \frac{3}{16}bd^2enx^4 + \frac{3}{5}ade^2x^5 + \frac{3}{4}bd^2ex^4\log(c) + \frac{1}{3}bd^3nx^3\log(x) - \frac{1}{9}bd^3nx^3 + \frac{3}{4}ad^2ex^4 + \frac{1}{3}bd^3x^3\log(c) + \frac{1}{3}ad^3x^3$$

input
```
integrate(x^2*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/6*b*e^3*n*x^6*log(x) - 1/36*b*e^3*n*x^6 + 1/6*b*e^3*x^6*log(c) + 3/5*b*d
*e^2*n*x^5*log(x) - 3/25*b*d*e^2*n*x^5 + 1/6*a*e^3*x^6 + 3/5*b*d*e^2*x^5*l
og(c) + 3/4*b*d^2*e*n*x^4*log(x) - 3/16*b*d^2*e*n*x^4 + 3/5*a*d*e^2*x^5 +
3/4*b*d^2*e*x^4*log(c) + 1/3*b*d^3*n*x^3*log(x) - 1/9*b*d^3*n*x^3 + 3/4*a*
d^2*e*x^4 + 1/3*b*d^3*x^3*log(c) + 1/3*a*d^3*x^3
```

Mupad [B] (verification not implemented)

Time = 28.68 (sec) , antiderivative size = 113, normalized size of antiderivative = 1.13

$$\int x^2(d+ex)^3(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,d^3\,x^3}{3} + \frac{3\,b\,d^2\,e\,x^4}{4} + \frac{3\,b\,d\,e^2\,x^5}{5} + \frac{b\,e^3\,x^6}{6}\right) + \frac{d^3\,x^3\,(3\,a-b\,n)}{9} + \frac{e^3\,x^6\,(6\,a-b\,n)}{36} + \frac{3\,d^2\,e\,x^4\,(4\,a-b\,n)}{16} + \frac{3\,d\,e^2\,x^5\,(5\,a-b\,n)}{25}$$

input
```
int(x^2*(a + b*log(c*x^n))*(d + e*x)^3,x)
```

output
```
log(c*x^n)*((b*d^3*x^3)/3 + (b*e^3*x^6)/6 + (3*b*d^2*e*x^4)/4 + (3*b*d*e^2
*x^5)/5) + (d^3*x^3*(3*a - b*n))/9 + (e^3*x^6*(6*a - b*n))/36 + (3*d^2*e*x
^4*(4*a - b*n))/16 + (3*d*e^2*x^5*(5*a - b*n))/25
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.33

$$\int x^2(d+ex)^3\,(a+b\log{(cx^n)})\,\,dx$$
$$=\frac{x^3(1200\log(x^nc)\,b\,d^3+2700\log(x^nc)\,b\,d^2ex+2160\log(x^nc)\,bd\,e^2x^2+600\log(x^nc)\,b\,e^3x^3+1200a\,d^3+2}{3600}$$

input
```
int(x^2*(e*x+d)^3*(a+b*log(c*x^n)),x)
```

output
```
(x**3*(1200*log(x**n*c)*b*d**3 + 2700*log(x**n*c)*b*d**2*e*x + 2160*log(x*
*n*c)*b*d*e**2*x**2 + 600*log(x**n*c)*b*e**3*x**3 + 1200*a*d**3 + 2700*a*d
**2*e*x + 2160*a*d*e**2*x**2 + 600*a*e**3*x**3 - 400*b*d**3*n - 675*b*d**2
*e*n*x - 432*b*d*e**2*n*x**2 - 100*b*e**3*n*x**3))/3600
```

3.21 $\int x(d+ex)^3 (a+b\log(cx^n))\, dx$

Optimal result . . . 310
Mathematica [A] (verified) . . . 310
Rubi [A] (verified) . . . 311
Maple [A] (verified) . . . 313
Fricas [A] (verification not implemented) . . . 313
Sympy [A] (verification not implemented) . . . 314
Maxima [A] (verification not implemented) . . . 314
Giac [A] (verification not implemented) . . . 315
Mupad [B] (verification not implemented) . . . 315
Reduce [B] (verification not implemented) . . . 316

Optimal result

Integrand size = 19, antiderivative size = 122

$$\int x(d+ex)^3 (a+b\log(cx^n))\, dx = \frac{bd^4nx}{5e} + \frac{3}{20}bd^3nx^2 + \frac{1}{15}bd^2enx^3 + \frac{1}{80}bde^2nx^4 - \frac{bn(d+ex)^5}{25e^2} + \frac{bd^5n\log(x)}{20e^2} - \frac{1}{20}\left(\frac{5d(d+ex)^4}{e^2} - \frac{4(d+ex)^5}{e^2}\right)(a+b\log(cx^n))$$

output
```
1/5*b*d^4*n*x/e+3/20*b*d^3*n*x^2+1/15*b*d^2*e*n*x^3+1/80*b*d*e^2*n*x^4-1/2
5*b*n*(e*x+d)^5/e^2+1/20*b*d^5*n*ln(x)/e^2-1/20*(5*d*(e*x+d)^4/e^2-4*(e*x+
d)^5/e^2)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 130, normalized size of antiderivative = 1.07

$$\int x(d+ex)^3 (a+b\log(cx^n))\, dx = -\frac{1}{4}bd^3nx^2 - \frac{1}{3}bd^2enx^3 - \frac{3}{16}bde^2nx^4 - \frac{1}{25}be^3nx^5 + \frac{1}{2}d^3x^2(a+b\log(cx^n)) + d^2ex^3(a+b\log(cx^n)) + \frac{3}{4}de^2x^4(a+b\log(cx^n)) + \frac{1}{5}e^3x^5(a+b\log(cx^n))$$

input
```
Integrate[x*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/4*(b*d^3*n*x^2) - (b*d^2*e*n*x^3)/3 - (3*b*d*e^2*n*x^4)/16 - (b*e^3*n*x
^5)/25 + (d^3*x^2*(a + b*Log[c*x^n]))/2 + d^2*e*x^3*(a + b*Log[c*x^n]) + (
3*d*e^2*x^4*(a + b*Log[c*x^n]))/4 + (e^3*x^5*(a + b*Log[c*x^n]))/5
```

Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 110, normalized size of antiderivative = 0.90, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.263$, Rules used = {2771, 27, 90, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex)^3 (a+b\log(cx^n))\, dx$$

$$\Big\downarrow \text{2771}$$

$$-bn\int -\frac{(d-4ex)(d+ex)^4}{20e^2x}dx-\frac{1}{20}\left(\frac{5d(d+ex)^4}{e^2}-\frac{4(d+ex)^5}{e^2}\right)(a+b\log(cx^n))$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(d-4ex)(d+ex)^4}{x}dx}{20e^2}-\frac{1}{20}\left(\frac{5d(d+ex)^4}{e^2}-\frac{4(d+ex)^5}{e^2}\right)(a+b\log(cx^n))$$

$$\Big\downarrow \text{90}$$

$$\frac{bn\left(d\int \frac{(d+ex)^4}{x}dx-\frac{4}{5}(d+ex)^5\right)}{20e^2}-\frac{1}{20}\left(\frac{5d(d+ex)^4}{e^2}-\frac{4(d+ex)^5}{e^2}\right)(a+b\log(cx^n))$$

$$\Big\downarrow \text{49}$$

$$\frac{bn\left(d\int \left(\frac{d^4}{x}+4ed^3+6e^2xd^2+4e^3x^2d+e^4x^3\right)dx-\frac{4}{5}(d+ex)^5\right)}{20e^2}-\frac{1}{20}\left(\frac{5d(d+ex)^4}{e^2}-\frac{4(d+ex)^5}{e^2}\right)(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$\frac{bn\left(d\left(d^4\log(x)+4d^3ex+3d^2e^2x^2+\frac{4}{3}de^3x^3+\frac{e^4x^4}{4}\right)-\frac{4}{5}(d+ex)^5\right)}{20e^2}-\frac{1}{20}\left(\frac{5d(d+ex)^4}{e^2}-\frac{4(d+ex)^5}{e^2}\right)(a+b\log(cx^n))$$

input
```
Int[x*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
(b*n*((-4*(d + e*x)^5)/5 + d*(4*d^3*e*x + 3*d^2*e^2*x^2 + (4*d*e^3*x^3)/3
+ (e^4*x^4)/4 + d^4*Log[x])))/(20*e^2) - (((5*d*(d + e*x)^4)/e^2 - (4*(d +
 e*x)^5)/e^2)*(a + b*Log[c*x^n]))/20
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.67 (sec) , antiderivative size = 142, normalized size of antiderivative = 1.16

method	result
parallelrisch	$\frac{x^5 b \ln(c\,x^n) e^3}{5} - \frac{b\,e^3 n\,x^5}{25} + \frac{x^5 a\,e^3}{5} + \frac{3x^4 b \ln(c\,x^n) d\,e^2}{4} - \frac{3bd\,e^2 n\,x^4}{16} + \frac{3x^4 a\,e^2 d}{4} + x^3 b \ln\left(c\,x^n\right) d^2 e - \frac{b\,d^2 en}{3}$
risch	$\frac{b\,x^2 (4e^3x^3+15d\,e^2x^2+20d^2ex+10d^3) \ln(x^n)}{20} - \frac{i\pi b\,e^3 x^5 \operatorname{csgn}(ic\,x^n)^3}{10} - \frac{i\pi b\,d^3 x^2 \operatorname{csgn}(ic\,x^n)^3}{4} + \frac{a\,d^3 x^2}{2} + \frac{x^5 a\,e^3}{5} +$

input
```
int(x*(e*x+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/5*x^5*b*ln(c*x^n)*e^3-1/25*b*e^3*n*x^5+1/5*x^5*a*e^3+3/4*x^4*b*ln(c*x^n)
*d*e^2-3/16*b*d*e^2*n*x^4+3/4*x^4*a*e^2*d+x^3*b*ln(c*x^n)*d^2*e-1/3*b*d^2*
e*n*x^3+x^3*a*d^2*e+1/2*x^2*b*ln(c*x^n)*d^3-1/4*b*d^3*n*x^2+1/2*a*d^3*x^2
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.37

$$\begin{aligned}
&\int x(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx \\
&= -\frac{1}{25}\left(be^3n-5\,ae^3\right)x^5 - \frac{3}{16}\left(bde^2n-4\,ade^2\right)x^4 - \frac{1}{3}\left(bd^2en-3\,ad^2e\right)x^3 \\
&\quad - \frac{1}{4}\left(bd^3n-2\,ad^3\right)x^2 + \frac{1}{20}\left(4\,be^3x^5+15\,bde^2x^4+20\,bd^2ex^3+10\,bd^3x^2\right)\log\left(c\right) \\
&\quad + \frac{1}{20}\left(4\,be^3nx^5+15\,bde^2nx^4+20\,bd^2enx^3+10\,bd^3nx^2\right)\log\left(x\right)
\end{aligned}$$

input
```
integrate(x*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/25*(b*e^3*n - 5*a*e^3)*x^5 - 3/16*(b*d*e^2*n - 4*a*d*e^2)*x^4 - 1/3*(b*
d^2*e*n - 3*a*d^2*e)*x^3 - 1/4*(b*d^3*n - 2*a*d^3)*x^2 + 1/20*(4*b*e^3*x^5
 + 15*b*d*e^2*x^4 + 20*b*d^2*e*x^3 + 10*b*d^3*x^2)*log(c) + 1/20*(4*b*e^3*
n*x^5 + 15*b*d*e^2*n*x^4 + 20*b*d^2*e*n*x^3 + 10*b*d^3*n*x^2)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.37

$$\int x(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{ad^3x^2}{2}+ad^2ex^3+\frac{3ade^2x^4}{4}+\frac{ae^3x^5}{5}-\frac{bd^3nx^2}{4}+\frac{bd^3x^2\log\left(cx^n\right)}{2}-\frac{bd^2enx^3}{3}+bd^2ex^3\log\left(cx^n\right)-\frac{3bde^2nx^4}{16}+\frac{3bde^2x^4\log\left(cx^n\right)}{4}-\frac{be^3nx^5}{25}+\frac{be^3x^5\log\left(cx^n\right)}{5}$$

input
```
integrate(x*(e*x+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x**2/2 + a*d**2*e*x**3 + 3*a*d*e**2*x**4/4 + a*e**3*x**5/5 - b*d**3
*n*x**2/4 + b*d**3*x**2*log(c*x**n)/2 - b*d**2*e*n*x**3/3 + b*d**2*e*x**3*
log(c*x**n) - 3*b*d*e**2*n*x**4/16 + 3*b*d*e**2*x**4*log(c*x**n)/4 - b*e**
3*n*x**5/25 + b*e**3*x**5*log(c*x**n)/5
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.16

$$\int x(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{25}be^3nx^5+\frac{1}{5}be^3x^5\log\left(cx^n\right)-\frac{3}{16}bde^2nx^4+\frac{1}{5}ae^3x^5+\frac{3}{4}bde^2x^4\log\left(cx^n\right)-\frac{1}{3}bd^2enx^3+\frac{3}{4}ade^2x^4+bd^2ex^3\log\left(cx^n\right)-\frac{1}{4}bd^3nx^2+ad^2ex^3+\frac{1}{2}bd^3x^2\log\left(cx^n\right)+\frac{1}{2}ad^3x^2$$

input
```
integrate(x*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/25*b*e^3*n*x^5 + 1/5*b*e^3*x^5*log(c*x^n) - 3/16*b*d*e^2*n*x^4 + 1/5*a*
e^3*x^5 + 3/4*b*d*e^2*x^4*log(c*x^n) - 1/3*b*d^2*e*n*x^3 + 3/4*a*d*e^2*x^4
 + b*d^2*e*x^3*log(c*x^n) - 1/4*b*d^3*n*x^2 + a*d^2*e*x^3 + 1/2*b*d^3*x^2*
log(c*x^n) + 1/2*a*d^3*x^2
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 174, normalized size of antiderivative = 1.43

$$\int x(d+ex)^3 (a+b\log(cx^n))\,dx = \frac{1}{5}be^3nx^5\log(x) - \frac{1}{25}be^3nx^5 + \frac{1}{5}be^3x^5\log(c) + \frac{3}{4}bde^2nx^4\log(x) - \frac{3}{16}bde^2nx^4 + \frac{1}{5}ae^3x^5 + \frac{3}{4}bde^2x^4\log(c) + bd^2enx^3\log(x) - \frac{1}{3}bd^2enx^3 + \frac{3}{4}ade^2x^4 + bd^2ex^3\log(c) + \frac{1}{2}bd^3nx^2\log(x) - \frac{1}{4}bd^3nx^2 + ad^2ex^3 + \frac{1}{2}bd^3x^2\log(c) + \frac{1}{2}ad^3x^2$$

input
```
integrate(x*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/5*b*e^3*n*x^5*log(x) - 1/25*b*e^3*n*x^5 + 1/5*b*e^3*x^5*log(c) + 3/4*b*d
*e^2*n*x^4*log(x) - 3/16*b*d*e^2*n*x^4 + 1/5*a*e^3*x^5 + 3/4*b*d*e^2*x^4*l
og(c) + b*d^2*e*n*x^3*log(x) - 1/3*b*d^2*e*n*x^3 + 3/4*a*d*e^2*x^4 + b*d^2
*e*x^3*log(c) + 1/2*b*d^3*n*x^2*log(x) - 1/4*b*d^3*n*x^2 + a*d^2*e*x^3 + 1
/2*b*d^3*x^2*log(c) + 1/2*a*d^3*x^2
```

Mupad [B] (verification not implemented)

Time = 28.11 (sec) , antiderivative size = 112, normalized size of antiderivative = 0.92

$$\int x(d+ex)^3 (a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,d^3\,x^2}{2} + b\,d^2\,e\,x^3 + \frac{3\,b\,d\,e^2\,x^4}{4} + \frac{b\,e^3\,x^5}{5}\right) + \frac{d^3\,x^2\,(2\,a-b\,n)}{4} + \frac{e^3\,x^5\,(5\,a-b\,n)}{25} + \frac{d^2\,e\,x^3\,(3\,a-b\,n)}{3} + \frac{3\,d\,e^2\,x^4\,(4\,a-b\,n)}{16}$$

input
```
int(x*(a + b*log(c*x^n))*(d + e*x)^3,x)
```

output
```
log(c*x^n)*((b*d^3*x^2)/2 + (b*e^3*x^5)/5 + b*d^2*e*x^3 + (3*b*d*e^2*x^4)/
4) + (d^3*x^2*(2*a - b*n))/4 + (e^3*x^5*(5*a - b*n))/25 + (d^2*e*x^3*(3*a
- b*n))/3 + (3*d*e^2*x^4*(4*a - b*n))/16
```

Reduce [B] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.09

$$\int x(d+ex)^3\,(a+b\log{(cx^n)})\;dx$$
$$= \frac{x^2(600\log(x^nc)\,b\,d^3+1200\log(x^nc)\,b\,d^2ex+900\log(x^nc)\,bd\,e^2x^2+240\log(x^nc)\,b\,e^3x^3+600a\,d^3+120}{1200}$$

input
```
int(x*(e*x+d)^3*(a+b*log(c*x^n)),x)
```

output
```
(x**2*(600*log(x**n*c)*b*d**3 + 1200*log(x**n*c)*b*d**2*e*x + 900*log(x**n
*c)*b*d*e**2*x**2 + 240*log(x**n*c)*b*e**3*x**3 + 600*a*d**3 + 1200*a*d**2
*e*x + 900*a*d*e**2*x**2 + 240*a*e**3*x**3 - 300*b*d**3*n - 400*b*d**2*e*n
*x - 225*b*d*e**2*n*x**2 - 48*b*e**3*n*x**3))/1200
```

3.22 $\int (d+ex)^3 (a+b\log(cx^n))\,dx$

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Optimal result

Integrand size = 18, antiderivative size = 85

$$\int (d+ex)^3 (a+b\log(cx^n))\,dx = -bd^3nx - \frac{3}{4}bd^2enx^2 - \frac{1}{3}bde^2nx^3 - \frac{1}{16}be^3nx^4 - \frac{bd^4n\log(x)}{4e} + \frac{(d+ex)^4(a+b\log(cx^n))}{4e}$$

output
```
-b*d^3*n*x-3/4*b*d^2*e*n*x^2-1/3*b*d*e^2*n*x^3-1/16*b*e^3*n*x^4-1/4*b*d^4*
n*ln(x)/e+1/4*(e*x+d)^4*(a+b*ln(c*x^n))/e
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 110, normalized size of antiderivative = 1.29

$$\int (d+ex)^3 (a+b\log(cx^n))\,dx = \frac{1}{48}x\left(12a\left(4d^3+6d^2ex+4de^2x^2+e^3x^3\right) - bn\left(48d^3+36d^2ex+16de^2x^2+3e^3x^3\right) + 12b\left(4d^3+6d^2ex+4de^2x^2+e^3x^3\right)\log(cx^n)\right)$$

input
```
Integrate[(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
(x*(12*a*(4*d^3 + 6*d^2*e*x + 4*d*e^2*x^2 + e^3*x^3) - b*n*(48*d^3 + 36*d^
2*e*x + 16*d*e^2*x^2 + 3*e^3*x^3) + 12*b*(4*d^3 + 6*d^2*e*x + 4*d*e^2*x^2
+ e^3*x^3)*Log[c*x^n]))/48
```

Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 80, normalized size of antiderivative = 0.94, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222, Rules used = {2750, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)^3 (a+b\log(cx^n)) \, dx$$

$$\Big\downarrow \text{ 2750}$$

$$\frac{(d+ex)^4 (a+b\log(cx^n))}{4e}-bn\int \frac{(d+ex)^4}{4ex}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{(d+ex)^4 (a+b\log(cx^n))}{4e}-\frac{bn\int \frac{(d+ex)^4}{x}dx}{4e}$$

$$\Big\downarrow \text{ 49}$$

$$\frac{(d+ex)^4 (a+b\log(cx^n))}{4e}-\frac{bn\int \left(\frac{d^4}{x}+4ed^3+6e^2xd^2+4e^3x^2d+e^4x^3\right)dx}{4e}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{(d+ex)^4 (a+b\log(cx^n))}{4e}-\frac{bn\left(d^4\log(x)+4d^3ex+3d^2e^2x^2+\frac{4}{3}de^3x^3+\frac{e^4x^4}{4}\right)}{4e}$$

input
```
Int[(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/4*(b*n*(4*d^3*e*x + 3*d^2*e^2*x^2 + (4*d*e^3*x^3)/3 + (e^4*x^4)/4 + d^4
*Log[x]))/e + ((d + e*x)^4*(a + b*Log[c*x^n]))/(4*e)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2750
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Simp[(a + b*Log[c*x^n])
  u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b,
 c, d, e, n, r}, x] && IGtQ[q, 0]
```

Maple [A] (verified)

Time = 0.60 (sec) , antiderivative size = 134, normalized size of antiderivative = 1.58

method	result
parallelrisch	$\frac{b\ln(c\,x^n)e^3x^4}{4} - \frac{b\,e^3n\,x^4}{16} + \frac{a\,e^3x^4}{4} + b\ln\left(c\,x^n\right)d\,e^2x^3 - \frac{bd\,e^2n\,x^3}{3} + a\,e^2x^3d + \frac{3b\ln(c\,x^n)d^2e\,x^2}{2} - \frac{3b\,d^2e}{4}$
risch	$-\frac{ie^3\pi b\,x^4\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)\,\mathrm{csgn}(ic)}{8} + \frac{ie^2\pi bd\,x^3\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2}{2} + xa\,d^3 + \frac{a\,e^3x^4}{4} + a\,e^2x^3d + \frac{3a\,d}{}$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/4*b*ln(c*x^n)*e^3*x^4-1/16*b*e^3*n*x^4+1/4*a*e^3*x^4+b*ln(c*x^n)*d*e^2*x
^3-1/3*b*d*e^2*n*x^3+a*e^2*x^3*d+3/2*b*ln(c*x^n)*d^2*e*x^2-3/4*b*d^2*e*n*x
^2+3/2*a*d^2*e*x^2+x*b*ln(c*x^n)*d^3-b*d^3*n*x+x*a*d^3
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 159 vs. $2(75) = 150$.

Time = 0.07 (sec) , antiderivative size = 159, normalized size of antiderivative = 1.87

$$\begin{aligned}&\int (d+ex)^3 (a+b\log (cx^n))\,dx\\&=-\frac{1}{16}\left(be^3n-4\,ae^3\right)x^4-\frac{1}{3}\left(bde^2n-3\,ade^2\right)x^3-\frac{3}{4}\left(bd^2en-2\,ad^2e\right)x^2\\&\quad-\left(bd^3n-ad^3\right)x+\frac{1}{4}\left(be^3x^4+4\,bde^2x^3+6\,bd^2ex^2+4\,bd^3x\right)\log(c)\\&\quad+\frac{1}{4}\left(be^3nx^4+4\,bde^2nx^3+6\,bd^2enx^2+4\,bd^3nx\right)\log(x)\end{aligned}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/16*(b*e^3*n - 4*a*e^3)*x^4 - 1/3*(b*d*e^2*n - 3*a*d*e^2)*x^3 - 3/4*(b*d
^2*e*n - 2*a*d^2*e)*x^2 - (b*d^3*n - a*d^3)*x + 1/4*(b*e^3*x^4 + 4*b*d*e^2
*x^3 + 6*b*d^2*e*x^2 + 4*b*d^3*x)*log(c) + 1/4*(b*e^3*n*x^4 + 4*b*d*e^2*n*
x^3 + 6*b*d^2*e*n*x^2 + 4*b*d^3*n*x)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 156, normalized size of antiderivative = 1.84

$$\begin{aligned}\int (d+ex)^3 (a+b\log (cx^n))\,dx &= ad^3x+\frac{3ad^2ex^2}{2}+ade^2x^3+\frac{ae^3x^4}{4}\\&\quad-bd^3nx+bd^3x\log(cx^n)-\frac{3bd^2enx^2}{4}\\&\quad+\frac{3bd^2ex^2\log(cx^n)}{2}-\frac{bde^2nx^3}{3}\\&\quad+bde^2x^3\log(cx^n)-\frac{be^3nx^4}{16}+\frac{be^3x^4\log(cx^n)}{4}\end{aligned}$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x + 3*a*d**2*e*x**2/2 + a*d*e**2*x**3 + a*e**3*x**4/4 - b*d**3*n*x
+ b*d**3*x*log(c*x**n) - 3*b*d**2*e*n*x**2/4 + 3*b*d**2*e*x**2*log(c*x**n)
/2 - b*d*e**2*n*x**3/3 + b*d*e**2*x**3*log(c*x**n) - b*e**3*n*x**4/16 + b*
e**3*x**4*log(c*x**n)/4
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.56

$$\int (d+ex)^3 (a+b\log(cx^n)) \, dx = -\frac{1}{16} be^3nx^4 + \frac{1}{4} be^3x^4\log(cx^n) - \frac{1}{3} bde^2nx^3 + \frac{1}{4} ae^3x^4 + bde^2x^3\log(cx^n) - \frac{3}{4} bd^2enx^2 + ade^2x^3 + \frac{3}{2} bd^2ex^2\log(cx^n) - bd^3nx + \frac{3}{2} ad^2ex^2 + bd^3x\log(cx^n) + ad^3x$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/16*b*e^3*n*x^4 + 1/4*b*e^3*x^4*log(c*x^n) - 1/3*b*d*e^2*n*x^3 + 1/4*a*e
^3*x^4 + b*d*e^2*x^3*log(c*x^n) - 3/4*b*d^2*e*n*x^2 + a*d*e^2*x^3 + 3/2*b*
d^2*e*x^2*log(c*x^n) - b*d^3*n*x + 3/2*a*d^2*e*x^2 + b*d^3*x*log(c*x^n) +
a*d^3*x
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 163 vs. 2(75) = 150.

Time = 0.11 (sec) , antiderivative size = 163, normalized size of antiderivative = 1.92

$$\int (d+ex)^3 (a+b\log(cx^n))\,dx = \frac{1}{4}be^3nx^4\log(x) - \frac{1}{16}be^3nx^4 + \frac{1}{4}be^3x^4\log(c) + bde^2nx^3\log(x) - \frac{1}{3}bde^2nx^3 + \frac{1}{4}ae^3x^4 + bde^2x^3\log(c) + \frac{3}{2}bd^2enx^2\log(x) - \frac{3}{4}bd^2enx^2 + ade^2x^3 + \frac{3}{2}bd^2ex^2\log(c) + bd^3nx\log(x) - bd^3nx + \frac{3}{2}ad^2ex^2 + bd^3x\log(c) + ad^3x$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/4*b*e^3*n*x^4*log(x) - 1/16*b*e^3*n*x^4 + 1/4*b*e^3*x^4*log(c) + b*d*e^2
*n*x^3*log(x) - 1/3*b*d*e^2*n*x^3 + 1/4*a*e^3*x^4 + b*d*e^2*x^3*log(c) + 3
/2*b*d^2*e*n*x^2*log(x) - 3/4*b*d^2*e*n*x^2 + a*d*e^2*x^3 + 3/2*b*d^2*e*x^
2*log(c) + b*d^3*n*x*log(x) - b*d^3*n*x + 3/2*a*d^2*e*x^2 + b*d^3*x*log(c)
 + a*d^3*x
```

Mupad [B] (verification not implemented)

Time = 27.71 (sec) , antiderivative size = 104, normalized size of antiderivative = 1.22

$$\int (d+ex)^3 (a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(b\,d^3\,x + \frac{3\,b\,d^2\,e\,x^2}{2} + b\,d\,e^2\,x^3 + \frac{b\,e^3\,x^4}{4}\right) + \frac{e^3\,x^4\,(4\,a-b\,n)}{16} + d^3\,x\,(a-b\,n) + \frac{3\,d^2\,e\,x^2\,(2\,a-b\,n)}{4} + \frac{d\,e^2\,x^3\,(3\,a-b\,n)}{3}$$

input
```
int((a + b*log(c*x^n))*(d + e*x)^3,x)
```

output
```
log(c*x^n)*((b*e^3*x^4)/4 + b*d^3*x + (3*b*d^2*e*x^2)/2 + b*d*e^2*x^3) + (
e^3*x^4*(4*a - b*n))/16 + d^3*x*(a - b*n) + (3*d^2*e*x^2*(2*a - b*n))/4 +
(d*e^2*x^3*(3*a - b*n))/3
```

Reduce [B] (verification not implemented)

Time = 0.52 (sec) , antiderivative size = 131, normalized size of antiderivative = 1.54

$$\int (d+ex)^3 (a+b\log(cx^n))\, dx$$
$$= \frac{x(48\log(x^nc)\, b\, d^3 + 72\log(x^nc)\, b\, d^2ex + 48\log(x^nc)\, bd\, e^2x^2 + 12\log(x^nc)\, b\, e^3x^3 + 48a\, d^3 + 72a\, d^2ex + 4}{48}$$

input
```
int((e*x+d)^3*(a+b*log(c*x^n)),x)
```

output
```
(x*(48*log(x**n*c)*b*d**3 + 72*log(x**n*c)*b*d**2*e*x + 48*log(x**n*c)*b*d
*e**2*x**2 + 12*log(x**n*c)*b*e**3*x**3 + 48*a*d**3 + 72*a*d**2*e*x + 48*a
*d*e**2*x**2 + 12*a*e**3*x**3 - 48*b*d**3*n - 36*b*d**2*e*n*x - 16*b*d*e**
2*n*x**2 - 3*b*e**3*n*x**3))/48
```

3.23 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x}\,dx$

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Optimal result

Integrand size = 21, antiderivative size = 122

$$\int \frac{(d+ex)^3\,(a+b\log{(cx^n)})}{x}\,dx = -3bd^2enx-\frac{3}{4}bde^2nx^2-\frac{1}{9}be^3nx^3-\frac{1}{2}bd^3n\log^2(x) + 3d^2ex(a+b\log{(cx^n)})+\frac{3}{2}de^2x^2(a+b\log{(cx^n)}) + \frac{1}{3}e^3x^3(a+b\log{(cx^n)})+d^3\log(x)\,(a+b\log{(cx^n)})$$

output
```
-3*b*d^2*e*n*x-3/4*b*d*e^2*n*x^2-1/9*b*e^3*n*x^3-1/2*b*d^3*n*ln(x)^2+3*d^2
*e*x*(a+b*ln(c*x^n))+3/2*d*e^2*x^2*(a+b*ln(c*x^n))+1/3*e^3*x^3*(a+b*ln(c*x
^n))+d^3*ln(x)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.01

$$\int \frac{(d+ex)^3\,(a+b\log{(cx^n)})}{x}\,dx = 3ad^2ex-3bd^2enx-\frac{3}{4}bde^2nx^2-\frac{1}{9}be^3nx^3 + 3bd^2ex\log{(cx^n)}+\frac{3}{2}de^2x^2(a+b\log{(cx^n)}) + \frac{1}{3}e^3x^3(a+b\log{(cx^n)})+\frac{d^3(a+b\log{(cx^n)})^2}{2bn}$$

input
```
Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x,x]
```

output
```
3*a*d^2*e*x - 3*b*d^2*e*n*x - (3*b*d*e^2*n*x^2)/4 - (b*e^3*n*x^3)/9 + 3*b*
d^2*e*x*Log[c*x^n] + (3*d*e^2*x^2*(a + b*Log[c*x^n]))/2 + (e^3*x^3*(a + b*
Log[c*x^n]))/3 + (d^3*(a + b*Log[c*x^n])^2)/(2*b*n)
```

Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 119, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x} dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(\frac{\log(x)d^3}{x}+\frac{1}{6}e\left(18d^2+9exd+2e^2x^2\right)\right)dx+d^3\log(x)(a+b\log(cx^n))+ 3d^2ex(a+b\log(cx^n))+\frac{3}{2}de^2x^2(a+b\log(cx^n))+\frac{1}{3}e^3x^3(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$d^3\log(x)(a+b\log(cx^n))+3d^2ex(a+b\log(cx^n))+\frac{3}{2}de^2x^2(a+b\log(cx^n))+ \frac{1}{3}e^3x^3(a+b\log(cx^n))-bn\left(\frac{1}{2}d^3\log^2(x)+3d^2ex+\frac{3}{4}de^2x^2+\frac{e^3x^3}{9}\right)$$

input
```
Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x,x]
```

output
```
-(b*n*(3*d^2*e*x + (3*d*e^2*x^2)/4 + (e^3*x^3)/9 + (d^3*Log[x]^2)/2)) + 3*
d^2*e*x*(a + b*Log[c*x^n]) + (3*d*e^2*x^2*(a + b*Log[c*x^n]))/2 + (e^3*x^3
*(a + b*Log[c*x^n]))/3 + d^3*Log[x]*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.64 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.18

method	result
parallelrisch	$\frac{12x^3\ln(c\,x^n)b\,e^3n-4x^3b\,e^3n^2+12x^3a\,e^3n+54x^2\ln(c\,x^n)bd\,e^2n-27x^2bd\,e^2n^2+54x^2ad\,e^2n+108x\ln(c\,x^n)b\,d^2en-108xb\,d^2e}{36n}$
risch	$\frac{i\pi b\,e^3x^3\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2}{6}+\frac{3a\,e^2x^2d}{2}+3a\,d^2ex-\frac{i\ln(x)\pi b\,d^3\,\mathrm{csgn}(ic\,x^n)^3}{2}-\frac{i\pi b\,e^3x^3\,\mathrm{csgn}(ic\,x^n)^3}{6}+\frac{\ln(c)}{}$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/36*(12*x^3*ln(c*x^n)*b*e^3*n-4*x^3*b*e^3*n^2+12*x^3*a*e^3*n+54*x^2*ln(c*
x^n)*b*d*e^2*n-27*x^2*b*d*e^2*n^2+54*x^2*a*d*e^2*n+108*x*ln(c*x^n)*b*d^2*e
*n-108*x*b*d^2*e*n^2+36*ln(x)*a*d^3*n+108*x*a*d^2*e*n+18*b*d^3*ln(c*x^n)^2
)/n
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.22

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x}\,dx$$
$$= \frac{1}{2}\,bd^3n\log(x)^2 - \frac{1}{9}\left(be^3n - 3\,ae^3\right)x^3 - \frac{3}{4}\left(bde^2n - 2\,ade^2\right)x^2$$
$$- 3\left(bd^2en - ad^2e\right)x + \frac{1}{6}\left(2\,be^3x^3 + 9\,bde^2x^2 + 18\,bd^2ex\right)\log(c)$$
$$+ \frac{1}{6}\left(2\,be^3nx^3 + 9\,bde^2nx^2 + 18\,bd^2enx + 6\,bd^3\log(c) + 6\,ad^3\right)\log(x)$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/2*b*d^3*n*log(x)^2 - 1/9*(b*e^3*n - 3*a*e^3)*x^3 - 3/4*(b*d*e^2*n - 2*a*
d*e^2)*x^2 - 3*(b*d^2*e*n - a*d^2*e)*x + 1/6*(2*b*e^3*x^3 + 9*b*d*e^2*x^2
+ 18*b*d^2*e*x)*log(c) + 1/6*(2*b*e^3*n*x^3 + 9*b*d*e^2*n*x^2 + 18*b*d^2*e
*n*x + 6*b*d^3*log(c) + 6*a*d^3)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 199, normalized size of antiderivative = 1.63

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x}\,dx$$
$$= \begin{cases} \frac{ad^3\log(cx^n)}{n} + 3ad^2ex + \frac{3ade^2x^2}{2} + \frac{ae^3x^3}{3} + \frac{bd^3\log(cx^n)^2}{2n} - 3bd^2enx + 3bd^2ex\log(cx^n) - \frac{3bde^2nx^2}{4} + \frac{3bde^2x^2\,\mathrm{lo}}{2} \\ (a+b\log(c))\left(d^3\log(x) + 3d^2ex + \frac{3de^2x^2}{2} + \frac{e^3x^3}{3}\right) \end{cases}$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise((a*d**3*log(c*x**n)/n + 3*a*d**2*e*x + 3*a*d*e**2*x**2/2 + a*e**
3*x**3/3 + b*d**3*log(c*x**n)**2/(2*n) - 3*b*d**2*e*n*x + 3*b*d**2*e*x*log
(c*x**n) - 3*b*d*e**2*n*x**2/4 + 3*b*d*e**2*x**2*log(c*x**n)/2 - b*e**3*n*
x**3/9 + b*e**3*x**3*log(c*x**n)/3, Ne(n, 0)), ((a + b*log(c))*(d**3*log(x
) + 3*d**2*e*x + 3*d*e**2*x**2/2 + e**3*x**3/3), True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.04

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x}\,dx = -\frac{1}{9}\,be^3nx^3 + \frac{1}{3}\,be^3x^3\log(cx^n) - \frac{3}{4}\,bde^2nx^2 + \frac{1}{3}\,ae^3x^3 + \frac{3}{2}\,bde^2x^2\log(cx^n) - 3\,bd^2enx + \frac{3}{2}\,ade^2x^2 + 3\,bd^2ex\log(cx^n) + 3\,ad^2ex + \frac{bd^3\log(cx^n)^2}{2\,n} + ad^3\log(x)$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
-1/9*b*e^3*n*x^3 + 1/3*b*e^3*x^3*log(c*x^n) - 3/4*b*d*e^2*n*x^2 + 1/3*a*e^
3*x^3 + 3/2*b*d*e^2*x^2*log(c*x^n) - 3*b*d^2*e*n*x + 3/2*a*d*e^2*x^2 + 3*b
*d^2*e*x*log(c*x^n) + 3*a*d^2*e*x + 1/2*b*d^3*log(c*x^n)^2/n + a*d^3*log(x
)
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 145, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x}\,dx = \frac{1}{2}\,bd^3n\log(x)^2 - \frac{1}{9}\left(be^3n - 3\,be^3\log(c) - 3\,ae^3\right)x^3 - \frac{3}{4}\left(bde^2n - 2\,bde^2\log(c) - 2\,ade^2\right)x^2 - 3\left(bd^2en - bd^2e\log(c) - ad^2e\right)x + \frac{1}{6}\left(2\,be^3nx^3 + 9\,bde^2nx^2 + 18\,bd^2enx\right)\log(x) + \left(bd^3\log(c) + ad^3\right)\log(x)$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
1/2*b*d^3*n*log(x)^2 - 1/9*(b*e^3*n - 3*b*e^3*log(c) - 3*a*e^3)*x^3 - 3/4*
(b*d*e^2*n - 2*b*d*e^2*log(c) - 2*a*d*e^2)*x^2 - 3*(b*d^2*e*n - b*d^2*e*lo
g(c) - a*d^2*e)*x + 1/6*(2*b*e^3*n*x^3 + 9*b*d*e^2*n*x^2 + 18*b*d^2*e*n*x)
*log(x) + (b*d^3*log(c) + a*d^3)*log(x)
```

Mupad [B] (verification not implemented)

Time = 27.87 (sec) , antiderivative size = 106, normalized size of antiderivative = 0.87

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x} \, dx = \ln(c\,x^n) \left(3\,b\,d^2\,e\,x + \frac{3\,b\,d\,e^2\,x^2}{2} + \frac{b\,e^3\,x^3}{3}\right) + \frac{e^3\,x^3\,(3\,a-b\,n)}{9} + a\,d^3\,\ln(x) + \frac{b\,d^3\ln(c\,x^n)^2}{2\,n} + \frac{3\,d\,e^2\,x^2\,(2\,a-b\,n)}{4} + 3\,d^2\,e\,x\,(a-b\,n)$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^3)/x,x)
```

output
```
log(c*x^n)*((b*e^3*x^3)/3 + 3*b*d^2*e*x + (3*b*d*e^2*x^2)/2) + (e^3*x^3*(3
*a - b*n))/9 + a*d^3*log(x) + (b*d^3*log(c*x^n)^2)/(2*n) + (3*d*e^2*x^2*(2
*a - b*n))/4 + 3*d^2*e*x*(a - b*n)
```

Reduce [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.17

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x} \, dx = \frac{18\log(x^n c)^2 b\,d^3 + 108\log(x^n c)\,b\,d^2 enx + 54\log(x^n c)\,bd\,e^2 n\,x^2 + 12\log(x^n c)\,b\,e^3 n\,x^3 + 36\log(x)\,a\,d^3 n +}{36n}$$

input
```
int((e*x+d)^3*(a+b*log(c*x^n))/x,x)
```

output
```
(18*log(x**n*c)**2*b*d**3 + 108*log(x**n*c)*b*d**2*e*n*x + 54*log(x**n*c)*
b*d*e**2*n*x**2 + 12*log(x**n*c)*b*e**3*n*x**3 + 36*log(x)*a*d**3*n + 108*
a*d**2*e*n*x + 54*a*d*e**2*n*x**2 + 12*a*e**3*n*x**3 - 108*b*d**2*e*n**2*x
 - 27*b*d*e**2*n**2*x**2 - 4*b*e**3*n**2*x**3)/(36*n)
```

3.24 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^2}\,dx$

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Optimal result

Integrand size = 21, antiderivative size = 119

$$\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^2}\,dx = -\frac{bd^3n}{x} - 3bde^2nx - \frac{1}{4}be^3nx^2 - \frac{3}{2}bd^2en\log^2(x) - \frac{d^3(a+b\log(cx^n))}{x} + 3de^2x(a+b\log(cx^n)) + \frac{1}{2}e^3x^2(a+b\log(cx^n)) + 3d^2e\log(x)(a+b\log(cx^n))$$

output
```
-b*d^3*n/x-3*b*d*e^2*n*x-1/4*b*e^3*n*x^2-3/2*b*d^2*e*n*ln(x)^2-d^3*(a+b*ln
(c*x^n))/x+3*d*e^2*x*(a+b*ln(c*x^n))+1/2*e^3*x^2*(a+b*ln(c*x^n))+3*d^2*e*l
n(x)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 118, normalized size of antiderivative = 0.99

$$\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^2}\,dx = -\frac{bd^3n}{x} + 3ade^2x - 3bde^2nx - \frac{1}{4}be^3nx^2 + 3bde^2x\log(cx^n) - \frac{d^3(a+b\log(cx^n))}{x} + \frac{1}{2}e^3x^2(a+b\log(cx^n)) + \frac{3d^2e(a+b\log(cx^n))^2}{2bn}$$

input
```
Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-((b*d^3*n)/x) + 3*a*d*e^2*x - 3*b*d*e^2*n*x - (b*e^3*n*x^2)/4 + 3*b*d*e^2
*x*Log[c*x^n] - (d^3*(a + b*Log[c*x^n]))/x + (e^3*x^2*(a + b*Log[c*x^n]))/
2 + (3*d^2*e*(a + b*Log[c*x^n])^2)/(2*b*n)
```

Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 115, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^3 (a+b\log (cx^n))}{x^2} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(-\frac{d^3}{x^2}+\frac{3e\log(x)d^2}{x}+3e^2d+\frac{e^3x}{2}\right)dx-\frac{d^3(a+b\log (cx^n))}{x}+ 3d^2e\log(x)(a+b\log (cx^n))+3de^2x(a+b\log (cx^n))+\frac{1}{2}e^3x^2(a+b\log (cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log (cx^n))}{x}+3d^2e\log(x)(a+b\log (cx^n))+3de^2x(a+b\log (cx^n))+ \frac{1}{2}e^3x^2(a+b\log (cx^n))-bn\left(\frac{d^3}{x}+\frac{3}{2}d^2e\log^2(x)+3de^2x+\frac{e^3x^2}{4}\right)$$

input
```
Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-(b*n*(d^3/x + 3*d*e^2*x + (e^3*x^2)/4 + (3*d^2*e*Log[x]^2)/2)) - (d^3*(a
+ b*Log[c*x^n]))/x + 3*d*e^2*x*(a + b*Log[c*x^n]) + (e^3*x^2*(a + b*Log[c*
x^n]))/2 + 3*d^2*e*Log[x]*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.61 (sec) , antiderivative size = 145, normalized size of antiderivative = 1.22

method	result
parallelrisch	$\frac{2x^3\ln(c\,x^n)b\,e^3n-x^3b\,e^3n^2+2x^3a\,e^3n+12x^2\ln(c\,x^n)bd\,e^2n-12x^2bd\,e^2n^2+12\ln(x)xa\,d^2en+12x^2ad\,e^2n+6e\,d^2b\ln(c\,x^n)^2x}{4xn}$
risch	$-\frac{b(-e^3x^3-6e\,d^2\ln(x)x-6d\,e^2x^2+2d^3)\ln(x^n)}{2x}-\frac{-i\pi b\,e^3x^3\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2-12a\,e^2x^2d+4a\,d^3+i\pi b\,e^3x^3\operatorname{csgn}(ic\,x}{}$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

output
```
1/4/x*(2*x^3*ln(c*x^n)*b*e^3*n-x^3*b*e^3*n^2+2*x^3*a*e^3*n+12*x^2*ln(c*x^n
)*b*d*e^2*n-12*x^2*b*d*e^2*n^2+12*ln(x)*x*a*d^2*e*n+12*x^2*a*d*e^2*n+6*e*d
^2*b*ln(c*x^n)^2*x-4*ln(c*x^n)*b*d^3*n-4*b*d^3*n^2-4*a*d^3*n)/n
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.25

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^2}\,dx$$
$$=\frac{6\,bd^2enx\log(x)^2-4\,bd^3n-4\,ad^3-(be^3n-2\,ae^3)x^3-12\,(bde^2n-ade^2)x^2+2\,(be^3x^3+6\,bde^2x^2-2\,b}{4\,x}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
1/4*(6*b*d^2*e*n*x*log(x)^2 - 4*b*d^3*n - 4*a*d^3 - (b*e^3*n - 2*a*e^3)*x^
3 - 12*(b*d*e^2*n - a*d*e^2)*x^2 + 2*(b*e^3*x^3 + 6*b*d*e^2*x^2 - 2*b*d^3)
*log(c) + 2*(b*e^3*n*x^3 + 6*b*d*e^2*n*x^2 + 6*b*d^2*e*x*log(c) - 2*b*d^3*
n + 6*a*d^2*e*x)*log(x))/x
```

Sympy [A] (verification not implemented)

Time = 0.46 (sec) , antiderivative size = 182, normalized size of antiderivative = 1.53

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^2}\,dx = \begin{cases} -\frac{ad^3}{x} + \frac{3ad^2e\log(cx^n)}{n} + 3ade^2x + \frac{ae^3x^2}{2} - \frac{bd^3n}{x} - \frac{bd^3\log(cx^n)}{x} + \frac{3bd^2e\log(cx^n)^2}{2n} - 3bde^2nx + 3bde^2x\log(cx^n) \\ (a+b\log(c))\left(-\frac{d^3}{x} + 3d^2e\log(x) + 3de^2x + \frac{e^3x^2}{2}\right) \end{cases}$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**2,x)
```

output
```
Piecewise((-a*d**3/x + 3*a*d**2*e*log(c*x**n)/n + 3*a*d*e**2*x + a*e**3*x*
*2/2 - b*d**3*n/x - b*d**3*log(c*x**n)/x + 3*b*d**2*e*log(c*x**n)**2/(2*n)
 - 3*b*d*e**2*n*x + 3*b*d*e**2*x*log(c*x**n) - b*e**3*n*x**2/4 + b*e**3*x*
*2*log(c*x**n)/2, Ne(n, 0)), ((a + b*log(c))*(-d**3/x + 3*d**2*e*log(x) +
3*d*e**2*x + e**3*x**2/2), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.07

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^2}\,dx = -\frac{1}{4}\,be^3nx^2 + \frac{1}{2}\,be^3x^2\log(cx^n) - 3\,bde^2nx + \frac{1}{2}\,ae^3x^2 + 3\,bde^2x\log(cx^n) + 3\,ade^2x + \frac{3\,bd^2e\log(cx^n)^2}{2\,n} + 3\,ad^2e\log(x) - \frac{bd^3n}{x} - \frac{bd^3\log(cx^n)}{x} - \frac{ad^3}{x}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
-1/4*b*e^3*n*x^2 + 1/2*b*e^3*x^2*log(c*x^n) - 3*b*d*e^2*n*x + 1/2*a*e^3*x^
2 + 3*b*d*e^2*x*log(c*x^n) + 3*a*d*e^2*x + 3/2*b*d^2*e*log(c*x^n)^2/n + 3*
a*d^2*e*log(x) - b*d^3*n/x - b*d^3*log(c*x^n)/x - a*d^3/x
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 146, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^2}\,dx = \frac{1}{2}\,be^3x^2\log(c) + \frac{3}{2}\,bd^2en\log(x)^2 + 3\,(x\log(x)-x)bde^2n + \frac{1}{4}\,\left(2\,x^2\log(x)-x^2\right)be^3n + \frac{1}{2}\,ae^3x^2 - bd^3n\left(\frac{\log(x)}{x}+\frac{1}{x}\right) + 3\,bde^2x\log(c) + 3\,bd^2e\log(c)\log(|x|) + 3\,ade^2x + 3\,ad^2e\log(|x|) - \frac{bd^3\log(c)}{x} - \frac{ad^3}{x}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
1/2*b*e^3*x^2*log(c) + 3/2*b*d^2*e*n*log(x)^2 + 3*(x*log(x) - x)*b*d*e^2*n
 + 1/4*(2*x^2*log(x) - x^2)*b*e^3*n + 1/2*a*e^3*x^2 - b*d^3*n*(log(x)/x +
1/x) + 3*b*d*e^2*x*log(c) + 3*b*d^2*e*log(c)*log(abs(x)) + 3*a*d*e^2*x + 3
*a*d^2*e*log(abs(x)) - b*d^3*log(c)/x - a*d^3/x
```

Mupad [B] (verification not implemented)

Time = 27.44 (sec) , antiderivative size = 154, normalized size of antiderivative = 1.29

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^2} dx = \ln(x)\left(3ad^2e+3bd^2en\right) - \ln(cx^n)\left(\frac{bd^3+3bd^2ex+3bde^2x^2+be^3x^3}{x} - \frac{\frac{3be^3x^3}{2}+6bde^2x^2}{x}\right) - \frac{ad^3+bd^3n}{x} + \frac{e^3x^2(2a-bn)}{4} + 3de^2x(a-bn) + \frac{3bd^2e\ln(cx^n)^2}{2n}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^3)/x^2,x)
```

output
```
log(x)*(3*a*d^2*e + 3*b*d^2*e*n) - log(c*x^n)*((b*d^3 + b*e^3*x^3 + 3*b*d^
2*e*x + 3*b*d*e^2*x^2)/x - ((3*b*e^3*x^3)/2 + 6*b*d*e^2*x^2)/x) - (a*d^3 +
 b*d^3*n)/x + (e^3*x^2*(2*a - b*n))/4 + 3*d*e^2*x*(a - b*n) + (3*b*d^2*e*l
og(c*x^n)^2)/(2*n)
```

Reduce [B] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^2} dx = \frac{6\log(x^nc)^2bd^2ex-4\log(x^nc)bd^3n+12\log(x^nc)bde^2nx^2+2\log(x^nc)be^3nx^3+12\log(x)ad^2enx-4}{4nx}$$

input
```
int((e*x+d)^3*(a+b*log(c*x^n))/x^2,x)
```

output
```
(6*log(x**n*c)**2*b*d**2*e*x - 4*log(x**n*c)*b*d**3*n + 12*log(x**n*c)*b*d
*e**2*n*x**2 + 2*log(x**n*c)*b*e**3*n*x**3 + 12*log(x)*a*d**2*e*n*x - 4*a*
d**3*n + 12*a*d*e**2*n*x**2 + 2*a*e**3*n*x**3 - 4*b*d**3*n**2 - 12*b*d*e**
2*n**2*x**2 - b*e**3*n**2*x**3)/(4*n*x)
```

3.25 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^3}\,dx$

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Optimal result

Integrand size = 21, antiderivative size = 118

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^3}\,dx = -\frac{bd^3n}{4x^2}-\frac{3bd^2en}{x}-be^3nx-\frac{3}{2}bde^2n\log^2(x) -\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3d^2e(a+b\log(cx^n))}{x} +e^3x(a+b\log(cx^n))+3de^2\log(x)\,(a+b\log(cx^n))$$

output
```
-1/4*b*d^3*n/x^2-3*b*d^2*e*n/x-b*e^3*n*x-3/2*b*d*e^2*n*ln(x)^2-1/2*d^3*(a+
b*ln(c*x^n))/x^2-3*d^2*e*(a+b*ln(c*x^n))/x+e^3*x*(a+b*ln(c*x^n))+3*d*e^2*l
n(x)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 115, normalized size of antiderivative = 0.97

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^3}\,dx = -\frac{bd^3n}{4x^2}-\frac{3bd^2en}{x}+ae^3x-be^3nx +be^3x\log(cx^n)-\frac{d^3(a+b\log(cx^n))}{2x^2} -\frac{3d^2e(a+b\log(cx^n))}{x}+\frac{3de^2(a+b\log(cx^n))^2}{2bn}$$

input
```
Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-1/4*(b*d^3*n)/x^2 - (3*b*d^2*e*n)/x + a*e^3*x - b*e^3*n*x + b*e^3*x*Log[c
*x^n] - (d^3*(a + b*Log[c*x^n]))/(2*x^2) - (3*d^2*e*(a + b*Log[c*x^n]))/x
+ (3*d*e^2*(a + b*Log[c*x^n])^2)/(2*b*n)
```

Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 114, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^3} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(-\frac{d^3}{2x^3}-\frac{3ed^2}{x^2}+\frac{3e^2\log(x)d}{x}+e^3\right)dx-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3d^2e(a+b\log(cx^n))}{x}+3de^2\log(x)(a+b\log(cx^n))+e^3x(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3d^2e(a+b\log(cx^n))}{x}+3de^2\log(x)(a+b\log(cx^n))+e^3x(a+b\log(cx^n))-bn\left(\frac{d^3}{4x^2}+\frac{3d^2e}{x}+\frac{3}{2}de^2\log^2(x)+e^3x\right)$$

input
```
Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-(b*n*(d^3/(4*x^2) + (3*d^2*e)/x + e^3*x + (3*d*e^2*Log[x]^2)/2)) - (d^3*(
a + b*Log[c*x^n]))/(2*x^2) - (3*d^2*e*(a + b*Log[c*x^n]))/x + e^3*x*(a + b
*Log[c*x^n]) + 3*d*e^2*Log[x]*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.62 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.21

method	result
parallelrisch	$\frac{4x^3 \ln(c\,x^n) b\,e^3 n - 4x^3 b\,e^3 n^2 + 12\ln(x) x^2 a d\,e^2 n + 4x^3 a\,e^3 n + 6e^2 d b \ln(c\,x^n)^2 x^2 - 12x\ln(c\,x^n) b\,d^2 e n - 12x b\,d^2 e\,n^2 - 12x a\,d^2 e n}{4x^2 n}$
risch	$-\frac{b(-6e^2 d\ln(x) x^2 - 2e^3 x^3 + 6d^2 e x + d^3)\ln(x^n)}{2x^2} - \frac{-2i\pi b\,e^3 x^3 \operatorname{csgn}(i x^n)\operatorname{csgn}(i c\,x^n)^2 + 12a\,d^2 e x + 2a\,d^3 + 2i\pi b\,e^3 x^3 \operatorname{csgn}(ic}{}$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

output
```
1/4/x^2*(4*x^3*ln(c*x^n)*b*e^3*n-4*x^3*b*e^3*n^2+12*ln(x)*x^2*a*d*e^2*n+4*
x^3*a*e^3*n+6*e^2*d*b*ln(c*x^n)^2*x^2-12*x*ln(c*x^n)*b*d^2*e*n-12*x*b*d^2*
e*n^2-12*x*a*d^2*e*n-2*ln(c*x^n)*b*d^3*n-b*d^3*n^2-2*a*d^3*n)/n
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 150, normalized size of antiderivative = 1.27

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^3}\,dx$$
$$= \frac{6\,bde^2nx^2\log(x)^2 - bd^3n - 2\,ad^3 - 4\,(be^3n - ae^3)x^3 - 12\,(bd^2en + ad^2e)x + 2\,(2\,be^3x^3 - 6\,bd^2ex - bd^3)}{4\,x^2}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
1/4*(6*b*d*e^2*n*x^2*log(x)^2 - b*d^3*n - 2*a*d^3 - 4*(b*e^3*n - a*e^3)*x^
3 - 12*(b*d^2*e*n + a*d^2*e)*x + 2*(2*b*e^3*x^3 - 6*b*d^2*e*x - b*d^3)*log
(c) + 2*(2*b*e^3*n*x^3 + 6*b*d*e^2*x^2*log(c) - 6*b*d^2*e*n*x + 6*a*d*e^2*
x^2 - b*d^3*n)*log(x))/x^2
```

Sympy [A] (verification not implemented)

Time = 0.45 (sec) , antiderivative size = 182, normalized size of antiderivative = 1.54

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^3}\,dx = \begin{cases} -\frac{ad^3}{2x^2} - \frac{3ad^2e}{x} + \frac{3ade^2\log(cx^n)}{n} + ae^3x - \frac{bd^3n}{4x^2} - \frac{bd^3\log(cx^n)}{2x^2} - \frac{3bd^2en}{x} - \frac{3bd^2e\log(cx^n)}{x} + \frac{3bde^2\log(cx^n)^2}{2n} - be^3nx \\ (a+b\log(c))\left(-\frac{d^3}{2x^2} - \frac{3d^2e}{x} + 3de^2\log(x) + e^3x\right) \end{cases}$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**3,x)
```

output
```
Piecewise((-a*d**3/(2*x**2) - 3*a*d**2*e/x + 3*a*d*e**2*log(c*x**n)/n + a*
e**3*x - b*d**3*n/(4*x**2) - b*d**3*log(c*x**n)/(2*x**2) - 3*b*d**2*e*n/x
- 3*b*d**2*e*log(c*x**n)/x + 3*b*d*e**2*log(c*x**n)**2/(2*n) - b*e**3*n*x
+ b*e**3*x*log(c*x**n), Ne(n, 0)), ((a + b*log(c))*(-d**3/(2*x**2) - 3*d**
2*e/x + 3*d*e**2*log(x) + e**3*x), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 125, normalized size of antiderivative = 1.06

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^3}\,dx = -be^3nx + be^3x\log(cx^n) + ae^3x + \frac{3\,bde^2\log(cx^n)^2}{2\,n} + 3\,ade^2\log(x) - \frac{3\,bd^2en}{x} - \frac{3\,bd^2e\log(cx^n)}{x} - \frac{bd^3n}{4\,x^2} - \frac{3\,ad^2e}{x} - \frac{bd^3\log(cx^n)}{2\,x^2} - \frac{ad^3}{2\,x^2}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
-b*e^3*n*x + b*e^3*x*log(c*x^n) + a*e^3*x + 3/2*b*d*e^2*log(c*x^n)^2/n + 3
*a*d*e^2*log(x) - 3*b*d^2*e*n/x - 3*b*d^2*e*log(c*x^n)/x - 1/4*b*d^3*n/x^2
 - 3*a*d^2*e/x - 1/2*b*d^3*log(c*x^n)/x^2 - 1/2*a*d^3/x^2
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^3}\,dx = \frac{3}{2}\,bde^2n\log(x)^2 + (x\log(x)-x)be^3n - 3\,bd^2en\left(\frac{\log(x)}{x}+\frac{1}{x}\right) - \frac{1}{4}\,bd^3n\left(\frac{2\,\log(x)}{x^2}+\frac{1}{x^2}\right) + be^3x\log(c) + 3\,bde^2\log(c)\log(|x|) + ae^3x + 3\,ade^2\log(|x|) - \frac{3\,bd^2e\log(c)}{x} - \frac{3\,ad^2e}{x} - \frac{bd^3\log(c)}{2\,x^2} - \frac{ad^3}{2\,x^2}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
3/2*b*d*e^2*n*log(x)^2 + (x*log(x) - x)*b*e^3*n - 3*b*d^2*e*n*(log(x)/x +
1/x) - 1/4*b*d^3*n*(2*log(x)/x^2 + 1/x^2) + b*e^3*x*log(c) + 3*b*d*e^2*log
(c)*log(abs(x)) + a*e^3*x + 3*a*d*e^2*log(abs(x)) - 3*b*d^2*e*log(c)/x - 3
*a*d^2*e/x - 1/2*b*d^3*log(c)/x^2 - 1/2*a*d^3/x^2
```

Mupad [B] (verification not implemented)

Time = 27.50 (sec) , antiderivative size = 139, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^3}\,dx = \ln(x)\,\left(3\,a\,d\,e^2+\frac{9\,b\,d\,e^2\,n}{2}\right) - \ln(c\,x^n)\,\left(\frac{\frac{b\,d^3}{2}+3\,b\,d^2\,e\,x+\frac{9\,b\,d\,e^2\,x^2}{2}+2\,b\,e^3\,x^3}{x^2} - 3\,b\,e^3\,x\right) - \frac{x\,(6\,a\,d^2\,e+6\,b\,d^2\,e\,n)+a\,d^3+\frac{b\,d^3\,n}{2}}{2\,x^2} + e^3\,x\,(a-b\,n) + \frac{3\,b\,d\,e^2\,\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^3)/x^3,x)
```

output
```
log(x)*(3*a*d*e^2 + (9*b*d*e^2*n)/2) - log(c*x^n)*(((b*d^3)/2 + 2*b*e^3*x^
3 + 3*b*d^2*e*x + (9*b*d*e^2*x^2)/2)/x^2 - 3*b*e^3*x) - (x*(6*a*d^2*e + 6*
b*d^2*e*n) + a*d^3 + (b*d^3*n)/2)/(2*x^2) + e^3*x*(a - b*n) + (3*b*d*e^2*l
og(c*x^n)^2)/(2*n)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 142, normalized size of antiderivative = 1.20

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^3} dx$$
$$= \frac{6\log(x^n c)^2 bd e^2x^2 - 2\log(x^n c) b d^3n - 12\log(x^n c) b d^2enx + 4\log(x^n c) b e^3n x^3 + 12\log(x) ad e^2n x^2 - 2}{4n x^2}$$

input
```
int((e*x+d)^3*(a+b*log(c*x^n))/x^3,x)
```

output
```
(6*log(x**n*c)**2*b*d*e**2*x**2 - 2*log(x**n*c)*b*d**3*n - 12*log(x**n*c)*
b*d**2*e*n*x + 4*log(x**n*c)*b*e**3*n*x**3 + 12*log(x)*a*d*e**2*n*x**2 - 2
*a*d**3*n - 12*a*d**2*e*n*x + 4*a*e**3*n*x**3 - b*d**3*n**2 - 12*b*d**2*e*
n**2*x - 4*b*e**3*n**2*x**3)/(4*n*x**2)
```

3.26 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^4}\,dx$

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Optimal result

Integrand size = 21, antiderivative size = 126

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^4}\,dx = -\frac{bd^3n}{9x^3}-\frac{3bd^2en}{4x^2}-\frac{3bde^2n}{x}-\frac{1}{2}be^3n\log^2(x)-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}-\frac{3de^2(a+b\log(cx^n))}{x}+e^3\log(x)\,(a+b\log(cx^n))$$

output
```
-1/9*b*d^3*n/x^3-3/4*b*d^2*e*n/x^2-3*b*d*e^2*n/x-1/2*b*e^3*n*ln(x)^2-1/3*d
^3*(a+b*ln(c*x^n))/x^3-3/2*d^2*e*(a+b*ln(c*x^n))/x^2-3*d*e^2*(a+b*ln(c*x^n
))/x+e^3*ln(x)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 122, normalized size of antiderivative = 0.97

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^4}\,dx = -\frac{bd^3n}{9x^3}-\frac{3bd^2en}{4x^2}-\frac{3bde^2n}{x}-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}-\frac{3de^2(a+b\log(cx^n))}{x}+\frac{e^3(a+b\log(cx^n))^2}{2bn}$$

input
```
Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-1/9*(b*d^3*n)/x^3 - (3*b*d^2*e*n)/(4*x^2) - (3*b*d*e^2*n)/x - (d^3*(a + b
*Log[c*x^n]))/(3*x^3) - (3*d^2*e*(a + b*Log[c*x^n]))/(2*x^2) - (3*d*e^2*(a
 + b*Log[c*x^n]))/x + (e^3*(a + b*Log[c*x^n])^2)/(2*b*n)
```

Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 123, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^4} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(\frac{e^3\log(x)}{x}-\frac{d(2d^2+9exd+18e^2x^2)}{6x^4}\right)dx-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}-\frac{3de^2(a+b\log(cx^n))}{x}+e^3\log(x)(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}-\frac{3de^2(a+b\log(cx^n))}{x}+e^3\log(x)(a+b\log(cx^n))-bn\left(\frac{d^3}{9x^3}+\frac{3d^2e}{4x^2}+\frac{3de^2}{x}+\frac{1}{2}e^3\log^2(x)\right)$$

input
```
Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-(b*n*(d^3/(9*x^3) + (3*d^2*e)/(4*x^2) + (3*d*e^2)/x + (e^3*Log[x]^2)/2))
- (d^3*(a + b*Log[c*x^n]))/(3*x^3) - (3*d^2*e*(a + b*Log[c*x^n]))/(2*x^2)
- (3*d*e^2*(a + b*Log[c*x^n]))/x + e^3*Log[x]*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.57 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.14

method	result
parallelrisch	$\frac{36\ln(x)x^3 a e^3 n+18e^3 b\ln(c x^n)^2 x^3-108x^2\ln(c x^n)bd e^2 n-108x^2 bd e^2 n^2-108x^2 ad e^2 n-54x\ln(c x^n)b d^2 en-27xb d^2 e n^2-5}{36x^3 n}$
risch	$-\frac{b(-6e^3\ln(x)x^3+18d e^2 x^2+9d^2 ex+2d^3)\ln(x^n)}{6x^3}-\frac{18i\ln(x)\pi b e^3\operatorname{csgn}(ic x^n)^3 x^3-18i\ln(x)\pi b e^3\operatorname{csgn}(ix^n)\operatorname{csgn}(ic x^n)^2 x^3}{}$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

output
```
1/36/x^3*(36*ln(x)*x^3*a*e^3*n+18*e^3*b*ln(c*x^n)^2*x^3-108*x^2*ln(c*x^n)*
b*d*e^2*n-108*x^2*b*d*e^2*n^2-108*x^2*a*d*e^2*n-54*x*ln(c*x^n)*b*d^2*e*n-2
7*x*b*d^2*e*n^2-54*x*a*d^2*e*n-12*ln(c*x^n)*b*d^3*n-4*b*d^3*n^2-12*a*d^3*n
)/n
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 151, normalized size of antiderivative = 1.20

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^4}\,dx$$
$$=\frac{18\,be^3nx^3\log(x)^2-4\,bd^3n-12\,ad^3-108\,(bde^2n+ade^2)x^2-27\,(bd^2en+2\,ad^2e)x-6\,(18\,bde^2x^2+9\,b}{36\,x^3}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
1/36*(18*b*e^3*n*x^3*log(x)^2 - 4*b*d^3*n - 12*a*d^3 - 108*(b*d*e^2*n + a*
d*e^2)*x^2 - 27*(b*d^2*e*n + 2*a*d^2*e)*x - 6*(18*b*d*e^2*x^2 + 9*b*d^2*e*
x + 2*b*d^3)*log(c) + 6*(6*b*e^3*x^3*log(c) - 18*b*d*e^2*n*x^2 + 6*a*e^3*x
^3 - 9*b*d^2*e*n*x - 2*b*d^3*n)*log(x))/x^3
```

Sympy [A] (verification not implemented)

Time = 2.80 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.14

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^4}\,dx = -\frac{ad^3}{3x^3} - \frac{3ad^2e}{2x^2} - \frac{3ade^2}{x} + ae^3\log(x) + bd^3\left(-\frac{n}{9x^3} - \frac{\log(cx^n)}{3x^3}\right) + 3bd^2e\left(-\frac{n}{4x^2} - \frac{\log(cx^n)}{2x^2}\right) + 3bde^2\left(-\frac{n}{x} - \frac{\log(cx^n)}{x}\right) - be^3\left(\begin{cases} -\log(c)\log(x) & \text{for } n=0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right)$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**4,x)
```

output
```
-a*d**3/(3*x**3) - 3*a*d**2*e/(2*x**2) - 3*a*d*e**2/x + a*e**3*log(x) + b*
d**3*(-n/(9*x**3) - log(c*x**n)/(3*x**3)) + 3*b*d**2*e*(-n/(4*x**2) - log(
c*x**n)/(2*x**2)) + 3*b*d*e**2*(-n/x - log(c*x**n)/x) - b*e**3*Piecewise((
-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.06

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^4}\,dx = \frac{be^3\log(cx^n)^2}{2n} + ae^3\log(x) - \frac{3\,bde^2n}{x} - \frac{3\,bde^2\log(cx^n)}{x} - \frac{3\,bd^2en}{4\,x^2} - \frac{3\,ade^2}{x} - \frac{3\,bd^2e\log(cx^n)}{2\,x^2} - \frac{bd^3n}{9\,x^3} - \frac{3\,ad^2e}{2\,x^2} - \frac{bd^3\log(cx^n)}{3\,x^3} - \frac{ad^3}{3\,x^3}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
1/2*b*e^3*log(c*x^n)^2/n + a*e^3*log(x) - 3*b*d*e^2*n/x - 3*b*d*e^2*log(c*
x^n)/x - 3/4*b*d^2*e*n/x^2 - 3*a*d*e^2/x - 3/2*b*d^2*e*log(c*x^n)/x^2 - 1/
9*b*d^3*n/x^3 - 3/2*a*d^2*e/x^2 - 1/3*b*d^3*log(c*x^n)/x^3 - 1/3*a*d^3/x^3
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^4}\,dx = \frac{1}{2}\,be^3n\log(x)^2 - 3\,bde^2n\left(\frac{\log(x)}{x} + \frac{1}{x}\right) - \frac{3}{4}\,bd^2en\left(\frac{2\,\log(x)}{x^2} + \frac{1}{x^2}\right) - \frac{1}{9}\,bd^3n\left(\frac{3\,\log(x)}{x^3} + \frac{1}{x^3}\right) + be^3\log(c)\log(|x|) + ae^3\log(|x|) - \frac{3\,bde^2\log(c)}{x} - \frac{3\,ade^2}{x} - \frac{3\,bd^2e\log(c)}{2\,x^2} - \frac{3\,ad^2e}{2\,x^2} - \frac{bd^3\log(c)}{3\,x^3} - \frac{ad^3}{3\,x^3}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
1/2*b*e^3*n*log(x)^2 - 3*b*d*e^2*n*(log(x)/x + 1/x) - 3/4*b*d^2*e*n*(2*log
(x)/x^2 + 1/x^2) - 1/9*b*d^3*n*(3*log(x)/x^3 + 1/x^3) + b*e^3*log(c)*log(a
bs(x)) + a*e^3*log(abs(x)) - 3*b*d*e^2*log(c)/x - 3*a*d*e^2/x - 3/2*b*d^2*
e*log(c)/x^2 - 3/2*a*d^2*e/x^2 - 1/3*b*d^3*log(c)/x^3 - 1/3*a*d^3/x^3
```

Mupad [B] (verification not implemented)

Time = 27.03 (sec) , antiderivative size = 136, normalized size of antiderivative = 1.08

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^4}\,dx = \ln(x)\left(a\,e^3+\frac{11\,b\,e^3\,n}{6}\right) - \frac{x\left(9\,a\,d^2\,e+\frac{9\,b\,d^2\,e\,n}{2}\right)+2\,a\,d^3+x^2\,(18\,a\,d\,e^2+18\,b\,d\,e^2\,n)+\frac{2\,b\,d^3\,n}{3}}{6\,x^3} - \frac{\ln(c\,x^n)\left(\frac{b\,d^3}{3}+\frac{3\,b\,d^2\,e\,x}{2}+3\,b\,d\,e^2\,x^2+\frac{11\,b\,e^3\,x^3}{6}\right)}{x^3} + \frac{b\,e^3\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^3)/x^4,x)
```

output
```
log(x)*(a*e^3 + (11*b*e^3*n)/6) - (x*(9*a*d^2*e + (9*b*d^2*e*n)/2) + 2*a*d
^3 + x^2*(18*a*d*e^2 + 18*b*d*e^2*n) + (2*b*d^3*n)/3)/(6*x^3) - (log(c*x^n
)*((b*d^3)/3 + (11*b*e^3*x^3)/6 + (3*b*d^2*e*x)/2 + 3*b*d*e^2*x^2))/x^3 +
(b*e^3*log(c*x^n)^2)/(2*n)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.13

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^4}\,dx = \frac{18\log(x^n c)^2\,b\,e^3x^3-12\log(x^n c)\,b\,d^3n-54\log(x^n c)\,b\,d^2enx-108\log(x^n c)\,bd\,e^2n\,x^2+36\log(x)\,a\,e^3n\,x^3}{36n\,x^3}$$

input
```
int((e*x+d)^3*(a+b*log(c*x^n))/x^4,x)
```

output
```
(18*log(x**n*c)**2*b*e**3*x**3 - 12*log(x**n*c)*b*d**3*n - 54*log(x**n*c)*
b*d**2*e*n*x - 108*log(x**n*c)*b*d*e**2*n*x**2 + 36*log(x)*a*e**3*n*x**3 -
 12*a*d**3*n - 54*a*d**2*e*n*x - 108*a*d*e**2*n*x**2 - 4*b*d**3*n**2 - 27*
b*d**2*e*n**2*x - 108*b*d*e**2*n**2*x**2)/(36*n*x**3)
```

3.27 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^5}\,dx$

Optimal result 351
Mathematica [A] (verified) 351
Rubi [A] (verified) 352
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Reduce [B] (verification not implemented) 356

Optimal result

Integrand size = 21, antiderivative size = 90

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^5}\,dx = -\frac{bd^3n}{16x^4}-\frac{bd^2en}{3x^3}-\frac{3bde^2n}{4x^2}-\frac{be^3n}{x}+\frac{be^4n\log(x)}{4d}-\frac{(d+ex)^4\,(a+b\log(cx^n))}{4dx^4}$$

output
```
-1/16*b*d^3*n/x^4-1/3*b*d^2*e*n/x^3-3/4*b*d*e^2*n/x^2-b*e^3*n/x+1/4*b*e^4*
n*ln(x)/d-1/4*(e*x+d)^4*(a+b*ln(c*x^n))/d/x^4
```

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^5}\,dx = -\frac{12a(d^3+4d^2ex+6de^2x^2+4e^3x^3)+bn(3d^3+16d^2ex+36de^2x^2+48e^3x^3)+12b(d^3+4d^2ex+6de^2 \ldots}{48x^4}$$

input
```
Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
-1/48*(12*a*(d^3 + 4*d^2*e*x + 6*d*e^2*x^2 + 4*e^3*x^3) + b*n*(3*d^3 + 16*
d^2*e*x + 36*d*e^2*x^2 + 48*e^3*x^3) + 12*b*(d^3 + 4*d^2*e*x + 6*d*e^2*x^2
 + 4*e^3*x^3)*Log[c*x^n])/x^4
```

Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 85, normalized size of antiderivative = 0.94, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2772, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^5} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{(d+ex)^4}{4dx^5}dx-\frac{(d+ex)^4 (a+b\log(cx^n))}{4dx^4}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(d+ex)^4}{x^5}dx}{4d}-\frac{(d+ex)^4 (a+b\log(cx^n))}{4dx^4}$$

$$\Big\downarrow \text{49}$$

$$\frac{bn\int \left(\frac{d^4}{x^5}+\frac{4ed^3}{x^4}+\frac{6e^2d^2}{x^3}+\frac{4e^3d}{x^2}+\frac{e^4}{x}\right)dx}{4d}-\frac{(d+ex)^4 (a+b\log(cx^n))}{4dx^4}$$

$$\Big\downarrow \text{2009}$$

$$\frac{bn\left(-\frac{d^4}{4x^4}-\frac{4d^3e}{3x^3}-\frac{3d^2e^2}{x^2}-\frac{4de^3}{x}+e^4\log(x)\right)}{4d}-\frac{(d+ex)^4 (a+b\log(cx^n))}{4dx^4}$$

input
```
Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(b*n*(-1/4*d^4/x^4 - (4*d^3*e)/(3*x^3) - (3*d^2*e^2)/x^2 - (4*d*e^3)/x + e
^4*Log[x]))/(4*d) - ((d + e*x)^4*(a + b*Log[c*x^n]))/(4*d*x^4)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.51 (sec) , antiderivative size = 134, normalized size of antiderivative = 1.49

method	result
parallelrisch	$-\frac{48b\ln(c\,x^n)e^3x^3+48b\,e^3n\,x^3+48a\,e^3x^3+72b\ln(c\,x^n)d\,e^2x^2+36bd\,e^2n\,x^2+72a\,e^2x^2d+48b\ln(c\,x^n)d^2ex+16b\,d^2enx+48a\,d}{48x^4}$
risch	$-\frac{b(4e^3x^3+6d\,e^2x^2+4d^2ex+d^3)\ln(x^n)}{4x^4}-\ 24i\pi b\,e^3x^3\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2+72a\,e^2x^2d+48a\,d^2ex+12a\,d^3-24i\pi b\,e^3x^3\ \mathrm{cs}$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

output
```
-1/48/x^4*(48*b*ln(c*x^n)*e^3*x^3+48*b*e^3*n*x^3+48*a*e^3*x^3+72*b*ln(c*x^
n)*d*e^2*x^2+36*b*d*e^2*n*x^2+72*a*e^2*x^2*d+48*b*ln(c*x^n)*d^2*e*x+16*b*d
^2*e*n*x+48*a*d^2*e*x+12*b*ln(c*x^n)*d^3+3*b*d^3*n+12*a*d^3)
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 152, normalized size of antiderivative = 1.69

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^5}\,dx = -\frac{3\,bd^3n+12\,ad^3+48\,(be^3n+ae^3)x^3+36\,(bde^2n+2\,ade^2)x^2+16\,(bd^2en+3\,ad^2e)x+12\,(4\,be^3x^3+6}{48\,x^4}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

output
```
-1/48*(3*b*d^3*n + 12*a*d^3 + 48*(b*e^3*n + a*e^3)*x^3 + 36*(b*d*e^2*n + 2
*a*d*e^2)*x^2 + 16*(b*d^2*e*n + 3*a*d^2*e)*x + 12*(4*b*e^3*x^3 + 6*b*d*e^2
*x^2 + 4*b*d^2*e*x + b*d^3)*log(c) + 12*(4*b*e^3*n*x^3 + 6*b*d*e^2*n*x^2 +
 4*b*d^2*e*n*x + b*d^3*n)*log(x))/x^4
```

Sympy [A] (verification not implemented)

Time = 0.52 (sec) , antiderivative size = 158, normalized size of antiderivative = 1.76

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^5}\,dx = -\frac{ad^3}{4x^4}-\frac{ad^2e}{x^3}-\frac{3ade^2}{2x^2}-\frac{ae^3}{x}-\frac{bd^3n}{16x^4} - \frac{bd^3\log(cx^n)}{4x^4}-\frac{bd^2en}{3x^3}-\frac{bd^2e\log(cx^n)}{x^3} - \frac{3bde^2n}{4x^2}-\frac{3bde^2\log(cx^n)}{2x^2}-\frac{be^3n}{x}-\frac{be^3\log(cx^n)}{x}$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**5,x)
```

output
```
-a*d**3/(4*x**4) - a*d**2*e/x**3 - 3*a*d*e**2/(2*x**2) - a*e**3/x - b*d**3
*n/(16*x**4) - b*d**3*log(c*x**n)/(4*x**4) - b*d**2*e*n/(3*x**3) - b*d**2*
e*log(c*x**n)/x**3 - 3*b*d*e**2*n/(4*x**2) - 3*b*d*e**2*log(c*x**n)/(2*x**
2) - b*e**3*n/x - b*e**3*log(c*x**n)/x
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.59

$$\int \frac{(d+ex)^3 (a+b\log (cx^n))}{x^5}\,dx = -\frac{be^3n}{x} - \frac{be^3\log (cx^n)}{x} - \frac{3\,bde^2n}{4\,x^2} - \frac{ae^3}{x} - \frac{3\,bde^2\log (cx^n)}{2\,x^2} - \frac{bd^2en}{3\,x^3} - \frac{3\,ade^2}{2\,x^2} - \frac{bd^2e\log (cx^n)}{x^3} - \frac{bd^3n}{16\,x^4} - \frac{ad^2e}{x^3} - \frac{bd^3\log (cx^n)}{4\,x^4} - \frac{ad^3}{4\,x^4}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

output
```
-b*e^3*n/x - b*e^3*log(c*x^n)/x - 3/4*b*d*e^2*n/x^2 - a*e^3/x - 3/2*b*d*e^
2*log(c*x^n)/x^2 - 1/3*b*d^2*e*n/x^3 - 3/2*a*d*e^2/x^2 - b*d^2*e*log(c*x^n
)/x^3 - 1/16*b*d^3*n/x^4 - a*d^2*e/x^3 - 1/4*b*d^3*log(c*x^n)/x^4 - 1/4*a*
d^3/x^4
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 162 vs. 2(80) = 160.

Time = 0.11 (sec) , antiderivative size = 162, normalized size of antiderivative = 1.80

$$\int \frac{(d+ex)^3 (a+b\log (cx^n))}{x^5}\,dx = -\frac{(4\,be^3nx^3 + 6\,bde^2nx^2 + 4\,bd^2enx + bd^3n)\log (x)}{4\,x^4} - \frac{48\,be^3nx^3 + 48\,be^3x^3\log (c) + 36\,bde^2nx^2 + 48\,ae^3x^3 + 72\,bde^2x^2\log (c) + 16\,bd^2enx + 72\,ade^2x^2 + 48}{48\,x^4}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

output
```
-1/4*(4*b*e^3*n*x^3 + 6*b*d*e^2*n*x^2 + 4*b*d^2*e*n*x + b*d^3*n)*log(x)/x^
4 - 1/48*(48*b*e^3*n*x^3 + 48*b*e^3*x^3*log(c) + 36*b*d*e^2*n*x^2 + 48*a*e
^3*x^3 + 72*b*d*e^2*x^2*log(c) + 16*b*d^2*e*n*x + 72*a*d*e^2*x^2 + 48*b*d^
2*e*x*log(c) + 3*b*d^3*n + 48*a*d^2*e*x + 12*b*d^3*log(c) + 12*a*d^3)/x^4
```

Mupad [B] (verification not implemented)

Time = 27.38 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.31

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^5}\,dx$$
$$= -\frac{x^3 (4\,a\,e^3+4\,b\,e^3\,n)+x\left(4\,a\,d^2\,e+\frac{4\,b\,d^2\,e\,n}{3}\right)+a\,d^3+x^2 (6\,a\,d\,e^2+3\,b\,d\,e^2\,n)+\frac{b\,d^3\,n}{4}}{4\,x^4}$$
$$-\frac{\ln(c\,x^n)\left(\frac{b\,d^3}{4}+b\,d^2\,e\,x+\frac{3\,b\,d\,e^2\,x^2}{2}+b\,e^3\,x^3\right)}{x^4}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^3)/x^5,x)
```

output
```
- (x^3*(4*a*e^3 + 4*b*e^3*n) + x*(4*a*d^2*e + (4*b*d^2*e*n)/3) + a*d^3 + x
^2*(6*a*d*e^2 + 3*b*d*e^2*n) + (b*d^3*n)/4)/(4*x^4) - (log(c*x^n)*((b*d^3)
/4 + b*e^3*x^3 + b*d^2*e*x + (3*b*d*e^2*x^2)/2))/x^4
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.48

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^5}\,dx$$
$$= \frac{-12\log(x^n c)\,b\,d^3-48\log(x^n c)\,b\,d^2ex-72\log(x^n c)\,bd\,e^2x^2-48\log(x^n c)\,b\,e^3x^3-12a\,d^3-48a\,d^2ex-7}{48x^4}$$

input
```
int((e*x+d)^3*(a+b*log(c*x^n))/x^5,x)
```

output
```
( - 12*log(x**n*c)*b*d**3 - 48*log(x**n*c)*b*d**2*e*x - 72*log(x**n*c)*b*d
*e**2*x**2 - 48*log(x**n*c)*b*e**3*x**3 - 12*a*d**3 - 48*a*d**2*e*x - 72*a
*d*e**2*x**2 - 48*a*e**3*x**3 - 3*b*d**3*n - 16*b*d**2*e*n*x - 36*b*d*e**2
*n*x**2 - 48*b*e**3*n*x**3)/(48*x**4)
```

3.28 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^6}\,dx$

Optimal result 357
Mathematica [A] (verified) 357
Rubi [A] (verified) 358
Maple [A] (verified) 360
Fricas [A] (verification not implemented) 360
Sympy [A] (verification not implemented) 361
Maxima [A] (verification not implemented) 361
Giac [A] (verification not implemented) 362
Mupad [B] (verification not implemented) 362
Reduce [B] (verification not implemented) 363

Optimal result

Integrand size = 21, antiderivative size = 142

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^6}\,dx = \frac{bd^2en}{80x^4}+\frac{bde^2n}{15x^3}+\frac{3be^3n}{20x^2}+\frac{be^4n}{5dx}-\frac{bn(d+ex)^5}{25d^2x^5} - \frac{be^5n\log(x)}{20d^2}-\frac{(d+ex)^4\,(a+b\log(cx^n))}{5dx^5} + \frac{e(d+ex)^4\,(a+b\log(cx^n))}{20d^2x^4}$$

output
```
1/80*b*d^2*e*n/x^4+1/15*b*d*e^2*n/x^3+3/20*b*e^3*n/x^2+1/5*b*e^4*n/d/x-1/2
5*b*n*(e*x+d)^5/d^2/x^5-1/20*b*e^5*n*ln(x)/d^2-1/5*(e*x+d)^4*(a+b*ln(c*x^n
))/d/x^5+1/20*e*(e*x+d)^4*(a+b*ln(c*x^n))/d^2/x^4
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.80

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^6}\,dx = -\frac{60a(4d^3+15d^2ex+20de^2x^2+10e^3x^3)+bn(48d^3+225d^2ex+400de^2x^2+300e^3x^3)+60b(4d^3+15d}{1200x^5}$$

input
```
Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-1/1200*(60*a*(4*d^3 + 15*d^2*e*x + 20*d*e^2*x^2 + 10*e^3*x^3) + b*n*(48*d
^3 + 225*d^2*e*x + 400*d*e^2*x^2 + 300*e^3*x^3) + 60*b*(4*d^3 + 15*d^2*e*x
 + 20*d*e^2*x^2 + 10*e^3*x^3)*Log[c*x^n])/x^5
```

Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 131, normalized size of antiderivative = 0.92, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238, Rules used = {2772, 27, 87, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^6} dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{(4d-ex)(d+ex)^4}{20d^2x^6}dx+\frac{e(d+ex)^4(a+b\log(cx^n))}{20d^2x^4}-\frac{(d+ex)^4(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(4d-ex)(d+ex)^4}{x^6}dx}{20d^2}+\frac{e(d+ex)^4(a+b\log(cx^n))}{20d^2x^4}-\frac{(d+ex)^4(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{87}$$

$$\frac{bn\left(-e\int \frac{(d+ex)^4}{x^5}dx-\frac{4(d+ex)^5}{5x^5}\right)}{20d^2}+\frac{e(d+ex)^4(a+b\log(cx^n))}{20d^2x^4}-\frac{(d+ex)^4(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{49}$$

$$\frac{bn\left(-e\int \left(\frac{d^4}{x^5}+\frac{4ed^3}{x^4}+\frac{6e^2d^2}{x^3}+\frac{4e^3d}{x^2}+\frac{e^4}{x}\right)dx-\frac{4(d+ex)^5}{5x^5}\right)}{20d^2}+\frac{e(d+ex)^4(a+b\log(cx^n))}{20d^2x^4}-\frac{(d+ex)^4(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{2009}$$

$$\frac{e(d+ex)^4(a+b\log(cx^n))}{20d^2x^4}-\frac{(d+ex)^4(a+b\log(cx^n))}{5dx^5}+\frac{bn\left(-e\left(-\frac{d^4}{4x^4}-\frac{4d^3e}{3x^3}-\frac{3d^2e^2}{x^2}-\frac{4de^3}{x}+e^4\log(x)\right)-\frac{4(d+ex)^5}{5x^5}\right)}{20d^2}$$

input
```
Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*((-4*(d + e*x)^5)/(5*x^5) - e*(-1/4*d^4/x^4 - (4*d^3*e)/(3*x^3) - (3*
d^2*e^2)/x^2 - (4*d*e^3)/x + e^4*Log[x])))/(20*d^2) - ((d + e*x)^4*(a + b*
Log[c*x^n]))/(5*d*x^5) + (e*(d + e*x)^4*(a + b*Log[c*x^n]))/(20*d^2*x^4)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 87
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[(-(b*e - a*f))*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(f*(p
+ 1)*(c*f - d*e))), x] - Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p
+ 1)))/(f*(p + 1)*(c*f - d*e))   Int[(c + d*x)^n*(e + f*x)^(p + 1), x], x]
/; FreeQ[{a, b, c, d, e, f, n}, x] && LtQ[p, -1] && ( !LtQ[n, -1] || Intege
rQ[p] ||  !(IntegerQ[n] ||  !(EqQ[e, 0] ||  !(EqQ[c, 0] || LtQ[p, n]))))
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.53 (sec) , antiderivative size = 134, normalized size of antiderivative = 0.94

method	result
parallelrisch	$-\frac{600b\ln(c\,x^n)e^3x^3+300b\,e^3n\,x^3+600a\,e^3x^3+1200b\ln(c\,x^n)d\,e^2x^2+400bd\,e^2n\,x^2+1200a\,e^2x^2d+900b\ln(c\,x^n)d^2ex+225b\,d}{1200x^5}$
risch	$-\frac{b(10e^3x^3+20d\,e^2x^2+15d^2ex+4d^3)\ln(x^n)}{20x^5}-\frac{300i\pi b\,e^3x^3\,\text{csgn}(ix^n)\,\text{csgn}(ic\,x^n)^2+1200a\,e^2x^2d+900a\,d^2ex+240a\,d^3-30}{}$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

output
```
-1/1200/x^5*(600*b*ln(c*x^n)*e^3*x^3+300*b*e^3*n*x^3+600*a*e^3*x^3+1200*b*
ln(c*x^n)*d*e^2*x^2+400*b*d*e^2*n*x^2+1200*a*e^2*x^2*d+900*b*ln(c*x^n)*d^2
*e*x+225*b*d^2*e*n*x+900*a*d^2*e*x+240*b*ln(c*x^n)*d^3+48*b*d^3*n+240*a*d^
3)
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.09

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^6}\,dx =$$
$$-\frac{48\,bd^3n+240\,ad^3+300\,(be^3n+2\,ae^3)x^3+400\,(bde^2n+3\,ade^2)x^2+225\,(bd^2en+4\,ad^2e)x+60\,(10\,b}{120}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
-1/1200*(48*b*d^3*n + 240*a*d^3 + 300*(b*e^3*n + 2*a*e^3)*x^3 + 400*(b*d*e
^2*n + 3*a*d*e^2)*x^2 + 225*(b*d^2*e*n + 4*a*d^2*e)*x + 60*(10*b*e^3*x^3 +
 20*b*d*e^2*x^2 + 15*b*d^2*e*x + 4*b*d^3)*log(c) + 60*(10*b*e^3*n*x^3 + 20
*b*d*e^2*n*x^2 + 15*b*d^2*e*n*x + 4*b*d^3*n)*log(x))/x^5
```

Sympy [A] (verification not implemented)

Time = 0.73 (sec) , antiderivative size = 168, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^6}\,dx = -\frac{ad^3}{5x^5} - \frac{3ad^2e}{4x^4} - \frac{ade^2}{x^3} - \frac{ae^3}{2x^2} - \frac{bd^3n}{25x^5} - \frac{bd^3\log(cx^n)}{5x^5} - \frac{3bd^2en}{16x^4} - \frac{3bd^2e\log(cx^n)}{4x^4} - \frac{bde^2n}{3x^3} - \frac{bde^2\log(cx^n)}{x^3} - \frac{be^3n}{4x^2} - \frac{be^3\log(cx^n)}{2x^2}$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**6,x)
```

output
```
-a*d**3/(5*x**5) - 3*a*d**2*e/(4*x**4) - a*d*e**2/x**3 - a*e**3/(2*x**2) -
 b*d**3*n/(25*x**5) - b*d**3*log(c*x**n)/(5*x**5) - 3*b*d**2*e*n/(16*x**4)
 - 3*b*d**2*e*log(c*x**n)/(4*x**4) - b*d*e**2*n/(3*x**3) - b*d*e**2*log(c*
x**n)/x**3 - b*e**3*n/(4*x**2) - b*e**3*log(c*x**n)/(2*x**2)
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.01

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^6}\,dx = -\frac{be^3n}{4\,x^2} - \frac{be^3\log(cx^n)}{2\,x^2} - \frac{bde^2n}{3\,x^3} - \frac{ae^3}{2\,x^2} - \frac{bde^2\log(cx^n)}{x^3} - \frac{3\,bd^2en}{16\,x^4} - \frac{ade^2}{x^3} - \frac{3\,bd^2e\log(cx^n)}{4\,x^4} - \frac{bd^3n}{25\,x^5} - \frac{3\,ad^2e}{4\,x^4} - \frac{bd^3\log(cx^n)}{5\,x^5} - \frac{ad^3}{5\,x^5}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
-1/4*b*e^3*n/x^2 - 1/2*b*e^3*log(c*x^n)/x^2 - 1/3*b*d*e^2*n/x^3 - 1/2*a*e^
3/x^2 - b*d*e^2*log(c*x^n)/x^3 - 3/16*b*d^2*e*n/x^4 - a*d*e^2/x^3 - 3/4*b*
d^2*e*log(c*x^n)/x^4 - 1/25*b*d^3*n/x^5 - 3/4*a*d^2*e/x^4 - 1/5*b*d^3*log(
c*x^n)/x^5 - 1/5*a*d^3/x^5
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 163, normalized size of antiderivative = 1.15

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^6}\,dx$$
$$= -\frac{(10\,be^3nx^3 + 20\,bde^2nx^2 + 15\,bd^2enx + 4\,bd^3n)\log(x)}{20\,x^5} - \frac{300\,be^3nx^3 + 600\,be^3x^3\log(c) + 400\,bde^2nx^2 + 600\,ae^3x^3 + 1200\,bde^2x^2\log(c) + 225\,bd^2enx + 1200\,a}{1200\,x^5}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
-1/20*(10*b*e^3*n*x^3 + 20*b*d*e^2*n*x^2 + 15*b*d^2*e*n*x + 4*b*d^3*n)*log
(x)/x^5 - 1/1200*(300*b*e^3*n*x^3 + 600*b*e^3*x^3*log(c) + 400*b*d*e^2*n*x
^2 + 600*a*e^3*x^3 + 1200*b*d*e^2*x^2*log(c) + 225*b*d^2*e*n*x + 1200*a*d*
e^2*x^2 + 900*b*d^2*e*x*log(c) + 48*b*d^3*n + 900*a*d^2*e*x + 240*b*d^3*lo
g(c) + 240*a*d^3)/x^5
```

Mupad [B] (verification not implemented)

Time = 27.35 (sec) , antiderivative size = 120, normalized size of antiderivative = 0.85

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^6}\,dx = -\frac{x^3\,(10\,a\,e^3 + 5\,b\,e^3\,n) + x\left(15\,a\,d^2\,e + \frac{15\,b\,d^2\,e\,n}{4}\right) + 4\,a\,d^3 + x^2\left(20\,a\,d\,e^2 + \frac{20\,b\,d\,e^2\,n}{3}\right) + \frac{4\,b\,d^3\,n}{5}}{20\,x^5} - \frac{\ln(c\,x^n)\left(\frac{b\,d^3}{5} + \frac{3\,b\,d^2\,e\,x}{4} + b\,d\,e^2\,x^2 + \frac{b\,e^3\,x^3}{2}\right)}{x^5}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^3)/x^6,x)
```

output
```
- (x^3*(10*a*e^3 + 5*b*e^3*n) + x*(15*a*d^2*e + (15*b*d^2*e*n)/4) + 4*a*d^
3 + x^2*(20*a*d*e^2 + (20*b*d*e^2*n)/3) + (4*b*d^3*n)/5)/(20*x^5) - (log(c
*x^n)*((b*d^3)/5 + (b*e^3*x^3)/2 + (3*b*d^2*e*x)/4 + b*d*e^2*x^2))/x^5
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 133, normalized size of antiderivative = 0.94

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^6} \, dx = \frac{-240\log(x^n c)\, b\, d^3 - 900\log(x^n c)\, b\, d^2 ex - 1200\log(x^n c)\, bd\, e^2 x^2 - 600\log(x^n c)\, b\, e^3 x^3 - 240a\, d^3 - 900a}{1200x^5}$$

input
```
int((e*x+d)^3*(a+b*log(c*x^n))/x^6,x)
```

output
```
( - 240*log(x**n*c)*b*d**3 - 900*log(x**n*c)*b*d**2*e*x - 1200*log(x**n*c)
*b*d*e**2*x**2 - 600*log(x**n*c)*b*e**3*x**3 - 240*a*d**3 - 900*a*d**2*e*x
 - 1200*a*d*e**2*x**2 - 600*a*e**3*x**3 - 48*b*d**3*n - 225*b*d**2*e*n*x -
 400*b*d*e**2*n*x**2 - 300*b*e**3*n*x**3)/(1200*x**5)
```

3.29 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^7}\,dx$

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Optimal result

Integrand size = 21, antiderivative size = 133

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^7}\,dx = -\frac{bd^3n}{36x^6}-\frac{3bd^2en}{25x^5}-\frac{3bde^2n}{16x^4}-\frac{be^3n}{9x^3}-\frac{d^3(a+b\log(cx^n))}{6x^6}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{3de^2(a+b\log(cx^n))}{4x^4}-\frac{e^3(a+b\log(cx^n))}{3x^3}$$

output
```
-1/36*b*d^3*n/x^6-3/25*b*d^2*e*n/x^5-3/16*b*d*e^2*n/x^4-1/9*b*e^3*n/x^3-1/
6*d^3*(a+b*ln(c*x^n))/x^6-3/5*d^2*e*(a+b*ln(c*x^n))/x^5-3/4*d*e^2*(a+b*ln(
c*x^n))/x^4-1/3*e^3*(a+b*ln(c*x^n))/x^3
```

Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.85

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^7}\,dx = -\frac{60a(10d^3+36d^2ex+45de^2x^2+20e^3x^3)+bn(100d^3+432d^2ex+675de^2x^2+400e^3x^3)+60b(10d^3+}{3600x^6}$$

input
```
Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^7,x]
```

output
```
-1/3600*(60*a*(10*d^3 + 36*d^2*e*x + 45*d*e^2*x^2 + 20*e^3*x^3) + b*n*(100
*d^3 + 432*d^2*e*x + 675*d*e^2*x^2 + 400*e^3*x^3) + 60*b*(10*d^3 + 36*d^2*
e*x + 45*d*e^2*x^2 + 20*e^3*x^3)*Log[c*x^n])/x^6
```

Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 132, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^7} dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{10d^3+36exd^2+45e^2x^2d+20e^3x^3}{60x^7}dx-\frac{d^3(a+b\log(cx^n))}{6x^6}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{3de^2(a+b\log(cx^n))}{4x^4}-\frac{e^3(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{60}bn\int \frac{10d^3+36exd^2+45e^2x^2d+20e^3x^3}{x^7}dx-\frac{d^3(a+b\log(cx^n))}{6x^6}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{3de^2(a+b\log(cx^n))}{4x^4}-\frac{e^3(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{60}bn\int \left(\frac{10d^3}{x^7}+\frac{36ed^2}{x^6}+\frac{45e^2d}{x^5}+\frac{20e^3}{x^4}\right)dx-\frac{d^3(a+b\log(cx^n))}{6x^6}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{3de^2(a+b\log(cx^n))}{4x^4}-\frac{e^3(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{6x^6}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{3de^2(a+b\log(cx^n))}{4x^4}-\frac{e^3(a+b\log(cx^n))}{3x^3}+\frac{1}{60}bn\left(-\frac{5d^3}{3x^6}-\frac{36d^2e}{5x^5}-\frac{45de^2}{4x^4}-\frac{20e^3}{3x^3}\right)$$

input
```
Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^7,x]
```

output
```
(b*n*((-5*d^3)/(3*x^6) - (36*d^2*e)/(5*x^5) - (45*d*e^2)/(4*x^4) - (20*e^3
)/(3*x^3)))/60 - (d^3*(a + b*Log[c*x^n]))/(6*x^6) - (3*d^2*e*(a + b*Log[c*
x^n]))/(5*x^5) - (3*d*e^2*(a + b*Log[c*x^n]))/(4*x^4) - (e^3*(a + b*Log[c*
x^n]))/(3*x^3)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.53 (sec) , antiderivative size = 134, normalized size of antiderivative = 1.01

method	result
parallelrisch	$-\frac{1200 b \ln(c\,x^n) e^3 x^3+400 b\, e^3 n\, x^3+1200 a\, e^3 x^3+2700 b \ln(c\,x^n) d\, e^2 x^2+675 b d\, e^2 n\, x^2+2700 a\, e^2 x^2 d+2160 b \ln(c\,x^n) d^2 e x+43}{3600 x^6}$
risch	$-\frac{b(20 e^3 x^3+45 d\, e^2 x^2+36 d^2 e x+10 d^3) \ln(x^n)}{60 x^6}-\frac{600 i\pi b\, e^3 x^3 \operatorname{csgn}(i x^n) \operatorname{csgn}(i c\, x^n)^2+2700 a\, e^2 x^2 d+2160 a\, d^2 e x+600 a\, d^3-}{}$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n))/x^7,x,method=_RETURNVERBOSE)
```

output
```
-1/3600/x^6*(1200*b*ln(c*x^n)*e^3*x^3+400*b*e^3*n*x^3+1200*a*e^3*x^3+2700*
b*ln(c*x^n)*d*e^2*x^2+675*b*d*e^2*n*x^2+2700*a*e^2*x^2*d+2160*b*ln(c*x^n)*
d^2*e*x+432*b*d^2*e*n*x+2160*a*d^2*e*x+600*b*ln(c*x^n)*d^3+100*b*d^3*n+600
*a*d^3)
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.17

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^7}\,dx = -\frac{100\,bd^3n+600\,ad^3+400\,(be^3n+3\,ae^3)x^3+675\,(bde^2n+4\,ade^2)x^2+432\,(bd^2en+5\,ad^2e)x+60\,(20}{3}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^7,x, algorithm="fricas")
```

output
```
-1/3600*(100*b*d^3*n + 600*a*d^3 + 400*(b*e^3*n + 3*a*e^3)*x^3 + 675*(b*d*
e^2*n + 4*a*d*e^2)*x^2 + 432*(b*d^2*e*n + 5*a*d^2*e)*x + 60*(20*b*e^3*x^3
+ 45*b*d*e^2*x^2 + 36*b*d^2*e*x + 10*b*d^3)*log(c) + 60*(20*b*e^3*n*x^3 +
45*b*d*e^2*n*x^2 + 36*b*d^2*e*n*x + 10*b*d^3*n)*log(x))/x^6
```

Sympy [A] (verification not implemented)

Time = 0.88 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.33

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^7} dx = -\frac{ad^3}{6x^6} - \frac{3ad^2e}{5x^5} - \frac{3ade^2}{4x^4} - \frac{ae^3}{3x^3} - \frac{bd^3n}{36x^6} - \frac{bd^3\log(cx^n)}{6x^6} - \frac{3bd^2en}{25x^5} - \frac{3bd^2e\log(cx^n)}{5x^5} - \frac{3bde^2n}{16x^4} - \frac{3bde^2\log(cx^n)}{4x^4} - \frac{be^3n}{9x^3} - \frac{be^3\log(cx^n)}{3x^3}$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**7,x)
```

output
```
-a*d**3/(6*x**6) - 3*a*d**2*e/(5*x**5) - 3*a*d*e**2/(4*x**4) - a*e**3/(3*x
**3) - b*d**3*n/(36*x**6) - b*d**3*log(c*x**n)/(6*x**6) - 3*b*d**2*e*n/(25
*x**5) - 3*b*d**2*e*log(c*x**n)/(5*x**5) - 3*b*d*e**2*n/(16*x**4) - 3*b*d*
e**2*log(c*x**n)/(4*x**4) - b*e**3*n/(9*x**3) - b*e**3*log(c*x**n)/(3*x**3
)
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.08

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^7} dx = -\frac{be^3n}{9\,x^3} - \frac{be^3\log(cx^n)}{3\,x^3} - \frac{3\,bde^2n}{16\,x^4} - \frac{ae^3}{3\,x^3} - \frac{3\,bde^2\log(cx^n)}{4\,x^4} - \frac{3\,bd^2en}{25\,x^5} - \frac{3\,ade^2}{4\,x^4} - \frac{3\,bd^2e\log(cx^n)}{5\,x^5} - \frac{bd^3n}{36\,x^6} - \frac{3\,ad^2e}{5\,x^5} - \frac{bd^3\log(cx^n)}{6\,x^6} - \frac{ad^3}{6\,x^6}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^7,x, algorithm="maxima")
```

output
```
-1/9*b*e^3*n/x^3 - 1/3*b*e^3*log(c*x^n)/x^3 - 3/16*b*d*e^2*n/x^4 - 1/3*a*e
^3/x^3 - 3/4*b*d*e^2*log(c*x^n)/x^4 - 3/25*b*d^2*e*n/x^5 - 3/4*a*d*e^2/x^4
 - 3/5*b*d^2*e*log(c*x^n)/x^5 - 1/36*b*d^3*n/x^6 - 3/5*a*d^2*e/x^5 - 1/6*b
*d^3*log(c*x^n)/x^6 - 1/6*a*d^3/x^6
```

Giac [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 163, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex)^3\,(a+b\log{(cx^n)})}{x^7}\,dx$$
$$= -\frac{(20\,be^3nx^3+45\,bde^2nx^2+36\,bd^2enx+10\,bd^3n)\log{(x)}}{60\,x^6}$$
$$-\frac{400\,be^3nx^3+1200\,be^3x^3\log{(c)}+675\,bde^2nx^2+1200\,ae^3x^3+2700\,bde^2x^2\log{(c)}+432\,bd^2enx+270}{3600\,x^6}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^7,x, algorithm="giac")
```

output
```
-1/60*(20*b*e^3*n*x^3 + 45*b*d*e^2*n*x^2 + 36*b*d^2*e*n*x + 10*b*d^3*n)*lo
g(x)/x^6 - 1/3600*(400*b*e^3*n*x^3 + 1200*b*e^3*x^3*log(c) + 675*b*d*e^2*n
*x^2 + 1200*a*e^3*x^3 + 2700*b*d*e^2*x^2*log(c) + 432*b*d^2*e*n*x + 2700*a
*d*e^2*x^2 + 2160*b*d^2*e*x*log(c) + 100*b*d^3*n + 2160*a*d^2*e*x + 600*b*
d^3*log(c) + 600*a*d^3)/x^6
```

Mupad [B] (verification not implemented)

Time = 27.77 (sec) , antiderivative size = 121, normalized size of antiderivative = 0.91

$$\int \frac{(d+ex)^3\,(a+b\log{(cx^n)})}{x^7}\,dx =$$
$$-\frac{x^3\left(20\,a\,e^3+\frac{20\,b\,e^3\,n}{3}\right)+x\left(36\,a\,d^2\,e+\frac{36\,b\,d^2\,e\,n}{5}\right)+10\,a\,d^3+x^2\left(45\,a\,d\,e^2+\frac{45\,b\,d\,e^2\,n}{4}\right)+\frac{5\,b\,d^3\,n}{3}}{60\,x^6}$$
$$-\frac{\ln{(c\,x^n)}\left(\frac{b\,d^3}{6}+\frac{3\,b\,d^2\,e\,x}{5}+\frac{3\,b\,d\,e^2\,x^2}{4}+\frac{b\,e^3\,x^3}{3}\right)}{x^6}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^3)/x^7,x)
```

output
```
- (x^3*(20*a*e^3 + (20*b*e^3*n)/3) + x*(36*a*d^2*e + (36*b*d^2*e*n)/5) + 1
0*a*d^3 + x^2*(45*a*d*e^2 + (45*b*d*e^2*n)/4) + (5*b*d^3*n)/3)/(60*x^6) -
(log(c*x^n)*((b*d^3)/6 + (b*e^3*x^3)/3 + (3*b*d^2*e*x)/5 + (3*b*d*e^2*x^2)
/4))/x^6
```

Reduce [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^7}\,dx$$
$$= \frac{-600\log(x^nc)\,b\,d^3 - 2160\log(x^nc)\,b\,d^2ex - 2700\log(x^nc)\,bd\,e^2x^2 - 1200\log(x^nc)\,b\,e^3x^3 - 600a\,d^3 - 216}{3600x^6}$$

input
```
int((e*x+d)^3*(a+b*log(c*x^n))/x^7,x)
```

output
```
( - 600*log(x**n*c)*b*d**3 - 2160*log(x**n*c)*b*d**2*e*x - 2700*log(x**n*c
)*b*d*e**2*x**2 - 1200*log(x**n*c)*b*e**3*x**3 - 600*a*d**3 - 2160*a*d**2*
e*x - 2700*a*d*e**2*x**2 - 1200*a*e**3*x**3 - 100*b*d**3*n - 432*b*d**2*e*
n*x - 675*b*d*e**2*n*x**2 - 400*b*e**3*n*x**3)/(3600*x**6)
```

3.30 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^8}\,dx$

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Rubi [A] (verified) 372
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Maxima [A] (verification not implemented) 375
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Reduce [B] (verification not implemented) 377

Optimal result

Integrand size = 21, antiderivative size = 133

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^8}\,dx = -\frac{bd^3n}{49x^7}-\frac{bd^2en}{12x^6}-\frac{3bde^2n}{25x^5}-\frac{be^3n}{16x^4} - \frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{d^2e(a+b\log(cx^n))}{2x^6} - \frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{4x^4}$$

output
```
-1/49*b*d^3*n/x^7-1/12*b*d^2*e*n/x^6-3/25*b*d*e^2*n/x^5-1/16*b*e^3*n/x^4-1
/7*d^3*(a+b*ln(c*x^n))/x^7-1/2*d^2*e*(a+b*ln(c*x^n))/x^6-3/5*d*e^2*(a+b*ln
(c*x^n))/x^5-1/4*e^3*(a+b*ln(c*x^n))/x^4
```

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.85

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^8}\,dx = -\frac{420a(20d^3+70d^2ex+84de^2x^2+35e^3x^3)+bn(1200d^3+4900d^2ex+7056de^2x^2+3675e^3x^3)+420b(}{58800x^7}$$

input
```
Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
-1/58800*(420*a*(20*d^3 + 70*d^2*e*x + 84*d*e^2*x^2 + 35*e^3*x^3) + b*n*(1
200*d^3 + 4900*d^2*e*x + 7056*d*e^2*x^2 + 3675*e^3*x^3) + 420*b*(20*d^3 +
70*d^2*e*x + 84*d*e^2*x^2 + 35*e^3*x^3)*Log[c*x^n])/x^7
```

Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 132, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^8} dx$$

$$\Big\downarrow \text{ 2772}$$

$$-bn\int -\frac{20d^3+70exd^2+84e^2x^2d+35e^3x^3}{140x^8}dx-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{d^2e(a+b\log(cx^n))}{2x^6}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{4x^4}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{140}bn\int \frac{20d^3+70exd^2+84e^2x^2d+35e^3x^3}{x^8}dx-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{d^2e(a+b\log(cx^n))}{2x^6}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{4x^4}$$

$$\Big\downarrow \text{ 2010}$$

$$\frac{1}{140}bn\int \left(\frac{20d^3}{x^8}+\frac{70ed^2}{x^7}+\frac{84e^2d}{x^6}+\frac{35e^3}{x^5}\right)dx-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{d^2e(a+b\log(cx^n))}{2x^6}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{4x^4}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{d^2e(a+b\log(cx^n))}{2x^6}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{4x^4}+\frac{1}{140}bn\left(-\frac{20d^3}{7x^7}-\frac{35d^2e}{3x^6}-\frac{84de^2}{5x^5}-\frac{35e^3}{4x^4}\right)$$

input
```
Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
(b*n*((-20*d^3)/(7*x^7) - (35*d^2*e)/(3*x^6) - (84*d*e^2)/(5*x^5) - (35*e^
3)/(4*x^4)))/140 - (d^3*(a + b*Log[c*x^n]))/(7*x^7) - (d^2*e*(a + b*Log[c*
x^n]))/(2*x^6) - (3*d*e^2*(a + b*Log[c*x^n]))/(5*x^5) - (e^3*(a + b*Log[c*
x^n]))/(4*x^4)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.53 (sec) , antiderivative size = 134, normalized size of antiderivative = 1.01

method	result
parallelrisch	$-\frac{14700 b \ln \left(c \,x^{n}\right) e^{3} x^{3}+3675 b \,e^{3} n \,x^{3}+14700 a \,e^{3} x^{3}+35280 b \ln \left(c \,x^{n}\right) d \,e^{2} x^{2}+7056 b d \,e^{2} n \,x^{2}+35280 a \,e^{2} x^{2} d+29400 b \ln \left(c \,x^{n}\right) d}{58800 x^{7}}$
risch	$-\frac{b \left(35 e^{3} x^{3}+84 d \,e^{2} x^{2}+70 d^{2} e x+20 d^{3}\right) \ln \left(x^{n}\right)}{140 x^{7}}-\frac{7350 i \pi b \,e^{3} x^{3} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right)^{2}+35280 a \,e^{2} x^{2} d+29400 a \,d^{2} e x+8400 a}{}$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n))/x^8,x,method=_RETURNVERBOSE)
```

output
```
-1/58800/x^7*(14700*b*ln(c*x^n)*e^3*x^3+3675*b*e^3*n*x^3+14700*a*e^3*x^3+3
5280*b*ln(c*x^n)*d*e^2*x^2+7056*b*d*e^2*n*x^2+35280*a*e^2*x^2*d+29400*b*ln
(c*x^n)*d^2*e*x+4900*b*d^2*e*n*x+29400*a*d^2*e*x+8400*b*ln(c*x^n)*d^3+1200
*b*d^3*n+8400*a*d^3)
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.17

$$\int \frac{(d+ex)^3 (a+b\log (cx^n))}{x^8}\,dx =$$
$$-\frac{1200\,bd^3n+8400\,ad^3+3675\,(be^3n+4\,ae^3)x^3+7056\,(bde^2n+5\,ade^2)x^2+4900\,(bd^2en+6\,ad^2e)x+}{}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

output
```
-1/58800*(1200*b*d^3*n + 8400*a*d^3 + 3675*(b*e^3*n + 4*a*e^3)*x^3 + 7056*
(b*d*e^2*n + 5*a*d*e^2)*x^2 + 4900*(b*d^2*e*n + 6*a*d^2*e)*x + 420*(35*b*e
^3*x^3 + 84*b*d*e^2*x^2 + 70*b*d^2*e*x + 20*b*d^3)*log(c) + 420*(35*b*e^3*
n*x^3 + 84*b*d*e^2*n*x^2 + 70*b*d^2*e*n*x + 20*b*d^3*n)*log(x))/x^7
```

Sympy [A] (verification not implemented)

Time = 1.18 (sec) , antiderivative size = 172, normalized size of antiderivative = 1.29

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^8}\,dx = -\frac{ad^3}{7x^7} - \frac{ad^2e}{2x^6} - \frac{3ade^2}{5x^5} - \frac{ae^3}{4x^4} - \frac{bd^3n}{49x^7} - \frac{bd^3\log(cx^n)}{7x^7} - \frac{bd^2en}{12x^6} - \frac{bd^2e\log(cx^n)}{2x^6} - \frac{3bde^2n}{25x^5} - \frac{3bde^2\log(cx^n)}{5x^5} - \frac{be^3n}{16x^4} - \frac{be^3\log(cx^n)}{4x^4}$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**8,x)
```

output
```
-a*d**3/(7*x**7) - a*d**2*e/(2*x**6) - 3*a*d*e**2/(5*x**5) - a*e**3/(4*x**
4) - b*d**3*n/(49*x**7) - b*d**3*log(c*x**n)/(7*x**7) - b*d**2*e*n/(12*x**
6) - b*d**2*e*log(c*x**n)/(2*x**6) - 3*b*d*e**2*n/(25*x**5) - 3*b*d*e**2*l
og(c*x**n)/(5*x**5) - b*e**3*n/(16*x**4) - b*e**3*log(c*x**n)/(4*x**4)
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.08

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^8}\,dx = -\frac{be^3n}{16\,x^4} - \frac{be^3\log(cx^n)}{4\,x^4} - \frac{3\,bde^2n}{25\,x^5} - \frac{ae^3}{4\,x^4} - \frac{3\,bde^2\log(cx^n)}{5\,x^5} - \frac{bd^2en}{12\,x^6} - \frac{3\,ade^2}{5\,x^5} - \frac{bd^2e\log(cx^n)}{2\,x^6} - \frac{bd^3n}{49\,x^7} - \frac{ad^2e}{2\,x^6} - \frac{bd^3\log(cx^n)}{7\,x^7} - \frac{ad^3}{7\,x^7}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

output
```
-1/16*b*e^3*n/x^4 - 1/4*b*e^3*log(c*x^n)/x^4 - 3/25*b*d*e^2*n/x^5 - 1/4*a*
e^3/x^4 - 3/5*b*d*e^2*log(c*x^n)/x^5 - 1/12*b*d^2*e*n/x^6 - 3/5*a*d*e^2/x^
5 - 1/2*b*d^2*e*log(c*x^n)/x^6 - 1/49*b*d^3*n/x^7 - 1/2*a*d^2*e/x^6 - 1/7*
b*d^3*log(c*x^n)/x^7 - 1/7*a*d^3/x^7
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 163, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^8}\,dx$$
$$= -\frac{(35\,be^3nx^3+84\,bde^2nx^2+70\,bd^2enx+20\,bd^3n)\log(x)}{140\,x^7}$$
$$-\frac{3675\,be^3nx^3+14700\,be^3x^3\log(c)+7056\,bde^2nx^2+14700\,ae^3x^3+35280\,bde^2x^2\log(c)+4900\,bd^2enx}{58800\,x}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
```

output
```
-1/140*(35*b*e^3*n*x^3 + 84*b*d*e^2*n*x^2 + 70*b*d^2*e*n*x + 20*b*d^3*n)*l
og(x)/x^7 - 1/58800*(3675*b*e^3*n*x^3 + 14700*b*e^3*x^3*log(c) + 7056*b*d*
e^2*n*x^2 + 14700*a*e^3*x^3 + 35280*b*d*e^2*x^2*log(c) + 4900*b*d^2*e*n*x
+ 35280*a*d*e^2*x^2 + 29400*b*d^2*e*x*log(c) + 1200*b*d^3*n + 29400*a*d^2*
e*x + 8400*b*d^3*log(c) + 8400*a*d^3)/x^7
```

Mupad [B] (verification not implemented)

Time = 26.84 (sec) , antiderivative size = 121, normalized size of antiderivative = 0.91

$$\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^8}\,dx =$$
$$-\frac{x^3\left(35\,a\,e^3+\frac{35\,b\,e^3\,n}{4}\right)+x\left(70\,a\,d^2\,e+\frac{35\,b\,d^2\,e\,n}{3}\right)+20\,a\,d^3+x^2\left(84\,a\,d\,e^2+\frac{84\,b\,d\,e^2\,n}{5}\right)+\frac{20\,b\,d^3\,n}{7}}{140\,x^7}$$
$$-\frac{\ln(c\,x^n)\left(\frac{b\,d^3}{7}+\frac{b\,d^2\,e\,x}{2}+\frac{3\,b\,d\,e^2\,x^2}{5}+\frac{b\,e^3\,x^3}{4}\right)}{x^7}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^3)/x^8,x)
```

output
```
- (x^3*(35*a*e^3 + (35*b*e^3*n)/4) + x*(70*a*d^2*e + (35*b*d^2*e*n)/3) + 2
0*a*d^3 + x^2*(84*a*d*e^2 + (84*b*d*e^2*n)/5) + (20*b*d^3*n)/7)/(140*x^7)
- (log(c*x^n)*((b*d^3)/7 + (b*e^3*x^3)/4 + (b*d^2*e*x)/2 + (3*b*d*e^2*x^2)
/5))/x^7
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^8}\,dx$$
$$= \frac{-8400\log(x^n c)\,b\,d^3 - 29400\log(x^n c)\,b\,d^2ex - 35280\log(x^n c)\,bd\,e^2x^2 - 14700\log(x^n c)\,b\,e^3x^3 - 8400a\,d^3}{588}$$

input
```
int((e*x+d)^3*(a+b*log(c*x^n))/x^8,x)
```

output
```
( - 8400*log(x**n*c)*b*d**3 - 29400*log(x**n*c)*b*d**2*e*x - 35280*log(x**
n*c)*b*d*e**2*x**2 - 14700*log(x**n*c)*b*e**3*x**3 - 8400*a*d**3 - 29400*a
*d**2*e*x - 35280*a*d*e**2*x**2 - 14700*a*e**3*x**3 - 1200*b*d**3*n - 4900
*b*d**2*e*n*x - 7056*b*d*e**2*n*x**2 - 3675*b*e**3*n*x**3)/(58800*x**7)
```

3.31 $\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx$

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Rubi [A] (verified) 379
Maple [C] (warning: unable to verify) 380
Fricas [F] 381
Sympy [A] (verification not implemented) 381
Maxima [F] 382
Giac [F] 382
Mupad [F(-1)] 383
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Optimal result

Integrand size = 21, antiderivative size = 148

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx = \frac{ad^2x}{e^3} - \frac{bd^2nx}{e^3} + \frac{bdnx^2}{4e^2} - \frac{bnx^3}{9e} + \frac{bd^2x\log(cx^n)}{e^3} - \frac{dx^2(a+b\log(cx^n))}{2e^2} + \frac{x^3(a+b\log(cx^n))}{3e} - \frac{d^3(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^4} - \frac{bd^3n\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}$$

output
```
a*d^2*x/e^3-b*d^2*n*x/e^3+1/4*b*d*n*x^2/e^2-1/9*b*n*x^3/e+b*d^2*x*ln(c*x^n
)/e^3-1/2*d*x^2*(a+b*ln(c*x^n))/e^2+1/3*x^3*(a+b*ln(c*x^n))/e-d^3*(a+b*ln(
c*x^n))*ln(1+e*x/d)/e^4-b*d^3*n*polylog(2,-e*x/d)/e^4
```

Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 142, normalized size of antiderivative = 0.96

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx = \frac{36ad^2ex - 36bd^2enx - 18ade^2x^2 + 9bde^2nx^2 + 12ae^3x^3 - 4be^3nx^3 - 36ad^3\log\left(1+\frac{ex}{d}\right) + 6b\log(cx^n)\left(\right.}{36e^4}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x),x]
```

output
```
(36*a*d^2*e*x - 36*b*d^2*e*n*x - 18*a*d*e^2*x^2 + 9*b*d*e^2*n*x^2 + 12*a*e
^3*x^3 - 4*b*e^3*n*x^3 - 36*a*d^3*Log[1 + (e*x)/d] + 6*b*Log[c*x^n]*(e*x*(
6*d^2 - 3*d*e*x + 2*e^2*x^2) - 6*d^3*Log[1 + (e*x)/d]) - 36*b*d^3*n*PolyLo
g[2, -((e*x)/d)])/(36*e^4)
```

Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 148, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex}dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(-\frac{d^3(a+b\log(cx^n))}{e^3(d+ex)}+\frac{d^2(a+b\log(cx^n))}{e^3}-\frac{dx(a+b\log(cx^n))}{e^2}+\frac{x^2(a+b\log(cx^n))}{e}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^4}-\frac{dx^2(a+b\log(cx^n))}{2e^2}+\frac{x^3(a+b\log(cx^n))}{3e}+\frac{ad^2x}{e^3}+\frac{bd^2x\log(cx^n)}{e^3}-\frac{bd^3n\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}-\frac{bd^2nx}{e^3}+\frac{bdnx^2}{4e^2}-\frac{bnx^3}{9e}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x),x]
```

output
```
(a*d^2*x)/e^3 - (b*d^2*n*x)/e^3 + (b*d*n*x^2)/(4*e^2) - (b*n*x^3)/(9*e) +
(b*d^2*x*Log[c*x^n])/e^3 - (d*x^2*(a + b*Log[c*x^n]))/(2*e^2) + (x^3*(a +
b*Log[c*x^n]))/(3*e) - (d^3*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/e^4 - (b*
d^3*n*PolyLog[2, -((e*x)/d)])/e^4
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.55 (sec) , antiderivative size = 272, normalized size of antiderivative = 1.84

method	result
risch	$\frac{b\ln(x^n)x^3}{3e} - \frac{b\ln(x^n)d\,x^2}{2e^2} + \frac{b\ln(x^n)x\,d^2}{e^3} - \frac{b\ln(x^n)d^3\ln(ex+d)}{e^4} - \frac{bn\,x^3}{9e} + \frac{bdn\,x^2}{4e^2} - \frac{b\,d^2nx}{e^3} - \frac{49bn\,d^3}{36e^4} + \frac{bn\,d^3\ln(ex+}{e}$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
1/3*b*ln(x^n)/e*x^3-1/2*b*ln(x^n)/e^2*d*x^2+b*ln(x^n)/e^3*x*d^2-b*ln(x^n)*
d^3/e^4*ln(e*x+d)-1/9*b*n*x^3/e+1/4*b*d*n*x^2/e^2-b*d^2*n*x/e^3-49/36*b*n*
d^3/e^4+b*n*d^3/e^4*ln(e*x+d)*ln(-e*x/d)+b*n*d^3/e^4*dilog(-e*x/d)+(1/2*I*
Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn
(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln
(c)+a)*(1/e^3*(1/3*e^2*x^3-1/2*e*x^2*d+d^2*x)-d^3/e^4*ln(e*x+d))
```

Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx=\int \frac{(b\log(cx^n)+a)x^3}{ex+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x^n) + a*x^3)/(e*x + d), x)
```

Sympy [A] (verification not implemented)

Time = 18.01 (sec) , antiderivative size = 267, normalized size of antiderivative = 1.80

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx = -\frac{ad^3\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{e^3}+\frac{ad^2x}{e^3}-\frac{adx^2}{2e^2}+\frac{ax^3}{3e}$$
$$+\frac{bd^3n\left(\begin{cases}\frac{x}{d}\\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\wedge |x|<\\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e}\end{cases}\right)}{e^3}$$
$$-\frac{bd^3\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^3}-\frac{bd^2nx}{e^3}$$
$$+\frac{bd^2x\log(cx^n)}{e^3}+\frac{bdnx^2}{4e^2}-\frac{bdx^2\log(cx^n)}{2e^2}-\frac{bnx^3}{9e}+\frac{bx^3\log(cx^n)}{3e}$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x+d),x)
```

output
```
-a*d**3*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**3 + a*d**2*x
/e**3 - a*d*x**2/(2*e**2) + a*x**3/(3*e) + b*d**3*n*Piecewise((x/d, Eq(e,
0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs
(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1)
, (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-
meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((),
 (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/
e**3 - b*d**3*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**
n)/e**3 - b*d**2*n*x/e**3 + b*d**2*x*log(c*x**n)/e**3 + b*d*n*x**2/(4*e**2
) - b*d*x**2*log(c*x**n)/(2*e**2) - b*n*x**3/(9*e) + b*x**3*log(c*x**n)/(3
*e)
```

Maxima [F]

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx=\int \frac{(b\log(cx^n)+a)x^3}{ex+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d),x, algorithm="maxima")
```

output
```
-1/6*a*(6*d^3*log(e*x + d)/e^4 - (2*e^2*x^3 - 3*d*e*x^2 + 6*d^2*x)/e^3) +
b*integrate((x^3*log(c) + x^3*log(x^n))/(e*x + d), x)
```

Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx=\int \frac{(b\log(cx^n)+a)x^3}{ex+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))}{d+e\,x}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x), x)
```

Reduce [F]

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx = \frac{36\left(\int \frac{\log(x^n c)}{e\,x^2+dx}dx\right)b\,d^4n - 36\log(ex+d)\,a\,d^3n - 18\log(x^n c)^2\,b\,d^3 + 36\log(x^n c)\,b\,d^2enx - 18\log(x^n c)\,bd\,e}{3}$$

input
```
int(x^3*(a+b*log(c*x^n))/(e*x+d),x)
```

output
```
(36*int(log(x**n*c)/(d*x + e*x**2),x)*b*d**4*n - 36*log(d + e*x)*a*d**3*n
- 18*log(x**n*c)**2*b*d**3 + 36*log(x**n*c)*b*d**2*e*n*x - 18*log(x**n*c)*
b*d*e**2*n*x**2 + 12*log(x**n*c)*b*e**3*n*x**3 + 36*a*d**2*e*n*x - 18*a*d*
e**2*n*x**2 + 12*a*e**3*n*x**3 - 36*b*d**2*e*n**2*x + 9*b*d*e**2*n**2*x**2
 - 4*b*e**3*n**2*x**3)/(36*e**4*n)
```

3.32 $\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx$

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Optimal result

Integrand size = 21, antiderivative size = 107

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx = -\frac{adx}{e^2}+\frac{bdnx}{e^2}-\frac{bnx^2}{4e}-\frac{bdx\log(cx^n)}{e^2}+\frac{x^2(a+b\log(cx^n))}{2e}+\frac{d^2(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^3}+\frac{bd^2n\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}$$

output
```
-a*d*x/e^2+b*d*n*x/e^2-1/4*b*n*x^2/e-b*d*x*ln(c*x^n)/e^2+1/2*x^2*(a+b*ln(c
*x^n))/e+d^2*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^3+b*d^2*n*polylog(2,-e*x/d)/e^3
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 105, normalized size of antiderivative = 0.98

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx = \frac{-4adex+4bdenx+2ae^2x^2-be^2nx^2+4ad^2\log\left(1+\frac{ex}{d}\right)+2b\log(cx^n)\left(ex(-2d+ex)+2d^2\log\left(1+\right.\right.}{4e^3}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x),x]
```

output
```
(-4*a*d*e*x + 4*b*d*e*n*x + 2*a*e^2*x^2 - b*e^2*n*x^2 + 4*a*d^2*Log[1 + (e
*x)/d] + 2*b*Log[c*x^n]*(e*x*(-2*d + e*x) + 2*d^2*Log[1 + (e*x)/d]) + 4*b*
d^2*n*PolyLog[2, -((e*x)/d)])/(4*e^3)
```

Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 107, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{d^2(a+b\log(cx^n))}{e^2(d+ex)}-\frac{d(a+b\log(cx^n))}{e^2}+\frac{x(a+b\log(cx^n))}{e}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^2\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^3}+\frac{x^2(a+b\log(cx^n))}{2e}-\frac{adx}{e^2}-\frac{bdx\log(cx^n)}{e^2}+\frac{bd^2n\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}+\frac{bdnx}{e^2}-\frac{bnx^2}{4e}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x),x]
```

output
```
-((a*d*x)/e^2) + (b*d*n*x)/e^2 - (b*n*x^2)/(4*e) - (b*d*x*Log[c*x^n])/e^2
+ (x^2*(a + b*Log[c*x^n]))/(2*e) + (d^2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d
])/e^3 + (b*d^2*n*PolyLog[2, -((e*x)/d)])/e^3
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.46 (sec) , antiderivative size = 233, normalized size of antiderivative = 2.18

method	result
risch	$\frac{b\ln(x^n)x^2}{2e}-\frac{b\ln(x^n)dx}{e^2}+\frac{b\ln(x^n)d^2\ln(ex+d)}{e^3}-\frac{bn\,d^2\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e^3}-\frac{bn\,d^2\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{e^3}-\frac{bn\,x^2}{4e}+\frac{bdnx}{e^2}+\frac{5bn\,d}{4e^3}$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/e*x^2-b*ln(x^n)/e^2*d*x+b*ln(x^n)*d^2/e^3*ln(e*x+d)-b*n*d^2/
e^3*ln(e*x+d)*ln(-e*x/d)-b*n*d^2/e^3*dilog(-e*x/d)-1/4*b*n*x^2/e+b*d*n*x/e
^2+5/4*b*n*d^2/e^3+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn
(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn
(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(1/e^2*(1/2*e*x^2-d*x)+d^2/e^3*ln(e*x+d))
```

Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx=\int \frac{(b\log(cx^n)+a)x^2}{ex+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x^n) + a*x^2)/(e*x + d), x)
```

Sympy [A] (verification not implemented)

Time = 14.95 (sec) , antiderivative size = 218, normalized size of antiderivative = 2.04

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx = \frac{ad^2\left(\begin{cases} \frac{x}{d} & \text{for}\ e=0 \\ \frac{\log(d+ex)}{e} & \text{otherwise} \end{cases}\right)}{e^2} - \frac{adx}{e^2} + \frac{ax^2}{2e}$$

$$- \frac{bd^2n\left(\begin{cases} \frac{x}{d} \\ \frac{\begin{cases} -\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ \frac{1}{|x|}<1 \wedge |x|< \\ \log(d)\log(x) - \operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ |x|<1 \\ -\log(d)\log\left(\frac{1}{x}\right) - \operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(d) + G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)\log(d) - \operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise} \end{cases}}{e} \end{cases}\right.}{e^2}$$

$$+ \frac{bd^2\left(\begin{cases} \frac{x}{d} & \text{for}\ e=0 \\ \frac{\log(d+ex)}{e} & \text{otherwise} \end{cases}\right)\log(cx^n)}{e^2}$$

$$+ \frac{bdnx}{e^2} - \frac{bdx\log(cx^n)}{e^2} - \frac{bnx^2}{4e} + \frac{bx^2\log(cx^n)}{2e}$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x+d),x)
```

output
```
a*d**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**2 - a*d*x/e**
2 + a*x**2/(2*e) - b*d**2*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylo
g(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x
) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - po
lylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((
0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - po
lylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/e**2 + b*d**2*Piecewise(
(x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/e**2 + b*d*n*x/e**2 -
 b*d*x*log(c*x**n)/e**2 - b*n*x**2/(4*e) + b*x**2*log(c*x**n)/(2*e)
```

Maxima [F]

$$\int \frac{x^2(a + b\log(cx^n))}{d + ex}\,dx = \int \frac{(b\log(cx^n) + a)x^2}{ex + d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d),x, algorithm="maxima")
```

output
```
1/2*a*(2*d^2*log(e*x + d)/e^3 + (e*x^2 - 2*d*x)/e^2) + b*integrate((x^2*lo
g(c) + x^2*log(x^n))/(e*x + d), x)
```

Giac [F]

$$\int \frac{x^2(a + b\log(cx^n))}{d + ex}\,dx = \int \frac{(b\log(cx^n) + a)x^2}{ex + d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{d+e\,x}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x), x)
```

Reduce [F]

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx = \frac{-4\left(\int \frac{\log(x^n c)}{e\,x^2+dx}dx\right) b\,d^3n + 4\log(ex+d)\,a\,d^2n + 2\log(x^n c)^2\,b\,d^2 - 4\log(x^n c)\,bdenx + 2\log(x^n c)\,b\,e^2n\,x^2 -}{4e^3n}$$

input
```
int(x^2*(a+b*log(c*x^n))/(e*x+d),x)
```

output
```
( - 4*int(log(x**n*c)/(d*x + e*x**2),x)*b*d**3*n + 4*log(d + e*x)*a*d**2*n
 + 2*log(x**n*c)**2*b*d**2 - 4*log(x**n*c)*b*d*e*n*x + 2*log(x**n*c)*b*e**
2*n*x**2 - 4*a*d*e*n*x + 2*a*e**2*n*x**2 + 4*b*d*e*n**2*x - b*e**2*n**2*x*
*2)/(4*e**3*n)
```

3.33 $\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx$

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Reduce [F] 395

Optimal result

Integrand size = 19, antiderivative size = 69

$$\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx = \frac{ax}{e}-\frac{bnx}{e}+\frac{bx\log(cx^n)}{e} - \frac{d(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^2}-\frac{bdn\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}$$

output
```
a*x/e-b*n*x/e+b*x*ln(c*x^n)/e-d*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^2-b*d*n*poly
log(2,-e*x/d)/e^2
```

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 66, normalized size of antiderivative = 0.96

$$\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx = \frac{aex-benx-ad\log\left(1+\frac{ex}{d}\right)+b\log(cx^n)\left(ex-d\log\left(1+\frac{ex}{d}\right)\right)-bdn\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x),x]
```

output
```
(a*e*x - b*e*n*x - a*d*Log[1 + (e*x)/d] + b*Log[c*x^n]*(e*x - d*Log[1 + (e
*x)/d]) - b*d*n*PolyLog[2, -((e*x)/d)])/e^2
```

Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.105$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{d+ex}dx$$
$$\Big\downarrow \text{2793}$$
$$\int \left(\frac{a+b\log(cx^n)}{e}-\frac{d(a+b\log(cx^n))}{e(d+ex)}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-\frac{d\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^2}+\frac{ax}{e}+\frac{bx\log(cx^n)}{e}-\frac{bdn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}-\frac{bnx}{e}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x),x]
```

output
```
(a*x)/e - (b*n*x)/e + (b*x*Log[c*x^n])/e - (d*(a + b*Log[c*x^n])*Log[1 + (
e*x)/d])/e^2 - (b*d*n*PolyLog[2, -((e*x)/d)])/e^2
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.42 (sec) , antiderivative size = 188, normalized size of antiderivative = 2.72

method	result
risch	$\frac{b\ln(x^n)x}{e} - \frac{b\ln(x^n)d\ln(ex+d)}{e^2} - \frac{bnx}{e} - \frac{bnd}{e^2} + \frac{bnd\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e^2} + \frac{bnd\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{e^2} + \left(\frac{ib\pi\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2}{2}\right.$

input
```
int(x*(a+b*ln(c*x^n))/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)/e*x-b*ln(x^n)*d/e^2*ln(e*x+d)-b*n*x/e-b*n*d/e^2+b*n*d/e^2*ln(e*x
+d)*ln(-e*x/d)+b*n*d/e^2*dilog(-e*x/d)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^
n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^
n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(x/e-d/e^2*ln(e*x+d))
```

Fricas [F]

$$\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)x}{ex+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b*x*log(c*x^n) + a*x)/(e*x + d), x)
```

Sympy [A] (verification not implemented)

Time = 9.78 (sec) , antiderivative size = 163, normalized size of antiderivative = 2.36

$$\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx = -\frac{ad\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{e} + \frac{ax}{e} + \frac{bdn\left(\begin{cases}\frac{x}{d} & \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|< \\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e} & \end{cases}\right)}{e} - \frac{bd\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e} - \frac{bnx}{e} + \frac{bx\log(cx^n)}{e}$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x+d),x)
```

output
```
-a*d*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e + a*x/e + b*d*n*
Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d),
 (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar
(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)
/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meij
erg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)
/d), True))/e, True))/e - b*d*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e,
True))*log(c*x**n)/e - b*n*x/e + b*x*log(c*x**n)/e
```

Maxima [F]

$$\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)x}{ex+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d),x, algorithm="maxima")
```

output
```
a*(x/e - d*log(e*x + d)/e^2) + b*integrate((x*log(c) + x*log(x^n))/(e*x +
d), x)
```

Giac [F]

$$\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)x}{ex+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{d+e\,x}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x),x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x), x)
```

Reduce [F]

$$\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx$$
$$=\frac{2\left(\int \frac{\log(x^n c)}{e\,x^2+dx}dx\right) b\,d^2n - 2\log(ex+d)\,adn - \log(x^n c)^2\,bd + 2\log(x^n c)\,benx + 2aenx - 2be\,n^2x}{2e^2n}$$

input
```
int(x*(a+b*log(c*x^n))/(e*x+d),x)
```

output
```
(2*int(log(x**n*c)/(d*x + e*x**2),x)*b*d**2*n - 2*log(d + e*x)*a*d*n - log
(x**n*c)**2*b*d + 2*log(x**n*c)*b*e*n*x + 2*a*e*n*x - 2*b*e*n**2*x)/(2*e**
2*n)
```

3.34 $\int \frac{a+b\log(cx^n)}{d+ex}\,dx$

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Maple [C] (warning: unable to verify) 398
Fricas [F] 398
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Reduce [F] 400

Optimal result

Integrand size = 18, antiderivative size = 39

$$\int \frac{a+b\log(cx^n)}{d+ex}\,dx = \frac{(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e} + \frac{bn\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}$$

output
```
(a+b*ln(c*x^n))*ln(1+e*x/d)/e+b*n*polylog(2,-e*x/d)/e
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 37, normalized size of antiderivative = 0.95

$$\int \frac{a+b\log(cx^n)}{d+ex}\,dx = \frac{(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)+bn\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x),x]
```

output
```
((a + b*Log[c*x^n])*Log[1 + (e*x)/d] + b*n*PolyLog[2, -((e*x)/d)])/e
```

Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{d+ex}\,dx$$

$$\Big\downarrow \text{2754}$$

$$\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-\frac{bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}+\frac{bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x),x]
```

output
```
((a + b*Log[c*x^n])*Log[1 + (e*x)/d])/e + (b*n*PolyLog[2, -((e*x)/d)])/e
```

Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.39 (sec) , antiderivative size = 151, normalized size of antiderivative = 3.87

method	result
risch	$\frac{b\ln(x^n)\ln(ex+d)}{e} - \frac{bn\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e} - \frac{bn\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{e} + \frac{\left(\frac{ib\pi\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2}{2} - \frac{ib\pi\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)\,\mathrm{csgn}(ic)}{2} - \cdots\right.}{e}$

input
```
int((a+b*ln(c*x^n))/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)*ln(e*x+d)/e-b/e*n*ln(e*x+d)*ln(-e*x/d)-b/e*n*dilog(-e*x/d)+(1/2*
I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*cs
gn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*
ln(c)+a)*ln(e*x+d)/e
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{d+ex}\,dx = \int \frac{b\log(cx^n)+a}{ex+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x + d), x)
```

Sympy [F]

$$\int \frac{a+b\log(cx^n)}{d+ex}\,dx = \int \frac{a+b\log(cx^n)}{d+ex}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(e*x+d),x)
```

output
```
Integral((a + b*log(c*x**n))/(d + e*x), x)
```

Maxima [F]

$$\int \frac{a+b\log (cx^n)}{d+ex}\,dx=\int \frac{b\log (cx^n)+a}{ex+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d),x, algorithm="maxima")
```

output
```
b*integrate((log(c) + log(x^n))/(e*x + d), x) + a*log(e*x + d)/e
```

Giac [F]

$$\int \frac{a+b\log (cx^n)}{d+ex}\,dx=\int \frac{b\log (cx^n)+a}{ex+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log (cx^n)}{d+ex}\,dx=\int \frac{a+b\,\ln \left(c\,x^n\right)}{d+e\,x}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x),x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x), x)
```

Reduce [F]

$$\int \frac{a+b\log\left(cx^n\right)}{d+ex}\,dx = \frac{-2\left(\int \frac{\log(x^n c)}{e\,x^2+dx}dx\right)bdn + 2\log(ex+d)\,an + \log(x^n c)^2\,b}{2en}$$

input
```
int((a+b*log(c*x^n))/(e*x+d),x)
```

output
```
( - 2*int(log(x**n*c)/(d*x + e*x**2),x)*b*d*n + 2*log(d + e*x)*a*n + log(x
**n*c)**2*b)/(2*e*n)
```

3.35 $\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx$

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Maxima [F] 405
Giac [F] 405
Mupad [F(-1)] 405
Reduce [F] 406

Optimal result

Integrand size = 21, antiderivative size = 44

$$\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx = -\frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d}+\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}$$

output
```
-ln(1+d/e/x)*(a+b*ln(c*x^n))/d+b*n*polylog(2,-d/e/x)/d
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.43

$$\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx = \frac{(a+b\log(cx^n))\left(a+b\log(cx^n)-2bn\log\left(1+\frac{ex}{d}\right)\right)}{2bdn} - \frac{bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{d}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x)),x]
```

output
```
((a + b*Log[c*x^n])*(a + b*Log[c*x^n] - 2*b*n*Log[1 + (e*x)/d]))/(2*b*d*n)
 - (b*n*PolyLog[2, -((e*x)/d)])/d
```

Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx$$

$$\Big\downarrow \; 2779$$

$$\frac{bn\int \frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}$$

$$\Big\downarrow \; 2838$$

$$\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x)),x]
```

output
```
-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x))])/
d
```

Defintions of rubi rules used

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.41 (sec) , antiderivative size = 181, normalized size of antiderivative = 4.11

method	result
risch	$-\frac{b\ln(x^n)\ln(ex+d)}{d}+\frac{b\ln(x^n)\ln(x)}{d}-\frac{bn\ln(x)^2}{2d}+\frac{bn\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{d}+\frac{bn\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{d}+\left(\frac{ib\pi\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2}{2}\right.$

input
```
int((a+b*ln(c*x^n))/x/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)/d*ln(e*x+d)+b*ln(x^n)/d*ln(x)-1/2*b*n/d*ln(x)^2+b*n/d*ln(e*x+d)
*ln(-e*x/d)+b*n/d*dilog(-e*x/d)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/
2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/
2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(-1/d*ln(e*x+d)+1/d*ln(x))
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^2 + d*x), x)
```

Sympy [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 6.33 (sec) , antiderivative size = 175, normalized size of antiderivative = 3.98

$$\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx$$
$$= -\frac{2ae\left(\begin{cases}\frac{1}{2e}+\frac{x}{d} & \text{for } e=0\\ -\frac{\log(-2ex)}{2e} & \text{otherwise}\end{cases}\right)}{d} - \frac{2ae\left(\begin{cases}\frac{1}{2e}+\frac{x}{d} & \text{for } e=0\\ \frac{\log(2d+2ex)}{2e} & \text{otherwise}\end{cases}\right)}{d}$$
$$+ bn\left(\begin{cases}-\frac{1}{ex} \\ \frac{\begin{cases}\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(e)\log(x)+\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)+\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)+\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)$$
$$- b\left(\begin{cases}\frac{1}{ex} & \text{for } d=0\\ \frac{\log\left(\frac{d}{x}+e\right)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x+d),x)
```

output
```
-2*a*e*Piecewise((1/(2*e) + x/d, Eq(e, 0)), (-log(-2*e*x)/(2*e), True))/d
- 2*a*e*Piecewise((1/(2*e) + x/d, Eq(e, 0)), (log(2*d + 2*e*x)/(2*e), True
))/d + b*n*Piecewise((-1/(e*x), Eq(d, 0)), (Piecewise((polylog(2, d*exp_po
lar(I*pi)/(e*x)), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) + polylog
(2, d*exp_polar(I*pi)/(e*x)), Abs(x) < 1), (-log(e)*log(1/x) + polylog(2,
d*exp_polar(I*pi)/(e*x)), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0),
()), x)*log(e) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(e) + polylog(2
, d*exp_polar(I*pi)/(e*x)), True))/d, True)) - b*Piecewise((1/(e*x), Eq(d,
 0)), (log(d/x + e)/d, True))*log(c*x**n)
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d),x, algorithm="maxima")
```

output
```
-a*(log(e*x + d)/d - log(x)/d) + b*integrate((log(c) + log(x^n))/(e*x^2 +
d*x), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx = \int \frac{a+b\ln(c\,x^n)}{x\,(d+e\,x)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x)), x)
```

Reduce [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x(d+ex)}\,dx = \frac{\left(\int \frac{\log(x^n c)}{e\,x^2+dx}dx\right)bd-\log(ex+d)\,a+\log(x)\,a}{d}$$

input
```
int((a+b*log(c*x^n))/x/(e*x+d),x)
```

output
```
(int(log(x**n*c)/(d*x + e*x**2),x)*b*d - log(d + e*x)*a + log(x)*a)/d
```

3.36 $\int \frac{a+b\log(cx^n)}{x^2(d+ex)}\,dx$

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Giac [F] . . . 412
Mupad [F(-1)] . . . 412
Reduce [F] . . . 413

Optimal result

Integrand size = 21, antiderivative size = 74

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)}\,dx = -\frac{bn}{dx}-\frac{a+b\log(cx^n)}{dx}+\frac{e\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^2}-\frac{ben\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^2}$$

output
```
-b*n/d/x-(a+b*ln(c*x^n))/d/x+e*ln(1+d/e/x)*(a+b*ln(c*x^n))/d^2-b*e*n*polyl
og(2,-d/e/x)/d^2
```

Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 88, normalized size of antiderivative = 1.19

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)}\,dx = -\frac{\frac{2bdn}{x}+\frac{2d(a+b\log(cx^n))}{x}+\frac{e(a+b\log(cx^n))^2}{bn}-2e(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)-2ben\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{2d^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x)),x]
```

output
```
-1/2*((2*b*d*n)/x + (2*d*(a + b*Log[c*x^n]))/x + (e*(a + b*Log[c*x^n])^2)/
(b*n) - 2*e*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 2*b*e*n*PolyLog[2, -((e*
x)/d)])/d^2
```

Rubi [A] (verified)

Time = 0.46 (sec) , antiderivative size = 78, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)}dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x^2}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{bn\int \frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}\right)}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x)),x]
```

output
```
(-((b*n)/x) - (a + b*Log[c*x^n])/x)/d - (e*(-((Log[1 + d/(e*x)]*(a + b*Log
[c*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x))])/d))/d
```

Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.47 (sec) , antiderivative size = 221, normalized size of antiderivative = 2.99

method	result
risch	$\frac{b\ln(x^n)e\ln(ex+d)}{d^2}-\frac{b\ln(x^n)}{dx}-\frac{b\ln(x^n)e\ln(x)}{d^2}-\frac{bne\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{d^2}-\frac{bne\operatorname{dilog}\left(-\frac{ex}{d}\right)}{d^2}-\frac{bn}{dx}+\frac{bne\ln(x)^2}{2d^2}+\Big(\frac{ib\pi}{}$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)*e/d^2*ln(e*x+d)-b*ln(x^n)/d/x-b*ln(x^n)*e/d^2*ln(x)-b*n*e/d^2*ln
(e*x+d)*ln(-e*x/d)-b*n*e/d^2*dilog(-e*x/d)-b*n/d/x+1/2*b*n*e/d^2*ln(x)^2+(
1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n
)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c
)+b*ln(c)+a)*(e/d^2*ln(e*x+d)-1/d/x-e/d^2*ln(x))
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^3 + d*x^2), x)
```

Sympy [A] (verification not implemented)

Time = 40.15 (sec) , antiderivative size = 216, normalized size of antiderivative = 2.92

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)}\,dx$$

$$= -\frac{a}{dx} + \frac{ae^2\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{d^2} - \frac{ae\log(x)}{d^2} - \frac{bn}{dx} - \frac{b\log(cx^n)}{dx}$$

$$- \frac{be^2n\left(\begin{cases}\frac{x}{d} & \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|< \\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e} & \end{cases}\right.}{d^2}$$

$$+ \frac{be^2\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^2} + \frac{ben\log(x)^2}{2d^2} - \frac{be\log(x)\log(cx^n)}{d^2}$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x+d),x)
```

output
```
-a/(d*x) + a*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/d**2
- a*e*log(x)/d**2 - b*n/(d*x) - b*log(c*x**n)/(d*x) - b*e**2*n*Piecewise((
x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) <
1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d),
Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(
x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1)
, ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), True))
/e, True))/d**2 + b*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True)
)*log(c*x**n)/d**2 + b*e*n*log(x)**2/(2*d**2) - b*e*log(x)*log(c*x**n)/d**
2
```

Maxima [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^2(d+ex)}\,dx=\int \frac{b\log\left(cx^n\right)+a}{(ex+d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d),x, algorithm="maxima")
```

output
```
a*(e*log(e*x + d)/d^2 - e*log(x)/d^2 - 1/(d*x)) + b*integrate((log(c) + lo
g(x^n))/(e*x^3 + d*x^2), x)
```

Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^2(d+ex)}\,dx=\int \frac{b\log\left(cx^n\right)+a}{(ex+d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^2(d+ex)}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^2\,\left(d+e\,x\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)), x)
```

Reduce [F]

$$\int \frac{a + b\log(cx^n)}{x^2(d + ex)}\,dx = \frac{\left(\int \frac{\log(x^n c)}{e\,x^3+d\,x^2}dx\right) b\,d^2x + \log(ex + d)\,aex - \log(x)\,aex - ad}{d^2x}$$

input
```
int((a+b*log(c*x^n))/x^2/(e*x+d),x)
```

output
```
(int(log(x**n*c)/(d*x**2 + e*x**3),x)*b*d**2*x + log(d + e*x)*a*e*x - log(
x)*a*e*x - a*d)/(d**2*x)
```

3.37 $\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx$

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Rubi [A] (verified) 415
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Fricas [F] 417
Sympy [A] (verification not implemented) 418
Maxima [F] 419
Giac [F] 419
Mupad [F(-1)] 419
Reduce [F] 420

Optimal result

Integrand size = 21, antiderivative size = 110

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx=-\frac{bn}{4dx^2}+\frac{ben}{d^2x}-\frac{a+b\log(cx^n)}{2dx^2}+\frac{e(a+b\log(cx^n))}{d^2x}-\frac{e^2\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^3}+\frac{be^2n\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^3}$$

output
```
-1/4*b*n/d/x^2+b*e*n/d^2/x-1/2*(a+b*ln(c*x^n))/d/x^2+e*(a+b*ln(c*x^n))/d^2
/x-e^2*ln(1+d/e/x)*(a+b*ln(c*x^n))/d^3+b*e^2*n*polylog(2,-d/e/x)/d^3
```

Mathematica [A] (verified)

Time = 0.21 (sec) , antiderivative size = 124, normalized size of antiderivative = 1.13

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx=-\frac{\frac{bd^2n}{x^2}-\frac{4bden}{x}+\frac{2d^2(a+b\log(cx^n))}{x^2}-\frac{4de(a+b\log(cx^n))}{x}-\frac{2e^2(a+b\log(cx^n))^2}{bn}+4e^2(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)+4}{4d^3}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x)),x]
```

output
```
-1/4*((b*d^2*n)/x^2 - (4*b*d*e*n)/x + (2*d^2*(a + b*Log[c*x^n]))/x^2 - (4*
d*e*(a + b*Log[c*x^n]))/x - (2*e^2*(a + b*Log[c*x^n])^2)/(b*n) + 4*e^2*(a
+ b*Log[c*x^n])*Log[1 + (e*x)/d] + 4*b*e^2*n*PolyLog[2, -((e*x)/d)])/d^3
```

Rubi [A] (verified)

Time = 0.61 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.05, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.286, Rules used = {2780, 2741, 2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)}dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x^3}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^2(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^2(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2780}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{\int \frac{a+b\log(cx^n)}{x^2}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{bn\int\frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}\right)}{d}\right)}{d}$$

$\downarrow$ 2838

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{bn\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}\right)}{d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x)),x]
```

output
```
(-1/4*(b*n)/x^2 - (a + b*Log[c*x^n])/(2*x^2))/d - (e*((-((b*n)/x) - (a + b
*Log[c*x^n])/x)/d - (e*(-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d) + (b*n*
PolyLog[2, -(d/(e*x))])/d))/d))/d
```

Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.53 (sec) , antiderivative size = 264, normalized size of antiderivative = 2.40

method	result
risch	$-\frac{b\ln(x^n)e^2\ln(ex+d)}{d^3}-\frac{b\ln(x^n)}{2d\,x^2}+\frac{b\ln(x^n)e^2\ln(x)}{d^3}+\frac{b\ln(x^n)e}{d^2x}+\frac{ben}{d^2x}-\frac{bn}{4d\,x^2}-\frac{bn\,e^2\ln(x)^2}{2d^3}+\frac{bn\,e^2\ln(ex+d)\ln(-\frac{e}{}}{d^3}$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)*e^2/d^3*ln(e*x+d)-1/2*b*ln(x^n)/d/x^2+b*ln(x^n)*e^2/d^3*ln(x)+b
*ln(x^n)*e/d^2/x+b*e*n/d^2/x-1/4*b*n/d/x^2-1/2*b*n*e^2/d^3*ln(x)^2+b*n*e^2
/d^3*ln(e*x+d)*ln(-e*x/d)+b*n*e^2/d^3*dilog(-e*x/d)+(1/2*I*Pi*b*csgn(I*x^n
)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*
b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(-e^2/d^
3*ln(e*x+d)-1/2/d/x^2+e^2/d^3*ln(x)+e/d^2/x)
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^4 + d*x^3), x)
```

Sympy [A] (verification not implemented)

Time = 41.95 (sec) , antiderivative size = 265, normalized size of antiderivative = 2.41

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx = -\frac{a}{2dx^2}+\frac{ae}{d^2x}-\frac{ae^3\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{d^3}$$
$$+\frac{ae^2\log(x)}{d^3}-\frac{bn}{4dx^2}-\frac{b\log(cx^n)}{2dx^2}+\frac{ben}{d^2x}+\frac{be\log(cx^n)}{d^2x}$$
$$+\frac{be^3n\left(\begin{cases}\frac{x}{d}\\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ \frac{1}{|x|}<1\wedge|x|<\\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e}\end{cases}\right.}{d^3}$$
$$-\frac{be^3\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^3}-\frac{be^2n\log(x)^2}{2d^3}+\frac{be^2\log(x)\log(cx^n)}{d^3}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x+d),x)
```

output
```
-a/(2*d*x**2) + a*e/(d**2*x) - a*e**3*Piecewise((x/d, Eq(e, 0)), (log(d +
e*x)/e, True))/d**3 + a*e**2*log(x)/d**3 - b*n/(4*d*x**2) - b*log(c*x**n)/
(2*d*x**2) + b*e*n/(d**2*x) + b*e*log(c*x**n)/(d**2*x) + b*e**3*n*Piecewis
e((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x)
 < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d
), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/A
bs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1,
 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), Tru
e))/e, True))/d**3 - b*e**3*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, Tr
ue))*log(c*x**n)/d**3 - b*e**2*n*log(x)**2/(2*d**3) + b*e**2*log(x)*log(c*
x**n)/d**3
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d),x, algorithm="maxima")
```

output
```
-1/2*a*(2*e^2*log(e*x + d)/d^3 - 2*e^2*log(x)/d^3 - (2*e*x - d)/(d^2*x^2))
 + b*integrate((log(c) + log(x^n))/(e*x^4 + d*x^3), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)*x^3), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{x^3\,(d+e\,x)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx = \frac{2\left(\int \frac{\log(x^n c)}{e\,x^4+d\,x^3}dx\right) b\,d^3x^2 - 2\log(ex+d)\,a\,e^2x^2 + 2\log(x)\,a\,e^2x^2 - a\,d^2 + 2adex}{2d^3x^2}$$

input

```
int((a+b*log(c*x^n))/x^3/(e*x+d),x)
```

output

```
(2*int(log(x**n*c)/(d*x**3 + e*x**4),x)*b*d**3*x**2 - 2*log(d + e*x)*a*e**
2*x**2 + 2*log(x)*a*e**2*x**2 - a*d**2 + 2*a*d*e*x)/(2*d**3*x**2)
```

3.38 $\int \frac{a+b\log(cx^n)}{x^4(d+ex)}\,dx$

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Optimal result

Integrand size = 21, antiderivative size = 150

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex)}\,dx = -\frac{bn}{9dx^3}+\frac{ben}{4d^2x^2}-\frac{be^2n}{d^3x}-\frac{a+b\log(cx^n)}{3dx^3} + \frac{e(a+b\log(cx^n))}{2d^2x^2}-\frac{e^2(a+b\log(cx^n))}{d^3x} + \frac{e^3\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^4}-\frac{be^3n\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}$$

output
```
-1/9*b*n/d/x^3+1/4*b*e*n/d^2/x^2-b*e^2*n/d^3/x-1/3*(a+b*ln(c*x^n))/d/x^3+1
/2*e*(a+b*ln(c*x^n))/d^2/x^2-e^2*(a+b*ln(c*x^n))/d^3/x+e^3*ln(1+d/e/x)*(a+
b*ln(c*x^n))/d^4-b*e^3*n*polylog(2,-d/e/x)/d^4
```

Mathematica [A] (verified)

Time = 0.21 (sec) , antiderivative size = 159, normalized size of antiderivative = 1.06

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex)}\,dx = \frac{-\frac{4bd^3n}{x^3}+\frac{9bd^2en}{x^2}-\frac{36bde^2n}{x}-\frac{12d^3(a+b\log(cx^n))}{x^3}+\frac{18d^2e(a+b\log(cx^n))}{x^2}-\frac{36de^2(a+b\log(cx^n))}{x}-\frac{18e^3(a+b\log(cx^n))^2}{bn}+36e}{36d^4}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^4*(d + e*x)),x]
```

output
```
((-4*b*d^3*n)/x^3 + (9*b*d^2*e*n)/x^2 - (36*b*d*e^2*n)/x - (12*d^3*(a + b*
Log[c*x^n]))/x^3 + (18*d^2*e*(a + b*Log[c*x^n]))/x^2 - (36*d*e^2*(a + b*Lo
g[c*x^n]))/x - (18*e^3*(a + b*Log[c*x^n])^2)/(b*n) + 36*e^3*(a + b*Log[c*x
^n])*Log[1 + (e*x)/d] + 36*b*e^3*n*PolyLog[2, -((e*x)/d)])/(36*d^4)
```

Rubi [A] (verified)

Time = 0.82 (sec) , antiderivative size = 154, normalized size of antiderivative = 1.03, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.381, Rules used = {2780, 2741, 2780, 2741, 2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex)}dx$$

$$\Big\downarrow \text{ 2780}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x^4}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^3(d+ex)}dx}{d}$$

$$\Big\downarrow \text{ 2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^3(d+ex)}dx}{d}$$

$$\Big\downarrow \text{ 2780}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{\int \frac{a+b\log(cx^n)}{x^3}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^2(d+ex)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{ 2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^2(d+ex)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{ 2780}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{\int\frac{a+b\log(cx^n)}{x^2}dx}{d}-\frac{e\int\frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}\right)}{d}\right)}{d}$$

$\Big\downarrow$ 2741

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\int\frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}\right)}{d}\right)}{d}$$

$\Big\downarrow$ 2779

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{bn\int\frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}\right)}{d}\right)}{d}\right)}{d}$$

$\Big\downarrow$ 2838

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}\right)}{d}\right)}{d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^4*(d + e*x)),x]
```

output
```
(-1/9*(b*n)/x^3 - (a + b*Log[c*x^n])/(3*x^3))/d - (e*((-1/4*(b*n)/x^2 - (a
 + b*Log[c*x^n])/(2*x^2))/d - (e*((-((b*n)/x) - (a + b*Log[c*x^n])/x)/d -
(e*(-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x)
)])/d))/d))/d))/d
```

Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.62 (sec) , antiderivative size = 309, normalized size of antiderivative = 2.06

method	result
risch	$\frac{b\ln(x^n)e^3\ln(ex+d)}{d^4}-\frac{b\ln(x^n)}{3d\,x^3}-\frac{b\ln(x^n)e^2}{d^3x}+\frac{b\ln(x^n)e}{2d^2x^2}-\frac{b\ln(x^n)e^3\ln(x)}{d^4}-\frac{b\,e^2n}{d^3x}+\frac{ben}{4d^2x^2}-\frac{bn}{9d\,x^3}+\frac{bn\,e^3\ln(x)^2}{2d^4}$

input
```
int((a+b*ln(c*x^n))/x^4/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)*e^3/d^4*ln(e*x+d)-1/3*b*ln(x^n)/d/x^3-b*ln(x^n)*e^2/d^3/x+1/2*b*
ln(x^n)*e/d^2/x^2-b*ln(x^n)*e^3/d^4*ln(x)-b*e^2*n/d^3/x+1/4*b*e*n/d^2/x^2-
1/9*b*n/d/x^3+1/2*b*n*e^3/d^4*ln(x)^2-b*n*e^3/d^4*ln(e*x+d)*ln(-e*x/d)-b*n
*e^3/d^4*dilog(-e*x/d)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*
csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*
csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(e^3/d^4*ln(e*x+d)-1/3/d/x^3-e^2/d^3/
x+1/2*e/d^2/x^2-e^3/d^4*ln(x))
```

Fricas [F]

$$\int \frac{a + b\log(cx^n)}{x^4(d + ex)}\,dx = \int \frac{b\log(cx^n) + a}{(ex + d)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^5 + d*x^4), x)
```

Sympy [A] (verification not implemented)

Time = 60.28 (sec) , antiderivative size = 314, normalized size of antiderivative = 2.09

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex)}\,dx = -\frac{a}{3dx^3}+\frac{ae}{2d^2x^2}-\frac{ae^2}{d^3x}+\frac{ae^4\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{d^4} - \frac{ae^3\log(x)}{d^4}-\frac{bn}{9dx^3}-\frac{b\log(cx^n)}{3dx^3}+\frac{ben}{4d^2x^2}+\frac{be\log(cx^n)}{2d^2x^2}-\frac{be^2n}{d^3x}-\frac{be^2\log(cx^n)}{d^3x} - \frac{be^4n\left(\begin{cases}\frac{x}{d} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|< \\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e}\end{cases}\right)}{d^4} + \frac{be^4\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^4}+\frac{be^3n\log(x)^2}{2d^4}-\frac{be^3\log(x)\log(cx^n)}{d^4}$$

input
```
integrate((a+b*ln(c*x**n))/x**4/(e*x+d),x)
```

output
```
-a/(3*d*x**3) + a*e/(2*d**2*x**2) - a*e**2/(d**3*x) + a*e**4*Piecewise((x/
d, Eq(e, 0)), (log(d + e*x)/e, True))/d**4 - a*e**3*log(x)/d**4 - b*n/(9*d
*x**3) - b*log(c*x**n)/(3*d*x**3) + b*e*n/(4*d**2*x**2) + b*e*log(c*x**n)/
(2*d**2*x**2) - b*e**2*n/(d**3*x) - b*e**2*log(c*x**n)/(d**3*x) - b*e**4*n
*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d)
, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_pola
r(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi
)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + mei
jerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi
)/d), True))/e, True))/d**4 + b*e**4*Piecewise((x/d, Eq(e, 0)), (log(d + e
*x)/e, True))*log(c*x**n)/d**4 + b*e**3*n*log(x)**2/(2*d**4) - b*e**3*log(
x)*log(c*x**n)/d**4
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex)}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x+d),x, algorithm="maxima")
```

output
```
1/6*a*(6*e^3*log(e*x + d)/d^4 - 6*e^3*log(x)/d^4 - (6*e^2*x^2 - 3*d*e*x +
2*d^2)/(d^3*x^3)) + b*integrate((log(c) + log(x^n))/(e*x^5 + d*x^4), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex)}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)*x^4), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^4(d+ex)}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^4\,\left(d+e\,x\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^4*(d + e*x)),x)
```

output
```
int((a + b*log(c*x^n))/(x^4*(d + e*x)), x)
```

Reduce [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^4(d+ex)}\,dx$$
$$=\frac{6\left(\int \frac{\log(x^n c)}{e\,x^5+d\,x^4}dx\right)b\,d^4x^3+6\log(ex+d)\,a\,e^3x^3-6\log(x)\,a\,e^3x^3-2a\,d^3+3a\,d^2ex-6ad\,e^2x^2}{6d^4x^3}$$

input
```
int((a+b*log(c*x^n))/x^4/(e*x+d),x)
```

output
```
(6*int(log(x**n*c)/(d*x**4 + e*x**5),x)*b*d**4*x**3 + 6*log(d + e*x)*a*e**
3*x**3 - 6*log(x)*a*e**3*x**3 - 2*a*d**3 + 3*a*d**2*e*x - 6*a*d*e**2*x**2)
/(6*d**4*x**3)
```

3.39 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx$

Optimal result 429
Mathematica [A] (verified) 430
Rubi [A] (verified) 430
Maple [C] (warning: unable to verify) 432
Fricas [F] 432
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Maxima [F] 434
Giac [F] 434
Mupad [F(-1)] 435
Reduce [F] 435

Optimal result

Integrand size = 21, antiderivative size = 152

$$\begin{aligned}\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx &= \frac{3bdnx}{e^3}-\frac{d(3a+bn)x}{e^3}-\frac{3bnx^2}{4e^2}-\frac{3bdx\log(cx^n)}{e^3}\\ &\quad-\frac{x^3(a+b\log(cx^n))}{e(d+ex)}+\frac{x^2(3a+bn+3b\log(cx^n))}{2e^2}\\ &\quad+\frac{d^2(3a+bn+3b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^4}\\ &\quad+\frac{3bd^2n\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}\end{aligned}$$

output
```
3*b*d*n*x/e^3-d*(b*n+3*a)*x/e^3-3/4*b*n*x^2/e^2-3*b*d*x*ln(c*x^n)/e^3-x^3*
(a+b*ln(c*x^n))/e/(e*x+d)+1/2*x^2*(3*a+b*n+3*b*ln(c*x^n))/e^2+d^2*(3*a+b*n
+3*b*ln(c*x^n))*ln(1+e*x/d)/e^4+3*b*d^2*n*polylog(2,-e*x/d)/e^4
```

Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 141, normalized size of antiderivative = 0.93

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx$$
$$= \frac{-8adex+8bdenx-be^2nx^2-8bdex\log(cx^n)+2e^2x^2(a+b\log(cx^n))+\frac{4d^3(a+b\log(cx^n))}{d+ex}-4bd^2n(\log(x)}{4e^4}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

output
```
(-8*a*d*e*x + 8*b*d*e*n*x - b*e^2*n*x^2 - 8*b*d*e*x*Log[c*x^n] + 2*e^2*x^2
*(a + b*Log[c*x^n]) + (4*d^3*(a + b*Log[c*x^n]))/(d + e*x) - 4*b*d^2*n*(Lo
g[x] - Log[d + e*x]) + 12*d^2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] + 12*b*d
^2*n*PolyLog[2, -((e*x)/d)])/(4*e^4)
```

Rubi [A] (verified)

Time = 0.46 (sec) , antiderivative size = 157, normalized size of antiderivative = 1.03, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2784, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx$$
$$\Big\downarrow \text{2784}$$
$$\frac{\int \frac{x^2(3a+bn+3b\log(cx^n))}{d+ex}dx}{e}-\frac{x^3(a+b\log(cx^n))}{e(d+ex)}$$
$$\Big\downarrow \text{2793}$$
$$\frac{\int \left(\frac{(3a+bn+3b\log(cx^n))d^2}{e^2(d+ex)}-\frac{(3a+bn+3b\log(cx^n))d}{e^2}+\frac{x(3a+bn+3b\log(cx^n))}{e}\right)dx}{e}-\frac{x^3(a+b\log(cx^n))}{e(d+ex)}$$
$$\Big\downarrow \text{2009}$$

$$\frac{\frac{d^2\log\left(\frac{ex}{d}+1\right)(3a+3b\log(cx^n)+bn)}{e^3}+\frac{x^2(3a+3b\log(cx^n)+bn)}{2e}-\frac{dx(3a+bn)}{e^2}-\frac{3bdx\log(cx^n)}{e^2}+\frac{3bd^2n\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}+\frac{3bdnx}{e^2}-\frac{3bn}{4e}}{e}$$

$$\frac{x^3(a+b\log(cx^n))}{e(d+ex)}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

output
```
-((x^3*(a + b*Log[c*x^n]))/(e*(d + e*x))) + ((3*b*d*n*x)/e^2 - (d*(3*a + b
*n)*x)/e^2 - (3*b*n*x^2)/(4*e) - (3*b*d*x*Log[c*x^n])/e^2 + (x^2*(3*a + b*
n + 3*b*Log[c*x^n]))/(2*e) + (d^2*(3*a + b*n + 3*b*Log[c*x^n])*Log[1 + (e*
x)/d])/e^3 + (3*b*d^2*n*PolyLog[2, -((e*x)/d)])/e^3)/e
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.50 (sec) , antiderivative size = 298, normalized size of antiderivative = 1.96

method	result
risch	$\frac{b\ln(x^n)x^2}{2e^2} - \frac{2b\ln(x^n)dx}{e^3} + \frac{b\ln(x^n)d^3}{e^4(ex+d)} + \frac{3b\ln(x^n)d^2\ln(ex+d)}{e^4} - \frac{3bn\,d^2\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e^4} - \frac{3bn\,d^2\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{e^4} - \frac{bn\,x}{4e^2}$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/e^2*x^2-2*b*ln(x^n)/e^3*d*x+b*ln(x^n)*d^3/e^4/(e*x+d)+3*b*ln
(x^n)/e^4*d^2*ln(e*x+d)-3*b*n/e^4*d^2*ln(e*x+d)*ln(-e*x/d)-3*b*n/e^4*d^2*d
ilog(-e*x/d)-1/4*b*n*x^2/e^2+2*b*d*n*x/e^3+9/4*b*n/e^4*d^2+b*n/e^4*d^2*ln(
e*x+d)-b*n/e^4*d^2*ln(e*x)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*P
i*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*P
i*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(1/e^3*(1/2*e*x^2-2*d*x)+d^3/e^4/
(e*x+d)+3/e^4*d^2*ln(e*x+d))
```

Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x^n) + a*x^3)/(e^2*x^2 + 2*d*e*x + d^2), x)
```

Sympy [A] (verification not implemented)

Time = 28.06 (sec) , antiderivative size = 323, normalized size of antiderivative = 2.12

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx$$

$$= -\frac{ad^3\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)}{e^3} + \frac{3ad^2\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{e^3} - \frac{2adx}{e^3} + \frac{ax^2}{2e^2}$$

$$+ \frac{bd^3n\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{\log(x)}{de} + \frac{\log\left(\frac{d}{e}+x\right)}{de} & \text{otherwise}\end{cases}\right)}{e^3} - \frac{bd^3\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^3}$$

$$- \frac{3bd^2n\left(\begin{cases}\frac{x}{d} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x| \\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1 \\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e}\end{cases}\right.}{e^3}$$

$$+ \frac{3bd^2\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^3}$$

$$+ \frac{2bdnx}{e^3} - \frac{2bdx\log(cx^n)}{e^3} - \frac{bnx^2}{4e^2} + \frac{bx^2\log(cx^n)}{2e^2}$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x+d)**2,x)
```

output
```
-a*d**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**3 + 3*
a*d**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**3 - 2*a*d*x/e
**3 + a*x**2/(2*e**2) + b*d**3*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d
*e) + log(d/e + x)/(d*e), True))/e**3 - b*d**3*Piecewise((x/d**2, Eq(e, 0)
), (-1/(d*e + e**2*x), True))*log(c*x**n)/e**3 - 3*b*d**2*n*Piecewise((x/d
, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1)
& (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs
(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x)
< 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), (
)), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), True))/e,
 True))/e**3 + 3*b*d**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))
*log(c*x**n)/e**3 + 2*b*d*n*x/e**3 - 2*b*d*x*log(c*x**n)/e**3 - b*n*x**2/(
4*e**2) + b*x**2*log(c*x**n)/(2*e**2)
```

Maxima [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="maxima")
```

output
```
1/2*(2*d^3/(e^5*x + d*e^4) + 6*d^2*log(e*x + d)/e^4 + (e*x^2 - 4*d*x)/e^3)
*a + b*integrate((x^3*log(c) + x^3*log(x^n))/(e^2*x^2 + 2*d*e*x + d^2), x)
```

Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x + d)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^2}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^2,x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^2, x)
```

Reduce [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx$$
$$= \frac{-12\left(\int \frac{\log(x^nc)}{e^2x^3+2de\,x^2+d^2x}dx\right)b\,d^5n - 12\left(\int \frac{\log(x^nc)}{e^2x^3+2de\,x^2+d^2x}dx\right)b\,d^4enx + 12\log(ex+d)\,a\,d^3n + 12\log(ex+d}{}$$

input
```
int(x^3*(a+b*log(c*x^n))/(e*x+d)^2,x)
```

output
```
( - 12*int(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b*d**5*n - 12*
int(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b*d**4*e*n*x + 12*log
(d + e*x)*a*d**3*n + 12*log(d + e*x)*a*d**2*e*n*x + 16*log(d + e*x)*b*d**3
*n**2 + 16*log(d + e*x)*b*d**2*e*n**2*x + 6*log(x**n*c)**2*b*d**3 + 6*log(
x**n*c)**2*b*d**2*e*x - 24*log(x**n*c)*b*d**2*e*n*x - 6*log(x**n*c)*b*d*e*
*2*n*x**2 + 2*log(x**n*c)*b*e**3*n*x**3 - 12*a*d**2*e*n*x - 6*a*d*e**2*n*x
**2 + 2*a*e**3*n*x**3 + 8*b*d**2*e*n**2*x + 7*b*d*e**2*n**2*x**2 - b*e**3*
n**2*x**3)/(4*e**4*n*(d + e*x))
```

3.40 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2}\,dx$

Optimal result 436
Mathematica [A] (verified) 436
Rubi [A] (verified) 437
Maple [C] (warning: unable to verify) 438
Fricas [F] 439
Sympy [A] (verification not implemented) 439
Maxima [F] 440
Giac [F] 440
Mupad [F(-1)] 441
Reduce [F] 441

Optimal result

Integrand size = 21, antiderivative size = 98

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2}\,dx = -\frac{bnx}{e^2}+\frac{2x(a+b\log(cx^n))}{e^2}-\frac{x^2(a+b\log(cx^n))}{e(d+ex)} - \frac{d(2a+bn+2b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^3} - \frac{2bdn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}$$

output
```
-b*n*x/e^2+2*x*(a+b*ln(c*x^n))/e^2-x^2*(a+b*ln(c*x^n))/e/(e*x+d)-d*(2*a+b*
n+2*b*ln(c*x^n))*ln(1+e*x/d)/e^3-2*b*d*n*polylog(2,-e*x/d)/e^3
```

Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 98, normalized size of antiderivative = 1.00

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2}\,dx = \frac{aex-benx+bex\log(cx^n)-\frac{d^2(a+b\log(cx^n))}{d+ex}+bdn(\log(x)-\log(d+ex))-2d(a+b\log(cx^n))\log\left(1+\frac{e}{\ }\right.}{e^3}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

output
```
(a*e*x - b*e*n*x + b*e*x*Log[c*x^n] - (d^2*(a + b*Log[c*x^n]))/(d + e*x) +
 b*d*n*(Log[x] - Log[d + e*x]) - 2*d*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] -
 2*b*d*n*PolyLog[2, -((e*x)/d)])/e^3
```

Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.14, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2784, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2}dx$$

$$\Big\downarrow \text{2784}$$

$$\frac{\int \frac{x(2a+bn+2b\log(cx^n))}{d+ex}dx}{e}-\frac{x^2(a+b\log(cx^n))}{e(d+ex)}$$

$$\Big\downarrow \text{2793}$$

$$\frac{\int \left(\frac{2a+bn+2b\log(cx^n)}{e}-\frac{d(2a+bn+2b\log(cx^n))}{e(d+ex)}\right)dx}{e}-\frac{x^2(a+b\log(cx^n))}{e(d+ex)}$$

$$\Big\downarrow \text{2009}$$

$$\frac{-\frac{d\log\left(\frac{ex}{d}+1\right)(2a+2b\log(cx^n)+bn)}{e^2}+\frac{x(2a+bn)}{e}+\frac{2bx\log(cx^n)}{e}-\frac{2bdn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}-\frac{2bnx}{e}}{e}-\frac{x^2(a+b\log(cx^n))}{e(d+ex)}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

output
```
-((x^2*(a + b*Log[c*x^n]))/(e*(d + e*x))) + ((-2*b*n*x)/e + ((2*a + b*n)*x
)/e + (2*b*x*Log[c*x^n])/e - (d*(2*a + b*n + 2*b*Log[c*x^n])*Log[1 + (e*x)
/d])/e^2 - (2*b*d*n*PolyLog[2, -((e*x)/d)])/e^2)/e
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.47 (sec) , antiderivative size = 250, normalized size of antiderivative = 2.55

method	result
risch	$\frac{b\ln(x^n)x}{e^2} - \frac{b\ln(x^n)d^2}{e^3(ex+d)} - \frac{2b\ln(x^n)d\ln(ex+d)}{e^3} - \frac{bnd\ln(ex+d)}{e^3} + \frac{bnd\ln(ex)}{e^3} - \frac{bnx}{e^2} - \frac{bnd}{e^3} + \frac{2bnd\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e^3} +$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)/e^2*x-b*ln(x^n)/e^3*d^2/(e*x+d)-2*b*ln(x^n)/e^3*d*ln(e*x+d)-b*n/
e^3*d*ln(e*x+d)+b*n/e^3*d*ln(e*x)-b*n*x/e^2-b*n/e^3*d+2*b*n/e^3*d*ln(e*x+d
)*ln(-e*x/d)+2*b*n/e^3*d*dilog(-e*x/d)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^
n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^
n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(x/e^2-1/e^3*d^2/(e*x
+d)-2/e^3*d*ln(e*x+d))
```

Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x^n) + a*x^2)/(e^2*x^2 + 2*d*e*x + d^2), x)
```

Sympy [A] (verification not implemented)

Time = 13.21 (sec) , antiderivative size = 269, normalized size of antiderivative = 2.74

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2}\,dx$$

$$= \frac{ad^2\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)}{e^2} - \frac{2ad\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{e^2} + \frac{ax}{e^2}$$

$$- \frac{bd^2n\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{\log(x)}{de}+\frac{\log\left(\frac{d}{e}+x\right)}{de} & \text{otherwise}\end{cases}\right)}{e^2} + \frac{bd^2\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2}$$

$$+ \frac{2bdn\left(\begin{cases}\frac{x}{d} & \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|< \\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e} & \end{cases}\right.}{e^2}$$

$$- \frac{2bd\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2} - \frac{bnx}{e^2} + \frac{bx\log(cx^n)}{e^2}$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x+d)**2,x)
```

output
```
a*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**2 - 2*a
*d*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**2 + a*x/e**2 - b*
d**2*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*e),
True))/e**2 + b*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), Tru
e))*log(c*x**n)/e**2 + 2*b*d*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-pol
ylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*lo
g(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) -
 polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)),
 ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) -
 polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/e**2 - 2*b*d*Piecewis
e((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/e**2 - b*n*x/e**2 +
 b*x*log(c*x**n)/e**2
```

Maxima [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2}\,dx=\int \frac{(b\log(cx^n)+a)x^2}{(ex+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="maxima")
```

output
```
-a*(d^2/(e^4*x + d*e^3) - x/e^2 + 2*d*log(e*x + d)/e^3) + b*integrate((x^2
*log(c) + x^2*log(x^n))/(e^2*x^2 + 2*d*e*x + d^2), x)
```

Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2}\,dx=\int \frac{(b\log(cx^n)+a)x^2}{(ex+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x + d)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2}\,dx=\int \frac{x^2\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^2}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^2,x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^2, x)
```

Reduce [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2}\,dx = \frac{2\left(\int \frac{\log(x^n c)}{e^2x^3+2de\,x^2+d^2x}dx\right) b\,d^4n+2\left(\int \frac{\log(x^n c)}{e^2x^3+2de\,x^2+d^2x}dx\right) b\,d^3enx-2\log(ex+d)\,a\,d^2n-2\log(ex+d)\,aden}{}$$

input
```
int(x^2*(a+b*log(c*x^n))/(e*x+d)^2,x)
```

output
```
(2*int(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b*d**4*n + 2*int(l
og(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b*d**3*e*n*x - 2*log(d + e
*x)*a*d**2*n - 2*log(d + e*x)*a*d*e*n*x - 3*log(d + e*x)*b*d**2*n**2 - 3*l
og(d + e*x)*b*d*e*n**2*x - log(x**n*c)**2*b*d**2 - log(x**n*c)**2*b*d*e*x
+ 4*log(x**n*c)*b*d*e*n*x + log(x**n*c)*b*e**2*n*x**2 + 2*a*d*e*n*x + a*e*
*2*n*x**2 - b*d*e*n**2*x - b*e**2*n**2*x**2)/(e**3*n*(d + e*x))
```

3.41 $\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx$

Optimal result 442
Mathematica [A] (verified) 442
Rubi [A] (verified) 443
Maple [C] (warning: unable to verify) 444
Fricas [F] 445
Sympy [F] 445
Maxima [F] 445
Giac [F] 446
Mupad [F(-1)] 446
Reduce [F] 446

Optimal result

Integrand size = 19, antiderivative size = 65

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx = -\frac{x(a+b\log(cx^n))}{e(d+ex)}+\frac{(a+bn+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^2}+\frac{bn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}$$

output
```
-x*(a+b*ln(c*x^n))/e/(e*x+d)+(a+b*n+b*ln(c*x^n))*ln(1+e*x/d)/e^2+b*n*polyl
og(2,-e*x/d)/e^2
```

Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.09

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx = \frac{\frac{d(a+b\log(cx^n))}{d+ex}-bn(\log(x)-\log(d+ex))+(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)+bn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

output
```
((d*(a + b*Log[c*x^n]))/(d + e*x) - b*n*(Log[x] - Log[d + e*x]) + (a + b*L
og[c*x^n])*Log[1 + (e*x)/d] + b*n*PolyLog[2, -((e*x)/d)])/e^2
```

Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 70, normalized size of antiderivative = 1.08, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$, Rules used = {2784, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}dx$$

$$\Big\downarrow \text{2784}$$

$$\frac{\int \frac{a+bn+b\log(cx^n)}{d+ex}dx}{e} - \frac{x(a+b\log(cx^n))}{e(d+ex)}$$

$$\Big\downarrow \text{2754}$$

$$\frac{\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n)+bn)}{e} - \frac{bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}}{e} - \frac{x(a+b\log(cx^n))}{e(d+ex)}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n)+bn)}{e} + \frac{bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}}{e} - \frac{x(a+b\log(cx^n))}{e(d+ex)}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

output
```
-((x*(a + b*Log[c*x^n]))/(e*(d + e*x))) + (((a + b*n + b*Log[c*x^n])*Log[1
 + (e*x)/d])/e + (b*n*PolyLog[2, -((e*x)/d)])/e)/e
```

Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.46 (sec) , antiderivative size = 205, normalized size of antiderivative = 3.15

method	result
risch	$\frac{b\ln(x^n)d}{e^2(ex+d)} + \frac{b\ln(x^n)\ln(ex+d)}{e^2} - \frac{bn\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e^2} - \frac{bn\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{e^2} + \frac{bn\ln(ex+d)}{e^2} - \frac{bn\ln(ex)}{e^2} + \left(\frac{ib\pi\ \mathrm{csgn}(ix^n)\ \mathrm{cs}}{2}\right.$

input
```
int(x*(a+b*ln(c*x^n))/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)/e^2*d/(e*x+d)+b*ln(x^n)/e^2*ln(e*x+d)-b*n/e^2*ln(e*x+d)*ln(-e*x/
d)-b*n/e^2*dilog(-e*x/d)+b*n/e^2*ln(e*x+d)-b*n/e^2*ln(e*x)+(1/2*I*Pi*b*csg
n(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/
2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(
1/e^2*d/(e*x+d)+1/e^2*ln(e*x+d))
```

Fricas [F]

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)x}{(ex+d)^2}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b*x*log(c*x^n) + a*x)/(e^2*x^2 + 2*d*e*x + d^2), x)
```

Sympy [F]

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x+d)**2,x)
```

output
```
Integral(x*(a + b*log(c*x**n))/(d + e*x)**2, x)
```

Maxima [F]

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)x}{(ex+d)^2}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="maxima")
```

output
```
a*(d/(e^3*x + d*e^2) + log(e*x + d)/e^2) + b*integrate((x*log(c) + x*log(x
^n))/(e^2*x^2 + 2*d*e*x + d^2), x)
```

Giac [F]

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)x}{(ex+d)^2}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x + d)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^2}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x)^2,x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x)^2, x)
```

Reduce [F]

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx$$
$$= \frac{-2\left(\int \frac{\log(x^n c)}{e^2x^3+2de\,x^2+d^2x}dx\right)b\,d^3n - 2\left(\int \frac{\log(x^n c)}{e^2x^3+2de\,x^2+d^2x}dx\right)b\,d^2enx + 2\log(ex+d)\,adn + 2\log(ex+d)\,aen}{2e^2n\,(e}$$

input
```
int(x*(a+b*log(c*x^n))/(e*x+d)^2,x)
```

output
```
( - 2*int(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b*d**3*n - 2*in
t(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b*d**2*e*n*x + 2*log(d
+ e*x)*a*d*n + 2*log(d + e*x)*a*e*n*x + 4*log(d + e*x)*b*d*n**2 + 4*log(d
+ e*x)*b*e*n**2*x + log(x**n*c)**2*b*d + log(x**n*c)**2*b*e*x - 4*log(x**n
*c)*b*e*n*x - 2*a*e*n*x)/(2*e**2*n*(d + e*x))
```

3.42 $\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx$

Optimal result 448
Mathematica [A] (verified) 448
Rubi [A] (verified) 449
Maple [A] (verified) 450
Fricas [A] (verification not implemented) 450
Sympy [B] (verification not implemented) 450
Maxima [A] (verification not implemented) 451
Giac [A] (verification not implemented) 452
Mupad [B] (verification not implemented) 452
Reduce [B] (verification not implemented) 452

Optimal result

Integrand size = 18, antiderivative size = 39

$$\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx = \frac{x(a+b\log(cx^n))}{d(d+ex)} - \frac{bn\log(d+ex)}{de}$$

output
```
x*(a+b*ln(c*x^n))/d/(e*x+d)-b*n*ln(e*x+d)/d/e
```

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.05

$$\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx = \frac{-\frac{a+b\log(cx^n)}{d+ex} + \frac{bn(\log(x)-\log(d+ex))}{d}}{e}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x)^2,x]
```

output
```
(-((a + b*Log[c*x^n])/(d + e*x)) + (b*n*(Log[x] - Log[d + e*x]))/d)/e
```

Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2751, 16}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx$$

$$\Big\downarrow \text{ 2751}$$

$$\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int\frac{1}{d+ex}dx}{d}$$

$$\Big\downarrow \text{ 16}$$

$$\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x)^2,x]
```

output
```
(x*(a + b*Log[c*x^n]))/(d*(d + e*x)) - (b*n*Log[d + e*x])/(d*e)
```

Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a + 
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, 
x] && EqQ[r*(q + 1) + 1, 0]
```

Maple [A] (verified)

Time = 0.44 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.38

method	result
parallelrisch	$-\frac{\ln(ex+d)benx+\ln(ex+d)bdn-bex\ln(c\,x^{n})-aex}{d(ex+d)e}$
risch	$-\frac{b\ln(x^{n})}{e(ex+d)}-\frac{i\pi\ \text{csgn}(ix^{n})\,\text{csgn}(ic\,x^{n})^{2}bd-i\,\text{csgn}(ic\,x^{n})\,\text{csgn}(ix^{n})\,\text{csgn}(ic)\pi bd-i\pi\,\text{csgn}(ic\,x^{n})^{3}bd+i\pi\,\text{csgn}(ic\,x^{n})^{2}\,\text{csgn}(ic}{2(ex+d)ed}$

input
```
int((a+b*ln(c*x^n))/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-(ln(e*x+d)*b*e*n*x+ln(e*x+d)*b*d*n-b*e*x*ln(c*x^n)-a*e*x)/d/(e*x+d)/e
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.31

$$\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx=\frac{benx\log(x)-bd\log(c)-ad-(benx+bdn)\log(ex+d)}{de^2x+d^2e}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="fricas")
```

output
```
(b*e*n*x*log(x) - b*d*log(c) - a*d - (b*e*n*x + b*d*n)*log(e*x + d))/(d*e^
2*x + d^2*e)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 153 vs. 2(31) = 62.

Time = 0.72 (sec) , antiderivative size = 153, normalized size of antiderivative = 3.92

$$\int \frac{a+b\log\left(cx^n\right)}{(d+ex)^2}\,dx = \begin{cases} \tilde{\infty}\left(-\frac{a}{x}-\frac{bn}{x}-\frac{b\log\left(cx^n\right)}{x}\right) & \text{for } d=0\wedge e=0 \\ \frac{ax-bnx+bx\log\left(cx^n\right)}{d^2} & \text{for } e=0 \\ \frac{-\frac{a}{x}-\frac{bn}{x}-\frac{b\log\left(cx^n\right)}{x}}{e^2} & \text{for } d=0 \\ -\frac{ad}{d^2e+de^2x}-\frac{bdn\log\left(\frac{d}{e}+x\right)}{d^2e+de^2x}-\frac{benx\log\left(\frac{d}{e}+x\right)}{d^2e+de^2x}+\frac{bex\log\left(cx^n\right)}{d^2e+de^2x} & \text{otherwise} \end{cases}$$

input
```
integrate((a+b*ln(c*x**n))/(e*x+d)**2,x)
```

output
```
Piecewise((zoo*(-a/x - b*n/x - b*log(c*x**n)/x), Eq(d, 0) & Eq(e, 0)), ((a
*x - b*n*x + b*x*log(c*x**n))/d**2, Eq(e, 0)), ((-a/x - b*n/x - b*log(c*x*
*n)/x)/e**2, Eq(d, 0)), (-a*d/(d**2*e + d*e**2*x) - b*d*n*log(d/e + x)/(d*
*2*e + d*e**2*x) - b*e*n*x*log(d/e + x)/(d**2*e + d*e**2*x) + b*e*x*log(c*
x**n)/(d**2*e + d*e**2*x), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.62

$$\int \frac{a+b\log\left(cx^n\right)}{(d+ex)^2}\,dx = -bn\left(\frac{\log\left(ex+d\right)}{de}-\frac{\log\left(x\right)}{de}\right)-\frac{b\log\left(cx^n\right)}{e^2x+de}-\frac{a}{e^2x+de}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="maxima")
```

output
```
-b*n*(log(e*x + d)/(d*e) - log(x)/(d*e)) - b*log(c*x^n)/(e^2*x + d*e) - a/
(e^2*x + d*e)
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 64, normalized size of antiderivative = 1.64

$$\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx = -\frac{bn\log(x)}{e^2x+de} - \frac{bn\log(ex+d)}{de} + \frac{bn\log(x)}{de} - \frac{b\log(c)+a}{e^2x+de}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="giac")
```

output
```
-b*n*log(x)/(e^2*x + d*e) - b*n*log(e*x + d)/(d*e) + b*n*log(x)/(d*e) - (b
*log(c) + a)/(e^2*x + d*e)
```

Mupad [B] (verification not implemented)

Time = 27.28 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.38

$$\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx = -\frac{a}{x\,e^2+d\,e} - \frac{b\,\ln(c\,x^n)}{e\,(d+e\,x)} - \frac{2\,b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{d\,e}$$

input
```
int((a + b*log(c*x^n))/(d + e*x)^2,x)
```

output
```
- a/(d*e + e^2*x) - (b*log(c*x^n))/(e*(d + e*x)) - (2*b*n*atanh((2*e*x)/d
+ 1))/(d*e)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.33

$$\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx = \frac{-\log(ex+d)\,bdn - \log(ex+d)\,benx + \log(x^nc)\,bex + aex}{de\,(ex+d)}$$

input
```
int((a+b*log(c*x^n))/(e*x+d)^2,x)
```

output
```
( - log(d + e*x)*b*d*n - log(d + e*x)*b*e*n*x + log(x**n*c)*b*e*x + a*e*x)
/(d*e*(d + e*x))
```

3.43 $\int \frac{a+b\log(cx^n)}{x(d+ex)^2} dx$

Optimal result . . . 453
Mathematica [A] (verified) . . . 453
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Maple [C] (warning: unable to verify) . . . 456
Fricas [F] . . . 456
Sympy [F] . . . 457
Maxima [F] . . . 457
Giac [F] . . . 457
Mupad [F(-1)] . . . 458
Reduce [F] . . . 458

Optimal result

Integrand size = 21, antiderivative size = 80

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^2} dx = -\frac{ex(a+b\log(cx^n))}{d^2(d+ex)} - \frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^2} + \frac{bn\log(d+ex)}{d^2} + \frac{bn\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^2}$$

output
```
-e*x*(a+b*ln(c*x^n))/d^2/(e*x+d)-ln(1+d/e/x)*(a+b*ln(c*x^n))/d^2+b*n*ln(e*
x+d)/d^2+b*n*polylog(2,-d/e/x)/d^2
```

Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.20

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^2} dx = \frac{\frac{2d(a+b\log(cx^n))}{d+ex} + \frac{(a+b\log(cx^n))^2}{bn} - 2bn(\log(x)-\log(d+ex)) - 2(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) - 2bn\operatorname{PolyLo}}{2d^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x)^2),x]
```

output
```
((2*d*(a + b*Log[c*x^n]))/(d + e*x) + (a + b*Log[c*x^n])^2/(b*n) - 2*b*n*(
Log[x] - Log[d + e*x]) - 2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 2*b*n*Pol
yLog[2, -((e*x)/d)])/(2*d^2)
```

Rubi [A] (verified)

Time = 0.46 (sec) , antiderivative size = 94, normalized size of antiderivative = 1.18, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238, Rules used = {2789, 2751, 16, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx$$

$$\Big\downarrow \text{2789}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx}{d}$$

$$\Big\downarrow \text{2751}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int \frac{1}{d+ex}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{16}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{\frac{bn\int \frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x)^2),x]
```

output
```
-((e*((x*(a + b*Log[c*x^n]))/(d*(d + e*x)) - (b*n*Log[d + e*x])/(d*e)))/d)
 + (-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x)
)])/d)/d
```

Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.52 (sec) , antiderivative size = 229, normalized size of antiderivative = 2.86

method	result
risch	$-\frac{b\ln(x^n)\ln(ex+d)}{d^2}+\frac{b\ln(x^n)}{d(ex+d)}+\frac{b\ln(x^n)\ln(x)}{d^2}-\frac{bn\ln(x)^2}{2d^2}+\frac{bn\ln(ex+d)}{d^2}-\frac{bn\ln(x)}{d^2}+\frac{bn\ln(ex+d)\ln(-\frac{ex}{d})}{d^2}+\frac{bn\,\mathrm{di}}{}$

input
```
int((a+b*ln(c*x^n))/x/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)/d^2*ln(e*x+d)+b*ln(x^n)/d/(e*x+d)+b*ln(x^n)/d^2*ln(x)-1/2*b*n/d
^2*ln(x)^2+b*n*ln(e*x+d)/d^2-b*n/d^2*ln(x)+b*n/d^2*ln(e*x+d)*ln(-e*x/d)+b*
n/d^2*dilog(-e*x/d)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csg
n(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csg
n(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(-1/d^2*ln(e*x+d)+1/d/(e*x+d)+1/d^2*ln(x
))
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x(d+ex)^2}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex+d\right)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^3 + 2*d*e*x^2 + d^2*x), x)
```

Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx = \int \frac{a+b\log(cx^n)}{x\,(d+ex)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))/(x*(d + e*x)**2), x)
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^2,x, algorithm="maxima")
```

output
```
a*(1/(d*e*x + d^2) - log(e*x + d)/d^2 + log(x)/d^2) + b*integrate((log(c)
+ log(x^n))/(e^2*x^3 + 2*d*e*x^2 + d^2*x), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^2*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx = \int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(d+e\,x\right)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x)^2), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx = \frac{\left(\int \frac{\log(x^n c)}{e^2x^3+2de\,x^2+d^2x}dx\right)b\,d^3+\left(\int \frac{\log(x^n c)}{e^2x^3+2de\,x^2+d^2x}dx\right)b\,d^2ex-\log(ex+d)\,ad-\log(ex+d)\,aex+\log(x)\,ad}{d^2\,(ex+d)}$$

input
```
int((a+b*log(c*x^n))/x/(e*x+d)^2,x)
```

output
```
(int(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b*d**3 + int(log(x**
n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b*d**2*e*x - log(d + e*x)*a*d -
log(d + e*x)*a*e*x + log(x)*a*d + log(x)*a*e*x - a*e*x)/(d**2*(d + e*x))
```

3.44 $\int \frac{a+b\log(cx^n)}{x^2(d+ex)^2}\,dx$

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Mathematica [A] (verified) . . . 459
Rubi [A] (verified) . . . 460
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Sympy [A] (verification not implemented) . . . 462
Maxima [F] . . . 463
Giac [F] . . . 463
Mupad [F(-1)] . . . 463
Reduce [F] . . . 464

Optimal result

Integrand size = 21, antiderivative size = 114

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^2}\,dx = -\frac{bn}{d^2x}-\frac{a+b\log(cx^n)}{d^2x}+\frac{e^2x(a+b\log(cx^n))}{d^3(d+ex)} + \frac{2e\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^3} - \frac{ben\log(d+ex)}{d^3}-\frac{2ben\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^3}$$

output
```
-b*n/d^2/x-(a+b*ln(c*x^n))/d^2/x+e^2*x*(a+b*ln(c*x^n))/d^3/(e*x+d)+2*e*ln(
1+d/e/x)*(a+b*ln(c*x^n))/d^3-b*e*n*ln(e*x+d)/d^3-2*b*e*n*polylog(2,-d/e/x)
/d^3
```

Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 120, normalized size of antiderivative = 1.05

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^2}\,dx = -\frac{\frac{bdn}{x}+\frac{d(a+b\log(cx^n))}{x}+\frac{de(a+b\log(cx^n))}{d+ex}+\frac{e(a+b\log(cx^n))^2}{bn}-ben(\log(x)-\log(d+ex))-2e(a+b\log(cx^n))\,\mathrm{l}}{d^3}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x)^2),x]
```

output
```
-(((b*d*n)/x + (d*(a + b*Log[c*x^n]))/x + (d*e*(a + b*Log[c*x^n]))/(d + e*
x) + (e*(a + b*Log[c*x^n])^2)/(b*n) - b*e*n*(Log[x] - Log[d + e*x]) - 2*e*
(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 2*b*e*n*PolyLog[2, -((e*x)/d)])/d^3)
```

Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^2}dx$$

$$\Big\downarrow \text{ 2793}$$

$$\int \left(\frac{e^2(a+b\log(cx^n))}{d^2(d+ex)^2}-\frac{2e(a+b\log(cx^n))}{d^2x(d+ex)}+\frac{a+b\log(cx^n)}{d^2x^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{e^2x(a+b\log(cx^n))}{d^3(d+ex)}+\frac{2e\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^3}-\frac{a+b\log(cx^n)}{d^2x}-\frac{2ben\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^3}-\frac{ben\log(d+ex)}{d^3}-\frac{bn}{d^2x}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x)^2),x]
```

output
```
-((b*n)/(d^2*x)) - (a + b*Log[c*x^n])/(d^2*x) + (e^2*x*(a + b*Log[c*x^n]))
/(d^3*(d + e*x)) + (2*e*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d^3 - (b*e*n*
Log[d + e*x])/d^3 - (2*b*e*n*PolyLog[2, -(d/(e*x))])/d^3
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.62 (sec) , antiderivative size = 276, normalized size of antiderivative = 2.42

method	result
risch	$-\frac{b\ln(x^n)e}{d^2(ex+d)}+\frac{2b\ln(x^n)e\ln(ex+d)}{d^3}-\frac{b\ln(x^n)}{d^2x}-\frac{2b\ln(x^n)e\ln(x)}{d^3}+\frac{bne\ln(x)^2}{d^3}-\frac{2bne\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{d^3}-\frac{2bne\,\mathrm{dilog}(-}{d^3}$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)/d^2*e/(e*x+d)+2*b*ln(x^n)/d^3*e*ln(e*x+d)-b*ln(x^n)/d^2/x-2*b*l
n(x^n)/d^3*e*ln(x)+b*n/d^3*e*ln(x)^2-2*b*n/d^3*e*ln(e*x+d)*ln(-e*x/d)-2*b*
n/d^3*e*dilog(-e*x/d)-b*e*n*ln(e*x+d)/d^3-b*n/d^2/x+b*n/d^3*e*ln(x)+(1/2*I
*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csg
n(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*l
n(c)+a)*(-1/d^2*e/(e*x+d)+2/d^3*e*ln(e*x+d)-1/d^2/x-2/d^3*e*ln(x))
```

Fricas [F]

$$\int \frac{a + b\log(cx^n)}{x^2(d + ex)^2}\,dx = \int \frac{b\log(cx^n) + a}{(ex + d)^2 x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^4 + 2*d*e*x^3 + d^2*x^2), x)
```

Sympy [A] (verification not implemented)

Time = 36.32 (sec) , antiderivative size = 318, normalized size of antiderivative = 2.79

$$\int \frac{a + b\log(cx^n)}{x^2(d + ex)^2}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x+d)**2,x)
```

output
```
a*e**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d**2 - a/(
d**2*x) + 2*a*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/d**3
 - 2*a*e*log(x)/d**3 - b*e**2*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*
e) + log(d/e + x)/(d*e), True))/d**2 + b*e**2*Piecewise((x/d**2, Eq(e, 0))
, (-1/(d*e + e**2*x), True))*log(c*x**n)/d**2 - b*n/(d**2*x) - b*log(c*x**
n)/(d**2*x) - 2*b*e**2*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2
, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) -
 polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polyl
og(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0,
0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polyl
og(2, e*x*exp_polar(I*pi)/d), True))/e, True))/d**3 + 2*b*e**2*Piecewise((
x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/d**3 + b*e*n*log(x)**2
/d**3 - 2*b*e*log(x)*log(c*x**n)/d**3
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^2x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^2,x, algorithm="maxima")
```

output
```
-a*((2*e*x + d)/(d^2*e*x^2 + d^3*x) - 2*e*log(e*x + d)/d^3 + 2*e*log(x)/d^
3) + b*integrate((log(c) + log(x^n))/(e^2*x^4 + 2*d*e*x^3 + d^2*x^2), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^2x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^2*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^2}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^2\,(d+e\,x)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^2), x)
```

Reduce [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^2(d+ex)^2}\,dx$$
$$=\frac{\left(\int \frac{\log(x^n c)}{e^2x^4+2de\,x^3+d^2x^2}dx\right)b\,d^4x+\left(\int \frac{\log(x^n c)}{e^2x^4+2de\,x^3+d^2x^2}dx\right)b\,d^3e\,x^2+2\log(ex+d)\,adex+2\log(ex+d)\,a\,e^2x^2}{d^3x\,(ex+d)}$$

input
```
int((a+b*log(c*x^n))/x^2/(e*x+d)^2,x)
```

output
```
(int(log(x**n*c)/(d**2*x**2 + 2*d*e*x**3 + e**2*x**4),x)*b*d**4*x + int(lo
g(x**n*c)/(d**2*x**2 + 2*d*e*x**3 + e**2*x**4),x)*b*d**3*e*x**2 + 2*log(d
+ e*x)*a*d*e*x + 2*log(d + e*x)*a*e**2*x**2 - 2*log(x)*a*d*e*x - 2*log(x)*
a*e**2*x**2 - a*d**2 + 2*a*e**2*x**2)/(d**3*x*(d + e*x))
```

3.45 $\int \frac{a+b\log(cx^n)}{x^3(d+ex)^2}\,dx$

Optimal result 465
Mathematica [A] (verified) 465
Rubi [A] (verified) 466
Maple [C] (warning: unable to verify) 467
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Maxima [F] 469
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Reduce [F] 470

Optimal result

Integrand size = 21, antiderivative size = 154

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^2}\,dx = -\frac{bn}{4d^2x^2}+\frac{2ben}{d^3x}-\frac{a+b\log(cx^n)}{2d^2x^2}+\frac{2e(a+b\log(cx^n))}{d^3x} - \frac{e^3x(a+b\log(cx^n))}{d^4(d+ex)}-\frac{3e^2\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^4} + \frac{be^2n\log(d+ex)}{d^4}+\frac{3be^2n\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}$$

output
```
-1/4*b*n/d^2/x^2+2*b*e*n/d^3/x-1/2*(a+b*ln(c*x^n))/d^2/x^2+2*e*(a+b*ln(c*x
^n))/d^3/x-e^3*x*(a+b*ln(c*x^n))/d^4/(e*x+d)-3*e^2*ln(1+d/e/x)*(a+b*ln(c*x
^n))/d^4+b*e^2*n*ln(e*x+d)/d^4+3*b*e^2*n*polylog(2,-d/e/x)/d^4
```

Mathematica [A] (verified)

Time = 0.26 (sec) , antiderivative size = 165, normalized size of antiderivative = 1.07

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^2}\,dx = -\frac{\frac{bd^2n}{x^2}-\frac{8bden}{x}+\frac{2d^2(a+b\log(cx^n))}{x^2}-\frac{8de(a+b\log(cx^n))}{x}-\frac{4de^2(a+b\log(cx^n))}{d+ex}-\frac{6e^2(a+b\log(cx^n))^2}{bn}+4be^2n(\log(x)-\mathrm{lo}}{4d^4}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x)^2),x]
```

output
```
-1/4*((b*d^2*n)/x^2 - (8*b*d*e*n)/x + (2*d^2*(a + b*Log[c*x^n]))/x^2 - (8*
d*e*(a + b*Log[c*x^n]))/x - (4*d*e^2*(a + b*Log[c*x^n]))/(d + e*x) - (6*e^
2*(a + b*Log[c*x^n])^2)/(b*n) + 4*b*e^2*n*(Log[x] - Log[d + e*x]) + 12*e^2
*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] + 12*b*e^2*n*PolyLog[2, -((e*x)/d)])/
d^4
```

Rubi [A] (verified)

Time = 0.45 (sec) , antiderivative size = 154, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^2}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(-\frac{e^3(a+b\log(cx^n))}{d^3(d+ex)^2}+\frac{3e^2(a+b\log(cx^n))}{d^3x(d+ex)}-\frac{2e(a+b\log(cx^n))}{d^3x^2}+\frac{a+b\log(cx^n)}{d^2x^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{e^3x(a+b\log(cx^n))}{d^4(d+ex)}-\frac{3e^2\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^4}+\frac{2e(a+b\log(cx^n))}{d^3x}-\frac{a+b\log(cx^n)}{2d^2x^2}+\frac{3be^2n\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}+\frac{be^2n\log(d+ex)}{d^4}+\frac{2ben}{d^3x}-\frac{bn}{4d^2x^2}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x)^2),x]
```

output
```
-1/4*(b*n)/(d^2*x^2) + (2*b*e*n)/(d^3*x) - (a + b*Log[c*x^n])/(2*d^2*x^2)
+ (2*e*(a + b*Log[c*x^n]))/(d^3*x) - (e^3*x*(a + b*Log[c*x^n]))/(d^4*(d +
e*x)) - (3*e^2*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d^4 + (b*e^2*n*Log[d +
 e*x])/d^4 + (3*b*e^2*n*PolyLog[2, -(d/(e*x))])/d^4
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.77 (sec) , antiderivative size = 331, normalized size of antiderivative = 2.15

method	result
risch	$-\frac{3b\ln(x^n)e^2\ln(ex+d)}{d^4}+\frac{b\ln(x^n)e^2}{d^3(ex+d)}-\frac{b\ln(x^n)}{2d^2x^2}+\frac{3b\ln(x^n)e^2\ln(x)}{d^4}+\frac{2b\ln(x^n)e}{d^3x}+\frac{b\,e^2n\ln(ex+d)}{d^4}-\frac{bn}{4d^2x^2}+\frac{2ben}{d^3x}-$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-3*b*ln(x^n)/d^4*e^2*ln(e*x+d)+b*ln(x^n)/d^3*e^2/(e*x+d)-1/2*b*ln(x^n)/d^2
/x^2+3*b*ln(x^n)/d^4*e^2*ln(x)+2*b*ln(x^n)/d^3*e/x+b*e^2*n*ln(e*x+d)/d^4-1
/4*b*n/d^2/x^2+2*b*e*n/d^3/x-b*n/d^4*e^2*ln(x)-3/2*b*n/d^4*e^2*ln(x)^2+3*b
*n/d^4*e^2*ln(e*x+d)*ln(-e*x/d)+3*b*n/d^4*e^2*dilog(-e*x/d)+(1/2*I*Pi*b*cs
gn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1
/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*
(-3/d^4*e^2*ln(e*x+d)+1/d^3*e^2/(e*x+d)-1/2/d^2/x^2+3/d^4*e^2*ln(x)+2/d^3*
e/x)
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^2x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^5 + 2*d*e*x^4 + d^2*x^3), x)
```

Sympy [A] (verification not implemented)

Time = 51.74 (sec) , antiderivative size = 376, normalized size of antiderivative = 2.44

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^2}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x+d)**2,x)
```

output
```
-a/(2*d**2*x**2) - a*e**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x)
, True))/d**3 + 2*a*e/(d**3*x) - 3*a*e**3*Piecewise((x/d, Eq(e, 0)), (log(
d + e*x)/e, True))/d**4 + 3*a*e**2*log(x)/d**4 - b*n/(4*d**2*x**2) - b*log
(c*x**n)/(2*d**2*x**2) + b*e**3*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(
d*e) + log(d/e + x)/(d*e), True))/d**3 - b*e**3*Piecewise((x/d**2, Eq(e, 0
)), (-1/(d*e + e**2*x), True))*log(c*x**n)/d**3 + 2*b*e*n/(d**3*x) + 2*b*e
*log(c*x**n)/(d**3*x) + 3*b*e**3*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((
-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d
)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/
x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1,
1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(
d) - polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/d**4 - 3*b*e**3*P
iecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/d**4 - 3*b*e
**2*n*log(x)**2/(2*d**4) + 3*b*e**2*log(x)*log(c*x**n)/d**4
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^2x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^2,x, algorithm="maxima")
```

output
```
1/2*a*((6*e^2*x^2 + 3*d*e*x - d^2)/(d^3*e*x^3 + d^4*x^2) - 6*e^2*log(e*x +
 d)/d^4 + 6*e^2*log(x)/d^4) + b*integrate((log(c) + log(x^n))/(e^2*x^5 + 2
*d*e*x^4 + d^2*x^3), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^2x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^2*x^3), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^2}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^3\,(d+e\,x)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^2), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^2}\,dx$$
$$= \frac{2\left(\int \frac{\log(x^n c)}{e^2x^5+2de\,x^4+d^2x^3}dx\right) b\,d^5x^2 + 2\left(\int \frac{\log(x^n c)}{e^2x^5+2de\,x^4+d^2x^3}dx\right) b\,d^4e\,x^3 - 6\log(ex+d)\,ad\,e^2x^2 - 6\log(ex+d)}{2d^4x^2\,(ex+d)}$$

input
```
int((a+b*log(c*x^n))/x^3/(e*x+d)^2,x)
```

output
```
(2*int(log(x**n*c)/(d**2*x**3 + 2*d*e*x**4 + e**2*x**5),x)*b*d**5*x**2 + 2
*int(log(x**n*c)/(d**2*x**3 + 2*d*e*x**4 + e**2*x**5),x)*b*d**4*e*x**3 - 6
*log(d + e*x)*a*d*e**2*x**2 - 6*log(d + e*x)*a*e**3*x**3 + 6*log(x)*a*d*e*
*2*x**2 + 6*log(x)*a*e**3*x**3 - a*d**3 + 3*a*d**2*e*x - 6*a*e**3*x**3)/(2
*d**4*x**2*(d + e*x))
```

3.46 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx$

Optimal result 471
Mathematica [A] (verified) 472
Rubi [A] (verified) 472
Maple [C] (warning: unable to verify) 474
Fricas [F] 474
Sympy [A] (verification not implemented) 475
Maxima [F] 475
Giac [F] 476
Mupad [F(-1)] 476
Reduce [F] 476

Optimal result

Integrand size = 21, antiderivative size = 149

$$\begin{aligned}\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx = &-\frac{3bnx}{e^3}+\frac{(6a+5bn)x}{2e^3}+\frac{3bx\log(cx^n)}{e^3} \\ &-\frac{x^3(a+b\log(cx^n))}{2e(d+ex)^2}-\frac{x^2(3a+bn+3b\log(cx^n))}{2e^2(d+ex)} \\ &-\frac{d(6a+5bn+6b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{2e^4} \\ &-\frac{3bdn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}\end{aligned}$$

output
```
-3*b*n*x/e^3+1/2*(5*b*n+6*a)*x/e^3+3*b*x*ln(c*x^n)/e^3-1/2*x^3*(a+b*ln(c*x
^n))/e/(e*x+d)^2-1/2*x^2*(3*a+b*n+3*b*ln(c*x^n))/e^2/(e*x+d)-1/2*d*(6*a+5*
b*n+6*b*ln(c*x^n))*ln(1+e*x/d)/e^4-3*b*d*n*polylog(2,-e*x/d)/e^4
```

Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 150, normalized size of antiderivative = 1.01

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx$$
$$= \frac{2aex - 2benx + 2bex\log(cx^n) + \frac{d^3(a+b\log(cx^n))}{(d+ex)^2} - \frac{6d^2(a+b\log(cx^n))}{d+ex} + 6bdn(\log(x) - \log(d+ex)) - bdn\left(\frac{d}{d+\cdots}\right.}{2e^4}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

output
```
(2*a*e*x - 2*b*e*n*x + 2*b*e*x*Log[c*x^n] + (d^3*(a + b*Log[c*x^n]))/(d +
e*x)^2 - (6*d^2*(a + b*Log[c*x^n]))/(d + e*x) + 6*b*d*n*(Log[x] - Log[d +
e*x]) - b*d*n*(d/(d + e*x) + Log[x] - Log[d + e*x]) - 6*d*(a + b*Log[c*x^n
])*Log[1 + (e*x)/d] - 6*b*d*n*PolyLog[2, -((e*x)/d)])/(2*e^4)
```

Rubi [A] (verified)

Time = 0.54 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.04, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2784, 2784, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx$$

$$\Big\downarrow \text{2784}$$

$$\frac{\int \frac{x^2(3a+bn+3b\log(cx^n))}{(d+ex)^2}dx}{2e} - \frac{x^3(a+b\log(cx^n))}{2e(d+ex)^2}$$

$$\Big\downarrow \text{2784}$$

$$\frac{\frac{\int \frac{x(6a+5bn+6b\log(cx^n))}{d+ex}dx}{e} - \frac{x^2(3a+3b\log(cx^n)+bn)}{e(d+ex)}}{2e} - \frac{x^3(a+b\log(cx^n))}{2e(d+ex)^2}$$

$$\Big\downarrow \text{2793}$$

$$\frac{\frac{\int \left(\frac{6a+5bn+6b\log(cx^n)}{e}-\frac{d(6a+5bn+6b\log(cx^n))}{e(d+ex)}\right)dx}{e}-\frac{x^2(3a+3b\log(cx^n)+bn)}{e(d+ex)}}{2e}-\frac{x^3(a+b\log(cx^n))}{2e(d+ex)^2}$$

$$\Big\downarrow \text{2009}$$

$$\frac{\frac{-\frac{d\log\left(\frac{ex}{d}+1\right)(6a+6b\log(cx^n)+5bn)}{e^2}+\frac{x(6a+5bn)}{e}+\frac{6bx\log(cx^n)}{e}-\frac{6bdn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}-\frac{6bnx}{e}}{e}-\frac{x^2(3a+3b\log(cx^n)+bn)}{e(d+ex)}}{2e}-\frac{x^3(a+b\log(cx^n))}{2e(d+ex)^2}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

output
```
-1/2*(x^3*(a + b*Log[c*x^n]))/(e*(d + e*x)^2) + (-((x^2*(3*a + b*n + 3*b*L
og[c*x^n]))/(e*(d + e*x))) + ((-6*b*n*x)/e + ((6*a + 5*b*n)*x)/e + (6*b*x*
Log[c*x^n])/e - (d*(6*a + 5*b*n + 6*b*Log[c*x^n])*Log[1 + (e*x)/d])/e^2 -
(6*b*d*n*PolyLog[2, -((e*x)/d)])/e^2)/e)/(2*e)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.60 (sec) , antiderivative size = 303, normalized size of antiderivative = 2.03

method	result
risch	$\frac{b\ln(x^n)x}{e^3} - \frac{3b\ln(x^n)d^2}{e^4(ex+d)} - \frac{3b\ln(x^n)d\ln(ex+d)}{e^4} + \frac{b\ln(x^n)d^3}{2e^4(ex+d)^2} - \frac{bnx}{e^3} - \frac{bnd}{e^4} - \frac{5bnd\ln(ex+d)}{2e^4} - \frac{bn\,d^2}{2e^4(ex+d)} + \frac{5bnd\ln}{2e^4}$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)*x/e^3-3*b*ln(x^n)/e^4*d^2/(e*x+d)-3*b*ln(x^n)/e^4*d*ln(e*x+d)+1/
2*b*ln(x^n)*d^3/e^4/(e*x+d)^2-b*n*x/e^3-b*n/e^4*d-5/2*b*n/e^4*d*ln(e*x+d)-
1/2*b*n/e^4*d^2/(e*x+d)+5/2*b*n/e^4*d*ln(e*x)+3*b*n/e^4*d*ln(e*x+d)*ln(-e*
x/d)+3*b*n/e^4*d*dilog(-e*x/d)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2
*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2
*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(x/e^3-3/e^4*d^2/(e*x+d)-3/e^
4*d*ln(e*x+d)+1/2*d^3/e^4/(e*x+d)^2)
```

Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex+d)^3}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x^n) + a*x^3)/(e^3*x^3 + 3*d*e^2*x^2 + 3*d^2*e*x + d
^3), x)
```

Sympy [A] (verification not implemented)

Time = 32.09 (sec) , antiderivative size = 391, normalized size of antiderivative = 2.62

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx = \text{Too large to display}$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x+d)**3,x)
```

output
```
-a*d**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/e**3
+ 3*a*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**3 -
 3*a*d*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**3 + a*x/e**3
+ b*d**3*n*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log
(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e), True))/e**3 - b*d**3*Piecewise((
x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))*log(c*x**n)/e**3 - 3*b*d
**2*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*e), T
rue))/e**3 + 3*b*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), Tr
ue))*log(c*x**n)/e**3 + 3*b*d*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-po
lylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*l
og(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x)
- polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1))
, ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d)
- polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/e**3 - 3*b*d*Piecewi
se((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/e**3 - b*n*x/e**3
+ b*x*log(c*x**n)/e**3
```

Maxima [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex+d)^3}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="maxima")
```

output
```
-1/2*a*((6*d^2*e*x + 5*d^3)/(e^6*x^2 + 2*d*e^5*x + d^2*e^4) - 2*x/e^3 + 6*
d*log(e*x + d)/e^4) + b*integrate((x^3*log(c) + x^3*log(x^n))/(e^3*x^3 + 3
*d*e^2*x^2 + 3*d^2*e*x + d^3), x)
```

Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex+d)^3}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x + d)^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^3}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^3,x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^3, x)
```

Reduce [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx = \frac{6\left(\int \frac{\log(x^n c)}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+d^3x}dx\right)b\,d^6n+12\left(\int \frac{\log(x^n c)}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+d^3x}dx\right)b\,d^5enx+6\left(\int \frac{\log(x^n c)}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+}\right.}{}$$

input
```
int(x^3*(a+b*log(c*x^n))/(e*x+d)^3,x)
```

output
```
(6*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)
*b*d**6*n + 12*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e
**3*x**4),x)*b*d**5*e*n*x + 6*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*
d*e**2*x**3 + e**3*x**4),x)*b*d**4*e**2*n*x**2 - 6*log(d + e*x)*a*d**3*n -
 12*log(d + e*x)*a*d**2*e*n*x - 6*log(d + e*x)*a*d*e**2*n*x**2 - 14*log(d
+ e*x)*b*d**3*n**2 - 28*log(d + e*x)*b*d**2*e*n**2*x - 14*log(d + e*x)*b*d
*e**2*n**2*x**2 - 3*log(x**n*c)**2*b*d**3 - 6*log(x**n*c)**2*b*d**2*e*x -
3*log(x**n*c)**2*b*d*e**2*x**2 - 9*log(x**n*c)*b*d**3*n + 9*log(x**n*c)*b*
d*e**2*n*x**2 + 2*log(x**n*c)*b*e**3*n*x**3 + 9*log(x)*b*d**3*n**2 + 18*lo
g(x)*b*d**2*e*n**2*x + 9*log(x)*b*d*e**2*n**2*x**2 - 3*a*d**3*n + 6*a*d*e*
*2*n*x**2 + 2*a*e**3*n*x**3 + 2*b*d**3*n**2 - 4*b*d*e**2*n**2*x**2 - 2*b*e
**3*n**2*x**3)/(2*e**4*n*(d**2 + 2*d*e*x + e**2*x**2))
```

3.47 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}\,dx$

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Optimal result

Integrand size = 21, antiderivative size = 107

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}\,dx = -\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2} - \frac{x(2a+bn+2b\log(cx^n))}{2e^2(d+ex)} + \frac{(2a+3bn+2b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{2e^3} + \frac{bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}$$

output
```
-1/2*x^2*(a+b*ln(c*x^n))/e/(e*x+d)^2-1/2*x*(2*a+b*n+2*b*ln(c*x^n))/e^2/(e*
x+d)+1/2*(2*a+3*b*n+2*b*ln(c*x^n))*ln(1+e*x/d)/e^3+b*n*polylog(2,-e*x/d)/e
^3
```

Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 122, normalized size of antiderivative = 1.14

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}\,dx = \frac{-\frac{d^2(a+b\log(cx^n))}{(d+ex)^2} + \frac{4d(a+b\log(cx^n))}{d+ex} - 4bn(\log(x)-\log(d+ex)) + bn\left(\frac{d}{d+ex}+\log(x)-\log(d+ex)\right) + 2(a+}{2e^3}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

output
```
(-((d^2*(a + b*Log[c*x^n]))/(d + e*x)^2) + (4*d*(a + b*Log[c*x^n]))/(d + e
*x) - 4*b*n*(Log[x] - Log[d + e*x]) + b*n*(d/(d + e*x) + Log[x] - Log[d +
e*x]) + 2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] + 2*b*n*PolyLog[2, -((e*x)/d
)])/(2*e^3)
```

Rubi [A] (verified)

Time = 0.44 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.08, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2784, 2784, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}dx$$

$$\Big\downarrow \text{2784}$$

$$\frac{\int \frac{x(2a+bn+2b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2}$$

$$\Big\downarrow \text{2784}$$

$$\frac{\frac{\int \frac{2a+3bn+2b\log(cx^n)}{d+ex}dx}{e}-\frac{x(2a+2b\log(cx^n)+bn)}{e(d+ex)}}{2e}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2}$$

$$\Big\downarrow \text{2754}$$

$$\frac{\frac{\frac{\log\left(\frac{ex}{d}+1\right)(2a+2b\log(cx^n)+3bn)}{e}-\frac{2bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}}{e}-\frac{x(2a+2b\log(cx^n)+bn)}{e(d+ex)}}{2e}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\frac{\frac{\log\left(\frac{ex}{d}+1\right)(2a+2b\log(cx^n)+3bn)}{e}+\frac{2bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}}{e}-\frac{x(2a+2b\log(cx^n)+bn)}{e(d+ex)}}{2e}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

output
```
-1/2*(x^2*(a + b*Log[c*x^n]))/(e*(d + e*x)^2) + (-((x*(2*a + b*n + 2*b*Log
[c*x^n]))/(e*(d + e*x))) + (((2*a + 3*b*n + 2*b*Log[c*x^n])*Log[1 + (e*x)/
d])/e + (2*b*n*PolyLog[2, -((e*x)/d)])/e)/e)/(2*e)
```

Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.59 (sec) , antiderivative size = 258, normalized size of antiderivative = 2.41

method	result
risch	$\frac{2b\ln(x^n)d}{e^3(ex+d)} + \frac{b\ln(x^n)\ln(ex+d)}{e^3} - \frac{b\ln(x^n)d^2}{2e^3(ex+d)^2} + \frac{bnd}{2e^3(ex+d)} + \frac{3bn\ln(ex+d)}{2e^3} - \frac{3bn\ln(ex)}{2e^3} - \frac{bn\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e^3} -$ bn

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
2*b*ln(x^n)/e^3*d/(e*x+d)+b*ln(x^n)/e^3*ln(e*x+d)-1/2*b*ln(x^n)/e^3*d^2/(e
*x+d)^2+1/2*b*n/e^3*d/(e*x+d)+3/2*b*n/e^3*ln(e*x+d)-3/2*b*n/e^3*ln(e*x)-b*
n/e^3*ln(e*x+d)*ln(-e*x/d)-b*n/e^3*dilog(-e*x/d)+(1/2*I*Pi*b*csgn(I*x^n)*c
sgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*c
sgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(2/e^3*d/(e
*x+d)+1/e^3*ln(e*x+d)-1/2/e^3*d^2/(e*x+d)^2)
```

Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex+d)^3}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x^n) + a*x^2)/(e^3*x^3 + 3*d*e^2*x^2 + 3*d^2*e*x + d
^3), x)
```

Sympy [A] (verification not implemented)

Time = 23.74 (sec) , antiderivative size = 347, normalized size of antiderivative = 3.24

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}\,dx = \text{Too large to display}$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x+d)**3,x)
```

output
```
a*d**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/e**2 -
 2*a*d*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**2 + a*P
iecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**2 - b*d**2*n*Piecewis
e((x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + lo
g(d/e + x)/(2*d**2*e), True))/e**2 + b*d**2*Piecewise((x/d**3, Eq(e, 0)),
(-1/(2*e*(d + e*x)**2), True))*log(c*x**n)/e**2 + 2*b*d*n*Piecewise((x/d**
2, Eq(e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*e), True))/e**2 - 2*b*d*Pie
cewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))*log(c*x**n)/e**2 - b
*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/
d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_po
lar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*
pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + m
eijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*
pi)/d), True))/e, True))/e**2 + b*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)
/e, True))*log(c*x**n)/e**2
```

Maxima [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex+d)^3}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="maxima")
```

output
```
1/2*a*((4*d*e*x + 3*d^2)/(e^5*x^2 + 2*d*e^4*x + d^2*e^3) + 2*log(e*x + d)/
e^3) + b*integrate((x^2*log(c) + x^2*log(x^n))/(e^3*x^3 + 3*d*e^2*x^2 + 3*
d^2*e*x + d^3), x)
```

Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex+d)^3}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x + d)^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^3}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^3,x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^3, x)
```

Reduce [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}\,dx$$
$$= \frac{-2\left(\int \frac{\log(x^n c)}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+d^3x}dx\right) b\,d^5n - 4\left(\int \frac{\log(x^n c)}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+d^3x}dx\right) b\,d^4enx - 2\left(\int \frac{\log(x^n c)}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2-}\right.}{}$$

input
```
int(x^2*(a+b*log(c*x^n))/(e*x+d)^3,x)
```

output
```
( - 2*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4)
,x)*b*d**5*n - 4*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 +
 e**3*x**4),x)*b*d**4*e*n*x - 2*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 +
3*d*e**2*x**3 + e**3*x**4),x)*b*d**3*e**2*n*x**2 + 2*log(d + e*x)*a*d**2*n
 + 4*log(d + e*x)*a*d*e*n*x + 2*log(d + e*x)*a*e**2*n*x**2 + 6*log(d + e*x
)*b*d**2*n**2 + 12*log(d + e*x)*b*d*e*n**2*x + 6*log(d + e*x)*b*e**2*n**2*
x**2 + log(x**n*c)**2*b*d**2 + 2*log(x**n*c)**2*b*d*e*x + log(x**n*c)**2*b
*e**2*x**2 + 3*log(x**n*c)*b*d**2*n - 3*log(x**n*c)*b*e**2*n*x**2 - 3*log(
x)*b*d**2*n**2 - 6*log(x)*b*d*e*n**2*x - 3*log(x)*b*e**2*n**2*x**2 + a*d**
2*n - 2*a*e**2*n*x**2)/(2*e**3*n*(d**2 + 2*d*e*x + e**2*x**2))
```

3.48 $\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}\,dx$

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Optimal result

Integrand size = 19, antiderivative size = 62

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}\,dx = -\frac{bn}{2e^2(d+ex)}+\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\log(d+ex)}{2de^2}$$

output
```
-1/2*b*n/e^2/(e*x+d)+1/2*x^2*(a+b*ln(c*x^n))/d/(e*x+d)^2-1/2*b*n*ln(e*x+d)
/d/e^2
```

Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 75, normalized size of antiderivative = 1.21

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}\,dx = \frac{bn\log(x)-\frac{bdn(d+ex)+ad(d+2ex)+bd(d+2ex)\log(cx^n)+bn(d+ex)^2\log(d+ex)}{(d+ex)^2}}{2de^2}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

output
```
(b*n*Log[x] - (b*d*n*(d + e*x) + a*d*(d + 2*e*x) + b*d*(d + 2*e*x)*Log[c*x
^n] + b*n*(d + e*x)^2*Log[d + e*x])/(d + e*x)^2)/(2*d*e^2)
```

Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 60, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {2773, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}dx$$

$$\Big\downarrow \text{2773}$$

$$\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\int \frac{x}{(d+ex)^2}dx}{2d}$$

$$\Big\downarrow \text{49}$$

$$\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\int \left(\frac{1}{e(d+ex)}-\frac{d}{e(d+ex)^2}\right)dx}{2d}$$

$$\Big\downarrow \text{2009}$$

$$\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\left(\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}\right)}{2d}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

output
```
(x^2*(a + b*Log[c*x^n]))/(2*d*(d + e*x)^2) - (b*n*(d/(e^2*(d + e*x)) + Log
[d + e*x]/e^2))/(2*d)
```

Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 136 vs. $2(56) = 112$.

Time = 0.56 (sec) , antiderivative size = 137, normalized size of antiderivative = 2.21

method	result
parallelrisch	$\frac{\ln(x) b\, e^{2} n\, x^{2}-\ln(ex+d) b\, e^{2} n\, x^{2}+2 \ln(x) bdenx-2 \ln(ex+d) bdenx+\ln(x) b\, d^{2} n-\ln(ex+d) b\, d^{2} n-2 b \ln(c\, x^{n}) exd-bdenx-2ae}{2 e^{2} (ex+d)^{2} d}$
risch	$-\frac{b(2ex+d)\ln(x^{n})}{2(ex+d)^{2}e^{2}}-\frac{2i\pi bdex\ \mathrm{csgn}(ix^{n})\,\mathrm{csgn}(ic\,x^{n})^{2}+2i\pi bdex\,\mathrm{csgn}(ic\,x^{n})^{2}\,\mathrm{csgn}(ic)+i\pi b\, d^{2}\,\mathrm{csgn}(ic\,x^{n})^{2}\,\mathrm{csgn}(ic)-2i\pi bde}{}$

input
```
int(x*(a+b*ln(c*x^n))/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
1/2*(ln(x)*b*e^2*n*x^2-ln(e*x+d)*b*e^2*n*x^2+2*ln(x)*b*d*e*n*x-2*ln(e*x+d)
*b*d*e*n*x+ln(x)*b*d^2*n-ln(e*x+d)*b*d^2*n-2*b*ln(c*x^n)*e*x*d-b*d*e*n*x-2
*a*e*x*d-b*ln(c*x^n)*d^2-b*d^2*n-a*d^2)/e^2/(e*x+d)^2/d
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 115 vs. $2(56) = 112$.

Time = 0.09 (sec) , antiderivative size = 115, normalized size of antiderivative = 1.85

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}\,dx = \frac{be^2nx^2\log(x) - bd^2n - ad^2 - (bden + 2\,ade)x - (be^2nx^2 + 2\,bdenx + bd^2n)\log(ex+d) - (2\,bdex + bd}{2\,(de^4x^2 + 2\,d^2e^3x + d^3e^2)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="fricas")
```

output
```
1/2*(b*e^2*n*x^2*log(x) - b*d^2*n - a*d^2 - (b*d*e*n + 2*a*d*e)*x - (b*e^2
*n*x^2 + 2*b*d*e*n*x + b*d^2*n)*log(e*x + d) - (2*b*d*e*x + b*d^2)*log(c))
/(d*e^4*x^2 + 2*d^2*e^3*x + d^3*e^2)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 398 vs. $2(53) = 106$.

Time = 2.38 (sec) , antiderivative size = 398, normalized size of antiderivative = 6.42

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}\,dx = \begin{cases} \tilde{\infty}\left(-\frac{a}{x} - \frac{bn}{x} - \frac{b\log(cx^n)}{x}\right) \\ \frac{\frac{ax^2}{2} - \frac{bnx^2}{4} + \frac{bx^2\log(cx^n)}{2}}{d^3} \\ \frac{-\frac{a}{x} - \frac{bn}{x} - \frac{b\log(cx^n)}{x}}{e^3} \\ -\frac{ad^2}{2d^3e^2+4d^2e^3x+2de^4x^2} - \frac{2adex}{2d^3e^2+4d^2e^3x+2de^4x^2} - \frac{bd^2n\log\left(\frac{d}{e}+x\right)}{2d^3e^2+4d^2e^3x+2de^4x^2} - \frac{bd^2n}{2d^3e^2+4d^2e^3x+2de^4x^2} - \frac{2bdenx\log\left(\frac{d}{e}+x\right)}{2d^3e^2+4d^2e^3x+2de^4x^2} \end{cases}$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x+d)**3,x)
```

output
```
Piecewise((zoo*(-a/x - b*n/x - b*log(c*x**n)/x), Eq(d, 0) & Eq(e, 0)), ((a
*x**2/2 - b*n*x**2/4 + b*x**2*log(c*x**n)/2)/d**3, Eq(e, 0)), ((-a/x - b*n
/x - b*log(c*x**n)/x)/e**3, Eq(d, 0)), (-a*d**2/(2*d**3*e**2 + 4*d**2*e**3
*x + 2*d*e**4*x**2) - 2*a*d*e*x/(2*d**3*e**2 + 4*d**2*e**3*x + 2*d*e**4*x*
*2) - b*d**2*n*log(d/e + x)/(2*d**3*e**2 + 4*d**2*e**3*x + 2*d*e**4*x**2)
- b*d**2*n/(2*d**3*e**2 + 4*d**2*e**3*x + 2*d*e**4*x**2) - 2*b*d*e*n*x*log
(d/e + x)/(2*d**3*e**2 + 4*d**2*e**3*x + 2*d*e**4*x**2) - b*d*e*n*x/(2*d**
3*e**2 + 4*d**2*e**3*x + 2*d*e**4*x**2) - b*e**2*n*x**2*log(d/e + x)/(2*d*
*3*e**2 + 4*d**2*e**3*x + 2*d*e**4*x**2) + b*e**2*x**2*log(c*x**n)/(2*d**3
*e**2 + 4*d**2*e**3*x + 2*d*e**4*x**2), True))
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 114 vs. $2(56) = 112$.

Time = 0.03 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.84

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}\,dx = -\frac{1}{2}\,bn\left(\frac{1}{e^3x+de^2}+\frac{\log(ex+d)}{de^2}-\frac{\log(x)}{de^2}\right) - \frac{(2\,ex+d)b\log(cx^n)}{2\,(e^4x^2+2\,de^3x+d^2e^2)} - \frac{(2\,ex+d)a}{2\,(e^4x^2+2\,de^3x+d^2e^2)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="maxima")
```

output
```
-1/2*b*n*(1/(e^3*x + d*e^2) + log(e*x + d)/(d*e^2) - log(x)/(d*e^2)) - 1/2
*(2*e*x + d)*b*log(c*x^n)/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) - 1/2*(2*e*x + d
)*a/(e^4*x^2 + 2*d*e^3*x + d^2*e^2)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 124 vs. $2(56) = 112$.

Time = 0.12 (sec) , antiderivative size = 124, normalized size of antiderivative = 2.00

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}\,dx = -\frac{(2\,benx+bdn)\log(x)}{2\,(e^4x^2+2\,de^3x+d^2e^2)} - \frac{benx+2\,bex\log(c)+bdn+2\,aex+bd\log(c)+ad}{2\,(e^4x^2+2\,de^3x+d^2e^2)} - \frac{bn\log(ex+d)}{2\,de^2} + \frac{bn\log(x)}{2\,de^2}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="giac")
```

output
```
-1/2*(2*b*e*n*x + b*d*n)*log(x)/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) - 1/2*(b*e
*n*x + 2*b*e*x*log(c) + b*d*n + 2*a*e*x + b*d*log(c) + a*d)/(e^4*x^2 + 2*d
*e^3*x + d^2*e^2) - 1/2*b*n*log(e*x + d)/(d*e^2) + 1/2*b*n*log(x)/(d*e^2)
```

Mupad [B] (verification not implemented)

Time = 26.63 (sec) , antiderivative size = 108, normalized size of antiderivative = 1.74

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}\,dx = -\frac{a\,d+x\,(2\,a\,e+b\,e\,n)+b\,d\,n}{2\,d^2\,e^2+4\,d\,e^3\,x+2\,e^4\,x^2} - \frac{\ln(c\,x^n)\,\left(\frac{b\,d}{2\,e^2}+\frac{b\,x}{e}\right)}{d^2+2\,d\,e\,x+e^2\,x^2} - \frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{d\,e^2}$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x)^3,x)
```

output
```
- (a*d + x*(2*a*e + b*e*n) + b*d*n)/(2*d^2*e^2 + 2*e^4*x^2 + 4*d*e^3*x) -
(log(c*x^n)*((b*d)/(2*e^2) + (b*x)/e))/(d^2 + e^2*x^2 + 2*d*e*x) - (b*n*at
anh((2*e*x)/d + 1))/(d*e^2)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.76

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}\,dx$$
$$= \frac{-2\log(ex+d)\,b\,d^2n - 4\log(ex+d)\,bdenx - 2\log(ex+d)\,b\,e^2n\,x^2 + 2\log(x^nc)\,b\,e^2x^2 + 2a\,e^2x^2 - b\,d^2n}{4d\,e^2\,(e^2x^2+2dex+d^2)}$$

input
```
int(x*(a+b*log(c*x^n))/(e*x+d)^3,x)
```

output
```
( - 2*log(d + e*x)*b*d**2*n - 4*log(d + e*x)*b*d*e*n*x - 2*log(d + e*x)*b*
e**2*n*x**2 + 2*log(x**n*c)*b*e**2*x**2 + 2*a*e**2*x**2 - b*d**2*n + b*e**
2*n*x**2)/(4*d*e**2*(d**2 + 2*d*e*x + e**2*x**2))
```

3.49 $\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx$

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Optimal result

Integrand size = 18, antiderivative size = 76

$$\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx = \frac{bn}{2de(d+ex)} + \frac{bn\log(x)}{2d^2e} - \frac{a+b\log(cx^n)}{2e(d+ex)^2} - \frac{bn\log(d+ex)}{2d^2e}$$

output
```
1/2*b*n/d/e/(e*x+d)+1/2*b*n*ln(x)/d^2/e-1/2*(a+b*ln(c*x^n))/e/(e*x+d)^2-1/
2*b*n*ln(e*x+d)/d^2/e
```

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 53, normalized size of antiderivative = 0.70

$$\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx = \frac{-\frac{a+b\log(cx^n)}{(d+ex)^2} + \frac{bn\left(\frac{d}{d+ex}+\log(x)-\log(d+ex)\right)}{d^2}}{2e}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x)^3,x]
```

output
```
(-((a + b*Log[c*x^n])/(d + e*x)^2) + (b*n*(d/(d + e*x) + Log[x] - Log[d +
e*x]))/d^2)/(2*e)
```

Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 63, normalized size of antiderivative = 0.83, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {2756, 54, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex)^3}dx$$

$$\Big\downarrow \text{2756}$$

$$\frac{bn\int \frac{1}{x(d+ex)^2}dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}$$

$$\Big\downarrow \text{54}$$

$$\frac{bn\int \left(-\frac{e}{d^2(d+ex)}-\frac{e}{d(d+ex)^2}+\frac{1}{d^2x}\right)dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}$$

$$\Big\downarrow \text{2009}$$

$$\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x)^3,x]
```

output
```
-1/2*(a + b*Log[c*x^n])/(e*(d + e*x)^2) + (b*n*(1/(d*(d + e*x)) + Log[x]/d
^2 - Log[d + e*x]/d^2))/(2*e)
```

Defintions of rubi rules used

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

Maple [A] (verified)

Time = 0.55 (sec) , antiderivative size = 132, normalized size of antiderivative = 1.74

method	result
parallelrisch	$\frac{2\ln(x)x^2 b e^3 n-2\ln(ex+d)x^2 b e^3 n+4\ln(x)xbd e^2 n-4\ln(ex+d)xbd e^2 n-b e^3 n x^2+2\ln(x)b d^2 en-2\ln(ex+d)b d^2 en-2b\ln(c}{4d^2e^2(ex+d)^2}$
risch	$-\frac{b\ln(x^n)}{2e(ex+d)^2}-\frac{i\pi b d^2\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2-i\pi\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)\,\mathrm{csgn}(ic)b\,d^2-i\pi b\,d^2\,\mathrm{csgn}(ic\,x^n)^3+i\pi b\,d^2\,\mathrm{csgn}(ic\,x}{}$

input
```
int((a+b*ln(c*x^n))/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
1/4*(2*ln(x)*x^2*b*e^3*n-2*ln(e*x+d)*x^2*b*e^3*n+4*ln(x)*x*b*d*e^2*n-4*ln(
e*x+d)*x*b*d*e^2*n-b*e^3*n*x^2+2*ln(x)*b*d^2*e*n-2*ln(e*x+d)*b*d^2*e*n-2*b
*ln(c*x^n)*d^2*e+e*d^2*b*n-2*e*d^2*a)/d^2/e^2/(e*x+d)^2
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 107, normalized size of antiderivative = 1.41

$$\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx = \frac{bdenx+bd^2n-bd^2\log(c)-ad^2-(be^2nx^2+2\,bdenx+bd^2n)\log(ex+d)+(be^2nx^2+2\,bdenx)\log(x)}{2\,(d^2e^3x^2+2\,d^3e^2x+d^4e)}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="fricas")
```

output
```
1/2*(b*d*e*n*x + b*d^2*n - b*d^2*log(c) - a*d^2 - (b*e^2*n*x^2 + 2*b*d*e*n
*x + b*d^2*n)*log(e*x + d) + (b*e^2*n*x^2 + 2*b*d*e*n*x)*log(x))/(d^2*e^3*
x^2 + 2*d^3*e^2*x + d^4*e)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 415 vs. $2(65) = 130$.

Time = 2.46 (sec) , antiderivative size = 415, normalized size of antiderivative = 5.46

$$\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx = \begin{cases} \tilde{\infty}\left(-\frac{a}{2x^2}-\frac{bn}{4x^2}-\frac{b\log(cx^n)}{2x^2}\right) \\ \frac{ax-bnx+bx\log(cx^n)}{d^3} \\ \frac{-\frac{a}{2x^2}-\frac{bn}{4x^2}-\frac{b\log(cx^n)}{2x^2}}{e^3} \\ -\frac{ad^2}{2d^4e+4d^3e^2x+2d^2e^3x^2}-\frac{bd^2n\log\left(\frac{d}{e}+x\right)}{2d^4e+4d^3e^2x+2d^2e^3x^2}+\frac{bd^2n}{2d^4e+4d^3e^2x+2d^2e^3x^2}-\frac{2bdenx\log\left(\frac{d}{e}+x\right)}{2d^4e+4d^3e^2x+2d^2e^3x^2}+\frac{bdenx}{2d^4e+4d^3e^2x+2d^2e^3x^2} \end{cases}$$

input
```
integrate((a+b*ln(c*x**n))/(e*x+d)**3,x)
```

output
```
Piecewise((zoo*(-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2)), Eq(d
, 0) & Eq(e, 0)), ((a*x - b*n*x + b*x*log(c*x**n))/d**3, Eq(e, 0)), ((-a/(
2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2))/e**3, Eq(d, 0)), (-a*d**2
/(2*d**4*e + 4*d**3*e**2*x + 2*d**2*e**3*x**2) - b*d**2*n*log(d/e + x)/(2*
d**4*e + 4*d**3*e**2*x + 2*d**2*e**3*x**2) + b*d**2*n/(2*d**4*e + 4*d**3*e
**2*x + 2*d**2*e**3*x**2) - 2*b*d*e*n*x*log(d/e + x)/(2*d**4*e + 4*d**3*e*
*2*x + 2*d**2*e**3*x**2) + b*d*e*n*x/(2*d**4*e + 4*d**3*e**2*x + 2*d**2*e*
*3*x**2) + 2*b*d*e*x*log(c*x**n)/(2*d**4*e + 4*d**3*e**2*x + 2*d**2*e**3*x
**2) - b*e**2*n*x**2*log(d/e + x)/(2*d**4*e + 4*d**3*e**2*x + 2*d**2*e**3*
x**2) + b*e**2*x**2*log(c*x**n)/(2*d**4*e + 4*d**3*e**2*x + 2*d**2*e**3*x*
*2), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 99, normalized size of antiderivative = 1.30

$$\int \frac{a+b\log\left(cx^n\right)}{(d+ex)^3}\,dx = \frac{1}{2}\,bn\left(\frac{1}{de^2x+d^2e} - \frac{\log\left(ex+d\right)}{d^2e} + \frac{\log\left(x\right)}{d^2e}\right) - \frac{b\log\left(cx^n\right)}{2\left(e^3x^2+2\,de^2x+d^2e\right)} - \frac{a}{2\left(e^3x^2+2\,de^2x+d^2e\right)}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="maxima")
```

output
```
1/2*b*n*(1/(d*e^2*x + d^2*e) - log(e*x + d)/(d^2*e) + log(x)/(d^2*e)) - 1/
2*b*log(c*x^n)/(e^3*x^2 + 2*d*e^2*x + d^2*e) - 1/2*a/(e^3*x^2 + 2*d*e^2*x
+ d^2*e)
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 104, normalized size of antiderivative = 1.37

$$\int \frac{a+b\log\left(cx^n\right)}{(d+ex)^3}\,dx = -\frac{bn\log\left(x\right)}{2\left(e^3x^2+2\,de^2x+d^2e\right)} + \frac{benx+bdn-bd\log\left(c\right)-ad}{2\left(de^3x^2+2\,d^2e^2x+d^3e\right)} - \frac{bn\log\left(ex+d\right)}{2\,d^2e} + \frac{bn\log\left(x\right)}{2\,d^2e}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="giac")
```

output
```
-1/2*b*n*log(x)/(e^3*x^2 + 2*d*e^2*x + d^2*e) + 1/2*(b*e*n*x + b*d*n - b*d
*log(c) - a*d)/(d*e^3*x^2 + 2*d^2*e^2*x + d^3*e) - 1/2*b*n*log(e*x + d)/(d
^2*e) + 1/2*b*n*log(x)/(d^2*e)
```

Mupad [B] (verification not implemented)

Time = 27.30 (sec) , antiderivative size = 91, normalized size of antiderivative = 1.20

$$\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx = \frac{b\,n-a+\frac{b\,e\,n\,x}{d}}{2\,d^2\,e+4\,d\,e^2\,x+2\,e^3\,x^2} - \frac{b\,\ln(c\,x^n)}{2\,e\,(d^2+2\,d\,e\,x+e^2\,x^2)} - \frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{d^2\,e}$$

input
```
int((a + b*log(c*x^n))/(d + e*x)^3,x)
```

output
```
(b*n - a + (b*e*n*x)/d)/(2*d^2*e + 2*e^3*x^2 + 4*d*e^2*x) - (b*log(c*x^n))
/(2*e*(d^2 + e^2*x^2 + 2*d*e*x)) - (b*n*atanh((2*e*x)/d + 1))/(d^2*e)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.55

$$\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx = \frac{-2\log(ex+d)\,b\,d^2n-4\log(ex+d)\,bdenx-2\log(ex+d)\,b\,e^2n\,x^2+4\log(x^nc)\,bdex+2\log(x^nc)\,b\,e^2x^2}{4d^2e\,(e^2x^2+2dex+d^2)}$$

input
```
int((a+b*log(c*x^n))/(e*x+d)^3,x)
```

output
```
( - 2*log(d + e*x)*b*d**2*n - 4*log(d + e*x)*b*d*e*n*x - 2*log(d + e*x)*b*
e**2*n*x**2 + 4*log(x**n*c)*b*d*e*x + 2*log(x**n*c)*b*e**2*x**2 - 2*a*d**2
 + b*d**2*n - b*e**2*n*x**2)/(4*d**2*e*(d**2 + 2*d*e*x + e**2*x**2))
```

3.50 $\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx$

Optimal result 497
Mathematica [A] (verified) 497
Rubi [A] (verified) 498
Maple [C] (warning: unable to verify) 501
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Maxima [F] 502
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Mupad [F(-1)] 503
Reduce [F] 503

Optimal result

Integrand size = 21, antiderivative size = 134

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx = &-\frac{bn}{2d^2(d+ex)}-\frac{bn\log(x)}{2d^3}+\frac{a+b\log(cx^n)}{2d(d+ex)^2}\\&-\frac{ex(a+b\log(cx^n))}{d^3(d+ex)}-\frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^3}\\&+\frac{3bn\log(d+ex)}{2d^3}+\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^3}\end{aligned}$$

output
```
-1/2*b*n/d^2/(e*x+d)-1/2*b*n*ln(x)/d^3+1/2*(a+b*ln(c*x^n))/d/(e*x+d)^2-e*x
*(a+b*ln(c*x^n))/d^3/(e*x+d)-ln(1+d/e/x)*(a+b*ln(c*x^n))/d^3+3/2*b*n*ln(e*
x+d)/d^3+b*n*polylog(2,-d/e/x)/d^3
```

Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.05

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx$$
$$=\frac{\frac{d^2(a+b\log(cx^n))}{(d+ex)^2}+\frac{2d(a+b\log(cx^n))}{d+ex}+\frac{(a+b\log(cx^n))^2}{bn}-2bn(\log(x)-\log(d+ex))+bn\left(-\frac{d}{d+ex}-\log(x)+\log(d\right.}{2d^3}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x)^3),x]
```

output
```
((d^2*(a + b*Log[c*x^n]))/(d + e*x)^2 + (2*d*(a + b*Log[c*x^n]))/(d + e*x)
 + (a + b*Log[c*x^n])^2/(b*n) - 2*b*n*(Log[x] - Log[d + e*x]) + b*n*(-(d/(
d + e*x)) - Log[x] + Log[d + e*x]) - 2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d]
 - 2*b*n*PolyLog[2, -((e*x)/d)])/(2*d^3)
```

Rubi [A] (verified)

Time = 0.72 (sec) , antiderivative size = 168, normalized size of antiderivative = 1.25, number of steps used = 9, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.429$, Rules used = {2789, 2756, 54, 2009, 2789, 2751, 16, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx$$

$$\Big\downarrow \text{2789}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^3}dx}{d}$$

$$\Big\downarrow \text{2756}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(d+ex)^2}dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \text{54}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \left(-\frac{e}{d^2(d+ex)}-\frac{e}{d(d+ex)^2}+\frac{1}{d^2x}\right)dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \text{2009}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \text{2789}$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}$$

$\Big\downarrow$ 2751

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int \frac{1}{d+ex}dx}{d}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}$$

$\Big\downarrow$ 16

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}$$

$\Big\downarrow$ 2779

$$\frac{\frac{\frac{bn\int \frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}$$

$\Big\downarrow$ 2838

$$\frac{\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x)^3),x]
```

output
```
-((e*(-1/2*(a + b*Log[c*x^n])/(e*(d + e*x)^2) + (b*n*(1/(d*(d + e*x)) + Lo
g[x]/d^2 - Log[d + e*x]/d^2))/(2*e)))/d) + (-((e*((x*(a + b*Log[c*x^n]))/(
d*(d + e*x)) - (b*n*Log[d + e*x])/(d*e)))/d) + (-((Log[1 + d/(e*x)]*(a + b
*Log[c*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x))])/d)/d)/d
```

Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.73 (sec) , antiderivative size = 273, normalized size of antiderivative = 2.04

method	result
risch	$-\frac{b\ln(x^n)\ln(ex+d)}{d^3}+\frac{b\ln(x^n)}{d^2(ex+d)}+\frac{b\ln(x^n)}{2d(ex+d)^2}+\frac{b\ln(x^n)\ln(x)}{d^3}-\frac{bn}{2d^2(ex+d)}+\frac{3bn\ln(ex+d)}{2d^3}-\frac{3bn\ln(x)}{2d^3}-\frac{bn\ln(x)^2}{2d^3}$

input
```
int((a+b*ln(c*x^n))/x/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)/d^3*ln(e*x+d)+b*ln(x^n)/d^2/(e*x+d)+1/2*b*ln(x^n)/d/(e*x+d)^2+b
*ln(x^n)/d^3*ln(x)-1/2*b*n/d^2/(e*x+d)+3/2*b*n*ln(e*x+d)/d^3-3/2*b*n*ln(x)
/d^3-1/2*b*n/d^3*ln(x)^2+b*n/d^3*ln(e*x+d)*ln(-e*x/d)+b*n/d^3*dilog(-e*x/d
)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*
x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(
I*c)+b*ln(c)+a)*(-1/d^3*ln(e*x+d)+1/d^2/(e*x+d)+1/2/d/(e*x+d)^2+1/d^3*ln(x
))
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^3*x^4 + 3*d*e^2*x^3 + 3*d^2*e*x^2 + d^3*x),
 x)
```

Sympy [A] (verification not implemented)

Time = 45.71 (sec) , antiderivative size = 352, normalized size of antiderivative = 2.63

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x+d)**3,x)
```

output
```
-a*e*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d - a*e*
Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d**2 - a*e*Piecew
ise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/d**3 + a*log(x)/d**3 + b*e**2
*n*Piecewise((-1/(e**3*x), Eq(d, 0)), (-1/(2*d*e**2 + 2*e**3*x) - log(d +
e*x)/(2*d*e**2), True))/d**2 - b*e**2*Piecewise((1/(e**3*x), Eq(d, 0)), (-
1/(2*d*(d/x + e)**2), True))*log(c*x**n)/d**2 - 2*b*e*n*Piecewise((-1/(e**
2*x), Eq(d, 0)), (-log(d**2 + d*e*x)/(d*e), True))/d**2 + 2*b*e*Piecewise(
(1/(e**2*x), Eq(d, 0)), (-1/(d**2/x + d*e), True))*log(c*x**n)/d**2 + b*n*
Piecewise((-1/(e*x), Eq(d, 0)), (Piecewise((polylog(2, d*exp_polar(I*pi)/(
e*x)), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) + polylog(2, d*exp_p
olar(I*pi)/(e*x)), Abs(x) < 1), (-log(e)*log(1/x) + polylog(2, d*exp_polar
(I*pi)/(e*x)), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log
(e) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(e) + polylog(2, d*exp_pol
ar(I*pi)/(e*x)), True))/d, True))/d**2 - b*Piecewise((1/(e*x), Eq(d, 0)),
(log(d/x + e)/d, True))*log(c*x**n)/d**2
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^3,x, algorithm="maxima")
```

output
```
1/2*a*((2*e*x + 3*d)/(d^2*e^2*x^2 + 2*d^3*e*x + d^4) - 2*log(e*x + d)/d^3
+ 2*log(x)/d^3) + b*integrate((log(c) + log(x^n))/(e^3*x^4 + 3*d*e^2*x^3 +
 3*d^2*e*x^2 + d^3*x), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^3*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x\,(d+e\,x)^3}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x)^3),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x)^3), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx$$
$$= \frac{2\left(\int \frac{\log(x^nc)}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+d^3x}dx\right)b\,d^5+4\left(\int \frac{\log(x^nc)}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+d^3x}dx\right)b\,d^4ex+2\left(\int \frac{\log(x^nc)}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+d^3x}d\right.}{}$$

input
```
int((a+b*log(c*x^n))/x/(e*x+d)^3,x)
```

output
```
(2*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)
*b*d**5 + 4*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3
*x**4),x)*b*d**4*e*x + 2*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**
2*x**3 + e**3*x**4),x)*b*d**3*e**2*x**2 - 2*log(d + e*x)*a*d**2 - 4*log(d
+ e*x)*a*d*e*x - 2*log(d + e*x)*a*e**2*x**2 + 2*log(x)*a*d**2 + 4*log(x)*a
*d*e*x + 2*log(x)*a*e**2*x**2 + 2*a*d**2 - a*e**2*x**2)/(2*d**3*(d**2 + 2*
d*e*x + e**2*x**2))
```

3.51 $\int \frac{a+b\log(cx^n)}{x^2(d+ex)^3}\,dx$

Optimal result 505
Mathematica [A] (verified) 506
Rubi [A] (verified) 506
Maple [C] (warning: unable to verify) 507
Fricas [F] 508
Sympy [A] (verification not implemented) 508
Maxima [F] 509
Giac [F] 510
Mupad [F(-1)] 510
Reduce [F] 510

Optimal result

Integrand size = 21, antiderivative size = 171

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^3}\,dx = -\frac{bn}{d^3x}+\frac{ben}{2d^3(d+ex)}+\frac{ben\log(x)}{2d^4}-\frac{a+b\log(cx^n)}{d^3x}-\frac{e(a+b\log(cx^n))}{2d^2(d+ex)^2}+\frac{2e^2x(a+b\log(cx^n))}{d^4(d+ex)}+\frac{3e\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^4}-\frac{5ben\log(d+ex)}{2d^4}-\frac{3ben\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}$$

output
```
-b*n/d^3/x+1/2*b*e*n/d^3/(e*x+d)+1/2*b*e*n*ln(x)/d^4-(a+b*ln(c*x^n))/d^3/x
-1/2*e*(a+b*ln(c*x^n))/d^2/(e*x+d)^2+2*e^2*x*(a+b*ln(c*x^n))/d^4/(e*x+d)+3
*e*ln(1+d/e/x)*(a+b*ln(c*x^n))/d^4-5/2*b*e*n*ln(e*x+d)/d^4-3*b*e*n*polylog
(2,-d/e/x)/d^4
```

Mathematica [A] (verified)

Time = 0.21 (sec) , antiderivative size = 173, normalized size of antiderivative = 1.01

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^3}\,dx$$
$$= \frac{-\frac{2bdn}{x}-\frac{2d(a+b\log(cx^n))}{x}-\frac{d^2e(a+b\log(cx^n))}{(d+ex)^2}-\frac{4de(a+b\log(cx^n))}{d+ex}-\frac{3e(a+b\log(cx^n))^2}{bn}+4ben(\log(x)-\log(d+ex))}{2d^4}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x)^3),x]
```

output
```
((-2*b*d*n)/x - (2*d*(a + b*Log[c*x^n]))/x - (d^2*e*(a + b*Log[c*x^n]))/(d
 + e*x)^2 - (4*d*e*(a + b*Log[c*x^n]))/(d + e*x) - (3*e*(a + b*Log[c*x^n])
^2)/(b*n) + 4*b*e*n*(Log[x] - Log[d + e*x]) + b*e*n*(d/(d + e*x) + Log[x]
- Log[d + e*x]) + 6*e*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] + 6*b*e*n*PolyLo
g[2, -((e*x)/d)])/(2*d^4)
```

Rubi [A] (verified)

Time = 0.47 (sec) , antiderivative size = 171, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^3}\,dx$$
$$\Big\downarrow \text{2793}$$
$$\int \left(\frac{2e^2(a+b\log(cx^n))}{d^3(d+ex)^2}-\frac{3e(a+b\log(cx^n))}{d^3x(d+ex)}+\frac{a+b\log(cx^n)}{d^3x^2}+\frac{e^2(a+b\log(cx^n))}{d^2(d+ex)^3}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{2e^2x(a+b\log(cx^n))}{d^4(d+ex)}+\frac{3e\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^4}-\frac{a+b\log(cx^n)}{d^3x}-\frac{e(a+b\log(cx^n))}{2d^2(d+ex)^2}-\frac{3ben\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}+\frac{ben\log(x)}{2d^4}-\frac{5ben\log(d+ex)}{2d^4}+\frac{ben}{2d^3(d+ex)}-\frac{bn}{d^3x}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x)^3),x]
```

output
```
-((b*n)/(d^3*x)) + (b*e*n)/(2*d^3*(d + e*x)) + (b*e*n*Log[x])/(2*d^4) - (a
 + b*Log[c*x^n])/(d^3*x) - (e*(a + b*Log[c*x^n]))/(2*d^2*(d + e*x)^2) + (2
*e^2*x*(a + b*Log[c*x^n]))/(d^4*(d + e*x)) + (3*e*Log[1 + d/(e*x)]*(a + b*
Log[c*x^n]))/d^4 - (5*b*e*n*Log[d + e*x])/(2*d^4) - (3*b*e*n*PolyLog[2, -(
d/(e*x))])/d^4
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.92 (sec) , antiderivative size = 324, normalized size of antiderivative = 1.89

method	result
risch	$-\frac{b\ln(x^n)e}{2d^2(ex+d)^2}+\frac{3b\ln(x^n)e\ln(ex+d)}{d^4}-\frac{2b\ln(x^n)e}{d^3(ex+d)}-\frac{b\ln(x^n)}{d^3x}-\frac{3b\ln(x^n)e\ln(x)}{d^4}+\frac{3bne\ln(x)^2}{2d^4}-\frac{3bne\ln(ex+d)\ln\left(-\frac{ex}{d}\right.}{d^4}$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-1/2*b*ln(x^n)/d^2/(e*x+d)^2*e+3*b*ln(x^n)/d^4*e*ln(e*x+d)-2*b*ln(x^n)/d^3
*e/(e*x+d)-b*ln(x^n)/d^3/x-3*b*ln(x^n)/d^4*e*ln(x)+3/2*b*n/d^4*e*ln(x)^2-3
*b*n/d^4*e*ln(e*x+d)*ln(-e*x/d)-3*b*n/d^4*e*dilog(-e*x/d)+1/2*b*e*n/d^3/(e
*x+d)-5/2*b*e*n*ln(e*x+d)/d^4-b*n/d^3/x+5/2*b*e*n*ln(x)/d^4+(1/2*I*Pi*b*cs
gn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1
/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*
(-1/2/d^2/(e*x+d)^2*e+3/d^4*e*ln(e*x+d)-2/d^3*e/(e*x+d)-1/d^3/x-3/d^4*e*ln
(x))
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^3}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)^3x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^3*x^5 + 3*d*e^2*x^4 + 3*d^2*e*x^3 + d^3*x^2
), x)
```

Sympy [A] (verification not implemented)

Time = 45.74 (sec) , antiderivative size = 444, normalized size of antiderivative = 2.60

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^3}\,dx=\text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x+d)**3,x)
```

output
```
a*e**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d**2 +
 2*a*e**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d**3 -
a/(d**3*x) + 3*a*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/d
**4 - 3*a*e*log(x)/d**4 - b*e**2*n*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*d*
*2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e), True))/d
**2 + b*e**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))*
log(c*x**n)/d**2 - 2*b*e**2*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e)
 + log(d/e + x)/(d*e), True))/d**3 + 2*b*e**2*Piecewise((x/d**2, Eq(e, 0))
, (-1/(d*e + e**2*x), True))*log(c*x**n)/d**3 - b*n/(d**3*x) - b*log(c*x**
n)/(d**3*x) - 3*b*e**2*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2
, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) -
 polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polyl
og(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0,
0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polyl
og(2, e*x*exp_polar(I*pi)/d), True))/e, True))/d**4 + 3*b*e**2*Piecewise((
x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/d**4 + 3*b*e*n*log(x)*
*2/(2*d**4) - 3*b*e*log(x)*log(c*x**n)/d**4
```

Maxima [F]

$$\int \frac{a + b\log(cx^n)}{x^2(d + ex)^3}\,dx = \int \frac{b\log(cx^n) + a}{(ex + d)^3x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^3,x, algorithm="maxima")
```

output
```
-1/2*a*((6*e^2*x^2 + 9*d*e*x + 2*d^2)/(d^3*e^2*x^3 + 2*d^4*e*x^2 + d^5*x)
- 6*e*log(e*x + d)/d^4 + 6*e*log(x)/d^4) + b*integrate((log(c) + log(x^n))
/(e^3*x^5 + 3*d*e^2*x^4 + 3*d^2*e*x^3 + d^3*x^2), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^3}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^3x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^3*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^3}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^2\,(d+e\,x)^3}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^3),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^3), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^3}\,dx = \frac{2\left(\int \frac{\log(x^n c)}{e^3x^5+3d\,e^2x^4+3d^2e\,x^3+d^3x^2}dx\right)b\,d^6x+4\left(\int \frac{\log(x^n c)}{e^3x^5+3d\,e^2x^4+3d^2e\,x^3+d^3x^2}dx\right)b\,d^5e\,x^2+2\left(\int \frac{\log(x^n c)}{e^3x^5+3d\,e^2x^4+3d^2e\,x^3+\cdots}\right.}{}$$

input
```
int((a+b*log(c*x^n))/x^2/(e*x+d)^3,x)
```

output
```
(2*int(log(x**n*c)/(d**3*x**2 + 3*d**2*e*x**3 + 3*d*e**2*x**4 + e**3*x**5)
,x)*b*d**6*x + 4*int(log(x**n*c)/(d**3*x**2 + 3*d**2*e*x**3 + 3*d*e**2*x**
4 + e**3*x**5),x)*b*d**5*e*x**2 + 2*int(log(x**n*c)/(d**3*x**2 + 3*d**2*e*
x**3 + 3*d*e**2*x**4 + e**3*x**5),x)*b*d**4*e**2*x**3 + 6*log(d + e*x)*a*d
**2*e*x + 12*log(d + e*x)*a*d*e**2*x**2 + 6*log(d + e*x)*a*e**3*x**3 - 6*l
og(x)*a*d**2*e*x - 12*log(x)*a*d*e**2*x**2 - 6*log(x)*a*e**3*x**3 - 2*a*d*
*3 - 6*a*d**2*e*x + 3*a*e**3*x**3)/(2*d**4*x*(d**2 + 2*d*e*x + e**2*x**2))
```

3.52 $\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx$

Optimal result 512
Mathematica [A] (verified) 513
Rubi [A] (verified) 513
Maple [C] (warning: unable to verify) 514
Fricas [F] 515
Sympy [A] (verification not implemented) 515
Maxima [F] 516
Giac [F] 517
Mupad [F(-1)] 517
Reduce [F] 517

Optimal result

Integrand size = 21, antiderivative size = 217

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx = &-\frac{bn}{4d^3x^2}+\frac{3ben}{d^4x}-\frac{be^2n}{2d^4(d+ex)}-\frac{be^2n\log(x)}{2d^5}\\ &-\frac{a+b\log(cx^n)}{2d^3x^2}+\frac{3e(a+b\log(cx^n))}{d^4x}+\frac{e^2(a+b\log(cx^n))}{2d^3(d+ex)^2}\\ &-\frac{3e^3x(a+b\log(cx^n))}{d^5(d+ex)}-\frac{6e^2\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^5}\\ &+\frac{7be^2n\log(d+ex)}{2d^5}+\frac{6be^2n\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^5}\end{aligned}$$

output
```
-1/4*b*n/d^3/x^2+3*b*e*n/d^4/x-1/2*b*e^2*n/d^4/(e*x+d)-1/2*b*e^2*n*ln(x)/d
^5-1/2*(a+b*ln(c*x^n))/d^3/x^2+3*e*(a+b*ln(c*x^n))/d^4/x+1/2*e^2*(a+b*ln(c
*x^n))/d^3/(e*x+d)^2-3*e^3*x*(a+b*ln(c*x^n))/d^5/(e*x+d)-6*e^2*ln(1+d/e/x)
*(a+b*ln(c*x^n))/d^5+7/2*b*e^2*n*ln(e*x+d)/d^5+6*b*e^2*n*polylog(2,-d/e/x)
/d^5
```

Mathematica [A] (verified)

Time = 0.48 (sec) , antiderivative size = 227, normalized size of antiderivative = 1.05

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx =$$
$$-\frac{\frac{bd^2n}{x^2}-\frac{12bden}{x}+\frac{2d^2(a+b\log(cx^n))}{x^2}-\frac{12de(a+b\log(cx^n))}{x}-\frac{2d^2e^2(a+b\log(cx^n))}{(d+ex)^2}-\frac{12de^2(a+b\log(cx^n))}{d+ex}-\frac{12e^2(a+b\log(cx^n))}{bn}}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x)^3),x]
```

output
```
-1/4*((b*d^2*n)/x^2 - (12*b*d*e*n)/x + (2*d^2*(a + b*Log[c*x^n]))/x^2 - (1
2*d*e*(a + b*Log[c*x^n]))/x - (2*d^2*e^2*(a + b*Log[c*x^n]))/(d + e*x)^2 -
 (12*d*e^2*(a + b*Log[c*x^n]))/(d + e*x) - (12*e^2*(a + b*Log[c*x^n])^2)/(
b*n) + 12*b*e^2*n*(Log[x] - Log[d + e*x]) + (2*b*e^2*n*(d + (d + e*x)*Log[
x] - (d + e*x)*Log[d + e*x]))/(d + e*x) + 24*e^2*(a + b*Log[c*x^n])*Log[1
+ (e*x)/d] + 24*b*e^2*n*PolyLog[2, -((e*x)/d)])/d^5
```

Rubi [A] (verified)

Time = 0.56 (sec) , antiderivative size = 217, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx$$
$$\Big\downarrow \text{2793}$$
$$\int \left(-\frac{3e^3(a+b\log(cx^n))}{d^4(d+ex)^2}+\frac{6e^2(a+b\log(cx^n))}{d^4x(d+ex)}-\frac{3e(a+b\log(cx^n))}{d^4x^2}-\frac{e^3(a+b\log(cx^n))}{d^3(d+ex)^3}+\frac{a+b\log(cx^n)}{d^3x^3}\right)$$
$$\Big\downarrow \text{2009}$$

$$-\frac{3e^3x(a+b\log(cx^n))}{d^5(d+ex)}-\frac{6e^2\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^5}+\frac{3e(a+b\log(cx^n))}{d^4x}+\frac{e^2(a+b\log(cx^n))}{2d^3(d+ex)^2}-\frac{a+b\log(cx^n)}{2d^3x^2}+\frac{6be^2n\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^5}-\frac{be^2n\log(x)}{2d^5}+\frac{7be^2n\log(d+ex)}{2d^5}-\frac{be^2n}{2d^4(d+ex)}+\frac{3ben}{d^4x}-\frac{bn}{4d^3x^2}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x)^3),x]
```

output
```
-1/4*(b*n)/(d^3*x^2) + (3*b*e*n)/(d^4*x) - (b*e^2*n)/(2*d^4*(d + e*x)) - (
b*e^2*n*Log[x])/(2*d^5) - (a + b*Log[c*x^n])/(2*d^3*x^2) + (3*e*(a + b*Log
[c*x^n]))/(d^4*x) + (e^2*(a + b*Log[c*x^n]))/(2*d^3*(d + e*x)^2) - (3*e^3*
x*(a + b*Log[c*x^n]))/(d^5*(d + e*x)) - (6*e^2*Log[1 + d/(e*x)]*(a + b*Log
[c*x^n]))/d^5 + (7*b*e^2*n*Log[d + e*x])/(2*d^5) + (6*b*e^2*n*PolyLog[2, -
(d/(e*x))])/d^5
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.19 (sec) , antiderivative size = 386, normalized size of antiderivative = 1.78

method	result
risch	$-\frac{6b\ln(x^n)e^2\ln(ex+d)}{d^5}+\frac{3b\ln(x^n)e^2}{d^4(ex+d)}+\frac{b\ln(x^n)e^2}{2d^3(ex+d)^2}-\frac{b\ln(x^n)}{2d^3x^2}+\frac{6b\ln(x^n)e^2\ln(x)}{d^5}+\frac{3b\ln(x^n)e}{d^4x}-\frac{b\,e^2n}{2d^4(ex+d)}+\frac{7b\,e^2}{}$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-6*b*ln(x^n)/d^5*e^2*ln(e*x+d)+3*b*ln(x^n)/d^4*e^2/(e*x+d)+1/2*b*ln(x^n)/d
^3*e^2/(e*x+d)^2-1/2*b*ln(x^n)/d^3/x^2+6*b*ln(x^n)/d^5*e^2*ln(x)+3*b*ln(x^
n)/d^4*e/x-1/2*b*e^2*n/d^4/(e*x+d)+7/2*b*e^2*n*ln(e*x+d)/d^5-1/4*b*n/d^3/x
^2+3*b*e*n/d^4/x-7/2*b*e^2*n*ln(x)/d^5-3*b*n/d^5*e^2*ln(x)^2+6*b*n/d^5*e^2
*ln(e*x+d)*ln(-e*x/d)+6*b*n/d^5*e^2*dilog(-e*x/d)+(1/2*I*Pi*b*csgn(I*x^n)*
csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*
csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(-6/d^5*e^
2*ln(e*x+d)+3/d^4*e^2/(e*x+d)+1/2/d^3*e^2/(e*x+d)^2-1/2/d^3/x^2+6/d^5*e^2*
ln(x)+3/d^4*e/x)
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^3x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^3*x^6 + 3*d*e^2*x^5 + 3*d^2*e*x^4 + d^3*x^3
), x)
```

Sympy [A] (verification not implemented)

Time = 50.00 (sec) , antiderivative size = 496, normalized size of antiderivative = 2.29

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x+d)**3,x)
```

output
```
-a*e**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d**3
- a/(2*d**3*x**2) - 3*a*e**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2
*x), True))/d**4 + 3*a*e/(d**4*x) - 6*a*e**3*Piecewise((x/d, Eq(e, 0)), (l
og(d + e*x)/e, True))/d**5 + 6*a*e**2*log(x)/d**5 + b*e**3*n*Piecewise((x/
d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + log(d/e
 + x)/(2*d**2*e), True))/d**3 - b*e**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(
2*e*(d + e*x)**2), True))*log(c*x**n)/d**3 - b*n/(4*d**3*x**2) - b*log(c*x
**n)/(2*d**3*x**2) + 3*b*e**3*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*
e) + log(d/e + x)/(d*e), True))/d**4 - 3*b*e**3*Piecewise((x/d**2, Eq(e, 0
)), (-1/(d*e + e**2*x), True))*log(c*x**n)/d**4 + 3*b*e*n/(d**4*x) + 3*b*e
*log(c*x**n)/(d**4*x) + 6*b*e**3*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((
-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d
)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/
x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1,
1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(
d) - polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/d**5 - 6*b*e**3*P
iecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/d**5 - 3*b*e
**2*n*log(x)**2/d**5 + 6*b*e**2*log(x)*log(c*x**n)/d**5
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^3x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^3,x, algorithm="maxima")
```

output
```
1/2*a*((12*e^3*x^3 + 18*d*e^2*x^2 + 4*d^2*e*x - d^3)/(d^4*e^2*x^4 + 2*d^5*
e*x^3 + d^6*x^2) - 12*e^2*log(e*x + d)/d^5 + 12*e^2*log(x)/d^5) + b*integr
ate((log(c) + log(x^n))/(e^3*x^6 + 3*d*e^2*x^5 + 3*d^2*e*x^4 + d^3*x^3), x
)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)^3x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^3*x^3), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{x^3\,(d+e\,x)^3}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^3),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^3), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx$$
$$=\frac{2\left(\int \frac{\log(x^nc)}{e^3x^6+3d\,e^2x^5+3d^2e\,x^4+d^3x^3}dx\right)b\,d^7x^2+4\left(\int \frac{\log(x^nc)}{e^3x^6+3d\,e^2x^5+3d^2e\,x^4+d^3x^3}dx\right)b\,d^6e\,x^3+2\left(\int \frac{\log(x^nc)}{e^3x^6+3d\,e^2x^5+3d^2e\,x^4}\right.}{}$$

input
```
int((a+b*log(c*x^n))/x^3/(e*x+d)^3,x)
```

output
```
(2*int(log(x**n*c)/(d**3*x**3 + 3*d**2*e*x**4 + 3*d*e**2*x**5 + e**3*x**6)
,x)*b*d**7*x**2 + 4*int(log(x**n*c)/(d**3*x**3 + 3*d**2*e*x**4 + 3*d*e**2*
x**5 + e**3*x**6),x)*b*d**6*e*x**3 + 2*int(log(x**n*c)/(d**3*x**3 + 3*d**2
*e*x**4 + 3*d*e**2*x**5 + e**3*x**6),x)*b*d**5*e**2*x**4 - 12*log(d + e*x)
*a*d**2*e**2*x**2 - 24*log(d + e*x)*a*d*e**3*x**3 - 12*log(d + e*x)*a*e**4
*x**4 + 12*log(x)*a*d**2*e**2*x**2 + 24*log(x)*a*d*e**3*x**3 + 12*log(x)*a
*e**4*x**4 - a*d**4 + 4*a*d**3*e*x + 12*a*d**2*e**2*x**2 - 6*a*e**4*x**4)/
(2*d**5*x**2*(d**2 + 2*d*e*x + e**2*x**2))
```

3.53 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4} dx$

Optimal result 519
Mathematica [A] (verified) 520
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Maxima [F] 524
Giac [F] 525
Mupad [F(-1)] 525
Reduce [F] 525

Optimal result

Integrand size = 21, antiderivative size = 229

$$\begin{aligned}\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4}\,dx &= \frac{10bdnx}{e^5}-\frac{d(60a+47bn)x}{6e^5}-\frac{5bnx^2}{2e^4}-\frac{10bdx\log(cx^n)}{e^5}\\ &\quad-\frac{x^5(a+b\log(cx^n))}{3e(d+ex)^3}-\frac{x^4(5a+bn+5b\log(cx^n))}{6e^2(d+ex)^2}\\ &\quad-\frac{x^3(20a+9bn+20b\log(cx^n))}{6e^3(d+ex)}\\ &\quad+\frac{x^2(60a+47bn+60b\log(cx^n))}{12e^4}\\ &\quad+\frac{d^2(60a+47bn+60b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{6e^6}\\ &\quad+\frac{10bd^2n\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^6}\end{aligned}$$

output
```
10*b*d*n*x/e^5-1/6*d*(47*b*n+60*a)*x/e^5-5/2*b*n*x^2/e^4-10*b*d*x*ln(c*x^n
)/e^5-1/3*x^5*(a+b*ln(c*x^n))/e/(e*x+d)^3-1/6*x^4*(5*a+b*n+5*b*ln(c*x^n))/
e^2/(e*x+d)^2-1/6*x^3*(20*a+9*b*n+20*b*ln(c*x^n))/e^3/(e*x+d)+1/12*x^2*(60
*a+47*b*n+60*b*ln(c*x^n))/e^4+1/6*d^2*(60*a+47*b*n+60*b*ln(c*x^n))*ln(1+e*
x/d)/e^6+10*b*d^2*n*polylog(2,-e*x/d)/e^6
```

Mathematica [A] (verified)

Time = 0.37 (sec) , antiderivative size = 249, normalized size of antiderivative = 1.09

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4}\,dx$$
$$= \frac{-48adex+48bdenx-3be^2nx^2-48bdex\log(cx^n)+6e^2x^2(a+b\log(cx^n))+\frac{4d^5(a+b\log(cx^n))}{(d+ex)^3}-\frac{30d^4(a+b\log}{(d+ex}}{}$$

input
```
Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
(-48*a*d*e*x + 48*b*d*e*n*x - 3*b*e^2*n*x^2 - 48*b*d*e*x*Log[c*x^n] + 6*e^
2*x^2*(a + b*Log[c*x^n]) + (4*d^5*(a + b*Log[c*x^n]))/(d + e*x)^3 - (30*d^
4*(a + b*Log[c*x^n]))/(d + e*x)^2 + (120*d^3*(a + b*Log[c*x^n]))/(d + e*x)
 - 2*b*d^2*n*((d*(3*d + 2*e*x))/(d + e*x)^2 + 2*Log[x] - 2*Log[d + e*x]) -
 120*b*d^2*n*(Log[x] - Log[d + e*x]) + 30*b*d^2*n*(d/(d + e*x) + Log[x] -
Log[d + e*x]) + 120*d^2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] + 120*b*d^2*n*
PolyLog[2, -((e*x)/d)])/(12*e^6)
```

Rubi [A] (verified)

Time = 0.76 (sec) , antiderivative size = 241, normalized size of antiderivative = 1.05, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.238$, Rules used = {2784, 2784, 2784, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4}\,dx$$
$$\Big\downarrow \text{2784}$$
$$\frac{\int \frac{x^4(5a+bn+5b\log(cx^n))}{(d+ex)^3}dx}{3e}-\frac{x^5(a+b\log(cx^n))}{3e(d+ex)^3}$$
$$\Big\downarrow \text{2784}$$

$$\frac{\frac{\int \frac{x^3(20a+9bn+20b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^4(5a+5b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^5(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \text{2784}$$

$$\frac{\frac{\frac{\int \frac{x^2(60a+47bn+60b\log(cx^n))}{d+ex}dx}{e}-\frac{x^3(20a+20b\log(cx^n)+9bn)}{e(d+ex)}}{2e}-\frac{x^4(5a+5b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^5(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \text{2793}$$

$$\frac{\frac{\frac{\int \left(\frac{(60a+47bn+60b\log(cx^n))d^2}{e^2(d+ex)}-\frac{(60a+47bn+60b\log(cx^n))d}{e^2}+\frac{x(60a+47bn+60b\log(cx^n))}{e}\right)dx}{e}-\frac{x^3(20a+20b\log(cx^n)+9bn)}{e(d+ex)}}{2e}-\frac{x^4(5a+5b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}$$
$$\frac{x^5(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{\frac{\frac{d^2\log\left(\frac{ex}{d}+1\right)(60a+60b\log(cx^n)+47bn)}{e^3}+\frac{x^2(60a+60b\log(cx^n)+47bn)}{2e}-\frac{dx(60a+47bn)}{e^2}-\frac{60bdx\log(cx^n)}{e^2}+\frac{60bd^2n\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}+\frac{60bdnx}{e^2}-\frac{15bnx^2}{e}}{e}-\frac{x^3(}{}}{2e}}{3e}$$
$$\frac{x^5(a+b\log(cx^n))}{3e(d+ex)^3}$$

input
```
Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
-1/3*(x^5*(a + b*Log[c*x^n]))/(e*(d + e*x)^3) + (-1/2*(x^4*(5*a + b*n + 5*
b*Log[c*x^n]))/(e*(d + e*x)^2) + (-((x^3*(20*a + 9*b*n + 20*b*Log[c*x^n]))
/(e*(d + e*x))) + ((60*b*d*n*x)/e^2 - (d*(60*a + 47*b*n)*x)/e^2 - (15*b*n*
x^2)/e - (60*b*d*x*Log[c*x^n])/e^2 + (x^2*(60*a + 47*b*n + 60*b*Log[c*x^n]
))/(2*e) + (d^2*(60*a + 47*b*n + 60*b*Log[c*x^n])*Log[1 + (e*x)/d])/e^3 +
(60*b*d^2*n*PolyLog[2, -((e*x)/d)])/e^3)/e)/(2*e))/(3*e)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.91 (sec) , antiderivative size = 405, normalized size of antiderivative = 1.77

method	result
risch	$\frac{b\ln(x^n)x^2}{2e^4} - \frac{4b\ln(x^n)dx}{e^5} + \frac{10b\ln(x^n)d^3}{e^6(ex+d)} + \frac{10b\ln(x^n)d^2\ln(ex+d)}{e^6} - \frac{5b\ln(x^n)d^4}{2e^6(ex+d)^2} + \frac{b\ln(x^n)d^5}{3e^6(ex+d)^3} - \frac{bn\,x^2}{4e^4} + \frac{4bdnx}{e^5} +$

input
```
int(x^5*(a+b*ln(c*x^n))/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/e^4*x^2-4*b*ln(x^n)/e^5*d*x+10*b*ln(x^n)/e^6*d^3/(e*x+d)+10*
b*ln(x^n)/e^6*d^2*ln(e*x+d)-5/2*b*ln(x^n)/e^6*d^4/(e*x+d)^2+1/3*b*ln(x^n)*
d^5/e^6/(e*x+d)^3-1/4*b*n*x^2/e^4+4*b*d*n*x/e^5+17/4*b*n/e^6*d^2+47/6*b*n/
e^6*d^2*ln(e*x+d)+13/6*b*n/e^6*d^3/(e*x+d)-1/6*b*n/e^6*d^4/(e*x+d)^2-47/6*
b*n/e^6*d^2*ln(e*x)-10*b*n/e^6*d^2*ln(e*x+d)*ln(-e*x/d)-10*b*n/e^6*d^2*dil
og(-e*x/d)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*
csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n
)^2*csgn(I*c)+b*ln(c)+a)*(1/e^5*(1/2*e*x^2-4*d*x)+10/e^6*d^3/(e*x+d)+10/e^
6*d^2*ln(e*x+d)-5/2/e^6*d^4/(e*x+d)^2+1/3*d^5/e^6/(e*x+d)^3)
```

Fricas [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{(ex+d)^4}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b*x^5*log(c*x^n) + a*x^5)/(e^4*x^4 + 4*d*e^3*x^3 + 6*d^2*e^2*x^2
 + 4*d^3*e*x + d^4), x)
```

Sympy [A] (verification not implemented)

Time = 74.08 (sec) , antiderivative size = 617, normalized size of antiderivative = 2.69

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4}\,dx = \text{Too large to display}$$

input
```
integrate(x**5*(a+b*ln(c*x**n))/(e*x+d)**4,x)
```

output
```
-a*d**5*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/e**5
+ 5*a*d**4*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/e*
*5 - 10*a*d**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e*
*5 + 10*a*d**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**5 - 4
*a*d*x/e**5 + a*x**2/(2*e**4) + b*d**5*n*Piecewise((x/d**4, Eq(e, 0)), (-3
*d/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - 2*e*x/(6*d**4*e + 12*d
**3*e**2*x + 6*d**2*e**3*x**2) - log(x)/(3*d**3*e) + log(d/e + x)/(3*d**3*
e), True))/e**5 - b*d**5*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)*
*3), True))*log(c*x**n)/e**5 - 5*b*d**4*n*Piecewise((x/d**3, Eq(e, 0)), (-
1/(2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e), T
rue))/e**5 + 5*b*d**4*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2)
, True))*log(c*x**n)/e**5 + 10*b*d**3*n*Piecewise((x/d**2, Eq(e, 0)), (-lo
g(x)/(d*e) + log(d/e + x)/(d*e), True))/e**5 - 10*b*d**3*Piecewise((x/d**2
, Eq(e, 0)), (-1/(d*e + e**2*x), True))*log(c*x**n)/e**5 - 10*b*d**2*n*Pie
cewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (A
bs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*
pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d)
, 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg
(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d)
, True))/e, True))/e**5 + 10*b*d**2*Piecewise((x/d, Eq(e, 0)), (log(d +...
```

Maxima [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{(ex+d)^4}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/6*a*((60*d^3*e^2*x^2 + 105*d^4*e*x + 47*d^5)/(e^9*x^3 + 3*d*e^8*x^2 + 3*
d^2*e^7*x + d^3*e^6) + 60*d^2*log(e*x + d)/e^6 + 3*(e*x^2 - 8*d*x)/e^5) +
b*integrate((x^5*log(c) + x^5*log(x^n))/(e^4*x^4 + 4*d*e^3*x^3 + 6*d^2*e^2
*x^2 + 4*d^3*e*x + d^4), x)
```

Giac [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{(ex+d)^4}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^5/(e*x + d)^4, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4}\,dx = \int \frac{x^5\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^4}\,dx$$

input
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x)^4,x)
```

output
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x)^4, x)
```

Reduce [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4}\,dx = \text{Too large to display}$$

input
```
int(x^5*(a+b*log(c*x^n))/(e*x+d)^4,x)
```

output
```
( - 360*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e
**3*x**4 + e**4*x**5),x)*b*d**9*n - 1080*int(log(x**n*c)/(d**4*x + 4*d**3*
e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b*d**8*e*n*x - 1
080*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*
x**4 + e**4*x**5),x)*b*d**7*e**2*n*x**2 - 360*int(log(x**n*c)/(d**4*x + 4*
d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b*d**6*e**3
*n*x**3 + 360*log(d + e*x)*a*d**5*n + 1080*log(d + e*x)*a*d**4*e*n*x + 108
0*log(d + e*x)*a*d**3*e**2*n*x**2 + 360*log(d + e*x)*a*d**2*e**3*n*x**3 +
942*log(d + e*x)*b*d**5*n**2 + 2826*log(d + e*x)*b*d**4*e*n**2*x + 2826*lo
g(d + e*x)*b*d**3*e**2*n**2*x**2 + 942*log(d + e*x)*b*d**2*e**3*n**2*x**3
+ 180*log(x**n*c)**2*b*d**5 + 540*log(x**n*c)**2*b*d**4*e*x + 540*log(x**n
*c)**2*b*d**3*e**2*x**2 + 180*log(x**n*c)**2*b*d**2*e**3*x**3 + 840*log(x*
*n*c)*b*d**5*n + 1080*log(x**n*c)*b*d**4*e*n*x - 480*log(x**n*c)*b*d**2*e*
*3*n*x**3 - 90*log(x**n*c)*b*d*e**4*n*x**4 + 18*log(x**n*c)*b*e**5*n*x**5
- 840*log(x)*b*d**5*n**2 - 2520*log(x)*b*d**4*e*n**2*x - 2520*log(x)*b*d**
3*e**2*n**2*x**2 - 840*log(x)*b*d**2*e**3*n**2*x**3 + 300*a*d**5*n + 540*a
*d**4*e*n*x - 360*a*d**2*e**3*n*x**3 - 90*a*d*e**4*n*x**4 + 18*a*e**5*n*x*
*5 - 355*b*d**5*n**2 - 567*b*d**4*e*n**2*x + 338*b*d**2*e**3*n**2*x**3 + 1
17*b*d*e**4*n**2*x**4 - 9*b*e**5*n**2*x**5)/(36*e**6*n*(d**3 + 3*d**2*e*x
+ 3*d*e**2*x**2 + e**3*x**3))
```

3.54 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4}\,dx$

Optimal result 527
Mathematica [A] (verified) 528
Rubi [A] (verified) 528
Maple [C] (warning: unable to verify) 530
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Maxima [F] 532
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Reduce [F] 533

Optimal result

Integrand size = 21, antiderivative size = 183

$$\begin{aligned}\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4}\,dx =& -\frac{4bnx}{e^4}+\frac{(12a+13bn)x}{3e^4}+\frac{4bx\log(cx^n)}{e^4}\\ &-\frac{x^4(a+b\log(cx^n))}{3e(d+ex)^3}-\frac{x^3(4a+bn+4b\log(cx^n))}{6e^2(d+ex)^2}\\ &-\frac{x^2(12a+7bn+12b\log(cx^n))}{6e^3(d+ex)}\\ &-\frac{d(12a+13bn+12b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{3e^5}\\ &-\frac{4bdn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^5}\end{aligned}$$

output
```
-4*b*n*x/e^4+1/3*(13*b*n+12*a)*x/e^4+4*b*x*ln(c*x^n)/e^4-1/3*x^4*(a+b*ln(c
*x^n))/e/(e*x+d)^3-1/6*x^3*(4*a+b*n+4*b*ln(c*x^n))/e^2/(e*x+d)^2-1/6*x^2*(
12*a+7*b*n+12*b*ln(c*x^n))/e^3/(e*x+d)-1/3*d*(12*a+13*b*n+12*b*ln(c*x^n))*
ln(1+e*x/d)/e^5-4*b*d*n*polylog(2,-e*x/d)/e^5
```

Mathematica [A] (verified)

Time = 0.27 (sec) , antiderivative size = 207, normalized size of antiderivative = 1.13

$$\int \frac{x^4(a + b\log(cx^n))}{(d + ex)^4}\,dx$$
$$= \frac{6aex - 6benx + 6bex\log(cx^n) - \frac{2d^4(a+b\log(cx^n))}{(d+ex)^3} + \frac{12d^3(a+b\log(cx^n))}{(d+ex)^2} - \frac{36d^2(a+b\log(cx^n))}{d+ex} + bdn\left(\frac{d(3d+2ex)}{(d+ex)^2} + 2\right.}{}$$

input
```
Integrate[(x^4*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
(6*a*e*x - 6*b*e*n*x + 6*b*e*x*Log[c*x^n] - (2*d^4*(a + b*Log[c*x^n]))/(d
+ e*x)^3 + (12*d^3*(a + b*Log[c*x^n]))/(d + e*x)^2 - (36*d^2*(a + b*Log[c*
x^n]))/(d + e*x) + b*d*n*((d*(3*d + 2*e*x))/(d + e*x)^2 + 2*Log[x] - 2*Log
[d + e*x]) + 36*b*d*n*(Log[x] - Log[d + e*x]) - 12*b*d*n*(d/(d + e*x) + Lo
g[x] - Log[d + e*x]) - 24*d*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 24*b*d*n
*PolyLog[2, -((e*x)/d)])/(6*e^5)
```

Rubi [A] (verified)

Time = 0.69 (sec) , antiderivative size = 198, normalized size of antiderivative = 1.08, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2784, 2784, 2784, 27, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4(a + b\log(cx^n))}{(d + ex)^4}\,dx$$

$$\Big\downarrow \text{2784}$$

$$\frac{\int \frac{x^3(4a+bn+4b\log(cx^n))}{(d+ex)^3}dx}{3e} - \frac{x^4(a + b\log(cx^n))}{3e(d + ex)^3}$$

$$\Big\downarrow \text{2784}$$

$$\frac{\frac{\int \frac{x^2(12a+7bn+12b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^3(4a+4b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^4(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \text{2784}$$

$$\frac{\frac{\frac{\int \frac{2x(12a+13bn+12b\log(cx^n))}{d+ex}dx}{e}-\frac{x^2(12a+12b\log(cx^n)+7bn)}{e(d+ex)}}{2e}-\frac{x^3(4a+4b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^4(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \text{27}$$

$$\frac{\frac{\frac{2\int \frac{x(12a+13bn+12b\log(cx^n))}{d+ex}dx}{e}-\frac{x^2(12a+12b\log(cx^n)+7bn)}{e(d+ex)}}{2e}-\frac{x^3(4a+4b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^4(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \text{2793}$$

$$\frac{\frac{\frac{2\int \left(\frac{12a+13bn+12b\log(cx^n)}{e}-\frac{d(12a+13bn+12b\log(cx^n))}{e(d+ex)}\right)dx}{e}-\frac{x^2(12a+12b\log(cx^n)+7bn)}{e(d+ex)}}{2e}-\frac{x^3(4a+4b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^4(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{\frac{\frac{2\left(-\frac{d\log\left(\frac{ex}{d}+1\right)(12a+12b\log(cx^n)+13bn)}{e^2}+\frac{x(12a+13bn)}{e}+\frac{12bx\log(cx^n)}{e}-\frac{12bdn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}-\frac{12bnx}{e}\right)}{e}-\frac{x^2(12a+12b\log(cx^n)+7bn)}{e(d+ex)}}{2e}-\frac{x^3(4a+4b}{2e(}}{3e}$$

$$\frac{x^4(a+b\log(cx^n))}{3e(d+ex)^3}$$

input
```
Int[(x^4*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
-1/3*(x^4*(a + b*Log[c*x^n]))/(e*(d + e*x)^3) + (-1/2*(x^3*(4*a + b*n + 4*
b*Log[c*x^n]))/(e*(d + e*x)^2) + (-((x^2*(12*a + 7*b*n + 12*b*Log[c*x^n]))
/(e*(d + e*x))) + (2*((-12*b*n*x)/e + ((12*a + 13*b*n)*x)/e + (12*b*x*Log[
c*x^n])/e - (d*(12*a + 13*b*n + 12*b*Log[c*x^n])*Log[1 + (e*x)/d])/e^2 - (
12*b*d*n*PolyLog[2, -((e*x)/d)])/e^2))/e)/(2*e))/(3*e)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.89 (sec) , antiderivative size = 355, normalized size of antiderivative = 1.94

method	result
risch	$\frac{b\ln(x^n)x}{e^4}-\frac{6b\ln(x^n)d^2}{e^5(ex+d)}-\frac{4b\ln(x^n)d\ln(ex+d)}{e^5}+\frac{2b\ln(x^n)d^3}{e^5(ex+d)^2}-\frac{b\ln(x^n)d^4}{3e^5(ex+d)^3}-\frac{bnx}{e^4}-\frac{bnd}{e^5}+\frac{bn\,d^3}{6e^5(ex+d)^2}-\frac{13bnd\ln(}{3e^5}$

input
```
int(x^4*(a+b*ln(c*x^n))/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)/e^4*x-6*b*ln(x^n)/e^5*d^2/(e*x+d)-4*b*ln(x^n)/e^5*d*ln(e*x+d)+2*
b*ln(x^n)/e^5*d^3/(e*x+d)^2-1/3*b*ln(x^n)/e^5*d^4/(e*x+d)^3-b*n*x/e^4-b*n/
e^5*d+1/6*b*n/e^5*d^3/(e*x+d)^2-13/3*b*n/e^5*d*ln(e*x+d)-5/3*b*n/e^5*d^2/(
e*x+d)+13/3*b*n/e^5*d*ln(e*x)+4*b*n/e^5*d*ln(e*x+d)*ln(-e*x/d)+4*b*n/e^5*d
*dilog(-e*x/d)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x
^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c
*x^n)^2*csgn(I*c)+b*ln(c)+a)*(x/e^4-6/e^5*d^2/(e*x+d)-4/e^5*d*ln(e*x+d)+2/
e^5*d^3/(e*x+d)^2-1/3/e^5*d^4/(e*x+d)^3)
```

Fricas [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)x^4}{(ex+d)^4}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b*x^4*log(c*x^n) + a*x^4)/(e^4*x^4 + 4*d*e^3*x^3 + 6*d^2*e^2*x^2
 + 4*d^3*e*x + d^4), x)
```

Sympy [A] (verification not implemented)

Time = 37.46 (sec) , antiderivative size = 563, normalized size of antiderivative = 3.08

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4}\,dx = \text{Too large to display}$$

input
```
integrate(x**4*(a+b*ln(c*x**n))/(e*x+d)**4,x)
```

output
```
a*d**4*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/e**4 -
 4*a*d**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/e**
4 + 6*a*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**4
 - 4*a*d*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**4 + a*x/e**
4 - b*d**4*n*Piecewise((x/d**4, Eq(e, 0)), (-3*d/(6*d**4*e + 12*d**3*e**2*
x + 6*d**2*e**3*x**2) - 2*e*x/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**
2) - log(x)/(3*d**3*e) + log(d/e + x)/(3*d**3*e), True))/e**4 + b*d**4*Pie
cewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))*log(c*x**n)/e**4
 + 4*b*d**3*n*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) -
log(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e), True))/e**4 - 4*b*d**3*Piecew
ise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))*log(c*x**n)/e**4 -
6*b*d**2*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*
e), True))/e**4 + 6*b*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x
), True))*log(c*x**n)/e**4 + 4*b*d*n*Piecewise((x/d, Eq(e, 0)), (Piecewise
((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log
(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(
1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1
, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*lo
g(d) - polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/e**4 - 4*b*d*Pi
ecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/e**4 - b*n...
```

Maxima [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)x^4}{(ex+d)^4}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="maxima")
```

output
```
-1/3*a*((18*d^2*e^2*x^2 + 30*d^3*e*x + 13*d^4)/(e^8*x^3 + 3*d*e^7*x^2 + 3*
d^2*e^6*x + d^3*e^5) - 3*x/e^4 + 12*d*log(e*x + d)/e^5) + b*integrate((x^4
*log(c) + x^4*log(x^n))/(e^4*x^4 + 4*d*e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x
 + d^4), x)
```

Giac [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)x^4}{(ex+d)^4}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^4/(e*x + d)^4, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4}\,dx = \int \frac{x^4\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^4}\,dx$$

input
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x)^4,x)
```

output
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x)^4, x)
```

Reduce [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4}\,dx = \text{Too large to display}$$

input
```
int(x^4*(a+b*log(c*x^n))/(e*x+d)^4,x)
```

output
```
(72*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*
x**4 + e**4*x**5),x)*b*d**8*n + 216*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**
2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b*d**7*e*n*x + 216*in
t(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 +
 e**4*x**5),x)*b*d**6*e**2*n*x**2 + 72*int(log(x**n*c)/(d**4*x + 4*d**3*e*
x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b*d**5*e**3*n*x**3
 - 72*log(d + e*x)*a*d**4*n - 216*log(d + e*x)*a*d**3*e*n*x - 216*log(d +
e*x)*a*d**2*e**2*n*x**2 - 72*log(d + e*x)*a*d*e**3*n*x**3 - 210*log(d + e*
x)*b*d**4*n**2 - 630*log(d + e*x)*b*d**3*e*n**2*x - 630*log(d + e*x)*b*d**
2*e**2*n**2*x**2 - 210*log(d + e*x)*b*d*e**3*n**2*x**3 - 36*log(x**n*c)**2
*b*d**4 - 108*log(x**n*c)**2*b*d**3*e*x - 108*log(x**n*c)**2*b*d**2*e**2*x
**2 - 36*log(x**n*c)**2*b*d*e**3*x**3 - 168*log(x**n*c)*b*d**4*n - 216*log
(x**n*c)*b*d**3*e*n*x + 96*log(x**n*c)*b*d*e**3*n*x**3 + 18*log(x**n*c)*b*
e**4*n*x**4 + 168*log(x)*b*d**4*n**2 + 504*log(x)*b*d**3*e*n**2*x + 504*lo
g(x)*b*d**2*e**2*n**2*x**2 + 168*log(x)*b*d*e**3*n**2*x**3 - 60*a*d**4*n -
 108*a*d**3*e*n*x + 72*a*d*e**3*n*x**3 + 18*a*e**4*n*x**4 + 53*b*d**4*n**2
 + 81*b*d**3*e*n**2*x - 46*b*d*e**3*n**2*x**3 - 18*b*e**4*n**2*x**4)/(18*e
**5*n*(d**3 + 3*d**2*e*x + 3*d*e**2*x**2 + e**3*x**3))
```

3.55 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^4}\,dx$

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Mathematica [A] (verified) 536
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Maple [C] (warning: unable to verify) 538
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Mupad [F(-1)] 541
Reduce [F] 541

Optimal result

Integrand size = 21, antiderivative size = 141

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^4}\,dx = -\frac{x^3(a+b\log(cx^n))}{3e(d+ex)^3} - \frac{x^2(3a+bn+3b\log(cx^n))}{6e^2(d+ex)^2} - \frac{x(6a+5bn+6b\log(cx^n))}{6e^3(d+ex)} + \frac{(6a+11bn+6b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{6e^4} + \frac{bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}$$

output
```
-1/3*x^3*(a+b*ln(c*x^n))/e/(e*x+d)^3-1/6*x^2*(3*a+b*n+3*b*ln(c*x^n))/e^2/(
e*x+d)^2-1/6*x*(6*a+5*b*n+6*b*ln(c*x^n))/e^3/(e*x+d)+1/6*(6*a+11*b*n+6*b*l
n(c*x^n))*ln(1+e*x/d)/e^4+b*n*polylog(2,-e*x/d)/e^4
```

Mathematica [A] (verified)

Time = 0.27 (sec) , antiderivative size = 179, normalized size of antiderivative = 1.27

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^4}\,dx = \frac{\frac{2d^3(a+b\log(cx^n))}{(d+ex)^3}-\frac{9d^2(a+b\log(cx^n))}{(d+ex)^2}+\frac{18d(a+b\log(cx^n))}{d+ex}-bn\left(\frac{d(3d+2ex)}{(d+ex)^2}+2\log(x)-2\log(d+ex)\right)-18bn(\log(\ldots}{}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
((2*d^3*(a + b*Log[c*x^n]))/(d + e*x)^3 - (9*d^2*(a + b*Log[c*x^n]))/(d +
e*x)^2 + (18*d*(a + b*Log[c*x^n]))/(d + e*x) - b*n*((d*(3*d + 2*e*x))/(d +
 e*x)^2 + 2*Log[x] - 2*Log[d + e*x]) - 18*b*n*(Log[x] - Log[d + e*x]) + 9*
b*n*(d/(d + e*x) + Log[x] - Log[d + e*x]) + 6*(a + b*Log[c*x^n])*Log[1 + (
e*x)/d] + 6*b*n*PolyLog[2, -((e*x)/d)])/(6*e^4)
```

Rubi [A] (verified)

Time = 0.59 (sec) , antiderivative size = 158, normalized size of antiderivative = 1.12, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.238$, Rules used = {2784, 2784, 2784, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^4}\,dx$$

$$\Big\downarrow \text{ 2784}$$

$$\frac{\int \frac{x^2(3a+bn+3b\log(cx^n))}{(d+ex)^3}dx}{3e}-\frac{x^3(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \text{ 2784}$$

$$\frac{\frac{\int \frac{x(6a+5bn+6b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^2(3a+3b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^3(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \; 2784$$

$$\frac{\frac{\frac{\int \frac{6a+11bn+6b\log(cx^n)}{d+ex}dx}{e}-\frac{x(6a+6b\log(cx^n)+5bn)}{e(d+ex)}}{2e}-\frac{x^2(3a+3b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^3(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \; 2754$$

$$\frac{\frac{\frac{\frac{\log\left(\frac{ex}{d}+1\right)(6a+6b\log(cx^n)+11bn)}{e}-\frac{6bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}}{e}-\frac{x(6a+6b\log(cx^n)+5bn)}{e(d+ex)}}{2e}-\frac{x^2(3a+3b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^3(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \; 2838$$

$$\frac{\frac{\frac{\frac{\log\left(\frac{ex}{d}+1\right)(6a+6b\log(cx^n)+11bn)}{e}+\frac{6bn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}}{e}-\frac{x(6a+6b\log(cx^n)+5bn)}{e(d+ex)}}{2e}-\frac{x^2(3a+3b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^3(a+b\log(cx^n))}{3e(d+ex)^3}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
-1/3*(x^3*(a + b*Log[c*x^n]))/(e*(d + e*x)^3) + (-1/2*(x^2*(3*a + b*n + 3*
b*Log[c*x^n]))/(e*(d + e*x)^2) + (-((x*(6*a + 5*b*n + 6*b*Log[c*x^n]))/(e*
(d + e*x))) + (((6*a + 11*b*n + 6*b*Log[c*x^n])*Log[1 + (e*x)/d])/e + (6*b
*n*PolyLog[2, -((e*x)/d)])/e)/e)/(2*e))/(3*e)
```

Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.89 (sec) , antiderivative size = 310, normalized size of antiderivative = 2.20

method	result
risch	$\frac{3b\ln(x^n)d}{e^4(ex+d)}+\frac{b\ln(x^n)\ln(ex+d)}{e^4}-\frac{3b\ln(x^n)d^2}{2e^4(ex+d)^2}+\frac{b\ln(x^n)d^3}{3e^4(ex+d)^3}+\frac{7bnd}{6e^4(ex+d)}+\frac{11bn\ln(ex+d)}{6e^4}-\frac{bn\,d^2}{6e^4(ex+d)^2}-\frac{11bn\ln(}{6e^4}$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
3*b*ln(x^n)/e^4*d/(e*x+d)+b*ln(x^n)/e^4*ln(e*x+d)-3/2*b*ln(x^n)/e^4*d^2/(e
*x+d)^2+1/3*b*ln(x^n)/e^4*d^3/(e*x+d)^3+7/6*b*n/e^4*d/(e*x+d)+11/6*b*n/e^4
*ln(e*x+d)-1/6*b*n/e^4*d^2/(e*x+d)^2-11/6*b*n/e^4*ln(e*x)-b*n/e^4*ln(e*x+d
)*ln(-e*x/d)-b*n/e^4*dilog(-e*x/d)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2
-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3
+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(3/e^4*d/(e*x+d)+1/e^4*ln
(e*x+d)-3/2/e^4*d^2/(e*x+d)^2+1/3/e^4*d^3/(e*x+d)^3)
```

Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex+d)^4}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x^n) + a*x^3)/(e^4*x^4 + 4*d*e^3*x^3 + 6*d^2*e^2*x^2
 + 4*d^3*e*x + d^4), x)
```

Sympy [A] (verification not implemented)

Time = 35.38 (sec) , antiderivative size = 518, normalized size of antiderivative = 3.67

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^4}\,dx = \text{Too large to display}$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x+d)**4,x)
```

output
```
-a*d**3*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/e**3
+ 3*a*d**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/e*
*3 - 3*a*d*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**3 +
 a*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**3 + b*d**3*n*Piec
ewise((x/d**4, Eq(e, 0)), (-3*d/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x
**2) - 2*e*x/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - log(x)/(3*d*
*3*e) + log(d/e + x)/(3*d**3*e), True))/e**3 - b*d**3*Piecewise((x/d**4, E
q(e, 0)), (-1/(3*e*(d + e*x)**3), True))*log(c*x**n)/e**3 - 3*b*d**2*n*Pie
cewise((x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e)
 + log(d/e + x)/(2*d**2*e), True))/e**3 + 3*b*d**2*Piecewise((x/d**3, Eq(e
, 0)), (-1/(2*e*(d + e*x)**2), True))*log(c*x**n)/e**3 + 3*b*d*n*Piecewise
((x/d**2, Eq(e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*e), True))/e**3 - 3*
b*d*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))*log(c*x**n)/e
**3 - b*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar
(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x
*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_p
olar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log
(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_p
olar(I*pi)/d), True))/e, True))/e**3 + b*Piecewise((x/d, Eq(e, 0)), (log(d
 + e*x)/e, True))*log(c*x**n)/e**3
```

Maxima [F]

$$\int \frac{x^3(a + b\log(cx^n))}{(d + ex)^4}\,dx = \int \frac{(b\log(cx^n) + a)x^3}{(ex + d)^4}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/6*a*((18*d*e^2*x^2 + 27*d^2*e*x + 11*d^3)/(e^7*x^3 + 3*d*e^6*x^2 + 3*d^2
*e^5*x + d^3*e^4) + 6*log(e*x + d)/e^4) + b*integrate((x^3*log(c) + x^3*lo
g(x^n))/(e^4*x^4 + 4*d*e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d^4), x)
```

Giac [F]

$$\int \frac{x^3(a + b\log(cx^n))}{(d + ex)^4} \, dx = \int \frac{(b\log(cx^n) + a)x^3}{(ex + d)^4} \, dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x + d)^4, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a + b\log(cx^n))}{(d + ex)^4} \, dx = \int \frac{x^3\,(a + b\,\ln(c\,x^n))}{(d + e\,x)^4} \, dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^4,x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^4, x)
```

Reduce [F]

$$\int \frac{x^3(a + b\log(cx^n))}{(d + ex)^4} \, dx$$

$$= \frac{27\log(x^nc)^2\,b\,d^2ex + 15a\,d^3n - 2b\,d^3n^2 + 9\log(x^nc)^2\,b\,d^3 + 18\log(ex + d)\,a\,e^3n\,x^3 + 66\log(ex + d)\,b\,e^3n}{}$$

input
```
int(x^3*(a+b*log(c*x^n))/(e*x+d)^4,x)
```

output
```
( - 18*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e*
*3*x**4 + e**4*x**5),x)*b*d**7*n - 54*int(log(x**n*c)/(d**4*x + 4*d**3*e*x
**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b*d**6*e*n*x - 54*i
nt(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4
+ e**4*x**5),x)*b*d**5*e**2*n*x**2 - 18*int(log(x**n*c)/(d**4*x + 4*d**3*e
*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b*d**4*e**3*n*x**
3 + 18*log(d + e*x)*a*d**3*n + 54*log(d + e*x)*a*d**2*e*n*x + 54*log(d + e
*x)*a*d*e**2*n*x**2 + 18*log(d + e*x)*a*e**3*n*x**3 + 66*log(d + e*x)*b*d*
*3*n**2 + 198*log(d + e*x)*b*d**2*e*n**2*x + 198*log(d + e*x)*b*d*e**2*n**
2*x**2 + 66*log(d + e*x)*b*e**3*n**2*x**3 + 9*log(x**n*c)**2*b*d**3 + 27*l
og(x**n*c)**2*b*d**2*e*x + 27*log(x**n*c)**2*b*d*e**2*x**2 + 9*log(x**n*c)
**2*b*e**3*x**3 + 42*log(x**n*c)*b*d**3*n + 54*log(x**n*c)*b*d**2*e*n*x -
24*log(x**n*c)*b*e**3*n*x**3 - 42*log(x)*b*d**3*n**2 - 126*log(x)*b*d**2*e
*n**2*x - 126*log(x)*b*d*e**2*n**2*x**2 - 42*log(x)*b*e**3*n**2*x**3 + 15*
a*d**3*n + 27*a*d**2*e*n*x - 18*a*e**3*n*x**3 - 2*b*d**3*n**2 - 2*b*e**3*n
**2*x**3)/(18*e**4*n*(d**3 + 3*d**2*e*x + 3*d*e**2*x**2 + e**3*x**3))
```

3.56 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^4}\,dx$

Optimal result 543
Mathematica [F(-1)] 543
Rubi [A] (verified) 544
Maple [B] (verified) 545
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Optimal result

Integrand size = 21, antiderivative size = 79

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^4}\,dx = \frac{bdn}{6e^3(d+ex)^2}-\frac{2bn}{3e^3(d+ex)}+\frac{x^3(a+b\log(cx^n))}{3d(d+ex)^3}-\frac{bn\log(d+ex)}{3de^3}$$

output
```
1/6*b*d*n/e^3/(e*x+d)^2-2/3*b*n/e^3/(e*x+d)+1/3*x^3*(a+b*ln(c*x^n))/d/(e*x
+d)^3-1/3*b*n*ln(e*x+d)/d/e^3
```

Mathematica [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^4}\,dx = \$\text{Aborted}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
$Aborted
```

Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 78, normalized size of antiderivative = 0.99, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {2773, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^4}dx$$

$$\Big\downarrow \text{ 2773}$$

$$\frac{x^3(a+b\log(cx^n))}{3d(d+ex)^3}-\frac{bn\int \frac{x^2}{(d+ex)^3}dx}{3d}$$

$$\Big\downarrow \text{ 49}$$

$$\frac{x^3(a+b\log(cx^n))}{3d(d+ex)^3}-\frac{bn\int \left(\frac{d^2}{e^2(d+ex)^3}-\frac{2d}{e^2(d+ex)^2}+\frac{1}{e^2(d+ex)}\right)dx}{3d}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{x^3(a+b\log(cx^n))}{3d(d+ex)^3}-\frac{bn\left(-\frac{d^2}{2e^3(d+ex)^2}+\frac{2d}{e^3(d+ex)}+\frac{\log(d+ex)}{e^3}\right)}{3d}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
(x^3*(a + b*Log[c*x^n]))/(3*d*(d + e*x)^3) - (b*n*(-1/2*d^2/(e^3*(d + e*x)
^2) + (2*d)/(e^3*(d + e*x)) + Log[d + e*x]/e^3))/(3*d)
```

Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 164 vs. $2(71) = 142$.

Time = 0.80 (sec) , antiderivative size = 165, normalized size of antiderivative = 2.09

method	result
parallelrisch	$\frac{-2\ln(ex+d)x^3 b e^3 n^2-6\ln(ex+d)x^2 bd e^2 n^2+2x^3\ln(c x^n)b e^3 n-6\ln(ex+d)xb d^2 e n^2-4x^2 bd e^2 n^2-2\ln(ex+d)b d^3 n^2-6x^2 a}{6e^3 nd(ex+d)^3}$
risch	$-\frac{b(3e^2x^2+3exd+d^2)\ln(x^n)}{3(ex+d)^3 e^3}-\frac{2\ln(ex+d)b e^3 n x^3+6a e^2x^2d+6a d^2ex+2a d^3+i\pi b d^3\,\mathrm{csgn}(ic x^n)^2\,\mathrm{csgn}(ic)+6\ln(ex+d)b}{}$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
1/6*(-2*ln(e*x+d)*x^3*b*e^3*n^2-6*ln(e*x+d)*x^2*b*d*e^2*n^2+2*x^3*ln(c*x^n
)*b*e^3*n-6*ln(e*x+d)*x*b*d^2*e*n^2-4*x^2*b*d*e^2*n^2-2*ln(e*x+d)*b*d^3*n^
2-6*x^2*a*d*e^2*n-7*x*b*d^2*e*n^2-6*x*a*d^2*e*n-3*b*d^3*n^2-2*a*d^3*n)/e^3
/n/d/(e*x+d)^3
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 178 vs. $2(71) = 142$.

Time = 0.09 (sec) , antiderivative size = 178, normalized size of antiderivative = 2.25

$$\int \frac{x^2(a + b\log(cx^n))}{(d + ex)^4}\,dx$$
$$= \frac{2\,be^3nx^3\log(x) - 3\,bd^3n - 2\,ad^3 - 2\,(2\,bde^2n + 3\,ade^2)x^2 - (7\,bd^2en + 6\,ad^2e)x - 2\,(be^3nx^3 + 3\,bde^2nx}{6\,(de^6x^3 + 3\,d^2e^5x^2 + 3\,d^3e^4x + d^4e}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="fricas")
```

output
```
1/6*(2*b*e^3*n*x^3*log(x) - 3*b*d^3*n - 2*a*d^3 - 2*(2*b*d*e^2*n + 3*a*d*e
^2)*x^2 - (7*b*d^2*e*n + 6*a*d^2*e)*x - 2*(b*e^3*n*x^3 + 3*b*d*e^2*n*x^2 +
 3*b*d^2*e*n*x + b*d^3*n)*log(e*x + d) - 2*(3*b*d*e^2*x^2 + 3*b*d^2*e*x +
b*d^3)*log(c))/(d*e^6*x^3 + 3*d^2*e^5*x^2 + 3*d^3*e^4*x + d^4*e^3)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 677 vs. $2(71) = 142$.

Time = 6.49 (sec) , antiderivative size = 677, normalized size of antiderivative = 8.57

$$\int \frac{x^2(a + b\log(cx^n))}{(d + ex)^4}\,dx$$
$$= \begin{cases} \tilde{\infty}\left(-\frac{a}{x} - \frac{bn}{x} - \frac{b\log(cx^n)}{x}\right) \\ \frac{\frac{ax^3}{3} - \frac{bnx^3}{9} + \frac{bx^3\log(cx^n)}{3}}{d^4} \\ \frac{-\frac{a}{x} - \frac{bn}{x} - \frac{b\log(cx^n)}{x}}{e^4} \\ -\frac{2ad^3}{6d^4e^3+18d^3e^4x+18d^2e^5x^2+6de^6x^3} - \frac{6ad^2ex}{6d^4e^3+18d^3e^4x+18d^2e^5x^2+6de^6x^3} - \frac{6ade^2x^2}{6d^4e^3+18d^3e^4x+18d^2e^5x^2+6de^6x^3} - \frac{2bd^3}{6d^4e^3+18d^3e^4} \end{cases}$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x+d)**4,x)
```

output
```
Piecewise((zoo*(-a/x - b*n/x - b*log(c*x**n)/x), Eq(d, 0) & Eq(e, 0)), ((a
*x**3/3 - b*n*x**3/9 + b*x**3*log(c*x**n)/3)/d**4, Eq(e, 0)), ((-a/x - b*n
/x - b*log(c*x**n)/x)/e**4, Eq(d, 0)), (-2*a*d**3/(6*d**4*e**3 + 18*d**3*e
**4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3) - 6*a*d**2*e*x/(6*d**4*e**3 + 1
8*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3) - 6*a*d*e**2*x**2/(6*d*
*4*e**3 + 18*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3) - 2*b*d**3*n
*log(d/e + x)/(6*d**4*e**3 + 18*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*d*e**6
*x**3) - 3*b*d**3*n/(6*d**4*e**3 + 18*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*
d*e**6*x**3) - 6*b*d**2*e*n*x*log(d/e + x)/(6*d**4*e**3 + 18*d**3*e**4*x +
 18*d**2*e**5*x**2 + 6*d*e**6*x**3) - 7*b*d**2*e*n*x/(6*d**4*e**3 + 18*d**
3*e**4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3) - 6*b*d*e**2*n*x**2*log(d/e
+ x)/(6*d**4*e**3 + 18*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3) -
4*b*d*e**2*n*x**2/(6*d**4*e**3 + 18*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*d*
e**6*x**3) - 2*b*e**3*n*x**3*log(d/e + x)/(6*d**4*e**3 + 18*d**3*e**4*x +
18*d**2*e**5*x**2 + 6*d*e**6*x**3) + 2*b*e**3*x**3*log(c*x**n)/(6*d**4*e**
3 + 18*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3), True))
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 179 vs. 2(71) = 142.

Time = 0.04 (sec) , antiderivative size = 179, normalized size of antiderivative = 2.27

$$\int \frac{x^2(a+b\log{(cx^n)})}{(d+ex)^4}\,dx = -\frac{1}{6}\,bn\left(\frac{4\,ex+3\,d}{e^5x^2+2\,de^4x+d^2e^3}+\frac{2\,\log{(ex+d)}}{de^3}-\frac{2\,\log{(x)}}{de^3}\right) - \frac{(3\,e^2x^2+3\,dex+d^2)b\log{(cx^n)}}{3\,(e^6x^3+3\,de^5x^2+3\,d^2e^4x+d^3e^3)} - \frac{(3\,e^2x^2+3\,dex+d^2)a}{3\,(e^6x^3+3\,de^5x^2+3\,d^2e^4x+d^3e^3)}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="maxima")
```

output
```
-1/6*b*n*((4*e*x + 3*d)/(e^5*x^2 + 2*d*e^4*x + d^2*e^3) + 2*log(e*x + d)/(
d*e^3) - 2*log(x)/(d*e^3)) - 1/3*(3*e^2*x^2 + 3*d*e*x + d^2)*b*log(c*x^n)/
(e^6*x^3 + 3*d*e^5*x^2 + 3*d^2*e^4*x + d^3*e^3) - 1/3*(3*e^2*x^2 + 3*d*e*x
 + d^2)*a/(e^6*x^3 + 3*d*e^5*x^2 + 3*d^2*e^4*x + d^3*e^3)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 202 vs. $2(71) = 142$.

Time = 0.12 (sec) , antiderivative size = 202, normalized size of antiderivative = 2.56

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^4}\,dx = -\frac{(3\,be^2nx^2+3\,bdenx+bd^2n)\log(x)}{3\,(e^6x^3+3\,de^5x^2+3\,d^2e^4x+d^3e^3)} - \frac{4\,be^2nx^2+6\,be^2x^2\log(c)+7\,bdenx+6\,ae^2x^2+6\,bdex\log(c)+3\,bd^2n+6\,adex+2\,bd^2\log(c)+2\,ad}{6\,(e^6x^3+3\,de^5x^2+3\,d^2e^4x+d^3e^3)} - \frac{bn\log(ex+d)}{3\,de^3} + \frac{bn\log(x)}{3\,de^3}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="giac")
```

output
```
-1/3*(3*b*e^2*n*x^2 + 3*b*d*e*n*x + b*d^2*n)*log(x)/(e^6*x^3 + 3*d*e^5*x^2
 + 3*d^2*e^4*x + d^3*e^3) - 1/6*(4*b*e^2*n*x^2 + 6*b*e^2*x^2*log(c) + 7*b*
d*e*n*x + 6*a*e^2*x^2 + 6*b*d*e*x*log(c) + 3*b*d^2*n + 6*a*d*e*x + 2*b*d^2
*log(c) + 2*a*d^2)/(e^6*x^3 + 3*d*e^5*x^2 + 3*d^2*e^4*x + d^3*e^3) - 1/3*b
*n*log(e*x + d)/(d*e^3) + 1/3*b*n*log(x)/(d*e^3)
```

Mupad [B] (verification not implemented)

Time = 26.43 (sec) , antiderivative size = 167, normalized size of antiderivative = 2.11

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^4}\,dx = -\frac{x^2\,(3\,a\,e^2+2\,b\,e^2\,n)+a\,d^2+x\,\left(3\,a\,d\,e+\frac{7\,b\,d\,e\,n}{2}\right)+\frac{3\,b\,d^2\,n}{2}}{3\,d^3\,e^3+9\,d^2\,e^4\,x+9\,d\,e^5\,x^2+3\,e^6\,x^3} - \frac{\ln(c\,x^n)\,\left(\frac{b\,d^2}{3\,e^3}+\frac{b\,x^2}{e}+\frac{b\,d\,x}{e^2}\right)}{d^3+3\,d^2\,e\,x+3\,d\,e^2\,x^2+e^3\,x^3} - \frac{2\,b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{3\,d\,e^3}$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^4,x)
```

output
```
- (x^2*(3*a*e^2 + 2*b*e^2*n) + a*d^2 + x*(3*a*d*e + (7*b*d*e*n)/2) + (3*b*
d^2*n)/2)/(3*d^3*e^3 + 3*e^6*x^3 + 9*d^2*e^4*x + 9*d*e^5*x^2) - (log(c*x^n
)*((b*d^2)/(3*e^3) + (b*x^2)/e + (b*d*x)/e^2))/(d^3 + e^3*x^3 + 3*d*e^2*x^
2 + 3*d^2*e*x) - (2*b*n*atanh((2*e*x)/d + 1))/(3*d*e^3)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.89

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^4}\,dx$$
$$= \frac{-6\log(ex+d)\,b\,d^3n-18\log(ex+d)\,b\,d^2enx-18\log(ex+d)\,bd\,e^2n\,x^2-6\log(ex+d)\,b\,e^3n\,x^3+6\log(}{18d\,e^3\,(e^3x^3+3d\,e^2x^2+3d^2ex+d^3)}$$

input
```
int(x^2*(a+b*log(c*x^n))/(e*x+d)^4,x)
```

output
```
( - 6*log(d + e*x)*b*d**3*n - 18*log(d + e*x)*b*d**2*e*n*x - 18*log(d + e*
x)*b*d*e**2*n*x**2 - 6*log(d + e*x)*b*e**3*n*x**3 + 6*log(x**n*c)*b*e**3*x
**3 + 6*a*e**3*x**3 - 5*b*d**3*n - 9*b*d**2*e*n*x + 4*b*e**3*n*x**3)/(18*d
*e**3*(d**3 + 3*d**2*e*x + 3*d*e**2*x**2 + e**3*x**3))
```

3.57 $\int \frac{x(a+b\log(cx^n))}{(d+ex)^4}\,dx$

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Optimal result

Integrand size = 19, antiderivative size = 117

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^4}\,dx = -\frac{bn}{6e^2(d+ex)^2}+\frac{bn}{6de^2(d+ex)}+\frac{bn\log(x)}{6d^2e^2}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3}-\frac{a+b\log(cx^n)}{2e^2(d+ex)^2}-\frac{bn\log(d+ex)}{6d^2e^2}$$

output
```
-1/6*b*n/e^2/(e*x+d)^2+1/6*b*n/d/e^2/(e*x+d)+1/6*b*n*ln(x)/d^2/e^2+1/3*d*(
a+b*ln(c*x^n))/e^2/(e*x+d)^3-1/2*(a+b*ln(c*x^n))/e^2/(e*x+d)^2-1/6*b*n*ln(
e*x+d)/d^2/e^2
```

Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.15

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^4}\,dx = \frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3}-\frac{a+b\log(cx^n)}{2e^2(d+ex)^2}-\frac{bn\left(\frac{1}{(d+ex)^2}+\frac{2}{d(d+ex)}+\frac{2\log(x)}{d^2}-\frac{2\log(d+ex)}{d^2}\right)}{6e^2}+\frac{bn\left(\frac{1}{d(d+ex)}+\frac{\log(x)}{d^2}-\frac{\log(d+ex)}{d^2}\right)}{2e^2}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
(d*(a + b*Log[c*x^n]))/(3*e^2*(d + e*x)^3) - (a + b*Log[c*x^n])/(2*e^2*(d
+ e*x)^2) - (b*n*((d + e*x)^(-2) + 2/(d*(d + e*x)) + (2*Log[x])/d^2 - (2*L
og[d + e*x])/d^2))/(6*e^2) + (b*n*(1/(d*(d + e*x)) + Log[x]/d^2 - Log[d +
e*x]/d^2))/(2*e^2)
```

Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 97, normalized size of antiderivative = 0.83, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.211$, Rules used = {2782, 27, 86, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^4}dx$$

$$\Big\downarrow \text{2782}$$

$$-bn\int -\frac{d+3ex}{6e^2x(d+ex)^3}dx-\frac{a+b\log(cx^n)}{2e^2(d+ex)^2}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{d+3ex}{x(d+ex)^3}dx}{6e^2}-\frac{a+b\log(cx^n)}{2e^2(d+ex)^2}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3}$$

$$\Big\downarrow \text{86}$$

$$\frac{bn\int \left(-\frac{e}{d^2(d+ex)}-\frac{e}{d(d+ex)^2}+\frac{2e}{(d+ex)^3}+\frac{1}{d^2x}\right)dx}{6e^2}-\frac{a+b\log(cx^n)}{2e^2(d+ex)^2}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{a+b\log(cx^n)}{2e^2(d+ex)^2}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3}+\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}-\frac{1}{(d+ex)^2}\right)}{6e^2}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
(d*(a + b*Log[c*x^n]))/(3*e^2*(d + e*x)^3) - (a + b*Log[c*x^n])/(2*e^2*(d
+ e*x)^2) + (b*n*(-(d + e*x)^(-2) + 1/(d*(d + e*x)) + Log[x]/d^2 - Log[d +
 e*x]/d^2))/(6*e^2)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 86
```
Int[((a_.) + (b_.)*(x_))*((c_) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p_
.), x_] :> Int[ExpandIntegrand[(a + b*x)*(c + d*x)^n*(e + f*x)^p, x], x] /;
 FreeQ[{a, b, c, d, e, f, n}, x] && ((ILtQ[n, 0] && ILtQ[p, 0]) || EqQ[p, 1
] || (IGtQ[p, 0] && ( !IntegerQ[n] || LeQ[9*p + 5*(n + 2), 0] || GeQ[n + p
+ 1, 0] || (GeQ[n + p + 2, 0] && RationalQ[a, b, c, d, e, f])))
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2782
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_))^(q
_), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x)^q, x]}, Simp[(a + b*Log[c*
x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[
{a, b, c, d, e, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.81 (sec) , antiderivative size = 205, normalized size of antiderivative = 1.75

method	result
parallelrisch	$\frac{-\ln(ex+d)b\,d^4en+xb\,d^3e^2n+x^2b\,d^2e^3n-3x\ln(c\,x^n)b\,d^3e^2+\ln(x)b\,d^4en-\ln(ex+d)x^3bd\,e^4n+3\ln(x)x^2b\,d^2e^3n-3\ln(ex+d)x}{6d^3e^3(ex+d)^3}$
risch	$-\frac{b(3ex+d)\ln(x^n)}{6(ex+d)^3e^2}-\frac{-3i\pi b\,d^2ex\,\mathrm{csgn}(ic\,x^n)^3+3i\pi b\,d^2\,\mathrm{csgn}(ic\,x^n)^2\,\mathrm{csgn}(ic)ex-i\pi b\,d^3\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)\,\mathrm{csgn}(ic)-i\pi b}{}$

input
```
int(x*(a+b*ln(c*x^n))/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
1/6*(-ln(e*x+d)*b*d^4*e*n+x*b*d^3*e^2*n+x^2*b*d^2*e^3*n-3*x*ln(c*x^n)*b*d^
3*e^2+ln(x)*b*d^4*e*n-ln(e*x+d)*x^3*b*d*e^4*n+3*ln(x)*x^2*b*d^2*e^3*n-3*ln
(e*x+d)*x^2*b*d^2*e^3*n+3*ln(x)*x*b*d^3*e^2*n-3*ln(e*x+d)*x*b*d^3*e^2*n+ln
(x)*x^3*b*d*e^4*n+3*x^2*a*d^2*e^3+x^3*a*d*e^4-ln(c*x^n)*b*d^4*e)/d^3/e^3/(
e*x+d)^3
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 162, normalized size of antiderivative = 1.38

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^4}\,dx = \frac{bde^2nx^2 - ad^3 + (bd^2en - 3\,ad^2e)x - (be^3nx^3 + 3\,bde^2nx^2 + 3\,bd^2enx + bd^3n)\log(ex+d) - (3\,bd^2ex +}{6\,(d^2e^5x^3 + 3\,d^3e^4x^2 + 3\,d^4e^3x + d^5e^2)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="fricas")
```

output
```
1/6*(b*d*e^2*n*x^2 - a*d^3 + (b*d^2*e*n - 3*a*d^2*e)*x - (b*e^3*n*x^3 + 3*
b*d*e^2*n*x^2 + 3*b*d^2*e*n*x + b*d^3*n)*log(e*x + d) - (3*b*d^2*e*x + b*d
^3)*log(c) + (b*e^3*n*x^3 + 3*b*d*e^2*n*x^2)*log(x))/(d^2*e^5*x^3 + 3*d^3*
e^4*x^2 + 3*d^4*e^3*x + d^5*e^2)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 661 vs. 2(110) = 220.

Time = 6.54 (sec) , antiderivative size = 661, normalized size of antiderivative = 5.65

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^4}\,dx = \begin{cases} \tilde{\infty}\left(-\frac{a}{2x^2} - \frac{bn}{4x^2} - \frac{b\log(cx^n)}{2x^2}\right) \\ \frac{\frac{ax^2}{2} - \frac{bnx^2}{4} + \frac{bx^2\log(cx^n)}{2}}{d^4} \\ \frac{-\frac{a}{2x^2} - \frac{bn}{4x^2} - \frac{b\log(cx^n)}{2x^2}}{e^4} \\ -\frac{ad^3}{6d^5e^2+18d^4e^3x+18d^3e^4x^2+6d^2e^5x^3} - \frac{3ad^2ex}{6d^5e^2+18d^4e^3x+18d^3e^4x^2+6d^2e^5x^3} - \frac{bd^3n\log\left(\frac{d}{e}+x\right)}{6d^5e^2+18d^4e^3x+18d^3e^4x^2+6d^2e^5x^3} - \frac{3b}{6d^5e^2+18d} \end{cases}$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x+d)**4,x)
```

output
```
Piecewise((zoo*(-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2)), Eq(d
, 0) & Eq(e, 0)), ((a*x**2/2 - b*n*x**2/4 + b*x**2*log(c*x**n)/2)/d**4, Eq
(e, 0)), ((-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2))/e**4, Eq(d
, 0)), (-a*d**3/(6*d**5*e**2 + 18*d**4*e**3*x + 18*d**3*e**4*x**2 + 6*d**2
*e**5*x**3) - 3*a*d**2*e*x/(6*d**5*e**2 + 18*d**4*e**3*x + 18*d**3*e**4*x*
*2 + 6*d**2*e**5*x**3) - b*d**3*n*log(d/e + x)/(6*d**5*e**2 + 18*d**4*e**3
*x + 18*d**3*e**4*x**2 + 6*d**2*e**5*x**3) - 3*b*d**2*e*n*x*log(d/e + x)/(
6*d**5*e**2 + 18*d**4*e**3*x + 18*d**3*e**4*x**2 + 6*d**2*e**5*x**3) + b*d
**2*e*n*x/(6*d**5*e**2 + 18*d**4*e**3*x + 18*d**3*e**4*x**2 + 6*d**2*e**5*
x**3) - 3*b*d*e**2*n*x**2*log(d/e + x)/(6*d**5*e**2 + 18*d**4*e**3*x + 18*
d**3*e**4*x**2 + 6*d**2*e**5*x**3) + b*d*e**2*n*x**2/(6*d**5*e**2 + 18*d**
4*e**3*x + 18*d**3*e**4*x**2 + 6*d**2*e**5*x**3) + 3*b*d*e**2*x**2*log(c*x
**n)/(6*d**5*e**2 + 18*d**4*e**3*x + 18*d**3*e**4*x**2 + 6*d**2*e**5*x**3)
 - b*e**3*n*x**3*log(d/e + x)/(6*d**5*e**2 + 18*d**4*e**3*x + 18*d**3*e**4
*x**2 + 6*d**2*e**5*x**3) + b*e**3*x**3*log(c*x**n)/(6*d**5*e**2 + 18*d**4
*e**3*x + 18*d**3*e**4*x**2 + 6*d**2*e**5*x**3), True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 150, normalized size of antiderivative = 1.28

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^4}\,dx = \frac{1}{6}bn\left(\frac{x}{de^3x^2+2\,d^2e^2x+d^3e}-\frac{\log(ex+d)}{d^2e^2}+\frac{\log(x)}{d^2e^2}\right) - \frac{(3\,ex+d)b\log(cx^n)}{6\,(e^5x^3+3\,de^4x^2+3\,d^2e^3x+d^3e^2)} - \frac{(3\,ex+d)a}{6\,(e^5x^3+3\,de^4x^2+3\,d^2e^3x+d^3e^2)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/6*b*n*(x/(d*e^3*x^2 + 2*d^2*e^2*x + d^3*e) - log(e*x + d)/(d^2*e^2) + lo
g(x)/(d^2*e^2)) - 1/6*(3*e*x + d)*b*log(c*x^n)/(e^5*x^3 + 3*d*e^4*x^2 + 3*
d^2*e^3*x + d^3*e^2) - 1/6*(3*e*x + d)*a/(e^5*x^3 + 3*d*e^4*x^2 + 3*d^2*e^
3*x + d^3*e^2)
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 163, normalized size of antiderivative = 1.39

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^4}\,dx$$
$$= -\frac{(3\,benx+bdn)\log(x)}{6\,(e^5x^3+3\,de^4x^2+3\,d^2e^3x+d^3e^2)} + \frac{be^2nx^2+bdenx-3\,bdex\log(c)-3\,adex-bd^2\log(c)-ad^2}{6\,(de^5x^3+3\,d^2e^4x^2+3\,d^3e^3x+d^4e^2)} - \frac{bn\log(ex+d)}{6\,d^2e^2} + \frac{bn\log(x)}{6\,d^2e^2}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="giac")
```

output
```
-1/6*(3*b*e*n*x + b*d*n)*log(x)/(e^5*x^3 + 3*d*e^4*x^2 + 3*d^2*e^3*x + d^3
*e^2) + 1/6*(b*e^2*n*x^2 + b*d*e*n*x - 3*b*d*e*x*log(c) - 3*a*d*e*x - b*d^
2*log(c) - a*d^2)/(d*e^5*x^3 + 3*d^2*e^4*x^2 + 3*d^3*e^3*x + d^4*e^2) - 1/
6*b*n*log(e*x + d)/(d^2*e^2) + 1/6*b*n*log(x)/(d^2*e^2)
```

Mupad [B] (verification not implemented)

Time = 26.34 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.21

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^4}\,dx = -\frac{a\,d+x\,(3\,a\,e-b\,e\,n)-\frac{b\,e^2\,n\,x^2}{d}}{6\,d^3\,e^2+18\,d^2\,e^3\,x+18\,d\,e^4\,x^2+6\,e^5\,x^3} - \frac{\ln(c\,x^n)\,\left(\frac{b\,d}{6\,e^2}+\frac{b\,x}{2\,e}\right)}{d^3+3\,d^2\,e\,x+3\,d\,e^2\,x^2+e^3\,x^3} - \frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{3\,d^2\,e^2}$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x)^4,x)
```

output
```
- (a*d + x*(3*a*e - b*e*n) - (b*e^2*n*x^2)/d)/(6*d^3*e^2 + 6*e^5*x^3 + 18*
d^2*e^3*x + 18*d*e^4*x^2) - (log(c*x^n)*((b*d)/(6*e^2) + (b*x)/(2*e)))/(d^
3 + e^3*x^3 + 3*d*e^2*x^2 + 3*d^2*e*x) - (b*n*atanh((2*e*x)/d + 1))/(3*d^2
*e^2)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 161, normalized size of antiderivative = 1.38

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^4}\,dx$$
$$= \frac{-3\log(ex+d)\,b\,d^3n-9\log(ex+d)\,b\,d^2enx-9\log(ex+d)\,bd\,e^2n\,x^2-3\log(ex+d)\,b\,e^3n\,x^3+9\log(x^n}{18d^2e^2\left(e^3x^3+3d\,e^2x^2+3d^2ex+d^3\right)}$$

input
```
int(x*(a+b*log(c*x^n))/(e*x+d)^4,x)
```

output
```
( - 3*log(d + e*x)*b*d**3*n - 9*log(d + e*x)*b*d**2*e*n*x - 9*log(d + e*x)
*b*d*e**2*n*x**2 - 3*log(d + e*x)*b*e**3*n*x**3 + 9*log(x**n*c)*b*d*e**2*x
**2 + 3*log(x**n*c)*b*e**3*x**3 - 3*a*d**3 - 9*a*d**2*e*x - b*d**3*n - b*e
**3*n*x**3)/(18*d**2*e**2*(d**3 + 3*d**2*e*x + 3*d*e**2*x**2 + e**3*x**3))
```

3.58 $\int \frac{a+b\log(cx^n)}{(d+ex)^4} dx$

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Optimal result

Integrand size = 18, antiderivative size = 95

$$\int \frac{a+b\log(cx^n)}{(d+ex)^4} dx = \frac{bn}{6de(d+ex)^2} + \frac{bn}{3d^2e(d+ex)} + \frac{bn\log(x)}{3d^3e} - \frac{a+b\log(cx^n)}{3e(d+ex)^3} - \frac{bn\log(d+ex)}{3d^3e}$$

output
```
1/6*b*n/d/e/(e*x+d)^2+1/3*b*n/d^2/e/(e*x+d)+1/3*b*n*ln(x)/d^3/e-1/3*(a+b*l
n(c*x^n))/e/(e*x+d)^3-1/3*b*n*ln(e*x+d)/d^3/e
```

Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 66, normalized size of antiderivative = 0.69

$$\int \frac{a+b\log(cx^n)}{(d+ex)^4} dx = \frac{-\frac{a+b\log(cx^n)}{(d+ex)^3} + \frac{bn\left(\frac{d(3d+2ex)}{(d+ex)^2}+2\log(x)-2\log(d+ex)\right)}{2d^3}}{3e}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x)^4,x]
```

output
```
(-((a + b*Log[c*x^n])/(d + e*x)^3) + (b*n*((d*(3*d + 2*e*x))/(d + e*x)^2 +
 2*Log[x] - 2*Log[d + e*x]))/(2*d^3))/(3*e)
```

Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 77, normalized size of antiderivative = 0.81, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {2756, 54, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex)^4}\,dx$$

$$\Big\downarrow \text{2756}$$

$$\frac{bn\int \frac{1}{x(d+ex)^3}dx}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}$$

$$\Big\downarrow \text{54}$$

$$\frac{bn\int \left(-\frac{e}{d^3(d+ex)}-\frac{e}{d^2(d+ex)^2}-\frac{e}{d(d+ex)^3}+\frac{1}{d^3x}\right)dx}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x)^4,x]
```

output
```
-1/3*(a + b*Log[c*x^n])/(e*(d + e*x)^3) + (b*n*(1/(2*d*(d + e*x)^2) + 1/(d
^2*(d + e*x)) + Log[x]/d^3 - Log[d + e*x]/d^3))/(3*e)
```

Defintions of rubi rules used

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 187 vs. $2(85) = 170$.

Time = 0.79 (sec) , antiderivative size = 188, normalized size of antiderivative = 1.98

method	result
parallelrisch	$\frac{-18\ln(ex+d)xb\,d^2e^3n+18\ln(x)x^2bd\,e^4n-6a\,d^3e^2+6\ln(x)b\,d^3e^2n+6\ln(x)x^3b\,e^5n-6\ln(ex+d)x^3b\,e^5n-18\ln(ex+d)x^2bd\,e^4}{18e^3d^3(ex+d)^3}$
risch	$-\frac{b\ln(x^n)}{3e(ex+d)^3}-\frac{-i\pi b\,d^3\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)\,\mathrm{csgn}(ic)-i\pi b\,d^3\,\mathrm{csgn}(ic\,x^n)^3+i\pi b\,d^3\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2+i\pi b\,d^3\,\mathrm{csgn}(ic}{}$

input
```
int((a+b*ln(c*x^n))/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
1/18*(-18*ln(e*x+d)*x*b*d^2*e^3*n+18*ln(x)*x^2*b*d*e^4*n-6*a*d^3*e^2+6*ln(
x)*b*d^3*e^2*n+6*ln(x)*x^3*b*e^5*n-6*ln(e*x+d)*x^3*b*e^5*n-18*ln(e*x+d)*x^
2*b*d*e^4*n+18*ln(x)*x*b*d^2*e^3*n-6*ln(e*x+d)*b*d^3*e^2*n-9*x^2*b*d*e^4*n
+4*b*d^3*e^2*n-6*ln(c*x^n)*b*d^3*e^2-5*x^3*b*e^5*n)/e^3/d^3/(e*x+d)^3
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 160, normalized size of antiderivative = 1.68

$$\int \frac{a+b\log(cx^n)}{(d+ex)^4}\,dx$$
$$= \frac{2\,bde^2nx^2 + 5\,bd^2enx + 3\,bd^3n - 2\,bd^3\log(c) - 2\,ad^3 - 2\,(be^3nx^3 + 3\,bde^2nx^2 + 3\,bd^2enx + bd^3n)\log(ex}{6\,(d^3e^4x^3 + 3\,d^4e^3x^2 + 3\,d^5e^2x + d^6e)}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="fricas")
```

output
```
1/6*(2*b*d*e^2*n*x^2 + 5*b*d^2*e*n*x + 3*b*d^3*n - 2*b*d^3*log(c) - 2*a*d^
3 - 2*(b*e^3*n*x^3 + 3*b*d*e^2*n*x^2 + 3*b*d^2*e*n*x + b*d^3*n)*log(e*x +
d) + 2*(b*e^3*n*x^3 + 3*b*d*e^2*n*x^2 + 3*b*d^2*e*n*x)*log(x))/(d^3*e^4*x^
3 + 3*d^4*e^3*x^2 + 3*d^5*e^2*x + d^6*e)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 700 vs. $2(82) = 164$.

Time = 6.30 (sec) , antiderivative size = 700, normalized size of antiderivative = 7.37

$$\int \frac{a+b\log(cx^n)}{(d+ex)^4}\,dx$$
$$= \begin{cases} \tilde{\infty}\left(-\frac{a}{3x^3} - \frac{bn}{9x^3} - \frac{b\log(cx^n)}{3x^3}\right) \\ \frac{ax-bnx+bx\log(cx^n)}{d^4} \\ \frac{-\frac{a}{3x^3}-\frac{bn}{9x^3}-\frac{b\log(cx^n)}{3x^3}}{e^4} \\ -\frac{2ad^3}{6d^6e+18d^5e^2x+18d^4e^3x^2+6d^3e^4x^3} - \frac{2bd^3n\log\left(\frac{d}{e}+x\right)}{6d^6e+18d^5e^2x+18d^4e^3x^2+6d^3e^4x^3} + \frac{3bd^3n}{6d^6e+18d^5e^2x+18d^4e^3x^2+6d^3e^4x^3} - \frac{6bd^2en}{6d^6e+18d^5e^2x} \end{cases}$$

input
```
integrate((a+b*ln(c*x**n))/(e*x+d)**4,x)
```

output
```
Piecewise((zoo*(-a/(3*x**3) - b*n/(9*x**3) - b*log(c*x**n)/(3*x**3)), Eq(d
, 0) & Eq(e, 0)), ((a*x - b*n*x + b*x*log(c*x**n))/d**4, Eq(e, 0)), ((-a/(
3*x**3) - b*n/(9*x**3) - b*log(c*x**n)/(3*x**3))/e**4, Eq(d, 0)), (-2*a*d*
*3/(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2 + 6*d**3*e**4*x**3) - 2*
b*d**3*n*log(d/e + x)/(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2 + 6*d
**3*e**4*x**3) + 3*b*d**3*n/(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2
 + 6*d**3*e**4*x**3) - 6*b*d**2*e*n*x*log(d/e + x)/(6*d**6*e + 18*d**5*e**
2*x + 18*d**4*e**3*x**2 + 6*d**3*e**4*x**3) + 5*b*d**2*e*n*x/(6*d**6*e + 1
8*d**5*e**2*x + 18*d**4*e**3*x**2 + 6*d**3*e**4*x**3) + 6*b*d**2*e*x*log(c
*x**n)/(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2 + 6*d**3*e**4*x**3)
- 6*b*d*e**2*n*x**2*log(d/e + x)/(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3
*x**2 + 6*d**3*e**4*x**3) + 2*b*d*e**2*n*x**2/(6*d**6*e + 18*d**5*e**2*x +
 18*d**4*e**3*x**2 + 6*d**3*e**4*x**3) + 6*b*d*e**2*x**2*log(c*x**n)/(6*d*
*6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2 + 6*d**3*e**4*x**3) - 2*b*e**3*n
*x**3*log(d/e + x)/(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2 + 6*d**3
*e**4*x**3) + 2*b*e**3*x**3*log(c*x**n)/(6*d**6*e + 18*d**5*e**2*x + 18*d*
*4*e**3*x**2 + 6*d**3*e**4*x**3), True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.52

$$\int \frac{a+b\log(cx^n)}{(d+ex)^4}\,dx = \frac{1}{6}\,bn\left(\frac{2\,ex+3\,d}{d^2e^3x^2+2\,d^3e^2x+d^4e}-\frac{2\,\log(ex+d)}{d^3e}+\frac{2\,\log(x)}{d^3e}\right) - \frac{b\log(cx^n)}{3\,(e^4x^3+3\,de^3x^2+3\,d^2e^2x+d^3e)} - \frac{a}{3\,(e^4x^3+3\,de^3x^2+3\,d^2e^2x+d^3e)}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/6*b*n*((2*e*x + 3*d)/(d^2*e^3*x^2 + 2*d^3*e^2*x + d^4*e) - 2*log(e*x + d
)/(d^3*e) + 2*log(x)/(d^3*e)) - 1/3*b*log(c*x^n)/(e^4*x^3 + 3*d*e^3*x^2 +
3*d^2*e^2*x + d^3*e) - 1/3*a/(e^4*x^3 + 3*d*e^3*x^2 + 3*d^2*e^2*x + d^3*e)
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 147, normalized size of antiderivative = 1.55

$$\int \frac{a + b\log(cx^n)}{(d + ex)^4}\,dx = -\frac{bn\log(x)}{3\,(e^4x^3 + 3\,de^3x^2 + 3\,d^2e^2x + d^3e)} + \frac{2\,be^2nx^2 + 5\,bdenx + 3\,bd^2n - 2\,bd^2\log(c) - 2\,ad^2}{6\,(d^2e^4x^3 + 3\,d^3e^3x^2 + 3\,d^4e^2x + d^5e)} - \frac{bn\log(ex + d)}{3\,d^3e} + \frac{bn\log(x)}{3\,d^3e}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="giac")
```

output
```
-1/3*b*n*log(x)/(e^4*x^3 + 3*d*e^3*x^2 + 3*d^2*e^2*x + d^3*e) + 1/6*(2*b*e
^2*n*x^2 + 5*b*d*e*n*x + 3*b*d^2*n - 2*b*d^2*log(c) - 2*a*d^2)/(d^2*e^4*x^
3 + 3*d^3*e^3*x^2 + 3*d^4*e^2*x + d^5*e) - 1/3*b*n*log(e*x + d)/(d^3*e) +
1/3*b*n*log(x)/(d^3*e)
```

Mupad [B] (verification not implemented)

Time = 26.55 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.34

$$\int \frac{a + b\log(cx^n)}{(d + ex)^4}\,dx = \frac{\frac{3\,b\,n}{2} - a + \frac{b\,e^2\,n\,x^2}{d^2} + \frac{5\,b\,e\,n\,x}{2\,d}}{3\,d^3\,e + 9\,d^2\,e^2\,x + 9\,d\,e^3\,x^2 + 3\,e^4\,x^3} - \frac{b\,\ln(c\,x^n)}{3\,e\,\left(d^3 + 3\,d^2\,e\,x + 3\,d\,e^2\,x^2 + e^3\,x^3\right)} - \frac{2\,b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d} + 1\right)}{3\,d^3\,e}$$

input
```
int((a + b*log(c*x^n))/(d + e*x)^4,x)
```

output
```
((3*b*n)/2 - a + (b*e^2*n*x^2)/d^2 + (5*b*e*n*x)/(2*d))/(3*d^3*e + 3*e^4*x
^3 + 9*d^2*e^2*x + 9*d*e^3*x^2) - (b*log(c*x^n))/(3*e*(d^3 + e^3*x^3 + 3*d
*e^2*x^2 + 3*d^2*e*x)) - (2*b*n*atanh((2*e*x)/d + 1))/(3*d^3*e)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 176, normalized size of antiderivative = 1.85

$$\int \frac{a+b\log(cx^n)}{(d+ex)^4}\,dx$$
$$= \frac{-6\log(ex+d)\,b\,d^3n-18\log(ex+d)\,b\,d^2enx-18\log(ex+d)\,bd\,e^2n\,x^2-6\log(ex+d)\,b\,e^3n\,x^3+18\log}{18d^3e\,(e^3x^3+3d\,e^2x^2+}$$

input
```
int((a+b*log(c*x^n))/(e*x+d)^4,x)
```

output
```
( - 6*log(d + e*x)*b*d**3*n - 18*log(d + e*x)*b*d**2*e*n*x - 18*log(d + e*
x)*b*d*e**2*n*x**2 - 6*log(d + e*x)*b*e**3*n*x**3 + 18*log(x**n*c)*b*d**2*
e*x + 18*log(x**n*c)*b*d*e**2*x**2 + 6*log(x**n*c)*b*e**3*x**3 - 6*a*d**3
+ 7*b*d**3*n + 9*b*d**2*e*n*x - 2*b*e**3*n*x**3)/(18*d**3*e*(d**3 + 3*d**2
*e*x + 3*d*e**2*x**2 + e**3*x**3))
```

3.59 $\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx$

Optimal result 564
Mathematica [F(-1)] 565
Rubi [A] (verified) 565
Maple [C] (warning: unable to verify) 569
Fricas [F] 570
Sympy [A] (verification not implemented) 570
Maxima [F] 571
Giac [F] 572
Mupad [F(-1)] 572
Reduce [F] 572

Optimal result

Integrand size = 21, antiderivative size = 174

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx = -\frac{bn}{6d^2(d+ex)^2} - \frac{5bn}{6d^3(d+ex)} - \frac{5bn\log(x)}{6d^4} + \frac{a+b\log(cx^n)}{3d(d+ex)^3} + \frac{a+b\log(cx^n)}{2d^2(d+ex)^2} - \frac{ex(a+b\log(cx^n))}{d^4(d+ex)} - \frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^4} + \frac{11bn\log(d+ex)}{6d^4} + \frac{bn\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}$$

output
```
-1/6*b*n/d^2/(e*x+d)^2-5/6*b*n/d^3/(e*x+d)-5/6*b*n*ln(x)/d^4+1/3*(a+b*ln(c
*x^n))/d/(e*x+d)^3+1/2*(a+b*ln(c*x^n))/d^2/(e*x+d)^2-e*x*(a+b*ln(c*x^n))/d
^4/(e*x+d)-ln(1+d/e/x)*(a+b*ln(c*x^n))/d^4+11/6*b*n*ln(e*x+d)/d^4+b*n*poly
log(2,-d/e/x)/d^4
```

Mathematica [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx = \$\text{Aborted}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x)^4),x]
```

output
```
$Aborted
```

Rubi [A] (verified)

Time = 1.09 (sec) , antiderivative size = 256, normalized size of antiderivative = 1.47, number of steps used = 13, number of rules used = 13, $\frac{\text{number of rules}}{\text{integrand size}} = 0.619$, Rules used = {2789, 2756, 54, 2009, 2789, 2756, 54, 2009, 2789, 2751, 16, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx$$

$$\Big\downarrow \; 2789$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^4}dx}{d}$$

$$\Big\downarrow \; 2756$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(d+ex)^3}dx}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \; 54$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{d}-\frac{e\left(\frac{bn\int \left(-\frac{e}{d^3(d+ex)}-\frac{e}{d^2(d+ex)^2}-\frac{e}{d(d+ex)^3}+\frac{1}{d^3x}\right)dx}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \; 2009$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \text{2789}$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^3}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \text{2756}$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(d+ex)^2}dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \text{54}$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \left(-\frac{e}{d^2(d+ex)}-\frac{e}{d(d+ex)^2}+\frac{1}{d^2x}\right)dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \text{2009}$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \text{2789}$$

$$\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$\Big\downarrow$ 2751

$$\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int \frac{1}{d+ex}dx}{d}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$\Big\downarrow$ 16

$$\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$\Big\downarrow$ 2779

$$\frac{\frac{\frac{\frac{bn\int \frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$\Big\downarrow$ 2838

$$\frac{\frac{\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x)^4),x]
```

output
```
-((e*(-1/3*(a + b*Log[c*x^n])/(e*(d + e*x)^3) + (b*n*(1/(2*d*(d + e*x)^2)
+ 1/(d^2*(d + e*x)) + Log[x]/d^3 - Log[d + e*x]/d^3))/(3*e)))/d) + (-((e*(
-1/2*(a + b*Log[c*x^n])/(e*(d + e*x)^2) + (b*n*(1/(d*(d + e*x)) + Log[x]/d
^2 - Log[d + e*x]/d^2))/(2*e)))/d) + (-((e*((x*(a + b*Log[c*x^n]))/(d*(d +
 e*x)) - (b*n*Log[d + e*x])/(d*e)))/d) + (-((Log[1 + d/(e*x)]*(a + b*Log[c
*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x))])/d)/d)/d)/d
```

Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.17 (sec) , antiderivative size = 316, normalized size of antiderivative = 1.82

method	result
risch	$-\frac{b\ln(x^n)\ln(ex+d)}{d^4}+\frac{b\ln(x^n)}{d^3(ex+d)}+\frac{b\ln(x^n)}{2d^2(ex+d)^2}+\frac{b\ln(x^n)}{3d(ex+d)^3}+\frac{b\ln(x^n)\ln(x)}{d^4}-\frac{5bn}{6d^3(ex+d)}-\frac{bn}{6d^2(ex+d)^2}+\frac{11bn\ln(}{6d}$

input
```
int((a+b*ln(c*x^n))/x/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)/d^4*ln(e*x+d)+b*ln(x^n)/d^3/(e*x+d)+1/2*b*ln(x^n)/d^2/(e*x+d)^2
+1/3*b*ln(x^n)/d/(e*x+d)^3+b*ln(x^n)/d^4*ln(x)-5/6*b*n/d^3/(e*x+d)-1/6*b*n
/d^2/(e*x+d)^2+11/6*b*n*ln(e*x+d)/d^4-11/6*b*n*ln(x)/d^4-1/2*b*n/d^4*ln(x)
^2+b*n/d^4*ln(e*x+d)*ln(-e*x/d)+b*n/d^4*dilog(-e*x/d)+(1/2*I*Pi*b*csgn(I*x
^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*P
i*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(-1/d^
4*ln(e*x+d)+1/d^3/(e*x+d)+1/2/d^2/(e*x+d)^2+1/3/d/(e*x+d)^3+1/d^4*ln(x))
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x(d+ex)^4}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex+d\right)^4x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^4*x^5 + 4*d*e^3*x^4 + 6*d^2*e^2*x^3 + 4*d^3
*e*x^2 + d^4*x), x)
```

Sympy [A] (verification not implemented)

Time = 66.28 (sec) , antiderivative size = 510, normalized size of antiderivative = 2.93

$$\int \frac{a+b\log\left(cx^n\right)}{x(d+ex)^4}\,dx=\text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x+d)**4,x)
```

output
```
-a*e*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/d - a*e*
Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d**2 - a*e*Pi
ecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d**3 - a*e*Piecewis
e((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/d**4 + a*log(x)/d**4 - b*e**3*n
*Piecewise((-1/(e**4*x), Eq(d, 0)), (-3*d/(6*d**2*e**3 + 12*d*e**4*x + 6*e
**5*x**2) - 4*e*x/(6*d**2*e**3 + 12*d*e**4*x + 6*e**5*x**2) - log(d + e*x)
/(3*d*e**3), True))/d**3 + b*e**3*Piecewise((1/(e**4*x), Eq(d, 0)), (-1/(3
*d*(d/x + e)**3), True))*log(c*x**n)/d**3 + 3*b*e**2*n*Piecewise((-1/(e**3
*x), Eq(d, 0)), (-1/(2*d*e**2 + 2*e**3*x) - log(d + e*x)/(2*d*e**2), True)
)/d**3 - 3*b*e**2*Piecewise((1/(e**3*x), Eq(d, 0)), (-1/(2*d*(d/x + e)**2)
, True))*log(c*x**n)/d**3 - 3*b*e*n*Piecewise((-1/(e**2*x), Eq(d, 0)), (-l
og(d**2 + d*e*x)/(d*e), True))/d**3 + 3*b*e*Piecewise((1/(e**2*x), Eq(d, 0
)), (-1/(d**2/x + d*e), True))*log(c*x**n)/d**3 + b*n*Piecewise((-1/(e*x),
 Eq(d, 0)), (Piecewise((polylog(2, d*exp_polar(I*pi)/(e*x)), (Abs(x) < 1)
& (1/Abs(x) < 1)), (log(e)*log(x) + polylog(2, d*exp_polar(I*pi)/(e*x)), A
bs(x) < 1), (-log(e)*log(1/x) + polylog(2, d*exp_polar(I*pi)/(e*x)), 1/Abs
(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1
), ()), ((), (0, 0)), x)*log(e) + polylog(2, d*exp_polar(I*pi)/(e*x)), Tru
e))/d, True))/d**3 - b*Piecewise((1/(e*x), Eq(d, 0)), (log(d/x + e)/d, Tru
e))*log(c*x**n)/d**3
```

Maxima [F]

$$\int \frac{a + b\log(cx^n)}{x(d + ex)^4}\,dx = \int \frac{b\log(cx^n) + a}{(ex + d)^4 x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/6*a*((6*e^2*x^2 + 15*d*e*x + 11*d^2)/(d^3*e^3*x^3 + 3*d^4*e^2*x^2 + 3*d^
5*e*x + d^6) - 6*log(e*x + d)/d^4 + 6*log(x)/d^4) + b*integrate((log(c) +
log(x^n))/(e^4*x^5 + 4*d*e^3*x^4 + 6*d^2*e^2*x^3 + 4*d^3*e*x^2 + d^4*x), x
)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^4x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^4*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx = \int \frac{a+b\ln(cx^n)}{x(d+ex)^4}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x)^4),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x)^4), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx$$
$$= \frac{6\left(\int \frac{\log(x^nc)}{e^4x^5+4d\,e^3x^4+6d^2e^2x^3+4d^3e\,x^2+d^4x}dx\right)b\,d^7+18\left(\int \frac{\log(x^nc)}{e^4x^5+4d\,e^3x^4+6d^2e^2x^3+4d^3e\,x^2+d^4x}dx\right)b\,d^6ex+18\left(\int \frac{}{e^4x^5+4}\right.}{}$$

input
```
int((a+b*log(c*x^n))/x/(e*x+d)^4,x)
```

output
```
(6*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x
**4 + e**4*x**5),x)*b*d**7 + 18*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 +
6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b*d**6*e*x + 18*int(log(x
**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x
**5),x)*b*d**5*e**2*x**2 + 6*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d
**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b*d**4*e**3*x**3 - 6*log(d +
 e*x)*a*d**3 - 18*log(d + e*x)*a*d**2*e*x - 18*log(d + e*x)*a*d*e**2*x**2
- 6*log(d + e*x)*a*e**3*x**3 + 6*log(x)*a*d**3 + 18*log(x)*a*d**2*e*x + 18
*log(x)*a*d*e**2*x**2 + 6*log(x)*a*e**3*x**3 + 9*a*d**3 + 9*a*d**2*e*x - 2
*a*e**3*x**3)/(6*d**4*(d**3 + 3*d**2*e*x + 3*d*e**2*x**2 + e**3*x**3))
```

3.60 $\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx$

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Optimal result

Integrand size = 21, antiderivative size = 211

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx = & -\frac{bn}{d^4x}+\frac{ben}{6d^3(d+ex)^2}+\frac{4ben}{3d^4(d+ex)}+\frac{4ben\log(x)}{3d^5} \\ & -\frac{a+b\log(cx^n)}{d^4x}-\frac{e(a+b\log(cx^n))}{3d^2(d+ex)^3}-\frac{e(a+b\log(cx^n))}{d^3(d+ex)^2} \\ & +\frac{3e^2x(a+b\log(cx^n))}{d^5(d+ex)}+\frac{4e\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^5} \\ & -\frac{13ben\log(d+ex)}{3d^5}-\frac{4ben\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^5}\end{aligned}$$

output
```
-b*n/d^4/x+1/6*b*e*n/d^3/(e*x+d)^2+4/3*b*e*n/d^4/(e*x+d)+4/3*b*e*n*ln(x)/d
^5-(a+b*ln(c*x^n))/d^4/x-1/3*e*(a+b*ln(c*x^n))/d^2/(e*x+d)^3-e*(a+b*ln(c*x
^n))/d^3/(e*x+d)^2+3*e^2*x*(a+b*ln(c*x^n))/d^5/(e*x+d)+4*e*ln(1+d/e/x)*(a+
b*ln(c*x^n))/d^5-13/3*b*e*n*ln(e*x+d)/d^5-4*b*e*n*polylog(2,-d/e/x)/d^5
```

Mathematica [A] (verified)

Time = 0.32 (sec) , antiderivative size = 231, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx = \frac{-\frac{6bdn}{x}-\frac{6d(a+b\log(cx^n))}{x}-\frac{2d^3e(a+b\log(cx^n))}{(d+ex)^3}-\frac{6d^2e(a+b\log(cx^n))}{(d+ex)^2}-\frac{18de(a+b\log(cx^n))}{d+ex}-\frac{12e(a+b\log(cx^n))^2}{bn}+ben\left(\frac{d(3d}{(d+}\right.}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x)^4),x]
```

output
```
((-6*b*d*n)/x - (6*d*(a + b*Log[c*x^n]))/x - (2*d^3*e*(a + b*Log[c*x^n]))/
(d + e*x)^3 - (6*d^2*e*(a + b*Log[c*x^n]))/(d + e*x)^2 - (18*d*e*(a + b*Lo
g[c*x^n]))/(d + e*x) - (12*e*(a + b*Log[c*x^n])^2)/(b*n) + b*e*n*((d*(3*d
+ 2*e*x))/(d + e*x)^2 + 2*Log[x] - 2*Log[d + e*x]) + 18*b*e*n*(Log[x] - Lo
g[d + e*x]) + 6*b*e*n*(d/(d + e*x) + Log[x] - Log[d + e*x]) + 24*e*(a + b*
Log[c*x^n])*Log[1 + (e*x)/d] + 24*b*e*n*PolyLog[2, -((e*x)/d)])/(6*d^5)
```

Rubi [A] (verified)

Time = 0.56 (sec) , antiderivative size = 211, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{3e^2(a+b\log(cx^n))}{d^4(d+ex)^2}-\frac{4e(a+b\log(cx^n))}{d^4x(d+ex)}+\frac{a+b\log(cx^n)}{d^4x^2}+\frac{2e^2(a+b\log(cx^n))}{d^3(d+ex)^3}+\frac{e^2(a+b\log(cx^n))}{d^2(d+ex)^4}\right)d$$

$$\Big\downarrow \text{2009}$$

$$\frac{3e^2x(a+b\log(cx^n))}{d^5(d+ex)}+\frac{4e\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^5}-\frac{a+b\log(cx^n)}{d^4x}-\frac{e(a+b\log(cx^n))}{d^3(d+ex)^2}-\frac{e(a+b\log(cx^n))}{3d^2(d+ex)^3}-\frac{4ben\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^5}+\frac{4ben\log(x)}{3d^5}-\frac{13ben\log(d+ex)}{3d^5}+\frac{4ben}{3d^4(d+ex)}-\frac{bn}{d^4x}+\frac{ben}{6d^3(d+ex)^2}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x)^4),x]
```

output
```
-((b*n)/(d^4*x)) + (b*e*n)/(6*d^3*(d + e*x)^2) + (4*b*e*n)/(3*d^4*(d + e*x
)) + (4*b*e*n*Log[x])/(3*d^5) - (a + b*Log[c*x^n])/(d^4*x) - (e*(a + b*Log
[c*x^n]))/(3*d^2*(d + e*x)^3) - (e*(a + b*Log[c*x^n]))/(d^3*(d + e*x)^2) +
 (3*e^2*x*(a + b*Log[c*x^n]))/(d^5*(d + e*x)) + (4*e*Log[1 + d/(e*x)]*(a +
 b*Log[c*x^n]))/d^5 - (13*b*e*n*Log[d + e*x])/(3*d^5) - (4*b*e*n*PolyLog[2
, -(d/(e*x))])/d^5
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.57 (sec) , antiderivative size = 370, normalized size of antiderivative = 1.75

method	result
risch	$-\frac{b\ln(x^n)e}{3d^2(ex+d)^3}+\frac{4b\ln(x^n)e\ln(ex+d)}{d^5}-\frac{3b\ln(x^n)e}{d^4(ex+d)}-\frac{b\ln(x^n)e}{d^3(ex+d)^2}-\frac{b\ln(x^n)}{d^4x}-\frac{4b\ln(x^n)e\ln(x)}{d^5}+\frac{2bne\ln(x)^2}{d^5}-\frac{4bne\ln}{}$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
-1/3*b*ln(x^n)/d^2/(e*x+d)^3*e+4*b*ln(x^n)/d^5*e*ln(e*x+d)-3*b*ln(x^n)/d^4
*e/(e*x+d)-b*ln(x^n)/d^3/(e*x+d)^2*e-b*ln(x^n)/d^4/x-4*b*ln(x^n)/d^5*e*ln(
x)+2*b*n/d^5*e*ln(x)^2-4*b*n/d^5*e*ln(e*x+d)*ln(-e*x/d)-4*b*n/d^5*e*dilog(
-e*x/d)+4/3*b*e*n/d^4/(e*x+d)-13/3*b*e*n*ln(e*x+d)/d^5+1/6*b*e*n/d^3/(e*x+
d)^2-b*n/d^4/x+13/3*b*e*n*ln(x)/d^5+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^
2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^
3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(-1/3/d^2/(e*x+d)^3*e+4/
d^5*e*ln(e*x+d)-3/d^4*e/(e*x+d)-1/d^3/(e*x+d)^2*e-1/d^4/x-4/d^5*e*ln(x))
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^4x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^4*x^6 + 4*d*e^3*x^5 + 6*d^2*e^2*x^4 + 4*d^3
*e*x^3 + d^4*x^2), x)
```

Sympy [A] (verification not implemented)

Time = 65.80 (sec) , antiderivative size = 614, normalized size of antiderivative = 2.91

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x+d)**4,x)
```

output
```
a*e**2*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/d**2 +
 2*a*e**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d**
3 + 3*a*e**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d**4
 - a/(d**4*x) + 4*a*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True)
)/d**5 - 4*a*e*log(x)/d**5 - b*e**2*n*Piecewise((x/d**4, Eq(e, 0)), (-3*d/
(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - 2*e*x/(6*d**4*e + 12*d**3
*e**2*x + 6*d**2*e**3*x**2) - log(x)/(3*d**3*e) + log(d/e + x)/(3*d**3*e),
 True))/d**2 + b*e**2*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3)
, True))*log(c*x**n)/d**2 - 2*b*e**2*n*Piecewise((x/d**3, Eq(e, 0)), (-1/(
2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e), True
))/d**3 + 2*b*e**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), T
rue))*log(c*x**n)/d**3 - 3*b*e**2*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)
/(d*e) + log(d/e + x)/(d*e), True))/d**4 + 3*b*e**2*Piecewise((x/d**2, Eq(
e, 0)), (-1/(d*e + e**2*x), True))*log(c*x**n)/d**4 - b*n/(d**4*x) - b*log
(c*x**n)/(d**4*x) - 4*b*e**2*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-pol
ylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*lo
g(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) -
 polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)),
 ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) -
 polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/d**5 + 4*b*e**2*Pi...
```

Maxima [F]

$$\int \frac{a + b\log(cx^n)}{x^2(d+ex)^4}\,dx = \int \frac{b\log(cx^n) + a}{(ex+d)^4x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^4,x, algorithm="maxima")
```

output
```
-1/3*a*((12*e^3*x^3 + 30*d*e^2*x^2 + 22*d^2*e*x + 3*d^3)/(d^4*e^3*x^4 + 3*
d^5*e^2*x^3 + 3*d^6*e*x^2 + d^7*x) - 12*e*log(e*x + d)/d^5 + 12*e*log(x)/d
^5) + b*integrate((log(c) + log(x^n))/(e^4*x^6 + 4*d*e^3*x^5 + 6*d^2*e^2*x
^4 + 4*d^3*e*x^3 + d^4*x^2), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^4x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^4*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^2\,(d+e\,x)^4}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^4),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^4), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx$$
$$= \frac{3\left(\int \frac{\log(x^nc)}{e^4x^6+4d\,e^3x^5+6d^2e^2x^4+4d^3e\,x^3+d^4x^2}dx\right)b\,d^8x+9\left(\int \frac{\log(x^nc)}{e^4x^6+4d\,e^3x^5+6d^2e^2x^4+4d^3e\,x^3+d^4x^2}dx\right)b\,d^7e\,x^2+9\left(\int \frac{}{e^4x^6}\right.}{}$$

input
```
int((a+b*log(c*x^n))/x^2/(e*x+d)^4,x)
```

output
```
(3*int(log(x**n*c)/(d**4*x**2 + 4*d**3*e*x**3 + 6*d**2*e**2*x**4 + 4*d*e**
3*x**5 + e**4*x**6),x)*b*d**8*x + 9*int(log(x**n*c)/(d**4*x**2 + 4*d**3*e*
x**3 + 6*d**2*e**2*x**4 + 4*d*e**3*x**5 + e**4*x**6),x)*b*d**7*e*x**2 + 9*
int(log(x**n*c)/(d**4*x**2 + 4*d**3*e*x**3 + 6*d**2*e**2*x**4 + 4*d*e**3*x
**5 + e**4*x**6),x)*b*d**6*e**2*x**3 + 3*int(log(x**n*c)/(d**4*x**2 + 4*d*
*3*e*x**3 + 6*d**2*e**2*x**4 + 4*d*e**3*x**5 + e**4*x**6),x)*b*d**5*e**3*x
**4 + 12*log(d + e*x)*a*d**3*e*x + 36*log(d + e*x)*a*d**2*e**2*x**2 + 36*l
og(d + e*x)*a*d*e**3*x**3 + 12*log(d + e*x)*a*e**4*x**4 - 12*log(x)*a*d**3
*e*x - 36*log(x)*a*d**2*e**2*x**2 - 36*log(x)*a*d*e**3*x**3 - 12*log(x)*a*
e**4*x**4 - 3*a*d**4 - 18*a*d**3*e*x - 18*a*d**2*e**2*x**2 + 4*a*e**4*x**4
)/(3*d**5*x*(d**3 + 3*d**2*e*x + 3*d*e**2*x**2 + e**3*x**3))
```

3.61 $\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx$

Optimal result 581
Mathematica [A] (verified) 582
Rubi [A] (verified) 582
Maple [C] (warning: unable to verify) 583
Fricas [F] 584
Sympy [A] (verification not implemented) 584
Maxima [F] 585
Giac [F] 586
Mupad [F(-1)] 586
Reduce [F] 586

Optimal result

Integrand size = 21, antiderivative size = 263

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx = &-\frac{bn}{4d^4x^2}+\frac{4ben}{d^5x}-\frac{be^2n}{6d^4(d+ex)^2}-\frac{11be^2n}{6d^5(d+ex)}\\ &-\frac{11be^2n\log(x)}{6d^6}-\frac{a+b\log(cx^n)}{2d^4x^2}+\frac{4e(a+b\log(cx^n))}{d^5x}\\ &+\frac{e^2(a+b\log(cx^n))}{3d^3(d+ex)^3}+\frac{3e^2(a+b\log(cx^n))}{2d^4(d+ex)^2}\\ &-\frac{6e^3x(a+b\log(cx^n))}{d^6(d+ex)}-\frac{10e^2\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^6}\\ &+\frac{47be^2n\log(d+ex)}{6d^6}+\frac{10be^2n\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^6}\end{aligned}$$

output
```
-1/4*b*n/d^4/x^2+4*b*e*n/d^5/x-1/6*b*e^2*n/d^4/(e*x+d)^2-11/6*b*e^2*n/d^5/
(e*x+d)-11/6*b*e^2*n*ln(x)/d^6-1/2*(a+b*ln(c*x^n))/d^4/x^2+4*e*(a+b*ln(c*x
^n))/d^5/x+1/3*e^2*(a+b*ln(c*x^n))/d^3/(e*x+d)^3+3/2*e^2*(a+b*ln(c*x^n))/d
^4/(e*x+d)^2-6*e^3*x*(a+b*ln(c*x^n))/d^6/(e*x+d)-10*e^2*ln(1+d/e/x)*(a+b*l
n(c*x^n))/d^6+47/6*b*e^2*n*ln(e*x+d)/d^6+10*b*e^2*n*polylog(2,-d/e/x)/d^6
```

Mathematica [A] (verified)

Time = 0.37 (sec) , antiderivative size = 276, normalized size of antiderivative = 1.05

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx = \frac{-\frac{3bd^2n}{x^2}+\frac{48bden}{x}-\frac{18bde^2n}{d+ex}-\frac{2bde^2n(3d+2ex)}{(d+ex)^2}-22be^2n\log(x)-\frac{6d^2(a+b\log(cx^n))}{x^2}+\frac{48de(a+b\log(cx^n))}{x}+\frac{4d^3e^2(a+b\log(cx^n))}{(d+ex)^3}}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x)^4),x]
```

output
```
((-3*b*d^2*n)/x^2 + (48*b*d*e*n)/x - (18*b*d*e^2*n)/(d + e*x) - (2*b*d*e^2
*n*(3*d + 2*e*x))/(d + e*x)^2 - 22*b*e^2*n*Log[x] - (6*d^2*(a + b*Log[c*x^
n]))/x^2 + (48*d*e*(a + b*Log[c*x^n]))/x + (4*d^3*e^2*(a + b*Log[c*x^n]))/
(d + e*x)^3 + (18*d^2*e^2*(a + b*Log[c*x^n]))/(d + e*x)^2 + (72*d*e^2*(a +
 b*Log[c*x^n]))/(d + e*x) + (60*e^2*(a + b*Log[c*x^n])^2)/(b*n) - 72*b*e^2
*n*(Log[x] - Log[d + e*x]) + 22*b*e^2*n*Log[d + e*x] - 120*e^2*(a + b*Log[
c*x^n])*Log[1 + (e*x)/d] - 120*b*e^2*n*PolyLog[2, -((e*x)/d)])/(12*d^6)
```

Rubi [A] (verified)

Time = 0.62 (sec) , antiderivative size = 263, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(-\frac{6e^3(a+b\log(cx^n))}{d^5(d+ex)^2}+\frac{10e^2(a+b\log(cx^n))}{d^5x(d+ex)}-\frac{4e(a+b\log(cx^n))}{d^5x^2}-\frac{3e^3(a+b\log(cx^n))}{d^4(d+ex)^3}+\frac{a+b\log(cx^n)}{d^4x^3}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\frac{6e^3x(a+b\log(cx^n))}{d^6(d+ex)}-\frac{10e^2\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^6}+\frac{4e(a+b\log(cx^n))}{d^5x}+\frac{3e^2(a+b\log(cx^n))}{2d^4(d+ex)^2}-\frac{a+b\log(cx^n)}{2d^4x^2}+\frac{e^2(a+b\log(cx^n))}{3d^3(d+ex)^3}+\frac{10be^2n\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^6}-\frac{11be^2n\log(x)}{6d^6}+\frac{47be^2n\log(d+ex)}{6d^6}-\frac{11be^2n}{6d^5(d+ex)}+\frac{4ben}{d^5x}-\frac{be^2n}{6d^4(d+ex)^2}-\frac{bn}{4d^4x^2}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x)^4),x]
```

output
```
-1/4*(b*n)/(d^4*x^2) + (4*b*e*n)/(d^5*x) - (b*e^2*n)/(6*d^4*(d + e*x)^2) -
 (11*b*e^2*n)/(6*d^5*(d + e*x)) - (11*b*e^2*n*Log[x])/(6*d^6) - (a + b*Log
[c*x^n])/(2*d^4*x^2) + (4*e*(a + b*Log[c*x^n]))/(d^5*x) + (e^2*(a + b*Log[
c*x^n]))/(3*d^3*(d + e*x)^3) + (3*e^2*(a + b*Log[c*x^n]))/(2*d^4*(d + e*x)
^2) - (6*e^3*x*(a + b*Log[c*x^n]))/(d^6*(d + e*x)) - (10*e^2*Log[1 + d/(e*
x)]*(a + b*Log[c*x^n]))/d^6 + (47*b*e^2*n*Log[d + e*x])/(6*d^6) + (10*b*e^
2*n*PolyLog[2, -(d/(e*x))]])/d^6
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.97 (sec) , antiderivative size = 438, normalized size of antiderivative = 1.67

method	result
risch	$-\frac{10b\ln(x^n)e^2\ln(ex+d)}{d^6}+\frac{6b\ln(x^n)e^2}{d^5(ex+d)}+\frac{3b\ln(x^n)e^2}{2d^4(ex+d)^2}+\frac{b\ln(x^n)e^2}{3d^3(ex+d)^3}-\frac{b\ln(x^n)}{2d^4x^2}+\frac{10b\ln(x^n)e^2\ln(x)}{d^6}+\frac{4b\ln(x^n)e}{d^5x}-$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
-10*b*ln(x^n)/d^6*e^2*ln(e*x+d)+6*b*ln(x^n)/d^5*e^2/(e*x+d)+3/2*b*ln(x^n)/
d^4*e^2/(e*x+d)^2+1/3*b*ln(x^n)/d^3/(e*x+d)^3*e^2-1/2*b*ln(x^n)/d^4/x^2+10
*b*ln(x^n)/d^6*e^2*ln(x)+4*b*ln(x^n)/d^5*e/x-11/6*b*e^2*n/d^5/(e*x+d)+47/6
*b*e^2*n*ln(e*x+d)/d^6-1/6*b*e^2*n/d^4/(e*x+d)^2-1/4*b*n/d^4/x^2+4*b*e*n/d
^5/x-47/6*b*e^2*n*ln(x)/d^6-5*b*n/d^6*e^2*ln(x)^2+10*b*n/d^6*e^2*ln(e*x+d)
*ln(-e*x/d)+10*b*n/d^6*e^2*dilog(-e*x/d)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*
x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*
x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(-10/d^6*e^2*ln(e*x
+d)+6/d^5*e^2/(e*x+d)+3/2/d^4*e^2/(e*x+d)^2+1/3/d^3/(e*x+d)^3*e^2-1/2/d^4/
x^2+10/d^6*e^2*ln(x)+4/d^5*e/x)
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^4x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^4*x^7 + 4*d*e^3*x^6 + 6*d^2*e^2*x^5 + 4*d^3
*e*x^4 + d^4*x^3), x)
```

Sympy [A] (verification not implemented)

Time = 71.08 (sec) , antiderivative size = 668, normalized size of antiderivative = 2.54

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x+d)**4,x)
```

output
```
-a*e**3*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/d**3
- 3*a*e**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d*
*4 - a/(2*d**4*x**2) - 6*a*e**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e
**2*x), True))/d**5 + 4*a*e/(d**5*x) - 10*a*e**3*Piecewise((x/d, Eq(e, 0))
, (log(d + e*x)/e, True))/d**6 + 10*a*e**2*log(x)/d**6 + b*e**3*n*Piecewis
e((x/d**4, Eq(e, 0)), (-3*d/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2)
 - 2*e*x/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - log(x)/(3*d**3*e
) + log(d/e + x)/(3*d**3*e), True))/d**3 - b*e**3*Piecewise((x/d**4, Eq(e,
 0)), (-1/(3*e*(d + e*x)**3), True))*log(c*x**n)/d**3 + 3*b*e**3*n*Piecewi
se((x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + l
og(d/e + x)/(2*d**2*e), True))/d**4 - 3*b*e**3*Piecewise((x/d**3, Eq(e, 0)
), (-1/(2*e*(d + e*x)**2), True))*log(c*x**n)/d**4 - b*n/(4*d**4*x**2) - b
*log(c*x**n)/(2*d**4*x**2) + 6*b*e**3*n*Piecewise((x/d**2, Eq(e, 0)), (-lo
g(x)/(d*e) + log(d/e + x)/(d*e), True))/d**5 - 6*b*e**3*Piecewise((x/d**2,
 Eq(e, 0)), (-1/(d*e + e**2*x), True))*log(c*x**n)/d**5 + 4*b*e*n/(d**5*x)
 + 4*b*e*log(c*x**n)/(d**5*x) + 10*b*e**3*n*Piecewise((x/d, Eq(e, 0)), (Pi
ecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)
), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(
d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(
((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, ...
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^4x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/6*a*((60*e^4*x^4 + 150*d*e^3*x^3 + 110*d^2*e^2*x^2 + 15*d^3*e*x - 3*d^4)
/(d^5*e^3*x^5 + 3*d^6*e^2*x^4 + 3*d^7*e*x^3 + d^8*x^2) - 60*e^2*log(e*x +
d)/d^6 + 60*e^2*log(x)/d^6) + b*integrate((log(c) + log(x^n))/(e^4*x^7 + 4
*d*e^3*x^6 + 6*d^2*e^2*x^5 + 4*d^3*e*x^4 + d^4*x^3), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)^4x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^4*x^3), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{x^3\,(d+e\,x)^4}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^4),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^4), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx$$
$$=\frac{6\left(\int \frac{\log(x^nc)}{e^4x^7+4d\,e^3x^6+6d^2e^2x^5+4d^3e\,x^4+d^4x^3}dx\right)b\,d^9x^2+18\left(\int \frac{\log(x^nc)}{e^4x^7+4d\,e^3x^6+6d^2e^2x^5+4d^3e\,x^4+d^4x^3}dx\right)b\,d^8e\,x^3+18\Big(\int}{}$$

input
```
int((a+b*log(c*x^n))/x^3/(e*x+d)^4,x)
```

output

```
(6*int(log(x**n*c)/(d**4*x**3 + 4*d**3*e*x**4 + 6*d**2*e**2*x**5 + 4*d*e**
3*x**6 + e**4*x**7),x)*b*d**9*x**2 + 18*int(log(x**n*c)/(d**4*x**3 + 4*d**
3*e*x**4 + 6*d**2*e**2*x**5 + 4*d*e**3*x**6 + e**4*x**7),x)*b*d**8*e*x**3
+ 18*int(log(x**n*c)/(d**4*x**3 + 4*d**3*e*x**4 + 6*d**2*e**2*x**5 + 4*d*e
**3*x**6 + e**4*x**7),x)*b*d**7*e**2*x**4 + 6*int(log(x**n*c)/(d**4*x**3 +
 4*d**3*e*x**4 + 6*d**2*e**2*x**5 + 4*d*e**3*x**6 + e**4*x**7),x)*b*d**6*e
**3*x**5 - 60*log(d + e*x)*a*d**3*e**2*x**2 - 180*log(d + e*x)*a*d**2*e**3
*x**3 - 180*log(d + e*x)*a*d*e**4*x**4 - 60*log(d + e*x)*a*e**5*x**5 + 60*
log(x)*a*d**3*e**2*x**2 + 180*log(x)*a*d**2*e**3*x**3 + 180*log(x)*a*d*e**
4*x**4 + 60*log(x)*a*e**5*x**5 - 3*a*d**5 + 15*a*d**4*e*x + 90*a*d**3*e**2
*x**2 + 90*a*d**2*e**3*x**3 - 20*a*e**5*x**5)/(6*d**6*x**2*(d**3 + 3*d**2*
e*x + 3*d*e**2*x**2 + e**3*x**3))
```

3.62 $\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}\,dx$

Optimal result 588
Mathematica [A] (verified) 589
Rubi [A] (verified) 590
Maple [C] (warning: unable to verify) 593
Fricas [F] 594
Sympy [F(-1)] 594
Maxima [F] 595
Giac [F] 595
Mupad [F(-1)] 595
Reduce [F] 596

Optimal result

Integrand size = 21, antiderivative size = 329

$$\begin{aligned}\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}\,dx &= \frac{28bdnx}{e^8}-\frac{d(280a+341bn)x}{10e^8}-\frac{7bnx^2}{e^7}-\frac{28bdx\log(cx^n)}{e^8}\\
&-\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}-\frac{x^7(8a+bn+8b\log(cx^n))}{30e^2(d+ex)^5}\\
&-\frac{x^6(56a+15bn+56b\log(cx^n))}{120e^3(d+ex)^4}\\
&-\frac{x^5(168a+73bn+168b\log(cx^n))}{180e^4(d+ex)^3}\\
&+\frac{x^2(280a+341bn+280b\log(cx^n))}{20e^7}\\
&-\frac{x^4(840a+533bn+840b\log(cx^n))}{360e^5(d+ex)^2}\\
&-\frac{x^3(840a+743bn+840b\log(cx^n))}{90e^6(d+ex)}\\
&+\frac{d^2(280a+341bn+280b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{10e^9}\\
&+\frac{28bd^2n\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^9}\end{aligned}$$

output
```
28*b*d*n*x/e^8-1/10*d*(341*b*n+280*a)*x/e^8-7*b*n*x^2/e^7-28*b*d*x*ln(c*x^
n)/e^8-1/6*x^8*(a+b*ln(c*x^n))/e/(e*x+d)^6-1/30*x^7*(8*a+b*n+8*b*ln(c*x^n)
)/e^2/(e*x+d)^5-1/120*x^6*(56*a+15*b*n+56*b*ln(c*x^n))/e^3/(e*x+d)^4-1/180
*x^5*(168*a+73*b*n+168*b*ln(c*x^n))/e^4/(e*x+d)^3+1/20*x^2*(280*a+341*b*n+
280*b*ln(c*x^n))/e^7-1/360*x^4*(840*a+533*b*n+840*b*ln(c*x^n))/e^5/(e*x+d)
^2-1/90*x^3*(840*a+743*b*n+840*b*ln(c*x^n))/e^6/(e*x+d)+1/10*d^2*(280*a+34
1*b*n+280*b*ln(c*x^n))*ln(1+e*x/d)/e^9+28*b*d^2*n*polylog(2,-e*x/d)/e^9
```

Mathematica [A] (verified)

Time = 0.58 (sec) , antiderivative size = 403, normalized size of antiderivative = 1.22

$$\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{-2520adex+2520bdenx+180ae^2x^2-90be^2nx^2-\frac{60ad^8}{(d+ex)^6}+\frac{576ad^7}{(d+ex)^5}+\frac{12bd^7n}{(d+ex)^5}-\frac{2520ad^6}{(d+ex)^4}-\frac{129bd^6n}{(d+ex)^4}+\frac{6720}{(d+e}}{}$$

input
```
Integrate[(x^8*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
(-2520*a*d*e*x + 2520*b*d*e*n*x + 180*a*e^2*x^2 - 90*b*e^2*n*x^2 - (60*a*d
^8)/(d + e*x)^6 + (576*a*d^7)/(d + e*x)^5 + (12*b*d^7*n)/(d + e*x)^5 - (25
20*a*d^6)/(d + e*x)^4 - (129*b*d^6*n)/(d + e*x)^4 + (6720*a*d^5)/(d + e*x)
^3 + (668*b*d^5*n)/(d + e*x)^3 - (12600*a*d^4)/(d + e*x)^2 - (2358*b*d^4*n
)/(d + e*x)^2 + (20160*a*d^3)/(d + e*x) + (7884*b*d^3*n)/(d + e*x) - 12276
*b*d^2*n*Log[x] - 2520*b*d*e*x*Log[c*x^n] + 180*b*e^2*x^2*Log[c*x^n] - (60
*b*d^8*Log[c*x^n])/(d + e*x)^6 + (576*b*d^7*Log[c*x^n])/(d + e*x)^5 - (252
0*b*d^6*Log[c*x^n])/(d + e*x)^4 + (6720*b*d^5*Log[c*x^n])/(d + e*x)^3 - (1
2600*b*d^4*Log[c*x^n])/(d + e*x)^2 + (20160*b*d^3*Log[c*x^n])/(d + e*x) +
12276*b*d^2*n*Log[d + e*x] + 10080*a*d^2*Log[1 + (e*x)/d] + 10080*b*d^2*Lo
g[c*x^n]*Log[1 + (e*x)/d] + 10080*b*d^2*n*PolyLog[2, -((e*x)/d)])/(360*e^9
)
```

Rubi [A] (verified)

Time = 1.25 (sec) , antiderivative size = 366, normalized size of antiderivative = 1.11, number of steps used = 11, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}} = 0.524$, Rules used = {2784, 2784, 2784, 27, 2784, 2784, 27, 2784, 27, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}dx$$

$$\Big\downarrow \text{2784}$$

$$\frac{\int \frac{x^7(8a+bn+8b\log(cx^n))}{(d+ex)^6}dx}{6e}-\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \text{2784}$$

$$\frac{\frac{\int \frac{x^6(56a+15bn+56b\log(cx^n))}{(d+ex)^5}dx}{5e}-\frac{x^7(8a+8b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \text{2784}$$

$$\frac{\frac{\frac{\int \frac{2x^5(168a+73bn+168b\log(cx^n))}{(d+ex)^4}dx}{4e}-\frac{x^6(56a+56b\log(cx^n)+15bn)}{4e(d+ex)^4}}{5e}-\frac{x^7(8a+8b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \text{27}$$

$$\frac{\frac{\frac{\int \frac{x^5(168a+73bn+168b\log(cx^n))}{(d+ex)^4}dx}{2e}-\frac{x^6(56a+56b\log(cx^n)+15bn)}{4e(d+ex)^4}}{5e}-\frac{x^7(8a+8b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \text{2784}$$

$$\frac{\frac{\frac{\frac{\int \frac{x^4(840a+533bn+840b\log(cx^n))}{(d+ex)^3}dx}{3e}-\frac{x^5(168a+168b\log(cx^n)+73bn)}{3e(d+ex)^3}}{2e}-\frac{x^6(56a+56b\log(cx^n)+15bn)}{4e(d+ex)^4}}{5e}-\frac{x^7(8a+8b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \text{2784}$$

$$\frac{\frac{\frac{\frac{\frac{\int \frac{4x^3(840a+743bn+840b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^4(840a+840b\log(cx^n)+533bn)}{2e(d+ex)^2}}{3e}-\frac{x^5(168a+168b\log(cx^n)+73bn)}{3e(d+ex)^3}}{2e}-\frac{x^6(56a+56b\log(cx^n)+15bn)}{4e(d+ex)^4}}{5e}-\frac{x^7(8a+8b\log}{5e(d+e}}{6e}$$

$$\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow 27$$

$$\frac{\frac{\frac{\frac{\frac{2\int \frac{x^3(840a+743bn+840b\log(cx^n))}{(d+ex)^2}dx}{e}-\frac{x^4(840a+840b\log(cx^n)+533bn)}{2e(d+ex)^2}}{3e}-\frac{x^5(168a+168b\log(cx^n)+73bn)}{3e(d+ex)^3}}{2e}-\frac{x^6(56a+56b\log(cx^n)+15bn)}{4e(d+ex)^4}}{5e}-\frac{x^7(8a+8b\log}{5e(d+}}{6e}$$

$$\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow 2784$$

$$\frac{\frac{\frac{\frac{2\left(\frac{\int \frac{9x^2(280a+341bn+280b\log(cx^n))}{d+ex}dx}{e}-\frac{x^3(840a+840b\log(cx^n)+743bn)}{e(d+ex)}\right)}{e}-\frac{x^4(840a+840b\log(cx^n)+533bn)}{2e(d+ex)^2}}{3e}-\frac{x^5(168a+168b\log(cx^n)+73bn)}{3e(d+ex)^3}}{2e}-x^6(56a+}{5e}$$
$$6e$$

$$\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow 27$$

$$\frac{\frac{\frac{\frac{2\left(\frac{9\int \frac{x^2(280a+341bn+280b\log(cx^n))}{d+ex}dx}{e}-\frac{x^3(840a+840b\log(cx^n)+743bn)}{e(d+ex)}\right)}{e}-\frac{x^4(840a+840b\log(cx^n)+533bn)}{2e(d+ex)^2}}{3e}-\frac{x^5(168a+168b\log(cx^n)+73bn)}{3e(d+ex)^3}}{2e}-x^6(56a+}{5e}$$
$$6e$$

$$\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow 2793$$

$$\frac{\frac{\frac{\frac{2\left(\frac{9\int\left(\frac{(280a+341bn+280b\log(cx^n))d^2}{e^2(d+ex)}-\frac{(280a+341bn+280b\log(cx^n))d}{e^2}+\frac{x(280a+341bn+280b\log(cx^n))}{e}\right)dx}{e}-\frac{x^3(840a+840b\log(cx^n)+743bn)}{e(d+ex)}\right)}{e}-\frac{x^4(840a}{}}{3e}}{2e}}{5e}}{6e}$$

$$\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \; 2009$$

$$\frac{\frac{\frac{2\left(\frac{9\left(\frac{d^2\log\left(\frac{ex}{d}+1\right)(280a+280b\log(cx^n)+341bn)}{e^3}+\frac{x^2(280a+280b\log(cx^n)+341bn)}{2e}-\frac{dx(280a+341bn)}{e^2}-\frac{280bdx\log(cx^n)}{e^2}+\frac{280bd^2n\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}+\frac{280bo}{e^2}\right.}{e}\right.}{e}}{3e}}{2e}}{5e}$$

$$\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

input
```
Int[(x^8*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
-1/6*(x^8*(a + b*Log[c*x^n]))/(e*(d + e*x)^6) + (-1/5*(x^7*(8*a + b*n + 8*
b*Log[c*x^n]))/(e*(d + e*x)^5) + (-1/4*(x^6*(56*a + 15*b*n + 56*b*Log[c*x^
n]))/(e*(d + e*x)^4) + (-1/3*(x^5*(168*a + 73*b*n + 168*b*Log[c*x^n]))/(e*
(d + e*x)^3) + (-1/2*(x^4*(840*a + 533*b*n + 840*b*Log[c*x^n]))/(e*(d + e*
x)^2) + (2*(-((x^3*(840*a + 743*b*n + 840*b*Log[c*x^n]))/(e*(d + e*x))) +
(9*((280*b*d*n*x)/e^2 - (d*(280*a + 341*b*n)*x)/e^2 - (70*b*n*x^2)/e - (28
0*b*d*x*Log[c*x^n])/e^2 + (x^2*(280*a + 341*b*n + 280*b*Log[c*x^n]))/(2*e)
 + (d^2*(280*a + 341*b*n + 280*b*Log[c*x^n])*Log[1 + (e*x)/d])/e^3 + (280*
b*d^2*n*PolyLog[2, -((e*x)/d)])/e^3))/e))/e)/(3*e))/(2*e))/(5*e))/(6*e)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 4.50 (sec) , antiderivative size = 561, normalized size of antiderivative = 1.71

method	result
risch	$\frac{b\ln(x^n)x^2}{2e^7} - \frac{7b\ln(x^n)dx}{e^8} + \frac{56b\ln(x^n)d^3}{e^9(ex+d)} + \frac{28b\ln(x^n)d^2\ln(ex+d)}{e^9} + \frac{56b\ln(x^n)d^5}{3e^9(ex+d)^3} + \frac{8b\ln(x^n)d^7}{5e^9(ex+d)^5} - \frac{b\ln(x^n)d^8}{6e^9(ex+d)^6} - \frac{35b}{e^9(}$

input
```
int(x^8*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/e^7*x^2-7*b*ln(x^n)/e^8*d*x+56*b*ln(x^n)/e^9*d^3/(e*x+d)+28*
b*ln(x^n)/e^9*d^2*ln(e*x+d)+56/3*b*ln(x^n)/e^9*d^5/(e*x+d)^3+8/5*b*ln(x^n)
/e^9*d^7/(e*x+d)^5-1/6*b*ln(x^n)*d^8/e^9/(e*x+d)^6-35*b*ln(x^n)/e^9*d^4/(e
*x+d)^2-7*b*ln(x^n)/e^9*d^6/(e*x+d)^4-1/4*b*n*x^2/e^7+7*b*d*n*x/e^8+29/4*b
*n/e^9*d^2+341/10*b*n/e^9*d^2*ln(e*x+d)+219/10*b*n/e^9*d^3/(e*x+d)-131/20*
b*n/e^9*d^4/(e*x+d)^2+167/90*b*n/e^9*d^5/(e*x+d)^3-43/120*b*n/e^9*d^6/(e*x
+d)^4+1/30*b*n/e^9*d^7/(e*x+d)^5-341/10*b*n/e^9*d^2*ln(e*x)-28*b*n/e^9*d^2
*ln(e*x+d)*ln(-e*x/d)-28*b*n/e^9*d^2*dilog(-e*x/d)+(1/2*I*Pi*b*csgn(I*x^n)
*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b
*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(1/e^8*(1
/2*e*x^2-7*d*x)+56/e^9*d^3/(e*x+d)+28/e^9*d^2*ln(e*x+d)+56/3/e^9*d^5/(e*x+
d)^3+8/5/e^9*d^7/(e*x+d)^5-1/6*d^8/e^9/(e*x+d)^6-35/e^9*d^4/(e*x+d)^2-7/e^
9*d^6/(e*x+d)^4)
```

Fricas [F]

$$\int \frac{x^8(a + b\log(cx^n))}{(d + ex)^7} \, dx = \int \frac{(b\log(cx^n) + a)x^8}{(ex + d)^7} \, dx$$

input
```
integrate(x^8*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

output
```
integral((b*x^8*log(c*x^n) + a*x^8)/(e^7*x^7 + 7*d*e^6*x^6 + 21*d^2*e^5*x^
5 + 35*d^3*e^4*x^4 + 35*d^4*e^3*x^3 + 21*d^5*e^2*x^2 + 7*d^6*e*x + d^7), x
)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{x^8(a + b\log(cx^n))}{(d + ex)^7} \, dx = \text{Timed out}$$

input
```
integrate(x**8*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

output
```
Timed out
```

Maxima [F]

$$\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}\,dx = \int \frac{(b\log(cx^n)+a)x^8}{(ex+d)^7}\,dx$$

input
```
integrate(x^8*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

output
```
1/30*a*((1680*d^3*e^5*x^5 + 7350*d^4*e^4*x^4 + 13160*d^5*e^3*x^3 + 11970*d
^6*e^2*x^2 + 5508*d^7*e*x + 1023*d^8)/(e^15*x^6 + 6*d*e^14*x^5 + 15*d^2*e^
13*x^4 + 20*d^3*e^12*x^3 + 15*d^4*e^11*x^2 + 6*d^5*e^10*x + d^6*e^9) + 840
*d^2*log(e*x + d)/e^9 + 15*(e*x^2 - 14*d*x)/e^8) + b*integrate((x^8*log(c)
 + x^8*log(x^n))/(e^7*x^7 + 7*d*e^6*x^6 + 21*d^2*e^5*x^5 + 35*d^3*e^4*x^4
+ 35*d^4*e^3*x^3 + 21*d^5*e^2*x^2 + 7*d^6*e*x + d^7), x)
```

Giac [F]

$$\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}\,dx = \int \frac{(b\log(cx^n)+a)x^8}{(ex+d)^7}\,dx$$

input
```
integrate(x^8*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^8/(e*x + d)^7, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}\,dx = \int \frac{x^8\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^7}\,dx$$

input
```
int((x^8*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

output
```
int((x^8*(a + b*log(c*x^n)))/(d + e*x)^7, x)
```

Reduce [F]

$$\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}\,dx = \text{too large to display}$$

input
```
int(x^8*(a+b*log(c*x^n))/(e*x+d)^7,x)
```

output
```
( - 3360*int(log(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 21*d**5*e**2*x**3 + 35*
d**4*e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2*e**5*x**6 + 7*d*e**6*x**7 + e
**7*x**8),x)*b*d**15*n - 20160*int(log(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 2
1*d**5*e**2*x**3 + 35*d**4*e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2*e**5*x*
*6 + 7*d*e**6*x**7 + e**7*x**8),x)*b*d**14*e*n*x - 50400*int(log(x**n*c)/(
d**7*x + 7*d**6*e*x**2 + 21*d**5*e**2*x**3 + 35*d**4*e**3*x**4 + 35*d**3*e
**4*x**5 + 21*d**2*e**5*x**6 + 7*d*e**6*x**7 + e**7*x**8),x)*b*d**13*e**2*
n*x**2 - 67200*int(log(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 21*d**5*e**2*x**3
 + 35*d**4*e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2*e**5*x**6 + 7*d*e**6*x*
*7 + e**7*x**8),x)*b*d**12*e**3*n*x**3 - 50400*int(log(x**n*c)/(d**7*x + 7
*d**6*e*x**2 + 21*d**5*e**2*x**3 + 35*d**4*e**3*x**4 + 35*d**3*e**4*x**5 +
 21*d**2*e**5*x**6 + 7*d*e**6*x**7 + e**7*x**8),x)*b*d**11*e**4*n*x**4 - 2
0160*int(log(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 21*d**5*e**2*x**3 + 35*d**4
*e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2*e**5*x**6 + 7*d*e**6*x**7 + e**7*
x**8),x)*b*d**10*e**5*n*x**5 - 3360*int(log(x**n*c)/(d**7*x + 7*d**6*e*x**
2 + 21*d**5*e**2*x**3 + 35*d**4*e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2*e*
*5*x**6 + 7*d*e**6*x**7 + e**7*x**8),x)*b*d**9*e**6*n*x**6 + 3360*log(d +
e*x)*a*d**8*n + 20160*log(d + e*x)*a*d**7*e*n*x + 50400*log(d + e*x)*a*d**
6*e**2*n*x**2 + 67200*log(d + e*x)*a*d**5*e**3*n*x**3 + 50400*log(d + e*x)
*a*d**4*e**4*n*x**4 + 20160*log(d + e*x)*a*d**3*e**5*n*x**5 + 3360*log(...
```

3.63 $\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx$

Optimal result 597
Mathematica [A] (verified) 598
Rubi [A] (verified) 599
Maple [C] (warning: unable to verify) 603
Fricas [F] 603
Sympy [A] (verification not implemented) 604
Maxima [F] 604
Giac [F] 605
Mupad [F(-1)] 605
Reduce [F] 606

Optimal result

Integrand size = 21, antiderivative size = 285

$$\begin{aligned}\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx = &-\frac{7bnx}{e^7}+\frac{(140a+223bn)x}{20e^7}+\frac{7bx\log(cx^n)}{e^7}\\ &-\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}-\frac{x^6(7a+bn+7b\log(cx^n))}{30e^2(d+ex)^5}\\ &-\frac{x^5(42a+13bn+42b\log(cx^n))}{120e^3(d+ex)^4}\\ &-\frac{x^2(140a+153bn+140b\log(cx^n))}{40e^6(d+ex)}\\ &-\frac{x^4(210a+107bn+210b\log(cx^n))}{360e^4(d+ex)^3}\\ &-\frac{x^3(420a+319bn+420b\log(cx^n))}{360e^5(d+ex)^2}\\ &-\frac{d(140a+223bn+140b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{20e^8}\\ &-\frac{7bdn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^8}\end{aligned}$$

output
```
-7*b*n*x/e^7+1/20*(223*b*n+140*a)*x/e^7+7*b*x*ln(c*x^n)/e^7-1/6*x^7*(a+b*l
n(c*x^n))/e/(e*x+d)^6-1/30*x^6*(7*a+b*n+7*b*ln(c*x^n))/e^2/(e*x+d)^5-1/120
*x^5*(42*a+13*b*n+42*b*ln(c*x^n))/e^3/(e*x+d)^4-1/40*x^2*(140*a+153*b*n+14
0*b*ln(c*x^n))/e^6/(e*x+d)-1/360*x^4*(210*a+107*b*n+210*b*ln(c*x^n))/e^4/(
e*x+d)^3-1/360*x^3*(420*a+319*b*n+420*b*ln(c*x^n))/e^5/(e*x+d)^2-1/20*d*(1
40*a+223*b*n+140*b*ln(c*x^n))*ln(1+e*x/d)/e^8-7*b*d*n*polylog(2,-e*x/d)/e^
8
```

Mathematica [A] (verified)

Time = 0.62 (sec) , antiderivative size = 356, normalized size of antiderivative = 1.25

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx =$$

$$-\frac{-360aex+360benx-\frac{60ad^7}{(d+ex)^6}+\frac{504ad^6}{(d+ex)^5}+\frac{12bd^6n}{(d+ex)^5}-\frac{1890ad^5}{(d+ex)^4}-\frac{111bd^5n}{(d+ex)^4}+\frac{4200ad^4}{(d+ex)^3}+\frac{482bd^4n}{(d+ex)^3}-\frac{6300ad^3}{(d+ex)^2}-\cdots}{\cdots}$$

input
```
Integrate[(x^7*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
-1/360*(-360*a*e*x + 360*b*e*n*x - (60*a*d^7)/(d + e*x)^6 + (504*a*d^6)/(d
 + e*x)^5 + (12*b*d^6*n)/(d + e*x)^5 - (1890*a*d^5)/(d + e*x)^4 - (111*b*d
^5*n)/(d + e*x)^4 + (4200*a*d^4)/(d + e*x)^3 + (482*b*d^4*n)/(d + e*x)^3 -
 (6300*a*d^3)/(d + e*x)^2 - (1377*b*d^3*n)/(d + e*x)^2 + (7560*a*d^2)/(d +
 e*x) + (3546*b*d^2*n)/(d + e*x) - 4014*b*d*n*Log[x] - 360*b*e*x*Log[c*x^n
] - (60*b*d^7*Log[c*x^n])/(d + e*x)^6 + (504*b*d^6*Log[c*x^n])/(d + e*x)^5
 - (1890*b*d^5*Log[c*x^n])/(d + e*x)^4 + (4200*b*d^4*Log[c*x^n])/(d + e*x)
^3 - (6300*b*d^3*Log[c*x^n])/(d + e*x)^2 + (7560*b*d^2*Log[c*x^n])/(d + e*
x) + 4014*b*d*n*Log[d + e*x] + 2520*a*d*Log[1 + (e*x)/d] + 2520*b*d*Log[c*
x^n]*Log[1 + (e*x)/d] + 2520*b*d*n*PolyLog[2, -((e*x)/d)])/e^8
```

Rubi [A] (verified)

Time = 1.19 (sec) , antiderivative size = 324, normalized size of antiderivative = 1.14, number of steps used = 11, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.524, Rules used = {2784, 2784, 2784, 2784, 27, 2784, 27, 2784, 27, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^7 (a+b \log (c x^n))}{(d+e x)^7} \, dx$$

$$\Big\downarrow \text{ 2784}$$

$$\frac{\int \frac{x^6 (7a+bn+7b \log (c x^n))}{(d+ex)^6}dx}{6e}-\frac{x^7 (a+b \log (c x^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \text{ 2784}$$

$$\frac{\frac{\int \frac{x^5 (42a+13bn+42b \log (c x^n))}{(d+ex)^5}dx}{5e}-\frac{x^6 (7a+7b \log (c x^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^7 (a+b \log (c x^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \text{ 2784}$$

$$\frac{\frac{\frac{\int \frac{x^4 (210a+107bn+210b \log (c x^n))}{(d+ex)^4}dx}{4e}-\frac{x^5 (42a+42b \log (c x^n)+13bn)}{4e(d+ex)^4}}{5e}-\frac{x^6 (7a+7b \log (c x^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^7 (a+b \log (c x^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \text{ 2784}$$

$$\frac{\frac{\frac{\frac{\int \frac{2x^3 (420a+319bn+420b \log (c x^n))}{(d+ex)^3}dx}{3e}-\frac{x^4 (210a+210b \log (c x^n)+107bn)}{3e(d+ex)^3}}{4e}-\frac{x^5 (42a+42b \log (c x^n)+13bn)}{4e(d+ex)^4}}{5e}-\frac{x^6 (7a+7b \log (c x^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^7 (a+b \log (c x^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{\frac{\frac{\frac{2\int \frac{x^3(420a+319bn+420b\log(cx^n))}{(d+ex)^3}dx}{3e}-\frac{x^4(210a+210b\log(cx^n)+107bn)}{3e(d+ex)^3}}{4e}-\frac{x^5(42a+42b\log(cx^n)+13bn)}{4e(d+ex)^4}}{5e}-\frac{x^6(7a+7b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 2784

$$\frac{\frac{\frac{2\left(\frac{\int \frac{9x^2(140a+153bn+140b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^3(420a+420b\log(cx^n)+319bn)}{2e(d+ex)^2}\right)}{3e}-\frac{x^4(210a+210b\log(cx^n)+107bn)}{3e(d+ex)^3}}{4e}-\frac{x^5(42a+42b\log(cx^n)+13bn)}{4e(d+ex)^4}}{5e}-\frac{x^6(7a+7b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 27

$$\frac{\frac{\frac{2\left(\frac{9\int \frac{x^2(140a+153bn+140b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^3(420a+420b\log(cx^n)+319bn)}{2e(d+ex)^2}\right)}{3e}-\frac{x^4(210a+210b\log(cx^n)+107bn)}{3e(d+ex)^3}}{4e}-\frac{x^5(42a+42b\log(cx^n)+13bn)}{4e(d+ex)^4}}{5e}-\frac{x^6(7a+7b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 2784

$$\frac{\frac{\frac{2\left(\frac{9\left(\frac{\int \frac{2x(140a+223bn+140b\log(cx^n))}{d+ex}dx}{e}-\frac{x^2(140a+140b\log(cx^n)+153bn)}{e(d+ex)}\right)}{2e}-\frac{x^3(420a+420b\log(cx^n)+319bn)}{2e(d+ex)^2}\right)}{3e}-\frac{x^4(210a+210b\log(cx^n)+107bn)}{3e(d+ex)^3}}{4e}-\frac{x^5(42a+42b\log(cx^n)+13bn)}{4e(d+ex)^4}}{5e}-\frac{x^6(7a+7b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 27

$$\frac{\frac{\frac{2\left(\frac{9\left(\frac{2\int\frac{x(140a+223bn+140b\log(cx^n))}{d+ex}dx}{e}-\frac{x^2(140a+140b\log(cx^n)+153bn)}{e(d+ex)}\right)}{2e}-\frac{x^3(420a+420b\log(cx^n)+319bn)}{2e(d+ex)^2}\right)}{3e}-\frac{x^4(210a+210b\log(cx^n)+107bn)}{3e(d+ex)^3}}{4e}-\frac{x^5(\cdots}{\cdots}}{5e}\cdots}{6e}$$

$$\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\downarrow$ 2793

$$\frac{\frac{\frac{2\left(\frac{9\left(\frac{2\int\left(\frac{140a+223bn+140b\log(cx^n)}{e}-\frac{d(140a+223bn+140b\log(cx^n))}{e(d+ex)}\right)dx}{e}-\frac{x^2(140a+140b\log(cx^n)+153bn)}{e(d+ex)}\right)}{2e}-\frac{x^3(420a+420b\log(cx^n)+319bn)}{2e(d+ex)^2}\right)}{3e}-\frac{x^4(210\cdots}{\cdots}}{4e}\cdots}{5e}\cdots}{6e}$$

$$\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\downarrow$ 2009

$$\frac{\frac{\frac{2\left(\frac{9\left(\frac{2\left(-\frac{d\log\left(\frac{ex}{d}+1\right)(140a+140b\log(cx^n)+223bn)}{e^2}+\frac{x(140a+223bn)}{e}+\frac{140bx\log(cx^n)}{e}-\frac{140bdn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}-\frac{140bnx}{e}\right)}{e}-\frac{x^2(140a+140b\log(cx^n)+153\cdots}{e(d+ex)}\right)}{2e}\cdots}{3e}\cdots}{4e}\cdots}{5e}\cdots}{6e}$$

$$\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}$$

input
```
Int[(x^7*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
-1/6*(x^7*(a + b*Log[c*x^n]))/(e*(d + e*x)^6) + (-1/5*(x^6*(7*a + b*n + 7*
b*Log[c*x^n]))/(e*(d + e*x)^5) + (-1/4*(x^5*(42*a + 13*b*n + 42*b*Log[c*x^
n]))/(e*(d + e*x)^4) + (-1/3*(x^4*(210*a + 107*b*n + 210*b*Log[c*x^n]))/(e
*(d + e*x)^3) + (2*(-1/2*(x^3*(420*a + 319*b*n + 420*b*Log[c*x^n]))/(e*(d
+ e*x)^2) + (9*(-((x^2*(140*a + 153*b*n + 140*b*Log[c*x^n]))/(e*(d + e*x))
) + (2*((-140*b*n*x)/e + ((140*a + 223*b*n)*x)/e + (140*b*x*Log[c*x^n])/e
- (d*(140*a + 223*b*n + 140*b*Log[c*x^n])*Log[1 + (e*x)/d])/e^2 - (140*b*d
*n*PolyLog[2, -((e*x)/d)])/e^2))/e))/(2*e)))/(3*e))/(4*e))/(5*e))/(6*e)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 4.47 (sec) , antiderivative size = 511, normalized size of antiderivative = 1.79

method	result
risch	$\frac{b\ln(x^n)x}{e^7} - \frac{21b\ln(x^n)d^2}{e^8(ex+d)} - \frac{35b\ln(x^n)d^4}{3e^8(ex+d)^3} - \frac{7b\ln(x^n)d\ln(ex+d)}{e^8} - \frac{7b\ln(x^n)d^6}{5e^8(ex+d)^5} + \frac{21b\ln(x^n)d^5}{4e^8(ex+d)^4} + \frac{b\ln(x^n)d^7}{6e^8(ex+d)^6} + \frac{35b\ln}{2e^8(e}$

input
```
int(x^7*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)/e^7*x-21*b*ln(x^n)/e^8*d^2/(e*x+d)-35/3*b*ln(x^n)/e^8*d^4/(e*x+d
)^3-7*b*ln(x^n)/e^8*d*ln(e*x+d)-7/5*b*ln(x^n)/e^8*d^6/(e*x+d)^5+21/4*b*ln(
x^n)/e^8*d^5/(e*x+d)^4+1/6*b*ln(x^n)/e^8*d^7/(e*x+d)^6+35/2*b*ln(x^n)/e^8*
d^3/(e*x+d)^2-b*n*x/e^7-b*n/e^8*d-223/20*b*n/e^8*d*ln(e*x+d)-197/20*b*n/e^
8*d^2/(e*x+d)+153/40*b*n/e^8*d^3/(e*x+d)^2-241/180*b*n/e^8*d^4/(e*x+d)^3+3
7/120*b*n/e^8*d^5/(e*x+d)^4-1/30*b*n/e^8*d^6/(e*x+d)^5+223/20*b*n/e^8*d*ln
(e*x)+7*b*n/e^8*d*ln(e*x+d)*ln(-e*x/d)+7*b*n/e^8*d*dilog(-e*x/d)+(1/2*I*Pi
*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I
*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c
)+a)*(x/e^7-21/e^8*d^2/(e*x+d)-35/3/e^8*d^4/(e*x+d)^3-7/e^8*d*ln(e*x+d)-7/
5/e^8*d^6/(e*x+d)^5+21/4/e^8*d^5/(e*x+d)^4+1/6/e^8*d^7/(e*x+d)^6+35/2/e^8*
d^3/(e*x+d)^2)
```

Fricas [F]

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx = \int \frac{(b\log(cx^n)+a)x^7}{(ex+d)^7}\,dx$$

input
```
integrate(x^7*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

output
```
integral((b*x^7*log(c*x^n) + a*x^7)/(e^7*x^7 + 7*d*e^6*x^6 + 21*d^2*e^5*x^
5 + 35*d^3*e^4*x^4 + 35*d^4*e^3*x^3 + 21*d^5*e^2*x^2 + 7*d^6*e*x + d^7), x
)
```

Sympy [A] (verification not implemented)

Time = 136.73 (sec) , antiderivative size = 1632, normalized size of antiderivative = 5.73

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx = \text{Too large to display}$$

input
```
integrate(x**7*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

output
```
-a*d**7*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))/e**7
+ 7*a*d**6*Piecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))/e*
*7 - 21*a*d**5*Piecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True)
)/e**7 + 35*a*d**4*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), T
rue))/e**7 - 35*a*d**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2
), True))/e**7 + 21*a*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x
), True))/e**7 - 7*a*d*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/
e**7 + a*x/e**7 + b*d**7*n*Piecewise((x/d**7, Eq(e, 0)), (-137*d**4/(360*d
**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 18
00*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 385*d**3*e*x/(360*d**10*e + 1800
*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*
x**4 + 360*d**5*e**6*x**5) - 470*d**2*e**2*x**2/(360*d**10*e + 1800*d**9*e
**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 +
360*d**5*e**6*x**5) - 270*d*e**3*x**3/(360*d**10*e + 1800*d**9*e**2*x + 36
00*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e
**6*x**5) - 60*e**4*x**4/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*
x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - l
og(x)/(6*d**6*e) + log(d/e + x)/(6*d**6*e), True))/e**7 - b*d**7*Piecewise
((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))*log(c*x**n)/e**7 - 7*b
*d**6*n*Piecewise((x/d**6, Eq(e, 0)), (-25*d**3/(60*d**8*e + 240*d**7*e...
```

Maxima [F]

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx = \int \frac{(b\log(cx^n)+a)x^7}{(ex+d)^7}\,dx$$

input
```
integrate(x^7*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

output
```
-1/60*a*((1260*d^2*e^5*x^5 + 5250*d^3*e^4*x^4 + 9100*d^4*e^3*x^3 + 8085*d^
5*e^2*x^2 + 3654*d^6*e*x + 669*d^7)/(e^14*x^6 + 6*d*e^13*x^5 + 15*d^2*e^12
*x^4 + 20*d^3*e^11*x^3 + 15*d^4*e^10*x^2 + 6*d^5*e^9*x + d^6*e^8) - 60*x/e
^7 + 420*d*log(e*x + d)/e^8) + b*integrate((x^7*log(c) + x^7*log(x^n))/(e^
7*x^7 + 7*d*e^6*x^6 + 21*d^2*e^5*x^5 + 35*d^3*e^4*x^4 + 35*d^4*e^3*x^3 + 2
1*d^5*e^2*x^2 + 7*d^6*e*x + d^7), x)
```

Giac [F]

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx=\int \frac{(b\log(cx^n)+a)x^7}{(ex+d)^7}\,dx$$

input
```
integrate(x^7*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^7/(e*x + d)^7, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx=\int \frac{x^7\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^7}\,dx$$

input
```
int((x^7*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

output
```
int((x^7*(a + b*log(c*x^n)))/(d + e*x)^7, x)
```

Reduce [F]

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx = \text{Too large to display}$$

input
```
int(x^7*(a+b*log(c*x^n))/(e*x+d)^7,x)
```

output
```
(420*int(log(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 21*d**5*e**2*x**3 + 35*d**4
*e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2*e**5*x**6 + 7*d*e**6*x**7 + e**7*
x**8),x)*b*d**14*n + 2520*int(log(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 21*d**
5*e**2*x**3 + 35*d**4*e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2*e**5*x**6 +
7*d*e**6*x**7 + e**7*x**8),x)*b*d**13*e*n*x + 6300*int(log(x**n*c)/(d**7*x
 + 7*d**6*e*x**2 + 21*d**5*e**2*x**3 + 35*d**4*e**3*x**4 + 35*d**3*e**4*x*
*5 + 21*d**2*e**5*x**6 + 7*d*e**6*x**7 + e**7*x**8),x)*b*d**12*e**2*n*x**2
 + 8400*int(log(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 21*d**5*e**2*x**3 + 35*d
**4*e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2*e**5*x**6 + 7*d*e**6*x**7 + e*
*7*x**8),x)*b*d**11*e**3*n*x**3 + 6300*int(log(x**n*c)/(d**7*x + 7*d**6*e*
x**2 + 21*d**5*e**2*x**3 + 35*d**4*e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2
*e**5*x**6 + 7*d*e**6*x**7 + e**7*x**8),x)*b*d**10*e**4*n*x**4 + 2520*int(
log(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 21*d**5*e**2*x**3 + 35*d**4*e**3*x**
4 + 35*d**3*e**4*x**5 + 21*d**2*e**5*x**6 + 7*d*e**6*x**7 + e**7*x**8),x)*
b*d**9*e**5*n*x**5 + 420*int(log(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 21*d**5
*e**2*x**3 + 35*d**4*e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2*e**5*x**6 + 7
*d*e**6*x**7 + e**7*x**8),x)*b*d**8*e**6*n*x**6 - 420*log(d + e*x)*a*d**7*
n - 2520*log(d + e*x)*a*d**6*e*n*x - 6300*log(d + e*x)*a*d**5*e**2*n*x**2
- 8400*log(d + e*x)*a*d**4*e**3*n*x**3 - 6300*log(d + e*x)*a*d**3*e**4*n*x
**4 - 2520*log(d + e*x)*a*d**2*e**5*n*x**5 - 420*log(d + e*x)*a*d*e**6*...
```

3.64 $\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx$

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Optimal result

Integrand size = 21, antiderivative size = 243

$$\begin{aligned}\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx = &-\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}-\frac{x^5(6a+bn+6b\log(cx^n))}{30e^2(d+ex)^5}\\ &-\frac{x^2(20a+19bn+20b\log(cx^n))}{40e^5(d+ex)^2}\\ &-\frac{x(20a+29bn+20b\log(cx^n))}{20e^6(d+ex)}\\ &-\frac{x^4(30a+11bn+30b\log(cx^n))}{120e^3(d+ex)^4}\\ &-\frac{x^3(60a+37bn+60b\log(cx^n))}{180e^4(d+ex)^3}\\ &+\frac{(20a+49bn+20b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{20e^7}\\ &+\frac{bn\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^7}\end{aligned}$$

output
```
-1/6*x^6*(a+b*ln(c*x^n))/e/(e*x+d)^6-1/30*x^5*(6*a+b*n+6*b*ln(c*x^n))/e^2/
(e*x+d)^5-1/40*x^2*(20*a+19*b*n+20*b*ln(c*x^n))/e^5/(e*x+d)^2-1/20*x*(20*a
+29*b*n+20*b*ln(c*x^n))/e^6/(e*x+d)-1/120*x^4*(30*a+11*b*n+30*b*ln(c*x^n))
/e^3/(e*x+d)^4-1/180*x^3*(60*a+37*b*n+60*b*ln(c*x^n))/e^4/(e*x+d)^3+1/20*(
20*a+49*b*n+20*b*ln(c*x^n))*ln(1+e*x/d)/e^7+b*n*polylog(2,-e*x/d)/e^7
```

Mathematica [A] (verified)

Time = 0.54 (sec) , antiderivative size = 333, normalized size of antiderivative = 1.37

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{-882bn\log(x)+\frac{-60ad^6+432ad^5(d+ex)+12bd^5n(d+ex)-1350ad^4(d+ex)^2-93bd^4n(d+ex)^2+2400ad^3(d+ex)^3+326bd^3n(d+ex)^3-270}{}}{}$$

input
```
Integrate[(x^6*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
(-882*b*n*Log[x] + (-60*a*d^6 + 432*a*d^5*(d + e*x) + 12*b*d^5*n*(d + e*x)
 - 1350*a*d^4*(d + e*x)^2 - 93*b*d^4*n*(d + e*x)^2 + 2400*a*d^3*(d + e*x)^
3 + 326*b*d^3*n*(d + e*x)^3 - 2700*a*d^2*(d + e*x)^4 - 711*b*d^2*n*(d + e*
x)^4 + 2160*a*d*(d + e*x)^5 + 1278*b*d*n*(d + e*x)^5 - 60*b*d^6*Log[c*x^n]
 + 432*b*d^5*(d + e*x)*Log[c*x^n] - 1350*b*d^4*(d + e*x)^2*Log[c*x^n] + 24
00*b*d^3*(d + e*x)^3*Log[c*x^n] - 2700*b*d^2*(d + e*x)^4*Log[c*x^n] + 2160
*b*d*(d + e*x)^5*Log[c*x^n] + 882*b*n*(d + e*x)^6*Log[d + e*x] + 360*a*(d
+ e*x)^6*Log[1 + (e*x)/d] + 360*b*(d + e*x)^6*Log[c*x^n]*Log[1 + (e*x)/d])
/(d + e*x)^6 + 360*b*n*PolyLog[2, -((e*x)/d)])/(360*e^7)
```

Rubi [A] (verified)

Time = 1.08 (sec) , antiderivative size = 279, normalized size of antiderivative = 1.15, number of steps used = 11, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}} = 0.524$, Rules used = {2784, 2784, 2784, 27, 2784, 27, 2784, 27, 2784, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$\Big\downarrow \text{2784}$$
$$\frac{\int \frac{x^5(6a+bn+6b\log(cx^n))}{(d+ex)^6}dx}{6e}-\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 2784

$$\frac{\frac{\int \frac{x^4(30a+11bn+30b\log(cx^n))}{(d+ex)^5}dx}{5e}-\frac{x^5(6a+6b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 2784

$$\frac{\frac{\frac{\int \frac{2x^3(60a+37bn+60b\log(cx^n))}{(d+ex)^4}dx}{4e}-\frac{x^4(30a+30b\log(cx^n)+11bn)}{4e(d+ex)^4}}{5e}-\frac{x^5(6a+6b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 27

$$\frac{\frac{\frac{\int \frac{x^3(60a+37bn+60b\log(cx^n))}{(d+ex)^4}dx}{2e}-\frac{x^4(30a+30b\log(cx^n)+11bn)}{4e(d+ex)^4}}{5e}-\frac{x^5(6a+6b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 2784

$$\frac{\frac{\frac{\frac{\int \frac{9x^2(20a+19bn+20b\log(cx^n))}{(d+ex)^3}dx}{3e}-\frac{x^3(60a+60b\log(cx^n)+37bn)}{3e(d+ex)^3}}{2e}-\frac{x^4(30a+30b\log(cx^n)+11bn)}{4e(d+ex)^4}}{5e}-\frac{x^5(6a+6b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 27

$$\frac{\frac{\frac{\frac{3\int \frac{x^2(20a+19bn+20b\log(cx^n))}{(d+ex)^3}dx}{e}-\frac{x^3(60a+60b\log(cx^n)+37bn)}{3e(d+ex)^3}}{2e}-\frac{x^4(30a+30b\log(cx^n)+11bn)}{4e(d+ex)^4}}{5e}-\frac{x^5(6a+6b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 2784

$$\frac{\frac{\frac{\frac{3\left(\frac{\int \frac{2x(20a+29bn+20b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^2(20a+20b\log(cx^n)+19bn)}{2e(d+ex)^2}\right)}{e}-\frac{x^3(60a+60b\log(cx^n)+37bn)}{3e(d+ex)^3}}{2e}-\frac{x^4(30a+30b\log(cx^n)+11bn)}{4e(d+ex)^4}}{5e}-\frac{x^5(6a+6b\log(cx^n}{5e(d+ex)^5}}{6e}-\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 27

$$\frac{\frac{\frac{3\left(\frac{\int \frac{x(20a+29bn+20b\log(cx^n))}{(d+ex)^2}dx}{e}-\frac{x^2(20a+20b\log(cx^n)+19bn)}{2e(d+ex)^2}\right)}{e}-\frac{x^3(60a+60b\log(cx^n)+37bn)}{3e(d+ex)^3}}{2e}-\frac{x^4(30a+30b\log(cx^n)+11bn)}{4e(d+ex)^4}}{5e}-\frac{x^5(6a+6b\log(cx^n)-}{5e(d+ex)^5}}{6e}$$

$$\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 2784

$$\frac{\frac{\frac{3\left(\frac{\frac{\int \frac{20a+49bn+20b\log(cx^n)}{d+ex}dx}{e}-\frac{x(20a+20b\log(cx^n)+29bn)}{e(d+ex)}}{e}-\frac{x^2(20a+20b\log(cx^n)+19bn)}{2e(d+ex)^2}\right)}{e}-\frac{x^3(60a+60b\log(cx^n)+37bn)}{3e(d+ex)^3}}{2e}-\frac{x^4(30a+30b\log(cx^n)+11bn)}{4e(d+ex)^4}}{5e}}{6e}$$

$$\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 2754

$$\frac{\frac{\frac{3\left(\frac{\frac{\frac{\log\left(\frac{ex}{d}+1\right)(20a+20b\log(cx^n)+49bn)}{e}-\frac{20bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}}{e}-\frac{x(20a+20b\log(cx^n)+29bn)}{e(d+ex)}}{e}-\frac{x^2(20a+20b\log(cx^n)+19bn)}{2e(d+ex)^2}\right)}{e}-\frac{x^3(60a+60b\log(cx^n)+37b}{3e(d+ex)^3}}{2e}}{5e}}{6e}$$

$$\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 2838

$$\frac{\frac{\frac{3\left(\frac{\frac{\frac{\log\left(\frac{ex}{d}+1\right)(20a+20b\log(cx^n)+49bn)}{e}+\frac{20bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}}{e}-\frac{x(20a+20b\log(cx^n)+29bn)}{e(d+ex)}}{e}-\frac{x^2(20a+20b\log(cx^n)+19bn)}{2e(d+ex)^2}\right)}{e}-\frac{x^3(60a+60b\log(cx^n)+37b}{3e(d+ex)^3}}{2e}}{5e}}{6e}$$

$$\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

input
```
Int[(x^6*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
-1/6*(x^6*(a + b*Log[c*x^n]))/(e*(d + e*x)^6) + (-1/5*(x^5*(6*a + b*n + 6*
b*Log[c*x^n]))/(e*(d + e*x)^5) + (-1/4*(x^4*(30*a + 11*b*n + 30*b*Log[c*x^
n]))/(e*(d + e*x)^4) + (-1/3*(x^3*(60*a + 37*b*n + 60*b*Log[c*x^n]))/(e*(d
 + e*x)^3) + (3*(-1/2*(x^2*(20*a + 19*b*n + 20*b*Log[c*x^n]))/(e*(d + e*x)
^2) + (-((x*(20*a + 29*b*n + 20*b*Log[c*x^n]))/(e*(d + e*x))) + (((20*a +
49*b*n + 20*b*Log[c*x^n])*Log[1 + (e*x)/d])/e + (20*b*n*PolyLog[2, -((e*x)
/d)])/e)/e)/e))/e)/(2*e))/(5*e))/(6*e)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 4.41 (sec) , antiderivative size = 466, normalized size of antiderivative = 1.92

method	result
risch	$-\frac{15b\ln(x^n)d^4}{4e^7(ex+d)^4}+\frac{6b\ln(x^n)d}{e^7(ex+d)}+\frac{6b\ln(x^n)d^5}{5e^7(ex+d)^5}+\frac{b\ln(x^n)\ln(ex+d)}{e^7}-\frac{b\ln(x^n)d^6}{6e^7(ex+d)^6}-\frac{15b\ln(x^n)d^2}{2e^7(ex+d)^2}+\frac{20b\ln(x^n)d^3}{3e^7(ex+d)^3}+\frac{71}{20e^7}$

input
```
int(x^6*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
-15/4*b*ln(x^n)/e^7*d^4/(e*x+d)^4+6*b*ln(x^n)/e^7*d/(e*x+d)+6/5*b*ln(x^n)/
e^7*d^5/(e*x+d)^5+b*ln(x^n)/e^7*ln(e*x+d)-1/6*b*ln(x^n)/e^7*d^6/(e*x+d)^6-
15/2*b*ln(x^n)/e^7*d^2/(e*x+d)^2+20/3*b*ln(x^n)/e^7*d^3/(e*x+d)^3+71/20*b*
n/e^7*d/(e*x+d)+49/20*b*n/e^7*ln(e*x+d)-79/40*b*n/e^7*d^2/(e*x+d)^2+163/18
0*b*n/e^7*d^3/(e*x+d)^3-31/120*b*n/e^7*d^4/(e*x+d)^4+1/30*b*n/e^7*d^5/(e*x
+d)^5-49/20*b*n/e^7*ln(e*x)-b*n/e^7*ln(e*x+d)*ln(-e*x/d)-b*n/e^7*dilog(-e*
x/d)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I
*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*cs
gn(I*c)+b*ln(c)+a)*(-15/4/e^7*d^4/(e*x+d)^4+6/e^7*d/(e*x+d)+6/5/e^7*d^5/(e
*x+d)^5+1/e^7*ln(e*x+d)-1/6/e^7*d^6/(e*x+d)^6-15/2/e^7*d^2/(e*x+d)^2+20/3/
e^7*d^3/(e*x+d)^3)
```

Fricas [F]

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx=\int \frac{(b\log(cx^n)+a)x^6}{(ex+d)^7}\,dx$$

input
```
integrate(x^6*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

output
```
integral((b*x^6*log(c*x^n) + a*x^6)/(e^7*x^7 + 7*d*e^6*x^6 + 21*d^2*e^5*x^
5 + 35*d^3*e^4*x^4 + 35*d^4*e^3*x^3 + 21*d^5*e^2*x^2 + 7*d^6*e*x + d^7), x
)
```

Sympy [A] (verification not implemented)

Time = 91.66 (sec) , antiderivative size = 1588, normalized size of antiderivative = 6.53

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx = \text{Too large to display}$$

input
```
integrate(x**6*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

output
```
a*d**6*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))/e**6 -
 6*a*d**5*Piecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))/e**
6 + 15*a*d**4*Piecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True))
/e**6 - 20*a*d**3*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), Tr
ue))/e**6 + 15*a*d**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2)
, True))/e**6 - 6*a*d*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), Tr
ue))/e**6 + a*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**6 - b*
d**6*n*Piecewise((x/d**7, Eq(e, 0)), (-137*d**4/(360*d**10*e + 1800*d**9*e
**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 +
360*d**5*e**6*x**5) - 385*d**3*e*x/(360*d**10*e + 1800*d**9*e**2*x + 3600*
d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6
*x**5) - 470*d**2*e**2*x**2/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e*
*3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5)
- 270*d*e**3*x**3/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 +
3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 60*e**4*
x**4/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**
4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - log(x)/(6*d**6*e) + l
og(d/e + x)/(6*d**6*e), True))/e**6 + b*d**6*Piecewise((x/d**7, Eq(e, 0)),
 (-1/(6*e*(d + e*x)**6), True))*log(c*x**n)/e**6 + 6*b*d**5*n*Piecewise((x
/d**6, Eq(e, 0)), (-25*d**3/(60*d**8*e + 240*d**7*e**2*x + 360*d**6*e**...
```

Maxima [F]

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx = \int \frac{(b\log(cx^n)+a)x^6}{(ex+d)^7}\,dx$$

input
```
integrate(x^6*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

output
```
1/60*a*((360*d*e^5*x^5 + 1350*d^2*e^4*x^4 + 2200*d^3*e^3*x^3 + 1875*d^4*e^
2*x^2 + 822*d^5*e*x + 147*d^6)/(e^13*x^6 + 6*d*e^12*x^5 + 15*d^2*e^11*x^4
+ 20*d^3*e^10*x^3 + 15*d^4*e^9*x^2 + 6*d^5*e^8*x + d^6*e^7) + 60*log(e*x +
 d)/e^7) + b*integrate((x^6*log(c) + x^6*log(x^n))/(e^7*x^7 + 7*d*e^6*x^6
+ 21*d^2*e^5*x^5 + 35*d^3*e^4*x^4 + 35*d^4*e^3*x^3 + 21*d^5*e^2*x^2 + 7*d^
6*e*x + d^7), x)
```

Giac [F]

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx=\int \frac{(b\log(cx^n)+a)x^6}{(ex+d)^7}\,dx$$

input
```
integrate(x^6*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^6/(e*x + d)^7, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx=\int \frac{x^6\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^7}\,dx$$

input
```
int((x^6*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

output
```
int((x^6*(a + b*log(c*x^n)))/(d + e*x)^7, x)
```

Reduce [F]

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx = \text{Too large to display}$$

input
```
int(x^6*(a+b*log(c*x^n))/(e*x+d)^7,x)
```

output
```
( - 60*int(log(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 21*d**5*e**2*x**3 + 35*d*
*4*e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2*e**5*x**6 + 7*d*e**6*x**7 + e**
7*x**8),x)*b*d**13*n - 360*int(log(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 21*d*
*5*e**2*x**3 + 35*d**4*e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2*e**5*x**6 +
 7*d*e**6*x**7 + e**7*x**8),x)*b*d**12*e*n*x - 900*int(log(x**n*c)/(d**7*x
 + 7*d**6*e*x**2 + 21*d**5*e**2*x**3 + 35*d**4*e**3*x**4 + 35*d**3*e**4*x*
*5 + 21*d**2*e**5*x**6 + 7*d*e**6*x**7 + e**7*x**8),x)*b*d**11*e**2*n*x**2
 - 1200*int(log(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 21*d**5*e**2*x**3 + 35*d
**4*e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2*e**5*x**6 + 7*d*e**6*x**7 + e*
*7*x**8),x)*b*d**10*e**3*n*x**3 - 900*int(log(x**n*c)/(d**7*x + 7*d**6*e*x
**2 + 21*d**5*e**2*x**3 + 35*d**4*e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2*
e**5*x**6 + 7*d*e**6*x**7 + e**7*x**8),x)*b*d**9*e**4*n*x**4 - 360*int(log
(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 21*d**5*e**2*x**3 + 35*d**4*e**3*x**4 +
 35*d**3*e**4*x**5 + 21*d**2*e**5*x**6 + 7*d*e**6*x**7 + e**7*x**8),x)*b*d
**8*e**5*n*x**5 - 60*int(log(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 21*d**5*e**
2*x**3 + 35*d**4*e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2*e**5*x**6 + 7*d*e
**6*x**7 + e**7*x**8),x)*b*d**7*e**6*n*x**6 + 60*log(d + e*x)*a*d**6*n + 3
60*log(d + e*x)*a*d**5*e*n*x + 900*log(d + e*x)*a*d**4*e**2*n*x**2 + 1200*
log(d + e*x)*a*d**3*e**3*n*x**3 + 900*log(d + e*x)*a*d**2*e**4*n*x**4 + 36
0*log(d + e*x)*a*d*e**5*n*x**5 + 60*log(d + e*x)*a*e**6*n*x**6 + 294*lo...
```

3.65 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}\,dx$

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Optimal result

Integrand size = 21, antiderivative size = 136

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}\,dx = -\frac{bd^4n}{30e^6(d+ex)^5}+\frac{5bd^3n}{24e^6(d+ex)^4}-\frac{5bd^2n}{9e^6(d+ex)^3}+\frac{5bdn}{6e^6(d+ex)^2}-\frac{5bn}{6e^6(d+ex)}+\frac{x^6(a+b\log(cx^n))}{6d(d+ex)^6}-\frac{bn\log(d+ex)}{6de^6}$$

output
```
-1/30*b*d^4*n/e^6/(e*x+d)^5+5/24*b*d^3*n/e^6/(e*x+d)^4-5/9*b*d^2*n/e^6/(e*
x+d)^3+5/6*b*d*n/e^6/(e*x+d)^2-5/6*b*n/e^6/(e*x+d)+1/6*x^6*(a+b*ln(c*x^n))
/d/(e*x+d)^6-1/6*b*n*ln(e*x+d)/d/e^6
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 335 vs. 2(136) = 272.

Time = 0.37 (sec) , antiderivative size = 335, normalized size of antiderivative = 2.46

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}\,dx = -\frac{60ad^6+137bd^6n+360ad^5ex+762bd^5enx+900ad^4e^2x^2+1725bd^4e^2nx^2+1200ad^3e^3x^3+2000bd^3e^3}{}$$

input
```
Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
-1/360*(60*a*d^6 + 137*b*d^6*n + 360*a*d^5*e*x + 762*b*d^5*e*n*x + 900*a*d
^4*e^2*x^2 + 1725*b*d^4*e^2*n*x^2 + 1200*a*d^3*e^3*x^3 + 2000*b*d^3*e^3*n*
x^3 + 900*a*d^2*e^4*x^4 + 1200*b*d^2*e^4*n*x^4 + 360*a*d*e^5*x^5 + 300*b*d
*e^5*n*x^5 - 60*b*n*(d + e*x)^6*Log[x] + 60*b*d*(d^5 + 6*d^4*e*x + 15*d^3*
e^2*x^2 + 20*d^2*e^3*x^3 + 15*d*e^4*x^4 + 6*e^5*x^5)*Log[c*x^n] + 60*b*d^6
*n*Log[d + e*x] + 360*b*d^5*e*n*x*Log[d + e*x] + 900*b*d^4*e^2*n*x^2*Log[d
 + e*x] + 1200*b*d^3*e^3*n*x^3*Log[d + e*x] + 900*b*d^2*e^4*n*x^4*Log[d +
e*x] + 360*b*d*e^5*n*x^5*Log[d + e*x] + 60*b*e^6*n*x^6*Log[d + e*x])/(d*e^
6*(d + e*x)^6)
```

Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 127, normalized size of antiderivative = 0.93, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2773, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}dx$$

$$\Big\downarrow \text{ 2773}$$

$$\frac{x^6(a+b\log(cx^n))}{6d(d+ex)^6}-\frac{bn\int \frac{x^5}{(d+ex)^6}dx}{6d}$$

$$\Big\downarrow \text{ 49}$$

$$\frac{x^6(a+b\log(cx^n))}{6d(d+ex)^6}-\frac{bn\int \left(-\frac{d^5}{e^5(d+ex)^6}+\frac{5d^4}{e^5(d+ex)^5}-\frac{10d^3}{e^5(d+ex)^4}+\frac{10d^2}{e^5(d+ex)^3}-\frac{5d}{e^5(d+ex)^2}+\frac{1}{e^5(d+ex)}\right)dx}{6d}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{x^6(a+b\log(cx^n))}{6d(d+ex)^6} - \frac{bn\left(\frac{d^5}{5e^6(d+ex)^5}-\frac{5d^4}{4e^6(d+ex)^4}+\frac{10d^3}{3e^6(d+ex)^3}-\frac{5d^2}{e^6(d+ex)^2}+\frac{5d}{e^6(d+ex)}+\frac{\log(d+ex)}{e^6}\right)}{6d}$$

input
```
Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
(x^6*(a + b*Log[c*x^n]))/(6*d*(d + e*x)^6) - (b*n*(d^5/(5*e^6*(d + e*x)^5)
 - (5*d^4)/(4*e^6*(d + e*x)^4) + (10*d^3)/(3*e^6*(d + e*x)^3) - (5*d^2)/(e
^6*(d + e*x)^2) + (5*d)/(e^6*(d + e*x)) + Log[d + e*x]/e^6))/(6*d)
```

Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 394 vs. $2(122) = 244$.

Time = 4.10 (sec) , antiderivative size = 395, normalized size of antiderivative = 2.90

method	result
parallelrisch	$-900\ln(ex+d)b\,d^2e^4n\,x^4-450b\,d^2e^4n\,x^4-1200\ln(ex+d)b\,d^3e^3n\,x^3-900\ln(ex+d)b\,d^4e^2n\,x^2-360\ln(ex+d)b\,d^5enx-360\ln($
risch	Expression too large to display

input
```
int(x^5*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
1/360*(-900*ln(e*x+d)*b*d^2*e^4*n*x^4-450*b*d^2*e^4*n*x^4-1200*ln(e*x+d)*b
*d^3*e^3*n*x^3-900*ln(e*x+d)*b*d^4*e^2*n*x^2-360*ln(e*x+d)*b*d^5*e*n*x-360
*ln(e*x+d)*b*d*e^5*n*x^5-1000*b*d^3*e^3*n*x^3-975*b*d^4*e^2*n*x^2-462*b*d^
5*e*n*x-60*ln(e*x+d)*b*e^6*n*x^6-60*ln(e*x+d)*b*d^6*n+50*b*e^6*n*x^6+1200*
ln(x)*x^3*b*d^3*e^3*n+900*ln(x)*x^2*b*d^4*e^2*n+360*ln(x)*x*b*d^5*e*n+360*
ln(x)*x^5*b*d*e^5*n+900*ln(x)*x^4*b*d^2*e^4*n+60*a*e^6*x^6-87*b*d^6*n+60*l
n(x)*b*d^6*n-360*x*ln(c*x^n)*b*d^5*e-900*x^2*ln(c*x^n)*b*d^4*e^2-1200*x^3*
ln(c*x^n)*b*d^3*e^3-900*x^4*ln(c*x^n)*b*d^2*e^4-360*x^5*ln(c*x^n)*b*d*e^5+
60*ln(x)*x^6*b*e^6*n-60*ln(c*x^n)*b*d^6)/d/e^6/(e*x+d)^6
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 361 vs. $2(122) = 244$.

Time = 0.09 (sec) , antiderivative size = 361, normalized size of antiderivative = 2.65

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{60\,be^6nx^6\log(x) - 137\,bd^6n - 60\,ad^6 - 60\,(5\,bde^5n + 6\,ade^5)x^5 - 300\,(4\,bd^2e^4n + 3\,ad^2e^4)x^4 - 400\,(5\,bc}{}$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

output
```
1/360*(60*b*e^6*n*x^6*log(x) - 137*b*d^6*n - 60*a*d^6 - 60*(5*b*d*e^5*n +
6*a*d*e^5)*x^5 - 300*(4*b*d^2*e^4*n + 3*a*d^2*e^4)*x^4 - 400*(5*b*d^3*e^3*
n + 3*a*d^3*e^3)*x^3 - 75*(23*b*d^4*e^2*n + 12*a*d^4*e^2)*x^2 - 6*(127*b*d
^5*e*n + 60*a*d^5*e)*x - 60*(b*e^6*n*x^6 + 6*b*d*e^5*n*x^5 + 15*b*d^2*e^4*
n*x^4 + 20*b*d^3*e^3*n*x^3 + 15*b*d^4*e^2*n*x^2 + 6*b*d^5*e*n*x + b*d^6*n)
*log(e*x + d) - 60*(6*b*d*e^5*x^5 + 15*b*d^2*e^4*x^4 + 20*b*d^3*e^3*x^3 +
15*b*d^4*e^2*x^2 + 6*b*d^5*e*x + b*d^6)*log(c))/(d*e^12*x^6 + 6*d^2*e^11*x
^5 + 15*d^3*e^10*x^4 + 20*d^4*e^9*x^3 + 15*d^5*e^8*x^2 + 6*d^6*e^7*x + d^7
*e^6)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1911 vs. 2(133) = 266.

Time = 90.26 (sec) , antiderivative size = 1911, normalized size of antiderivative = 14.05

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}\,dx = \text{Too large to display}$$

input
```
integrate(x**5*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

output
```
Piecewise((zoo*(-a/x - b*n/x - b*log(c*x**n)/x), Eq(d, 0) & Eq(e, 0)), ((a
*x**6/6 - b*n*x**6/36 + b*x**6*log(c*x**n)/6)/d**7, Eq(e, 0)), ((-a/x - b*
n/x - b*log(c*x**n)/x)/e**7, Eq(d, 0)), (-60*a*d**6/(360*d**7*e**6 + 2160*
d**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*
x**4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6) - 360*a*d**5*e*x/(360*d**7
*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9*x**3 + 540
0*d**3*e**10*x**4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6) - 900*a*d**4*
e**2*x**2/(360*d**7*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d
**4*e**9*x**3 + 5400*d**3*e**10*x**4 + 2160*d**2*e**11*x**5 + 360*d*e**12*
x**6) - 1200*a*d**3*e**3*x**3/(360*d**7*e**6 + 2160*d**6*e**7*x + 5400*d**
5*e**8*x**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*x**4 + 2160*d**2*e**11
*x**5 + 360*d*e**12*x**6) - 900*a*d**2*e**4*x**4/(360*d**7*e**6 + 2160*d**
6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*x**
4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6) - 360*a*d*e**5*x**5/(360*d**7
*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9*x**3 + 540
0*d**3*e**10*x**4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6) - 60*b*d**6*n
*log(d/e + x)/(360*d**7*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**8*x**2 + 72
00*d**4*e**9*x**3 + 5400*d**3*e**10*x**4 + 2160*d**2*e**11*x**5 + 360*d*e*
*12*x**6) - 137*b*d**6*n/(360*d**7*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**
8*x**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*x**4 + 2160*d**2*e**11*x...
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 377 vs. $2(122) = 244$.

Time = 0.05 (sec) , antiderivative size = 377, normalized size of antiderivative = 2.77

$$\int \frac{x^5(a + b\log(cx^n))}{(d+ex)^7}\,dx =$$
$$-\frac{1}{360}\,bn\left(\frac{300\,e^4x^4 + 900\,de^3x^3 + 1100\,d^2e^2x^2 + 625\,d^3ex + 137\,d^4}{e^{11}x^5 + 5\,de^{10}x^4 + 10\,d^2e^9x^3 + 10\,d^3e^8x^2 + 5\,d^4e^7x + d^5e^6} + \frac{60\,\log(ex+d)}{de^6} - \frac{60\,\log(x)}{de^6}\right)$$
$$-\frac{(6\,e^5x^5 + 15\,de^4x^4 + 20\,d^2e^3x^3 + 15\,d^3e^2x^2 + 6\,d^4ex + d^5)b\log(cx^n)}{6\,(e^{12}x^6 + 6\,de^{11}x^5 + 15\,d^2e^{10}x^4 + 20\,d^3e^9x^3 + 15\,d^4e^8x^2 + 6\,d^5e^7x + d^6e^6)}$$
$$-\frac{(6\,e^5x^5 + 15\,de^4x^4 + 20\,d^2e^3x^3 + 15\,d^3e^2x^2 + 6\,d^4ex + d^5)a}{6\,(e^{12}x^6 + 6\,de^{11}x^5 + 15\,d^2e^{10}x^4 + 20\,d^3e^9x^3 + 15\,d^4e^8x^2 + 6\,d^5e^7x + d^6e^6)}$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

output
```
-1/360*b*n*((300*e^4*x^4 + 900*d*e^3*x^3 + 1100*d^2*e^2*x^2 + 625*d^3*e*x
+ 137*d^4)/(e^11*x^5 + 5*d*e^10*x^4 + 10*d^2*e^9*x^3 + 10*d^3*e^8*x^2 + 5*
d^4*e^7*x + d^5*e^6) + 60*log(e*x + d)/(d*e^6) - 60*log(x)/(d*e^6)) - 1/6*
(6*e^5*x^5 + 15*d*e^4*x^4 + 20*d^2*e^3*x^3 + 15*d^3*e^2*x^2 + 6*d^4*e*x +
d^5)*b*log(c*x^n)/(e^12*x^6 + 6*d*e^11*x^5 + 15*d^2*e^10*x^4 + 20*d^3*e^9*
x^3 + 15*d^4*e^8*x^2 + 6*d^5*e^7*x + d^6*e^6) - 1/6*(6*e^5*x^5 + 15*d*e^4*
x^4 + 20*d^2*e^3*x^3 + 15*d^3*e^2*x^2 + 6*d^4*e*x + d^5)*a/(e^12*x^6 + 6*d
*e^11*x^5 + 15*d^2*e^10*x^4 + 20*d^3*e^9*x^3 + 15*d^4*e^8*x^2 + 6*d^5*e^7*
x + d^6*e^6)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 424 vs. $2(122) = 244$.

Time = 0.12 (sec) , antiderivative size = 424, normalized size of antiderivative = 3.12

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= -\frac{(6\,be^5nx^5+15\,bde^4nx^4+20\,bd^2e^3nx^3+15\,bd^3e^2nx^2+6\,bd^4enx+bd^5n)\log(x)}{6\,(e^{12}x^6+6\,de^{11}x^5+15\,d^2e^{10}x^4+20\,d^3e^9x^3+15\,d^4e^8x^2+6\,d^5e^7x+d^6e^6)}$$
$$-\frac{300\,be^5nx^5+360\,be^5x^5\log(c)+1200\,bde^4nx^4+360\,ae^5x^5+900\,bde^4x^4\log(c)+2000\,bd^2e^3nx^3+900}{}$$
$$-\frac{bn\log(ex+d)}{6\,de^6}+\frac{bn\log(x)}{6\,de^6}$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

output
```
-1/6*(6*b*e^5*n*x^5 + 15*b*d*e^4*n*x^4 + 20*b*d^2*e^3*n*x^3 + 15*b*d^3*e^2
*n*x^2 + 6*b*d^4*e*n*x + b*d^5*n)*log(x)/(e^12*x^6 + 6*d*e^11*x^5 + 15*d^2
*e^10*x^4 + 20*d^3*e^9*x^3 + 15*d^4*e^8*x^2 + 6*d^5*e^7*x + d^6*e^6) - 1/3
60*(300*b*e^5*n*x^5 + 360*b*e^5*x^5*log(c) + 1200*b*d*e^4*n*x^4 + 360*a*e^
5*x^5 + 900*b*d*e^4*x^4*log(c) + 2000*b*d^2*e^3*n*x^3 + 900*a*d*e^4*x^4 +
1200*b*d^2*e^3*x^3*log(c) + 1725*b*d^3*e^2*n*x^2 + 1200*a*d^2*e^3*x^3 + 90
0*b*d^3*e^2*x^2*log(c) + 762*b*d^4*e*n*x + 900*a*d^3*e^2*x^2 + 360*b*d^4*e
*x*log(c) + 137*b*d^5*n + 360*a*d^4*e*x + 60*b*d^5*log(c) + 60*a*d^5)/(e^1
2*x^6 + 6*d*e^11*x^5 + 15*d^2*e^10*x^4 + 20*d^3*e^9*x^3 + 15*d^4*e^8*x^2 +
 6*d^5*e^7*x + d^6*e^6) - 1/6*b*n*log(e*x + d)/(d*e^6) + 1/6*b*n*log(x)/(d
*e^6)
```

Mupad [B] (verification not implemented)

Time = 27.04 (sec) , antiderivative size = 341, normalized size of antiderivative = 2.51

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}\,dx = -\frac{x^5\,(6\,a\,e^5+5\,b\,e^5\,n)+x\,\left(6\,a\,d^4\,e+\frac{127\,b\,d^4\,e\,n}{10}\right)+a\,d^5+x^3\,\left(20\,a\,d^2\,e^3+\frac{100\,b\,d^2\,e^3\,n}{3}\right)+x^2\,\left(15\,a\,d^3\,e^2+\right.}{6\,d^6\,e^6+36\,d^5\,e^7\,x+90\,d^4\,e^8\,x^2+120\,d^3\,e^9\,x^3+90\,d^2\,e^{10}\,x^4+36\,d\,e} - \frac{\ln(c\,x^n)\,\left(\frac{b\,d^5}{6\,e^6}+\frac{b\,x^5}{e}+\frac{10\,b\,d^2\,x^3}{3\,e^3}+\frac{5\,b\,d^3\,x^2}{2\,e^4}+\frac{5\,b\,d\,x^4}{2\,e^2}+\frac{b\,d^4\,x}{e^5}\right)}{d^6+6\,d^5\,e\,x+15\,d^4\,e^2\,x^2+20\,d^3\,e^3\,x^3+15\,d^2\,e^4\,x^4+6\,d\,e^5\,x^5+e^6\,x^6} - \frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{3\,d\,e^6}$$

input
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

output
```
- (x^5*(6*a*e^5 + 5*b*e^5*n) + x*(6*a*d^4*e + (127*b*d^4*e*n)/10) + a*d^5
+ x^3*(20*a*d^2*e^3 + (100*b*d^2*e^3*n)/3) + x^2*(15*a*d^3*e^2 + (115*b*d^
3*e^2*n)/4) + x^4*(15*a*d*e^4 + 20*b*d*e^4*n) + (137*b*d^5*n)/60)/(6*d^6*e
^6 + 6*e^12*x^6 + 36*d^5*e^7*x + 36*d*e^11*x^5 + 90*d^4*e^8*x^2 + 120*d^3*
e^9*x^3 + 90*d^2*e^10*x^4) - (log(c*x^n)*((b*d^5)/(6*e^6) + (b*x^5)/e + (1
0*b*d^2*x^3)/(3*e^3) + (5*b*d^3*x^2)/(2*e^4) + (5*b*d*x^4)/(2*e^2) + (b*d^
4*x)/e^5))/(d^6 + e^6*x^6 + 6*d*e^5*x^5 + 15*d^4*e^2*x^2 + 20*d^3*e^3*x^3
+ 15*d^2*e^4*x^4 + 6*d^5*e*x) - (b*n*atanh((2*e*x)/d + 1))/(3*d*e^6)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 278, normalized size of antiderivative = 2.04

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}\,dx = \frac{-60\log(ex+d)\,b\,d^6n-360\log(ex+d)\,b\,d^5enx-900\log(ex+d)\,b\,d^4e^2n\,x^2-1200\log(ex+d)\,b\,d^3e^3n}{}$$

input
```
int(x^5*(a+b*log(c*x^n))/(e*x+d)^7,x)
```

output
```
( - 60*log(d + e*x)*b*d**6*n - 360*log(d + e*x)*b*d**5*e*n*x - 900*log(d +
 e*x)*b*d**4*e**2*n*x**2 - 1200*log(d + e*x)*b*d**3*e**3*n*x**3 - 900*log(
d + e*x)*b*d**2*e**4*n*x**4 - 360*log(d + e*x)*b*d*e**5*n*x**5 - 60*log(d
+ e*x)*b*e**6*n*x**6 + 60*log(x**n*c)*b*e**6*x**6 + 60*a*e**6*x**6 - 87*b*
d**6*n - 462*b*d**5*e*n*x - 975*b*d**4*e**2*n*x**2 - 1000*b*d**3*e**3*n*x*
*3 - 450*b*d**2*e**4*n*x**4 + 50*b*e**6*n*x**6)/(360*d*e**6*(d**6 + 6*d**5
*e*x + 15*d**4*e**2*x**2 + 20*d**3*e**3*x**3 + 15*d**2*e**4*x**4 + 6*d*e**
5*x**5 + e**6*x**6))
```

3.66 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^7}\,dx$

Optimal result 625
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Rubi [A] (verified) 626
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Mupad [B] (verification not implemented) 632
Reduce [B] (verification not implemented) 633

Optimal result

Integrand size = 21, antiderivative size = 163

$$\begin{aligned}\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^7}\,dx =& -\frac{bnx^5}{30d^2(d+ex)^5}+\frac{bd^2n}{120e^5(d+ex)^4}-\frac{2bdn}{45e^5(d+ex)^3}\\&+\frac{bn}{10e^5(d+ex)^2}-\frac{2bn}{15de^5(d+ex)}+\frac{x^5(a+b\log(cx^n))}{6d(d+ex)^6}\\&+\frac{x^5(a+b\log(cx^n))}{30d^2(d+ex)^5}-\frac{bn\log(d+ex)}{30d^2e^5}\end{aligned}$$

output
```
-1/30*b*n*x^5/d^2/(e*x+d)^5+1/120*b*d^2*n/e^5/(e*x+d)^4-2/45*b*d*n/e^5/(e*
x+d)^3+1/10*b*n/e^5/(e*x+d)^2-2/15*b*n/d/e^5/(e*x+d)+1/6*x^5*(a+b*ln(c*x^n
))/d/(e*x+d)^6+1/30*x^5*(a+b*ln(c*x^n))/d^2/(e*x+d)^5-1/30*b*n*ln(e*x+d)/d
^2/e^5
```

Mathematica [A] (verified)

Time = 0.33 (sec) , antiderivative size = 316, normalized size of antiderivative = 1.94

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^7}\,dx =$$
$$-\frac{12ad^6+13bd^6n+72ad^5ex+66bd^5enx+180ad^4e^2x^2+129bd^4e^2nx^2+240ad^3e^3x^3+112bd^3e^3nx^3+}{}$$

input
```
Integrate[(x^4*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
-1/360*(12*a*d^6 + 13*b*d^6*n + 72*a*d^5*e*x + 66*b*d^5*e*n*x + 180*a*d^4*
e^2*x^2 + 129*b*d^4*e^2*n*x^2 + 240*a*d^3*e^3*x^3 + 112*b*d^3*e^3*n*x^3 +
180*a*d^2*e^4*x^4 + 24*b*d^2*e^4*n*x^4 - 12*b*d*e^5*n*x^5 - 12*b*n*(d + e*
x)^6*Log[x] + 12*b*d^2*(d^4 + 6*d^3*e*x + 15*d^2*e^2*x^2 + 20*d*e^3*x^3 +
15*e^4*x^4)*Log[c*x^n] + 12*b*d^6*n*Log[d + e*x] + 72*b*d^5*e*n*x*Log[d +
e*x] + 180*b*d^4*e^2*n*x^2*Log[d + e*x] + 240*b*d^3*e^3*n*x^3*Log[d + e*x]
 + 180*b*d^2*e^4*n*x^4*Log[d + e*x] + 72*b*d*e^5*n*x^5*Log[d + e*x] + 12*b
*e^6*n*x^6*Log[d + e*x])/(d^2*e^5*(d + e*x)^6)
```

Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 148, normalized size of antiderivative = 0.91, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.238$, Rules used = {2782, 27, 87, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$\Big\downarrow \text{ 2782}$$
$$-bn\int \frac{x^4(6d+ex)}{30d^2(d+ex)^6}dx+\frac{x^5(a+b\log(cx^n))}{30d^2(d+ex)^5}+\frac{x^5(a+b\log(cx^n))}{6d(d+ex)^6}$$
$$\Big\downarrow \text{ 27}$$

$$-\frac{bn\int \frac{x^4(6d+ex)}{(d+ex)^6}dx}{30d^2}+\frac{x^5(a+b\log(cx^n))}{30d^2(d+ex)^5}+\frac{x^5(a+b\log(cx^n))}{6d(d+ex)^6}$$

$$\Big\downarrow \text{87}$$

$$-\frac{bn\left(\int \frac{x^4}{(d+ex)^5}dx+\frac{x^5}{(d+ex)^5}\right)}{30d^2}+\frac{x^5(a+b\log(cx^n))}{30d^2(d+ex)^5}+\frac{x^5(a+b\log(cx^n))}{6d(d+ex)^6}$$

$$\Big\downarrow \text{49}$$

$$-\frac{bn\left(\int \left(\frac{d^4}{e^4(d+ex)^5}-\frac{4d^3}{e^4(d+ex)^4}+\frac{6d^2}{e^4(d+ex)^3}-\frac{4d}{e^4(d+ex)^2}+\frac{1}{e^4(d+ex)}\right)dx+\frac{x^5}{(d+ex)^5}\right)}{30d^2}+ \frac{x^5(a+b\log(cx^n))}{30d^2(d+ex)^5}+\frac{x^5(a+b\log(cx^n))}{6d(d+ex)^6}$$

$$\Big\downarrow \text{2009}$$

$$\frac{x^5(a+b\log(cx^n))}{30d^2(d+ex)^5}+\frac{x^5(a+b\log(cx^n))}{6d(d+ex)^6}- \frac{bn\left(-\frac{d^4}{4e^5(d+ex)^4}+\frac{4d^3}{3e^5(d+ex)^3}-\frac{3d^2}{e^5(d+ex)^2}+\frac{4d}{e^5(d+ex)}+\frac{\log(d+ex)}{e^5}+\frac{x^5}{(d+ex)^5}\right)}{30d^2}$$

input
```
Int[(x^4*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
(x^5*(a + b*Log[c*x^n]))/(6*d*(d + e*x)^6) + (x^5*(a + b*Log[c*x^n]))/(30*
d^2*(d + e*x)^5) - (b*n*(x^5/(d + e*x)^5 - d^4/(4*e^5*(d + e*x)^4) + (4*d^
3)/(3*e^5*(d + e*x)^3) - (3*d^2)/(e^5*(d + e*x)^2) + (4*d)/(e^5*(d + e*x))
 + Log[d + e*x]/e^5))/(30*d^2)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 87
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[(-(b*e - a*f))*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(f*(p
+ 1)*(c*f - d*e))), x] - Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p
+ 1)))/(f*(p + 1)*(c*f - d*e))   Int[(c + d*x)^n*(e + f*x)^(p + 1), x], x]
/; FreeQ[{a, b, c, d, e, f, n}, x] && LtQ[p, -1] && ( !LtQ[n, -1] || Intege
rQ[p] ||  !(IntegerQ[n] ||  !(EqQ[e, 0] ||  !(EqQ[c, 0] || LtQ[p, n]))))
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2782
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_))^(q
_), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x)^q, x]}, Simp[(a + b*Log[c*
x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[
{a, b, c, d, e, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 434 vs. $2(147) = 294$.

Time = 4.13 (sec) , antiderivative size = 435, normalized size of antiderivative = 2.67

method	result
parallelrisch	$\frac{72\ln(x)x^5bd\,e^6n-72\ln(ex+d)x^5bd\,e^6n+180\ln(x)x^4b\,d^2e^5n-180\ln(ex+d)x^4b\,d^2e^5n+240\ln(x)x^3b\,d^3e^4n-240\ln(ex+d)x^3}{}$
risch	Expression too large to display

input
```
int(x^4*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
1/360*(72*ln(x)*x^5*b*d*e^6*n-72*ln(e*x+d)*x^5*b*d*e^6*n+180*ln(x)*x^4*b*d
^2*e^5*n-180*ln(e*x+d)*x^4*b*d^2*e^5*n+240*ln(x)*x^3*b*d^3*e^4*n-240*ln(e*
x+d)*x^3*b*d^3*e^4*n+180*ln(x)*x^2*b*d^4*e^3*n-180*ln(e*x+d)*x^2*b*d^4*e^3
*n+72*ln(x)*x*b*d^5*e^2*n-72*ln(e*x+d)*x*b*d^5*e^2*n-15*b*d^6*e*n-72*x*a*d
^5*e^2-180*x^2*a*d^4*e^3-240*x^3*a*d^3*e^4-180*x^4*a*d^2*e^5-2*x^6*b*e^7*n
-12*ln(c*x^n)*b*d^6*e-12*a*d^6*e-78*x*b*d^5*e^2*n-159*x^2*b*d^4*e^3*n-152*
x^3*b*d^3*e^4*n-54*x^4*b*d^2*e^5*n-72*x*ln(c*x^n)*b*d^5*e^2-180*x^2*ln(c*x
^n)*b*d^4*e^3-240*x^3*ln(c*x^n)*b*d^3*e^4-180*x^4*ln(c*x^n)*b*d^2*e^5+12*l
n(x)*x^6*b*e^7*n-12*ln(e*x+d)*x^6*b*e^7*n+12*ln(x)*b*d^6*e*n-12*ln(e*x+d)*
b*d^6*e*n)/d^2/e^6/(e*x+d)^6
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 356 vs. $2(147) = 294$.

Time = 0.09 (sec) , antiderivative size = 356, normalized size of antiderivative = 2.18

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{12\,bde^5nx^5 - 13\,bd^6n - 12\,ad^6 - 12\,(2\,bd^2e^4n + 15\,ad^2e^4)x^4 - 16\,(7\,bd^3e^3n + 15\,ad^3e^3)x^3 - 3\,(43\,bd^4e^2n}{}$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

output
```
1/360*(12*b*d*e^5*n*x^5 - 13*b*d^6*n - 12*a*d^6 - 12*(2*b*d^2*e^4*n + 15*a
*d^2*e^4)*x^4 - 16*(7*b*d^3*e^3*n + 15*a*d^3*e^3)*x^3 - 3*(43*b*d^4*e^2*n
+ 60*a*d^4*e^2)*x^2 - 6*(11*b*d^5*e*n + 12*a*d^5*e)*x - 12*(b*e^6*n*x^6 +
6*b*d*e^5*n*x^5 + 15*b*d^2*e^4*n*x^4 + 20*b*d^3*e^3*n*x^3 + 15*b*d^4*e^2*n
*x^2 + 6*b*d^5*e*n*x + b*d^6*n)*log(e*x + d) - 12*(15*b*d^2*e^4*x^4 + 20*b
*d^3*e^3*x^3 + 15*b*d^4*e^2*x^2 + 6*b*d^5*e*x + b*d^6)*log(c) + 12*(b*e^6*
n*x^6 + 6*b*d*e^5*n*x^5)*log(x))/(d^2*e^11*x^6 + 6*d^3*e^10*x^5 + 15*d^4*e
^9*x^4 + 20*d^5*e^8*x^3 + 15*d^6*e^7*x^2 + 6*d^7*e^6*x + d^8*e^5)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1972 vs. $2(155) = 310$.

Time = 91.79 (sec) , antiderivative size = 1972, normalized size of antiderivative = 12.10

$$\int \frac{x^4(a + b\log(cx^n))}{(d + ex)^7}\,dx = \text{Too large to display}$$

input
```
integrate(x**4*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

output
```
Piecewise((zoo*(-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2)), Eq(d
, 0) & Eq(e, 0)), ((a*x**5/5 - b*n*x**5/25 + b*x**5*log(c*x**n)/5)/d**7, E
q(e, 0)), ((-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2))/e**7, Eq(
d, 0)), (-12*a*d**6/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*x**
2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4 + 2160*d**3*e**10*x**5 + 360
*d**2*e**11*x**6) - 72*a*d**5*e*x/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400
*d**6*e**7*x**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4 + 2160*d**3*e*
*10*x**5 + 360*d**2*e**11*x**6) - 180*a*d**4*e**2*x**2/(360*d**8*e**5 + 21
60*d**7*e**6*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**
9*x**4 + 2160*d**3*e**10*x**5 + 360*d**2*e**11*x**6) - 240*a*d**3*e**3*x**
3/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8
*x**3 + 5400*d**4*e**9*x**4 + 2160*d**3*e**10*x**5 + 360*d**2*e**11*x**6)
- 180*a*d**2*e**4*x**4/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*
x**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4 + 2160*d**3*e**10*x**5 +
360*d**2*e**11*x**6) - 12*b*d**6*n*log(d/e + x)/(360*d**8*e**5 + 2160*d**7
*e**6*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4
+ 2160*d**3*e**10*x**5 + 360*d**2*e**11*x**6) - 13*b*d**6*n/(360*d**8*e**5
 + 2160*d**7*e**6*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8*x**3 + 5400*d**
4*e**9*x**4 + 2160*d**3*e**10*x**5 + 360*d**2*e**11*x**6) - 72*b*d**5*e*n*
x*log(d/e + x)/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*x**2 ...
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 358 vs. $2(147) = 294$.

Time = 0.05 (sec) , antiderivative size = 358, normalized size of antiderivative = 2.20

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^7}\,dx = \frac{1}{360}\,bn\left(\frac{12\,e^4x^4 - 36\,de^3x^3 - 76\,d^2e^2x^2 - 53\,d^3ex - 13\,d^4}{de^{10}x^5 + 5\,d^2e^9x^4 + 10\,d^3e^8x^3 + 10\,d^4e^7x^2 + 5\,d^5e^6x + d^6e^5} - \frac{12\,\log(ex+d)}{d^2e^5} + \frac{12\,\log(x)}{d^2e^5}\right) - \frac{(15\,e^4x^4 + 20\,de^3x^3 + 15\,d^2e^2x^2 + 6\,d^3ex + d^4)b\log(cx^n)}{30\,(e^{11}x^6 + 6\,de^{10}x^5 + 15\,d^2e^9x^4 + 20\,d^3e^8x^3 + 15\,d^4e^7x^2 + 6\,d^5e^6x + d^6e^5)} - \frac{(15\,e^4x^4 + 20\,de^3x^3 + 15\,d^2e^2x^2 + 6\,d^3ex + d^4)a}{30\,(e^{11}x^6 + 6\,de^{10}x^5 + 15\,d^2e^9x^4 + 20\,d^3e^8x^3 + 15\,d^4e^7x^2 + 6\,d^5e^6x + d^6e^5)}$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

output
```
1/360*b*n*((12*e^4*x^4 - 36*d*e^3*x^3 - 76*d^2*e^2*x^2 - 53*d^3*e*x - 13*d
^4)/(d*e^10*x^5 + 5*d^2*e^9*x^4 + 10*d^3*e^8*x^3 + 10*d^4*e^7*x^2 + 5*d^5*
e^6*x + d^6*e^5) - 12*log(e*x + d)/(d^2*e^5) + 12*log(x)/(d^2*e^5)) - 1/30
*(15*e^4*x^4 + 20*d*e^3*x^3 + 15*d^2*e^2*x^2 + 6*d^3*e*x + d^4)*b*log(c*x^
n)/(e^11*x^6 + 6*d*e^10*x^5 + 15*d^2*e^9*x^4 + 20*d^3*e^8*x^3 + 15*d^4*e^7
*x^2 + 6*d^5*e^6*x + d^6*e^5) - 1/30*(15*e^4*x^4 + 20*d*e^3*x^3 + 15*d^2*e
^2*x^2 + 6*d^3*e*x + d^4)*a/(e^11*x^6 + 6*d*e^10*x^5 + 15*d^2*e^9*x^4 + 20
*d^3*e^8*x^3 + 15*d^4*e^7*x^2 + 6*d^5*e^6*x + d^6*e^5)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 394 vs. $2(147) = 294$.

Time = 0.13 (sec) , antiderivative size = 394, normalized size of antiderivative = 2.42

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^7}\,dx = -\frac{(15\,be^4nx^4 + 20\,bde^3nx^3 + 15\,bd^2e^2nx^2 + 6\,bd^3enx + bd^4n)\log(x)}{30\,(e^{11}x^6 + 6\,de^{10}x^5 + 15\,d^2e^9x^4 + 20\,d^3e^8x^3 + 15\,d^4e^7x^2 + 6\,d^5e^6x + d^6e^5)} + \frac{12\,be^5nx^5 - 24\,bde^4nx^4 - 180\,bde^4x^4\log(c) - 112\,bd^2e^3nx^3 - 180\,ade^4x^4 - 240\,bd^2e^3x^3\log(c) - 129\,b}{360\,(de^{11}x^6 + 6\,d^2e^{10}}\ldots - \frac{bn\log(ex+d)}{30\,d^2e^5} + \frac{bn\log(x)}{30\,d^2e^5}$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

output
```
-1/30*(15*b*e^4*n*x^4 + 20*b*d*e^3*n*x^3 + 15*b*d^2*e^2*n*x^2 + 6*b*d^3*e*
n*x + b*d^4*n)*log(x)/(e^11*x^6 + 6*d*e^10*x^5 + 15*d^2*e^9*x^4 + 20*d^3*e
^8*x^3 + 15*d^4*e^7*x^2 + 6*d^5*e^6*x + d^6*e^5) + 1/360*(12*b*e^5*n*x^5 -
 24*b*d*e^4*n*x^4 - 180*b*d*e^4*x^4*log(c) - 112*b*d^2*e^3*n*x^3 - 180*a*d
*e^4*x^4 - 240*b*d^2*e^3*x^3*log(c) - 129*b*d^3*e^2*n*x^2 - 240*a*d^2*e^3*
x^3 - 180*b*d^3*e^2*x^2*log(c) - 66*b*d^4*e*n*x - 180*a*d^3*e^2*x^2 - 72*b
*d^4*e*x*log(c) - 13*b*d^5*n - 72*a*d^4*e*x - 12*b*d^5*log(c) - 12*a*d^5)/
(d*e^11*x^6 + 6*d^2*e^10*x^5 + 15*d^3*e^9*x^4 + 20*d^4*e^8*x^3 + 15*d^5*e^
7*x^2 + 6*d^6*e^6*x + d^7*e^5) - 1/30*b*n*log(e*x + d)/(d^2*e^5) + 1/30*b*
n*log(x)/(d^2*e^5)
```

Mupad [B] (verification not implemented)

Time = 26.56 (sec) , antiderivative size = 320, normalized size of antiderivative = 1.96

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^7}\,dx = -\frac{x^4\left(15\,a\,e^4+2\,b\,e^4\,n\right)+x\left(6\,a\,d^3\,e+\frac{11\,b\,d^3\,e\,n}{2}\right)+a\,d^4+x^2\left(15\,a\,d^2\,e^2+\frac{43\,b\,d^2\,e^2\,n}{4}\right)+x^3\left(20\,a\,d\,e^3+\frac{28}{\cdots}\right.}{30\,d^6\,e^5+180\,d^5\,e^6\,x+450\,d^4\,e^7\,x^2+600\,d^3\,e^8\,x^3+450\,d^2\,e^9\,x^4+180\,d\,e^{10}\,x^5+30\cdots} - \frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^4}{30\,e^5}+\frac{b\,x^4}{2\,e}+\frac{b\,d^2\,x^2}{2\,e^3}+\frac{2\,b\,d\,x^3}{3\,e^2}+\frac{b\,d^3\,x}{5\,e^4}\right)}{d^6+6\,d^5\,e\,x+15\,d^4\,e^2\,x^2+20\,d^3\,e^3\,x^3+15\,d^2\,e^4\,x^4+6\,d\,e^5\,x^5+e^6\,x^6} - \frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{15\,d^2\,e^5}$$

input
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

output
```
- (x^4*(15*a*e^4 + 2*b*e^4*n) + x*(6*a*d^3*e + (11*b*d^3*e*n)/2) + a*d^4 +
 x^2*(15*a*d^2*e^2 + (43*b*d^2*e^2*n)/4) + x^3*(20*a*d*e^3 + (28*b*d*e^3*n
)/3) + (13*b*d^4*n)/12 - (b*e^5*n*x^5)/d)/(30*d^6*e^5 + 30*e^11*x^6 + 180*
d^5*e^6*x + 180*d*e^10*x^5 + 450*d^4*e^7*x^2 + 600*d^3*e^8*x^3 + 450*d^2*e
^9*x^4) - (log(c*x^n)*((b*d^4)/(30*e^5) + (b*x^4)/(2*e) + (b*d^2*x^2)/(2*e
^3) + (2*b*d*x^3)/(3*e^2) + (b*d^3*x)/(5*e^4)))/(d^6 + e^6*x^6 + 6*d*e^5*x
^5 + 15*d^4*e^2*x^2 + 20*d^3*e^3*x^3 + 15*d^2*e^4*x^4 + 6*d^5*e*x) - (b*n*
atanh((2*e*x)/d + 1))/(15*d^2*e^5)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 335, normalized size of antiderivative = 2.06

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{-12\log(ex+d)\,b\,d^6n - 72\log(ex+d)\,b\,d^5enx - 180\log(ex+d)\,b\,d^4e^2n\,x^2 - 240\log(ex+d)\,b\,d^3e^3n\,x^3}{}$$

input
```
int(x^4*(a+b*log(c*x^n))/(e*x+d)^7,x)
```

output
```
( - 12*log(d + e*x)*b*d**6*n - 72*log(d + e*x)*b*d**5*e*n*x - 180*log(d +
e*x)*b*d**4*e**2*n*x**2 - 240*log(d + e*x)*b*d**3*e**3*n*x**3 - 180*log(d
+ e*x)*b*d**2*e**4*n*x**4 - 72*log(d + e*x)*b*d*e**5*n*x**5 - 12*log(d + e
*x)*b*e**6*n*x**6 + 72*log(x**n*c)*b*d*e**5*x**5 + 12*log(x**n*c)*b*e**6*x
**6 - 12*a*d**6 - 72*a*d**5*e*x - 180*a*d**4*e**2*x**2 - 240*a*d**3*e**3*x
**3 - 180*a*d**2*e**4*x**4 - 15*b*d**6*n - 78*b*d**5*e*n*x - 159*b*d**4*e*
*2*n*x**2 - 152*b*d**3*e**3*n*x**3 - 54*b*d**2*e**4*n*x**4 - 2*b*e**6*n*x*
*6)/(360*d**2*e**5*(d**6 + 6*d**5*e*x + 15*d**4*e**2*x**2 + 20*d**3*e**3*x
**3 + 15*d**2*e**4*x**4 + 6*d*e**5*x**5 + e**6*x**6))
```

3.67 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7}\,dx$

Optimal result 634
Mathematica [A] (verified) 635
Rubi [A] (verified) 635
Maple [B] (verified) 637
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Giac [A] (verification not implemented) 640
Mupad [B] (verification not implemented) 641
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Optimal result

Integrand size = 21, antiderivative size = 226

$$\begin{aligned}\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7}\,dx = &-\frac{bd^2n}{30e^4(d+ex)^5}+\frac{13bdn}{120e^4(d+ex)^4}-\frac{19bn}{180e^4(d+ex)^3}\\ &+\frac{bn}{120de^4(d+ex)^2}+\frac{bn}{60d^2e^4(d+ex)}+\frac{bn\log(x)}{60d^3e^4}\\ &+\frac{d^3(a+b\log(cx^n))}{6e^4(d+ex)^6}-\frac{3d^2(a+b\log(cx^n))}{5e^4(d+ex)^5}\\ &+\frac{3d(a+b\log(cx^n))}{4e^4(d+ex)^4}-\frac{a+b\log(cx^n)}{3e^4(d+ex)^3}-\frac{bn\log(d+ex)}{60d^3e^4}\end{aligned}$$

output
```
-1/30*b*d^2*n/e^4/(e*x+d)^5+13/120*b*d*n/e^4/(e*x+d)^4-19/180*b*n/e^4/(e*x
+d)^3+1/120*b*n/d/e^4/(e*x+d)^2+1/60*b*n/d^2/e^4/(e*x+d)+1/60*b*n*ln(x)/d^
3/e^4+1/6*d^3*(a+b*ln(c*x^n))/e^4/(e*x+d)^6-3/5*d^2*(a+b*ln(c*x^n))/e^4/(e
*x+d)^5+3/4*d*(a+b*ln(c*x^n))/e^4/(e*x+d)^4-1/3*(a+b*ln(c*x^n))/e^4/(e*x+d
)^3-1/60*b*n*ln(e*x+d)/d^3/e^4
```

Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 281, normalized size of antiderivative = 1.24

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7}\,dx = \frac{ad^3}{6e^4(d+ex)^6}-\frac{3ad^2}{5e^4(d+ex)^5}-\frac{bd^2n}{30e^4(d+ex)^5}+\frac{3ad}{4e^4(d+ex)^4}+\frac{13bdn}{120e^4(d+ex)^4}-\frac{a}{3e^4(d+ex)^3}-\frac{19bn}{180e^4(d+ex)^3}+\frac{bn}{120de^4(d+ex)^2}+\frac{bn}{60d^2e^4(d+ex)}+\frac{bn\log(x)}{60d^3e^4}+\frac{bd^3\log(cx^n)}{6e^4(d+ex)^6}-\frac{3bd^2\log(cx^n)}{5e^4(d+ex)^5}+\frac{3bd\log(cx^n)}{4e^4(d+ex)^4}-\frac{b\log(cx^n)}{3e^4(d+ex)^3}-\frac{bn\log(d+ex)}{60d^3e^4}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
(a*d^3)/(6*e^4*(d + e*x)^6) - (3*a*d^2)/(5*e^4*(d + e*x)^5) - (b*d^2*n)/(3
0*e^4*(d + e*x)^5) + (3*a*d)/(4*e^4*(d + e*x)^4) + (13*b*d*n)/(120*e^4*(d
+ e*x)^4) - a/(3*e^4*(d + e*x)^3) - (19*b*n)/(180*e^4*(d + e*x)^3) + (b*n)
/(120*d*e^4*(d + e*x)^2) + (b*n)/(60*d^2*e^4*(d + e*x)) + (b*n*Log[x])/(60
*d^3*e^4) + (b*d^3*Log[c*x^n])/(6*e^4*(d + e*x)^6) - (3*b*d^2*Log[c*x^n])/
(5*e^4*(d + e*x)^5) + (3*b*d*Log[c*x^n])/(4*e^4*(d + e*x)^4) - (b*Log[c*x^
n])/(3*e^4*(d + e*x)^3) - (b*n*Log[d + e*x])/(60*d^3*e^4)
```

Rubi [A] (verified)

Time = 0.52 (sec) , antiderivative size = 191, normalized size of antiderivative = 0.85, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2782, 27, 2123, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7}\,dx$$

$$\Big\downarrow \text{ 2782}$$

$$-bn\int -\frac{d^3+6exd^2+15e^2x^2d+20e^3x^3}{60e^4x(d+ex)^6}dx+\frac{d^3(a+b\log(cx^n))}{6e^4(d+ex)^6}-\frac{3d^2(a+b\log(cx^n))}{5e^4(d+ex)^5}+\frac{3d(a+b\log(cx^n))}{4e^4(d+ex)^4}-\frac{a+b\log(cx^n)}{3e^4(d+ex)^3}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{d^3+6exd^2+15e^2x^2d+20e^3x^3}{x(d+ex)^6}dx}{60e^4}+\frac{d^3(a+b\log(cx^n))}{6e^4(d+ex)^6}-\frac{3d^2(a+b\log(cx^n))}{5e^4(d+ex)^5}+\frac{3d(a+b\log(cx^n))}{4e^4(d+ex)^4}-\frac{a+b\log(cx^n)}{3e^4(d+ex)^3}$$

$$\Big\downarrow \text{2123}$$

$$\frac{bn\int \left(\frac{10ed^2}{(d+ex)^6}-\frac{26ed}{(d+ex)^5}+\frac{19e}{(d+ex)^4}-\frac{e}{(d+ex)^3d}-\frac{e}{(d+ex)^2d^2}+\frac{1}{xd^3}-\frac{e}{(d+ex)d^3}\right)dx}{60e^4}+\frac{d^3(a+b\log(cx^n))}{6e^4(d+ex)^6}-\frac{3d^2(a+b\log(cx^n))}{5e^4(d+ex)^5}+\frac{3d(a+b\log(cx^n))}{4e^4(d+ex)^4}-\frac{a+b\log(cx^n)}{3e^4(d+ex)^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^3(a+b\log(cx^n))}{6e^4(d+ex)^6}-\frac{3d^2(a+b\log(cx^n))}{5e^4(d+ex)^5}+\frac{3d(a+b\log(cx^n))}{4e^4(d+ex)^4}-\frac{a+b\log(cx^n)}{3e^4(d+ex)^3}+\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}-\frac{2d^2}{(d+ex)^5}+\frac{1}{d^2(d+ex)}+\frac{13d}{2(d+ex)^4}-\frac{19}{3(d+ex)^3}+\frac{1}{2d(d+ex)^2}\right)}{60e^4}$$

input

```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output

```
(d^3*(a + b*Log[c*x^n]))/(6*e^4*(d + e*x)^6) - (3*d^2*(a + b*Log[c*x^n]))/
(5*e^4*(d + e*x)^5) + (3*d*(a + b*Log[c*x^n]))/(4*e^4*(d + e*x)^4) - (a +
b*Log[c*x^n])/(3*e^4*(d + e*x)^3) + (b*n*((-2*d^2)/(d + e*x)^5 + (13*d)/(2
*(d + e*x)^4) - 19/(3*(d + e*x)^3) + 1/(2*d*(d + e*x)^2) + 1/(d^2*(d + e*x
)) + Log[x]/d^3 - Log[d + e*x]/d^3))/(60*e^4)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2123
```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2])
```

rule 2782
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_))^(q
_), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x)^q, x]}, Simp[(a + b*Log[c*
x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[
{a, b, c, d, e, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 412 vs. $2(204) = 408$.

Time = 4.12 (sec) , antiderivative size = 413, normalized size of antiderivative = 1.83

method	result
parallelrisch	$\frac{-180\ln(ex+d)x^5bde^7n+450\ln(x)x^4bd^2e^6n-450\ln(ex+d)x^4bd^2e^6n+600\ln(x)x^3bd^3e^5n-600\ln(ex+d)x^3bd^3e^5n+450\ln(}{}$
risch	$-\frac{b(20e^3x^3+15de^2x^2+6d^2ex+d^3)\ln(x^n)}{60(ex+d)^6e^4}-\frac{3i\pi bd^6\operatorname{csgn}(ix^n)\operatorname{csgn}(icx^n)^2+3i\pi bd^6\operatorname{csgn}(icx^n)^2\operatorname{csgn}(ic)+120ad^3e^3x^3+}{}$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
1/1800*(-180*ln(e*x+d)*x^5*b*d*e^7*n+450*ln(x)*x^4*b*d^2*e^6*n-450*ln(e*x+
d)*x^4*b*d^2*e^6*n+600*ln(x)*x^3*b*d^3*e^5*n-600*ln(e*x+d)*x^3*b*d^3*e^5*n
+450*ln(x)*x^2*b*d^4*e^4*n-450*ln(e*x+d)*x^2*b*d^4*e^4*n+180*ln(x)*x*b*d^5
*e^3*n-180*ln(e*x+d)*x*b*d^5*e^3*n+180*ln(x)*x^5*b*d*e^7*n-30*a*d^6*e^2-18
0*x*a*d^5*e^3-450*x^2*a*d^4*e^4-600*x^3*a*d^3*e^5-11*x^6*b*e^8*n-30*ln(c*x
^n)*b*d^6*e^2-21*b*d^6*e^2*n+30*ln(x)*x^6*b*e^8*n-30*ln(e*x+d)*x^6*b*e^8*n
+30*ln(x)*b*d^6*e^2*n-30*ln(e*x+d)*b*d^6*e^2*n-96*x*b*d^5*e^3*n-150*x^2*b*
d^4*e^4*n-50*x^3*b*d^3*e^5*n-36*x^5*b*d*e^7*n-180*x*ln(c*x^n)*b*d^5*e^3-45
0*x^2*ln(c*x^n)*b*d^4*e^4-600*x^3*ln(c*x^n)*b*d^3*e^5)/d^3/e^6/(e*x+d)^6
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 343, normalized size of antiderivative = 1.52

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7}\,dx = \frac{6\,bde^5nx^5 + 33\,bd^2e^4nx^4 - 2\,bd^6n - 6\,ad^6 + 2\,(17\,bd^3e^3n - 60\,ad^3e^3)x^3 + 3\,(bd^4e^2n - 30\,ad^4e^2)x^2 - 6\,(b}{}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

output
```
1/360*(6*b*d*e^5*n*x^5 + 33*b*d^2*e^4*n*x^4 - 2*b*d^6*n - 6*a*d^6 + 2*(17*
b*d^3*e^3*n - 60*a*d^3*e^3)*x^3 + 3*(b*d^4*e^2*n - 30*a*d^4*e^2)*x^2 - 6*(
b*d^5*e*n + 6*a*d^5*e)*x - 6*(b*e^6*n*x^6 + 6*b*d*e^5*n*x^5 + 15*b*d^2*e^4
*n*x^4 + 20*b*d^3*e^3*n*x^3 + 15*b*d^4*e^2*n*x^2 + 6*b*d^5*e*n*x + b*d^6*n
)*log(e*x + d) - 6*(20*b*d^3*e^3*x^3 + 15*b*d^4*e^2*x^2 + 6*b*d^5*e*x + b*
d^6)*log(c) + 6*(b*e^6*n*x^6 + 6*b*d*e^5*n*x^5 + 15*b*d^2*e^4*n*x^4)*log(x
))/(d^3*e^10*x^6 + 6*d^4*e^9*x^5 + 15*d^5*e^8*x^4 + 20*d^6*e^7*x^3 + 15*d^
7*e^6*x^2 + 6*d^8*e^5*x + d^9*e^4)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1979 vs. $2(223) = 446$.

Time = 95.36 (sec) , antiderivative size = 1979, normalized size of antiderivative = 8.76

$$\int \frac{x^3(a + b\log(cx^n))}{(d + ex)^7} \, dx = \text{Too large to display}$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

output
```
Piecewise((zoo*(-a/(3*x**3) - b*n/(9*x**3) - b*log(c*x**n)/(3*x**3)), Eq(d
, 0) & Eq(e, 0)), ((a*x**4/4 - b*n*x**4/16 + b*x**4*log(c*x**n)/4)/d**7, E
q(e, 0)), ((-a/(3*x**3) - b*n/(9*x**3) - b*log(c*x**n)/(3*x**3))/e**7, Eq(
d, 0)), (-6*a*d**6/(360*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**7*e**6*x**2
 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9*x**5 + 360*d
**3*e**10*x**6) - 36*a*d**5*e*x/(360*d**9*e**4 + 2160*d**8*e**5*x + 5400*d
**7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9
*x**5 + 360*d**3*e**10*x**6) - 90*a*d**4*e**2*x**2/(360*d**9*e**4 + 2160*d
**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*x*
*4 + 2160*d**4*e**9*x**5 + 360*d**3*e**10*x**6) - 120*a*d**3*e**3*x**3/(36
0*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d**6*e**7*x**3
 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9*x**5 + 360*d**3*e**10*x**6) - 6*b*
d**6*n*log(d/e + x)/(360*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**7*e**6*x**
2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9*x**5 + 360*
d**3*e**10*x**6) - 2*b*d**6*n/(360*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**
7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9*x
**5 + 360*d**3*e**10*x**6) - 36*b*d**5*e*n*x*log(d/e + x)/(360*d**9*e**4 +
 2160*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*
e**8*x**4 + 2160*d**4*e**9*x**5 + 360*d**3*e**10*x**6) - 6*b*d**5*e*n*x/(3
60*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d**6*e**7*...
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 338, normalized size of antiderivative = 1.50

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$=\frac{1}{360}bn\left(\frac{6e^4x^4+27de^3x^3+7d^2e^2x^2-4d^3ex-2d^4}{d^2e^9x^5+5d^3e^8x^4+10d^4e^7x^3+10d^5e^6x^2+5d^6e^5x+d^7e^4}-\frac{6\log(ex+d)}{d^3e^4}+\frac{6\log(x)}{d^3e^4}\right)$$
$$-\frac{(20e^3x^3+15de^2x^2+6d^2ex+d^3)b\log(cx^n)}{60(e^{10}x^6+6de^9x^5+15d^2e^8x^4+20d^3e^7x^3+15d^4e^6x^2+6d^5e^5x+d^6e^4)}$$
$$-\frac{(20e^3x^3+15de^2x^2+6d^2ex+d^3)a}{60(e^{10}x^6+6de^9x^5+15d^2e^8x^4+20d^3e^7x^3+15d^4e^6x^2+6d^5e^5x+d^6e^4)}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

output
```
1/360*b*n*((6*e^4*x^4 + 27*d*e^3*x^3 + 7*d^2*e^2*x^2 - 4*d^3*e*x - 2*d^4)/
(d^2*e^9*x^5 + 5*d^3*e^8*x^4 + 10*d^4*e^7*x^3 + 10*d^5*e^6*x^2 + 5*d^6*e^5
*x + d^7*e^4) - 6*log(e*x + d)/(d^3*e^4) + 6*log(x)/(d^3*e^4)) - 1/60*(20*
e^3*x^3 + 15*d*e^2*x^2 + 6*d^2*e*x + d^3)*b*log(c*x^n)/(e^10*x^6 + 6*d*e^9
*x^5 + 15*d^2*e^8*x^4 + 20*d^3*e^7*x^3 + 15*d^4*e^6*x^2 + 6*d^5*e^5*x + d^
6*e^4) - 1/60*(20*e^3*x^3 + 15*d*e^2*x^2 + 6*d^2*e*x + d^3)*a/(e^10*x^6 +
6*d*e^9*x^5 + 15*d^2*e^8*x^4 + 20*d^3*e^7*x^3 + 15*d^4*e^6*x^2 + 6*d^5*e^5
*x + d^6*e^4)
```

Giac [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 361, normalized size of antiderivative = 1.60

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$=-\frac{(20be^3nx^3+15bde^2nx^2+6bd^2enx+bd^3n)\log(x)}{60(e^{10}x^6+6de^9x^5+15d^2e^8x^4+20d^3e^7x^3+15d^4e^6x^2+6d^5e^5x+d^6e^4)}$$
$$+\frac{6be^5nx^5+33bde^4nx^4+34bd^2e^3nx^3-120bd^2e^3x^3\log(c)+3bd^3e^2nx^2-120ad^2e^3x^3-90bd^3e^2x^2\,\mathrm{lo}}{360(d^2e^{10}x^6+6d^3e^9x^5+15d^4e^8x^4+20d^5e}$$
$$-\frac{bn\log(ex+d)}{60d^3e^4}+\frac{bn\log(x)}{60d^3e^4}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

output
```
-1/60*(20*b*e^3*n*x^3 + 15*b*d*e^2*n*x^2 + 6*b*d^2*e*n*x + b*d^3*n)*log(x)
/(e^10*x^6 + 6*d*e^9*x^5 + 15*d^2*e^8*x^4 + 20*d^3*e^7*x^3 + 15*d^4*e^6*x^
2 + 6*d^5*e^5*x + d^6*e^4) + 1/360*(6*b*e^5*n*x^5 + 33*b*d*e^4*n*x^4 + 34*
b*d^2*e^3*n*x^3 - 120*b*d^2*e^3*x^3*log(c) + 3*b*d^3*e^2*n*x^2 - 120*a*d^2
*e^3*x^3 - 90*b*d^3*e^2*x^2*log(c) - 6*b*d^4*e*n*x - 90*a*d^3*e^2*x^2 - 36
*b*d^4*e*x*log(c) - 2*b*d^5*n - 36*a*d^4*e*x - 6*b*d^5*log(c) - 6*a*d^5)/(
d^2*e^10*x^6 + 6*d^3*e^9*x^5 + 15*d^4*e^8*x^4 + 20*d^5*e^7*x^3 + 15*d^6*e^
6*x^2 + 6*d^7*e^5*x + d^8*e^4) - 1/60*b*n*log(e*x + d)/(d^3*e^4) + 1/60*b*
n*log(x)/(d^3*e^4)
```

Mupad [B] (verification not implemented)

Time = 26.41 (sec) , antiderivative size = 296, normalized size of antiderivative = 1.31

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7}\,dx =$$

$$-\frac{x^3\left(20\,a\,e^3-\frac{17\,b\,e^3\,n}{3}\right)+x\left(6\,a\,d^2\,e+b\,d^2\,e\,n\right)+a\,d^3+x^2\left(15\,a\,d\,e^2-\frac{b\,d\,e^2\,n}{2}\right)+\frac{b\,d^3\,n}{3}-\frac{11\,b\,e^4\,n\,x^4}{2\,d}-\frac{b\,e^5}{}}{60\,d^6\,e^4+360\,d^5\,e^5\,x+900\,d^4\,e^6\,x^2+1200\,d^3\,e^7\,x^3+900\,d^2\,e^8\,x^4+360\,d\,e^9\,x^5+60\,e^{10}\,x^6}$$

$$-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^3}{60\,e^4}+\frac{b\,x^3}{3\,e}+\frac{b\,d\,x^2}{4\,e^2}+\frac{b\,d^2\,x}{10\,e^3}\right)}{d^6+6\,d^5\,e\,x+15\,d^4\,e^2\,x^2+20\,d^3\,e^3\,x^3+15\,d^2\,e^4\,x^4+6\,d\,e^5\,x^5+e^6\,x^6}$$

$$-\frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{30\,d^3\,e^4}$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

output
```
- (x^3*(20*a*e^3 - (17*b*e^3*n)/3) + x*(6*a*d^2*e + b*d^2*e*n) + a*d^3 + x
^2*(15*a*d*e^2 - (b*d*e^2*n)/2) + (b*d^3*n)/3 - (11*b*e^4*n*x^4)/(2*d) - (
b*e^5*n*x^5)/d^2)/(60*d^6*e^4 + 60*e^10*x^6 + 360*d^5*e^5*x + 360*d*e^9*x^
5 + 900*d^4*e^6*x^2 + 1200*d^3*e^7*x^3 + 900*d^2*e^8*x^4) - (log(c*x^n)*((
b*d^3)/(60*e^4) + (b*x^3)/(3*e) + (b*d*x^2)/(4*e^2) + (b*d^2*x)/(10*e^3)))
/(d^6 + e^6*x^6 + 6*d*e^5*x^5 + 15*d^4*e^2*x^2 + 20*d^3*e^3*x^3 + 15*d^2*e
^4*x^4 + 6*d^5*e*x) - (b*n*atanh((2*e*x)/d + 1))/(30*d^3*e^4)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 341, normalized size of antiderivative = 1.51

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7} dx$$
$$= \frac{-6\log(ex+d)\,b\,d^6n - 36\log(ex+d)\,b\,d^5enx - 90\log(ex+d)\,b\,d^4e^2n\,x^2 - 120\log(ex+d)\,b\,d^3e^3n\,x^3 -}{}$$

input
```
int(x^3*(a+b*log(c*x^n))/(e*x+d)^7,x)
```

output
```
( - 6*log(d + e*x)*b*d**6*n - 36*log(d + e*x)*b*d**5*e*n*x - 90*log(d + e*
x)*b*d**4*e**2*n*x**2 - 120*log(d + e*x)*b*d**3*e**3*n*x**3 - 90*log(d + e
*x)*b*d**2*e**4*n*x**4 - 36*log(d + e*x)*b*d*e**5*n*x**5 - 6*log(d + e*x)*
b*e**6*n*x**6 + 90*log(x**n*c)*b*d**2*e**4*x**4 + 36*log(x**n*c)*b*d*e**5*
x**5 + 6*log(x**n*c)*b*e**6*x**6 - 6*a*d**6 - 36*a*d**5*e*x - 90*a*d**4*e*
*2*x**2 - 120*a*d**3*e**3*x**3 - 3*b*d**6*n - 12*b*d**5*e*n*x - 12*b*d**4*
e**2*n*x**2 + 14*b*d**3*e**3*n*x**3 + 18*b*d**2*e**4*n*x**4 - b*e**6*n*x**
6)/(360*d**3*e**4*(d**6 + 6*d**5*e*x + 15*d**4*e**2*x**2 + 20*d**3*e**3*x*
*3 + 15*d**2*e**4*x**4 + 6*d*e**5*x**5 + e**6*x**6))
```

3.68 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^7}\,dx$

Optimal result 643
Mathematica [A] (verified) 644
Rubi [A] (verified) 644
Maple [B] (verified) 646
Fricas [A] (verification not implemented) 646
Sympy [B] (verification not implemented) 647
Maxima [A] (verification not implemented) 648
Giac [A] (verification not implemented) 649
Mupad [B] (verification not implemented) 650
Reduce [B] (verification not implemented) 650

Optimal result

Integrand size = 21, antiderivative size = 199

$$\begin{aligned}\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^7}\,dx = {} & \frac{bdn}{30e^3(d+ex)^5}-\frac{7bn}{120e^3(d+ex)^4}+\frac{bn}{180de^3(d+ex)^3} \\ & +\frac{bn}{120d^2e^3(d+ex)^2}+\frac{bn}{60d^3e^3(d+ex)}+\frac{bn\log(x)}{60d^4e^3} \\ & -\frac{d^2(a+b\log(cx^n))}{6e^3(d+ex)^6}+\frac{2d(a+b\log(cx^n))}{5e^3(d+ex)^5} \\ & -\frac{a+b\log(cx^n)}{4e^3(d+ex)^4}-\frac{bn\log(d+ex)}{60d^4e^3}\end{aligned}$$

output
```
1/30*b*d*n/e^3/(e*x+d)^5-7/120*b*n/e^3/(e*x+d)^4+1/180*b*n/d/e^3/(e*x+d)^3
+1/120*b*n/d^2/e^3/(e*x+d)^2+1/60*b*n/d^3/e^3/(e*x+d)+1/60*b*n*ln(x)/d^4/e
^3-1/6*d^2*(a+b*ln(c*x^n))/e^3/(e*x+d)^6+2/5*d*(a+b*ln(c*x^n))/e^3/(e*x+d)
^5-1/4*(a+b*ln(c*x^n))/e^3/(e*x+d)^4-1/60*b*n*ln(e*x+d)/d^4/e^3
```

Mathematica [A] (verified)

Time = 0.24 (sec) , antiderivative size = 192, normalized size of antiderivative = 0.96

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{-60ad^6+144ad^5(d+ex)+12bd^5n(d+ex)-90ad^4(d+ex)^2-21bd^4n(d+ex)^2+2bd^3n(d+ex)^3+3}{}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
(-60*a*d^6 + 144*a*d^5*(d + e*x) + 12*b*d^5*n*(d + e*x) - 90*a*d^4*(d + e*
x)^2 - 21*b*d^4*n*(d + e*x)^2 + 2*b*d^3*n*(d + e*x)^3 + 3*b*d^2*n*(d + e*x
)^4 + 6*b*d*n*(d + e*x)^5 + 6*b*n*(d + e*x)^6*Log[x] - 60*b*d^6*Log[c*x^n]
 + 144*b*d^5*(d + e*x)*Log[c*x^n] - 90*b*d^4*(d + e*x)^2*Log[c*x^n] - 6*b*
n*(d + e*x)^6*Log[d + e*x])/(360*d^4*e^3*(d + e*x)^6)
```

Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 164, normalized size of antiderivative = 0.82, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2782, 27, 1195, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^7}\,dx$$

$$\Big\downarrow \text{2782}$$

$$-bn\int -\frac{d^2+6exd+15e^2x^2}{60e^3x(d+ex)^6}dx-\frac{d^2(a+b\log(cx^n))}{6e^3(d+ex)^6}+\frac{2d(a+b\log(cx^n))}{5e^3(d+ex)^5}-\frac{a+b\log(cx^n)}{4e^3(d+ex)^4}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{d^2+6exd+15e^2x^2}{x(d+ex)^6}dx}{60e^3}-\frac{d^2(a+b\log(cx^n))}{6e^3(d+ex)^6}+\frac{2d(a+b\log(cx^n))}{5e^3(d+ex)^5}-\frac{a+b\log(cx^n)}{4e^3(d+ex)^4}$$

$$\Big\downarrow \text{1195}$$

$$\frac{bn\int\left(-\frac{e}{d^4(d+ex)}-\frac{e}{d^3(d+ex)^2}-\frac{e}{d^2(d+ex)^3}-\frac{e}{d(d+ex)^4}+\frac{14e}{(d+ex)^5}-\frac{10de}{(d+ex)^6}+\frac{1}{d^4x}\right)dx}{60e^3}-\frac{d^2(a+b\log(cx^n))}{6e^3(d+ex)^6}+\frac{2d(a+b\log(cx^n))}{5e^3(d+ex)^5}-\frac{a+b\log(cx^n)}{4e^3(d+ex)^4}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{6e^3(d+ex)^6}+\frac{2d(a+b\log(cx^n))}{5e^3(d+ex)^5}-\frac{a+b\log(cx^n)}{4e^3(d+ex)^4}+\frac{bn\left(-\frac{\log(d+ex)}{d^4}+\frac{\log(x)}{d^4}+\frac{1}{d^3(d+ex)}+\frac{1}{2d^2(d+ex)^2}+\frac{2d}{(d+ex)^5}-\frac{7}{2(d+ex)^4}+\frac{1}{3d(d+ex)^3}\right)}{60e^3}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
-1/6*(d^2*(a + b*Log[c*x^n]))/(e^3*(d + e*x)^6) + (2*d*(a + b*Log[c*x^n]))
/(5*e^3*(d + e*x)^5) - (a + b*Log[c*x^n])/(4*e^3*(d + e*x)^4) + (b*n*((2*d
)/(d + e*x)^5 - 7/(2*(d + e*x)^4) + 1/(3*d*(d + e*x)^3) + 1/(2*d^2*(d + e*
x)^2) + 1/(d^3*(d + e*x)) + Log[x]/d^4 - Log[d + e*x]/d^4))/(60*e^3)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1195
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((f_.) + (g_.)*(x_))^(n_.)*((a_.) + (b_.)*(x
_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(f +
 g*x)^n*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n}, x
] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2782
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_))^(q
_), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x)^q, x]}, Simp[(a + b*Log[c*
x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[
{a, b, c, d, e, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 382 vs. $2(179) = 358$.

Time = 4.09 (sec) , antiderivative size = 383, normalized size of antiderivative = 1.92

method	result
parallelrisch	$\frac{360 \ln(x) x^5 b d e^8 n - 360 \ln(ex+d) x^5 b d e^8 n + 900 \ln(x) x^4 b d^2 e^7 n - 900 \ln(ex+d) x^4 b d^2 e^7 n + 1200 \ln(x) x^3 b d^3 e^6 n - 1200 \ln(ex+}{}$
risch	$-\frac{b(15e^2x^2+6exd+d^2)\ln(x^n)}{60(ex+d)^6 e^3} - \frac{3i\pi b d^6 \operatorname{csgn}(ix^n)\operatorname{csgn}(icx^n)^2 + 3i\pi b d^6 \operatorname{csgn}(icx^n)^2 \operatorname{csgn}(ic) + 90a d^4 e^2 x^2 + 36a d^5 ex + 90}{}$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
1/3600*(360*ln(x)*x^5*b*d*e^8*n-360*ln(e*x+d)*x^5*b*d*e^8*n+900*ln(x)*x^4*
b*d^2*e^7*n-900*ln(e*x+d)*x^4*b*d^2*e^7*n+1200*ln(x)*x^3*b*d^3*e^6*n-1200*
ln(e*x+d)*x^3*b*d^3*e^6*n+900*ln(x)*x^2*b*d^4*e^5*n-900*ln(e*x+d)*x^2*b*d^
4*e^5*n+360*ln(x)*x*b*d^5*e^4*n-360*ln(e*x+d)*x*b*d^5*e^4*n-17*b*d^6*e^3*n
-360*x*a*d^5*e^4-900*x^2*a*d^4*e^5-37*x^6*b*e^9*n-60*ln(c*x^n)*b*d^6*e^3+7
5*x^2*b*d^4*e^5*n-225*x^4*b*d^2*e^7*n-162*x^5*b*d*e^8*n-360*x*ln(c*x^n)*b*
d^5*e^4-900*x^2*ln(c*x^n)*b*d^4*e^5+60*ln(x)*x^6*b*e^9*n-60*ln(e*x+d)*x^6*
b*e^9*n+60*ln(x)*b*d^6*e^3*n-60*ln(e*x+d)*b*d^6*e^3*n-60*a*d^6*e^3-42*x*b*
d^5*e^4*n)/d^4/e^6/(e*x+d)^6
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 333, normalized size of antiderivative = 1.67

$$\int \frac{x^2(a + b\log(cx^n))}{(d + ex)^7}\, dx$$
$$= \frac{6\, bde^5nx^5 + 33\, bd^2e^4nx^4 + 74\, bd^3e^3nx^3 + 2\, bd^6n - 6\, ad^6 + 9\,(7\, bd^4e^2n - 10\, ad^4e^2)x^2 + 18\,(bd^5en - 2\, ad^5}{}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

output
```
1/360*(6*b*d*e^5*n*x^5 + 33*b*d^2*e^4*n*x^4 + 74*b*d^3*e^3*n*x^3 + 2*b*d^6
*n - 6*a*d^6 + 9*(7*b*d^4*e^2*n - 10*a*d^4*e^2)*x^2 + 18*(b*d^5*e*n - 2*a*
d^5*e)*x - 6*(b*e^6*n*x^6 + 6*b*d*e^5*n*x^5 + 15*b*d^2*e^4*n*x^4 + 20*b*d^
3*e^3*n*x^3 + 15*b*d^4*e^2*n*x^2 + 6*b*d^5*e*n*x + b*d^6*n)*log(e*x + d) -
 6*(15*b*d^4*e^2*x^2 + 6*b*d^5*e*x + b*d^6)*log(c) + 6*(b*e^6*n*x^6 + 6*b*
d*e^5*n*x^5 + 15*b*d^2*e^4*n*x^4 + 20*b*d^3*e^3*n*x^3)*log(x))/(d^4*e^9*x^
6 + 6*d^5*e^8*x^5 + 15*d^6*e^7*x^4 + 20*d^7*e^6*x^3 + 15*d^8*e^5*x^2 + 6*d
^9*e^4*x + d^10*e^3)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1986 vs. $2(194) = 388$.

Time = 88.34 (sec) , antiderivative size = 1986, normalized size of antiderivative = 9.98

$$\int \frac{x^2(a + b\log(cx^n))}{(d+ex)^7}\,dx = \text{Too large to display}$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

output
```
Piecewise((zoo*(-a/(4*x**4) - b*n/(16*x**4) - b*log(c*x**n)/(4*x**4)), Eq(
d, 0) & Eq(e, 0)), ((a*x**3/3 - b*n*x**3/9 + b*x**3*log(c*x**n)/3)/d**7, E
q(e, 0)), ((-a/(4*x**4) - b*n/(16*x**4) - b*log(c*x**n)/(4*x**4))/e**7, Eq
(d, 0)), (-6*a*d**6/(360*d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x*
*2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 + 360
*d**4*e**9*x**6) - 36*a*d**5*e*x/(360*d**10*e**3 + 2160*d**9*e**4*x + 5400
*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 + 2160*d**5*e*
*8*x**5 + 360*d**4*e**9*x**6) - 90*a*d**4*e**2*x**2/(360*d**10*e**3 + 2160
*d**9*e**4*x + 5400*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7*
x**4 + 2160*d**5*e**8*x**5 + 360*d**4*e**9*x**6) - 6*b*d**6*n*log(d/e + x)
/(360*d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x**2 + 7200*d**7*e**6
*x**3 + 5400*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 + 360*d**4*e**9*x**6) +
2*b*d**6*n/(360*d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x**2 + 7200
*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 + 360*d**4*e**
9*x**6) - 36*b*d**5*e*n*x*log(d/e + x)/(360*d**10*e**3 + 2160*d**9*e**4*x
+ 5400*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 + 2160*d
**5*e**8*x**5 + 360*d**4*e**9*x**6) + 18*b*d**5*e*n*x/(360*d**10*e**3 + 21
60*d**9*e**4*x + 5400*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**
7*x**4 + 2160*d**5*e**8*x**5 + 360*d**4*e**9*x**6) - 90*b*d**4*e**2*n*x**2
*log(d/e + x)/(360*d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x**2 ...
```

Maxima [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 316, normalized size of antiderivative = 1.59

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{1}{360}\,bn\left(\frac{6\,e^4x^4+27\,de^3x^3+47\,d^2e^2x^2+16\,d^3ex+2\,d^4}{d^3e^8x^5+5\,d^4e^7x^4+10\,d^5e^6x^3+10\,d^6e^5x^2+5\,d^7e^4x+d^8e^3}-\frac{6\,\log(ex+d)}{d^4e^3}+\frac{6\,\log(x)}{d^4e^3}\right)$$
$$-\frac{(15\,e^2x^2+6\,dex+d^2)b\log(cx^n)}{60\,(e^9x^6+6\,de^8x^5+15\,d^2e^7x^4+20\,d^3e^6x^3+15\,d^4e^5x^2+6\,d^5e^4x+d^6e^3)}$$
$$-\frac{(15\,e^2x^2+6\,dex+d^2)a}{60\,(e^9x^6+6\,de^8x^5+15\,d^2e^7x^4+20\,d^3e^6x^3+15\,d^4e^5x^2+6\,d^5e^4x+d^6e^3)}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

output
```
1/360*b*n*((6*e^4*x^4 + 27*d*e^3*x^3 + 47*d^2*e^2*x^2 + 16*d^3*e*x + 2*d^4
)/(d^3*e^8*x^5 + 5*d^4*e^7*x^4 + 10*d^5*e^6*x^3 + 10*d^6*e^5*x^2 + 5*d^7*e
^4*x + d^8*e^3) - 6*log(e*x + d)/(d^4*e^3) + 6*log(x)/(d^4*e^3)) - 1/60*(1
5*e^2*x^2 + 6*d*e*x + d^2)*b*log(c*x^n)/(e^9*x^6 + 6*d*e^8*x^5 + 15*d^2*e^
7*x^4 + 20*d^3*e^6*x^3 + 15*d^4*e^5*x^2 + 6*d^5*e^4*x + d^6*e^3) - 1/60*(1
5*e^2*x^2 + 6*d*e*x + d^2)*a/(e^9*x^6 + 6*d*e^8*x^5 + 15*d^2*e^7*x^4 + 20*
d^3*e^6*x^3 + 15*d^4*e^5*x^2 + 6*d^5*e^4*x + d^6*e^3)
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 322, normalized size of antiderivative = 1.62

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= -\frac{(15\,be^2nx^2+6\,bdenx+bd^2n)\log(x)}{60\,(e^9x^6+6\,de^8x^5+15\,d^2e^7x^4+20\,d^3e^6x^3+15\,d^4e^5x^2+6\,d^5e^4x+d^6e^3)}$$
$$+\frac{6\,be^5nx^5+33\,bde^4nx^4+74\,bd^2e^3nx^3+63\,bd^3e^2nx^2-90\,bd^3e^2x^2\log(c)+18\,bd^4enx-90\,ad^3e^2x^2-3}{360\,(d^3e^9x^6+6\,d^4e^8x^5+15\,d^5e^7x^4+20\,d^6e^6x^3+15\,d^7e^5x^2+}$$
$$-\frac{bn\log(ex+d)}{60\,d^4e^3}+\frac{bn\log(x)}{60\,d^4e^3}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

output
```
-1/60*(15*b*e^2*n*x^2 + 6*b*d*e*n*x + b*d^2*n)*log(x)/(e^9*x^6 + 6*d*e^8*x
^5 + 15*d^2*e^7*x^4 + 20*d^3*e^6*x^3 + 15*d^4*e^5*x^2 + 6*d^5*e^4*x + d^6*
e^3) + 1/360*(6*b*e^5*n*x^5 + 33*b*d*e^4*n*x^4 + 74*b*d^2*e^3*n*x^3 + 63*b
*d^3*e^2*n*x^2 - 90*b*d^3*e^2*x^2*log(c) + 18*b*d^4*e*n*x - 90*a*d^3*e^2*x
^2 - 36*b*d^4*e*x*log(c) + 2*b*d^5*n - 36*a*d^4*e*x - 6*b*d^5*log(c) - 6*a
*d^5)/(d^3*e^9*x^6 + 6*d^4*e^8*x^5 + 15*d^5*e^7*x^4 + 20*d^6*e^6*x^3 + 15*
d^7*e^5*x^2 + 6*d^8*e^4*x + d^9*e^3) - 1/60*b*n*log(e*x + d)/(d^4*e^3) + 1
/60*b*n*log(x)/(d^4*e^3)
```

Mupad [B] (verification not implemented)

Time = 26.06 (sec) , antiderivative size = 275, normalized size of antiderivative = 1.38

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{\frac{b\,d^2\,n}{3}-a\,d^2-x\,(6\,a\,d\,e-3\,b\,d\,e\,n)-x^2\left(15\,a\,e^2-\frac{21\,b\,e^2\,n}{2}\right)+\frac{37\,b\,e^3\,n\,x^3}{3\,d}+\frac{11\,b\,e^4\,n\,x^4}{2\,d^2}+\frac{b\,e^5\,n\,x^5}{d^3}}{60\,d^6\,e^3+360\,d^5\,e^4\,x+900\,d^4\,e^5\,x^2+1200\,d^3\,e^6\,x^3+900\,d^2\,e^7\,x^4+360\,d\,e^8\,x^5+60\,e^9\,x^6}$$
$$-\frac{\ln(c\,x^n)\,\left(\frac{b\,d^2}{60\,e^3}+\frac{b\,x^2}{4\,e}+\frac{b\,d\,x}{10\,e^2}\right)}{d^6+6\,d^5\,e\,x+15\,d^4\,e^2\,x^2+20\,d^3\,e^3\,x^3+15\,d^2\,e^4\,x^4+6\,d\,e^5\,x^5+e^6\,x^6}$$
$$-\frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{30\,d^4\,e^3}$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

output
```
((b*d^2*n)/3 - a*d^2 - x*(6*a*d*e - 3*b*d*e*n) - x^2*(15*a*e^2 - (21*b*e^2
*n)/2) + (37*b*e^3*n*x^3)/(3*d) + (11*b*e^4*n*x^4)/(2*d^2) + (b*e^5*n*x^5)
/d^3)/(60*d^6*e^3 + 60*e^9*x^6 + 360*d^5*e^4*x + 360*d*e^8*x^5 + 900*d^4*e
^5*x^2 + 1200*d^3*e^6*x^3 + 900*d^2*e^7*x^4) - (log(c*x^n)*((b*d^2)/(60*e^
3) + (b*x^2)/(4*e) + (b*d*x)/(10*e^2)))/(d^6 + e^6*x^6 + 6*d*e^5*x^5 + 15*
d^4*e^2*x^2 + 20*d^3*e^3*x^3 + 15*d^2*e^4*x^4 + 6*d^5*e*x) - (b*n*atanh((2
*e*x)/d + 1))/(30*d^4*e^3)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 346, normalized size of antiderivative = 1.74

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{-6\log(ex+d)\,b\,d^6n-36\log(ex+d)\,b\,d^5enx-90\log(ex+d)\,b\,d^4e^2n\,x^2-120\log(ex+d)\,b\,d^3e^3n\,x^3-}{}$$

input
```
int(x^2*(a+b*log(c*x^n))/(e*x+d)^7,x)
```

output
```
( - 6*log(d + e*x)*b*d**6*n - 36*log(d + e*x)*b*d**5*e*n*x - 90*log(d + e*
x)*b*d**4*e**2*n*x**2 - 120*log(d + e*x)*b*d**3*e**3*n*x**3 - 90*log(d + e
*x)*b*d**2*e**4*n*x**4 - 36*log(d + e*x)*b*d*e**5*n*x**5 - 6*log(d + e*x)*
b*e**6*n*x**6 + 120*log(x**n*c)*b*d**3*e**3*x**3 + 90*log(x**n*c)*b*d**2*e
**4*x**4 + 36*log(x**n*c)*b*d*e**5*x**5 + 6*log(x**n*c)*b*e**6*x**6 - 6*a*
d**6 - 36*a*d**5*e*x - 90*a*d**4*e**2*x**2 + b*d**6*n + 12*b*d**5*e*n*x +
48*b*d**4*e**2*n*x**2 + 54*b*d**3*e**3*n*x**3 + 18*b*d**2*e**4*n*x**4 - b*
e**6*n*x**6)/(360*d**4*e**3*(d**6 + 6*d**5*e*x + 15*d**4*e**2*x**2 + 20*d*
*3*e**3*x**3 + 15*d**2*e**4*x**4 + 6*d*e**5*x**5 + e**6*x**6))
```

3.69 $\int \frac{x(a+b\log(cx^n))}{(d+ex)^7}\,dx$

Optimal result 652
Mathematica [A] (verified) 653
Rubi [A] (verified) 653
Maple [B] (verified) 655
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Sympy [B] (verification not implemented) 656
Maxima [A] (verification not implemented) 657
Giac [A] (verification not implemented) 658
Mupad [B] (verification not implemented) 659
Reduce [B] (verification not implemented) 659

Optimal result

Integrand size = 19, antiderivative size = 174

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^7}\,dx = -\frac{bn}{30e^2(d+ex)^5} + \frac{bn}{120de^2(d+ex)^4} + \frac{bn}{90d^2e^2(d+ex)^3} + \frac{bn}{60d^3e^2(d+ex)^2} + \frac{bn}{30d^4e^2(d+ex)} + \frac{bn\log(x)}{30d^5e^2} + \frac{d(a+b\log(cx^n))}{6e^2(d+ex)^6} - \frac{a+b\log(cx^n)}{5e^2(d+ex)^5} - \frac{bn\log(d+ex)}{30d^5e^2}$$

output
```
-1/30*b*n/e^2/(e*x+d)^5+1/120*b*n/d/e^2/(e*x+d)^4+1/90*b*n/d^2/e^2/(e*x+d)
^3+1/60*b*n/d^3/e^2/(e*x+d)^2+1/30*b*n/d^4/e^2/(e*x+d)+1/30*b*n*ln(x)/d^5/
e^2+1/6*d*(a+b*ln(c*x^n))/e^2/(e*x+d)^6-1/5*(a+b*ln(c*x^n))/e^2/(e*x+d)^5-
1/30*b*n*ln(e*x+d)/d^5/e^2
```

Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 160, normalized size of antiderivative = 0.92

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^7}\,dx = \frac{60ad^6-72ad^5(d+ex)-12bd^5n(d+ex)+3bd^4n(d+ex)^2+4bd^3n(d+ex)^3+6bd^2n(d+ex)^4+12bdn}{360d^5e^2}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
(60*a*d^6 - 72*a*d^5*(d + e*x) - 12*b*d^5*n*(d + e*x) + 3*b*d^4*n*(d + e*x
)^2 + 4*b*d^3*n*(d + e*x)^3 + 6*b*d^2*n*(d + e*x)^4 + 12*b*d*n*(d + e*x)^5
 + 12*b*n*(d + e*x)^6*Log[x] + 60*b*d^6*Log[c*x^n] - 72*b*d^5*(d + e*x)*Lo
g[c*x^n] - 12*b*n*(d + e*x)^6*Log[d + e*x])/(360*d^5*e^2*(d + e*x)^6)
```

Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 139, normalized size of antiderivative = 0.80, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.211$, Rules used = {2782, 27, 86, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^7}\,dx$$

$$\Big\downarrow \text{2782}$$

$$-bn\int -\frac{d+6ex}{30e^2x(d+ex)^6}dx-\frac{a+b\log(cx^n)}{5e^2(d+ex)^5}+\frac{d(a+b\log(cx^n))}{6e^2(d+ex)^6}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{d+6ex}{x(d+ex)^6}dx}{30e^2}-\frac{a+b\log(cx^n)}{5e^2(d+ex)^5}+\frac{d(a+b\log(cx^n))}{6e^2(d+ex)^6}$$

$$\Big\downarrow \text{86}$$

$$\frac{bn\int\left(-\frac{e}{d^5(d+ex)}-\frac{e}{d^4(d+ex)^2}-\frac{e}{d^3(d+ex)^3}-\frac{e}{d^2(d+ex)^4}-\frac{e}{d(d+ex)^5}+\frac{5e}{(d+ex)^6}+\frac{1}{d^5x}\right)dx}{30e^2}-\frac{a+b\log(cx^n)}{5e^2(d+ex)^5}+\frac{d(a+b\log(cx^n))}{6e^2(d+ex)^6}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{a+b\log(cx^n)}{5e^2(d+ex)^5}+\frac{d(a+b\log(cx^n))}{6e^2(d+ex)^6}+\frac{bn\left(-\frac{\log(d+ex)}{d^5}+\frac{\log(x)}{d^5}+\frac{1}{d^4(d+ex)}+\frac{1}{2d^3(d+ex)^2}+\frac{1}{3d^2(d+ex)^3}+\frac{1}{4d(d+ex)^4}-\frac{1}{(d+ex)^5}\right)}{30e^2}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
(d*(a + b*Log[c*x^n]))/(6*e^2*(d + e*x)^6) - (a + b*Log[c*x^n])/(5*e^2*(d
+ e*x)^5) + (b*n*(-(d + e*x)^(-5) + 1/(4*d*(d + e*x)^4) + 1/(3*d^2*(d + e*
x)^3) + 1/(2*d^3*(d + e*x)^2) + 1/(d^4*(d + e*x)) + Log[x]/d^5 - Log[d + e
*x]/d^5))/(30*e^2)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 86
```
Int[((a_.) + (b_.)*(x_))*((c_) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p_
.), x_] :> Int[ExpandIntegrand[(a + b*x)*(c + d*x)^n*(e + f*x)^p, x], x] /;
 FreeQ[{a, b, c, d, e, f, n}, x] && ((ILtQ[n, 0] && ILtQ[p, 0]) || EqQ[p, 1
] || (IGtQ[p, 0] && ( !IntegerQ[n] || LeQ[9*p + 5*(n + 2), 0] || GeQ[n + p
+ 1, 0] || (GeQ[n + p + 2, 0] && RationalQ[a, b, c, d, e, f]))))
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2782
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_))^(q
_), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x)^q, x]}, Simp[(a + b*Log[c*
x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[
{a, b, c, d, e, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 403 vs. 2(156) = 312.

Time = 4.03 (sec) , antiderivative size = 404, normalized size of antiderivative = 2.32

method	result
parallelrisch	$\frac{240x^3 a d^4 e^7+180x^4 a d^3 e^8+72x^5 a d^2 e^9+12x^6 a d e^{10}-12\ln(c x^n) b d^7 e^4+180\ln(x) x^2 b d^5 e^6 n-180\ln(ex+d) x^2 b d^5 e^6 n+72\ln(}{}$
risch	$-\frac{b(6ex+d)\ln(x^n)}{30(ex+d)^6 e^2}-\frac{6i\pi b d^6 \operatorname{csgn}(ix^n)\operatorname{csgn}(icx^n)^2+6i\pi b d^6 \operatorname{csgn}(icx^n)^2\operatorname{csgn}(ic)+72a d^5 ex+180\ln(ex+d) b d^2 e^4 n x^4-1}{}$

input
```
int(x*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
1/360*(240*x^3*a*d^4*e^7+180*x^4*a*d^3*e^8+72*x^5*a*d^2*e^9+12*x^6*a*d*e^1
0-12*ln(c*x^n)*b*d^7*e^4+180*ln(x)*x^2*b*d^5*e^6*n-180*ln(e*x+d)*x^2*b*d^5
*e^6*n+72*ln(x)*x*b*d^6*e^5*n-72*ln(e*x+d)*x*b*d^6*e^5*n+12*ln(x)*x^6*b*d*
e^10*n-12*ln(e*x+d)*x^6*b*d*e^10*n+72*ln(x)*x^5*b*d^2*e^9*n-72*ln(e*x+d)*x
^5*b*d^2*e^9*n+180*ln(x)*x^4*b*d^3*e^8*n-180*ln(e*x+d)*x^4*b*d^3*e^8*n+240
*ln(x)*x^3*b*d^4*e^7*n-240*ln(e*x+d)*x^3*b*d^4*e^7*n+180*x^2*a*d^5*e^6+12*
x*b*d^6*e^5*n-24*x^2*b*d^5*e^6*n-112*x^3*b*d^4*e^7*n-129*x^4*b*d^3*e^8*n-6
6*x^5*b*d^2*e^9*n-13*x^6*b*d*e^10*n-72*x*ln(c*x^n)*b*d^6*e^5+12*ln(x)*b*d^
7*e^4*n-12*ln(e*x+d)*b*d^7*e^4*n)/e^6/d^6/(e*x+d)^6
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 323 vs. 2(156) = 312.

Time = 0.09 (sec) , antiderivative size = 323, normalized size of antiderivative = 1.86

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{12\,bde^5nx^5+66\,bd^2e^4nx^4+148\,bd^3e^3nx^3+171\,bd^4e^2nx^2+13\,bd^6n-12\,ad^6+18\,(5\,bd^5en-4\,ad^5e)x-}{}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

output
```
1/360*(12*b*d*e^5*n*x^5 + 66*b*d^2*e^4*n*x^4 + 148*b*d^3*e^3*n*x^3 + 171*b
*d^4*e^2*n*x^2 + 13*b*d^6*n - 12*a*d^6 + 18*(5*b*d^5*e*n - 4*a*d^5*e)*x -
12*(b*e^6*n*x^6 + 6*b*d*e^5*n*x^5 + 15*b*d^2*e^4*n*x^4 + 20*b*d^3*e^3*n*x^
3 + 15*b*d^4*e^2*n*x^2 + 6*b*d^5*e*n*x + b*d^6*n)*log(e*x + d) - 12*(6*b*d
^5*e*x + b*d^6)*log(c) + 12*(b*e^6*n*x^6 + 6*b*d*e^5*n*x^5 + 15*b*d^2*e^4*
n*x^4 + 20*b*d^3*e^3*n*x^3 + 15*b*d^4*e^2*n*x^2)*log(x))/(d^5*e^8*x^6 + 6*
d^6*e^7*x^5 + 15*d^7*e^6*x^4 + 20*d^8*e^5*x^3 + 15*d^9*e^4*x^2 + 6*d^10*e^
3*x + d^11*e^2)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1992 vs. $2(167) = 334$.

Time = 93.34 (sec) , antiderivative size = 1992, normalized size of antiderivative = 11.45

$$\int \frac{x(a + b\log(cx^n))}{(d + ex)^7}\,dx = \text{Too large to display}$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

output
```
Piecewise((zoo*(-a/(5*x**5) - b*n/(25*x**5) - b*log(c*x**n)/(5*x**5)), Eq(
d, 0) & Eq(e, 0)), ((a*x**2/2 - b*n*x**2/4 + b*x**2*log(c*x**n)/2)/d**7, E
q(e, 0)), ((-a/(5*x**5) - b*n/(25*x**5) - b*log(c*x**n)/(5*x**5))/e**7, Eq
(d, 0)), (-12*a*d**6/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400*d**9*e**4*
x**2 + 7200*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x**5 + 3
60*d**5*e**8*x**6) - 72*a*d**5*e*x/(360*d**11*e**2 + 2160*d**10*e**3*x + 5
400*d**9*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6
*e**7*x**5 + 360*d**5*e**8*x**6) - 12*b*d**6*n*log(d/e + x)/(360*d**11*e**
2 + 2160*d**10*e**3*x + 5400*d**9*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*d
**7*e**6*x**4 + 2160*d**6*e**7*x**5 + 360*d**5*e**8*x**6) + 13*b*d**6*n/(3
60*d**11*e**2 + 2160*d**10*e**3*x + 5400*d**9*e**4*x**2 + 7200*d**8*e**5*x
**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x**5 + 360*d**5*e**8*x**6) - 72
*b*d**5*e*n*x*log(d/e + x)/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400*d**9
*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x*
*5 + 360*d**5*e**8*x**6) + 90*b*d**5*e*n*x/(360*d**11*e**2 + 2160*d**10*e*
*3*x + 5400*d**9*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2
160*d**6*e**7*x**5 + 360*d**5*e**8*x**6) - 180*b*d**4*e**2*n*x**2*log(d/e
+ x)/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400*d**9*e**4*x**2 + 7200*d**8
*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x**5 + 360*d**5*e**8*x**
6) + 171*b*d**4*e**2*n*x**2/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400*...
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 294, normalized size of antiderivative = 1.69

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{1}{360}\,bn\left(\frac{12\,e^4x^4+54\,de^3x^3+94\,d^2e^2x^2+77\,d^3ex+13\,d^4}{d^4e^7x^5+5\,d^5e^6x^4+10\,d^6e^5x^3+10\,d^7e^4x^2+5\,d^8e^3x+d^9e^2}-\frac{12\,\log(ex+d)}{d^5e^2}+\frac{12\,\log(x)}{d^5e^2}\right)$$
$$-\frac{(6\,ex+d)b\log(cx^n)}{30\,(e^8x^6+6\,de^7x^5+15\,d^2e^6x^4+20\,d^3e^5x^3+15\,d^4e^4x^2+6\,d^5e^3x+d^6e^2)}$$
$$-\frac{(6\,ex+d)a}{30\,(e^8x^6+6\,de^7x^5+15\,d^2e^6x^4+20\,d^3e^5x^3+15\,d^4e^4x^2+6\,d^5e^3x+d^6e^2)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

output
```
1/360*b*n*((12*e^4*x^4 + 54*d*e^3*x^3 + 94*d^2*e^2*x^2 + 77*d^3*e*x + 13*d
^4)/(d^4*e^7*x^5 + 5*d^5*e^6*x^4 + 10*d^6*e^5*x^3 + 10*d^7*e^4*x^2 + 5*d^8
*e^3*x + d^9*e^2) - 12*log(e*x + d)/(d^5*e^2) + 12*log(x)/(d^5*e^2)) - 1/3
0*(6*e*x + d)*b*log(c*x^n)/(e^8*x^6 + 6*d*e^7*x^5 + 15*d^2*e^6*x^4 + 20*d^
3*e^5*x^3 + 15*d^4*e^4*x^2 + 6*d^5*e^3*x + d^6*e^2) - 1/30*(6*e*x + d)*a/(
e^8*x^6 + 6*d*e^7*x^5 + 15*d^2*e^6*x^4 + 20*d^3*e^5*x^3 + 15*d^4*e^4*x^2 +
 6*d^5*e^3*x + d^6*e^2)
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 283, normalized size of antiderivative = 1.63

$$\int \frac{x(a + b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= -\frac{(6\,benx + bdn)\log(x)}{30\,(e^8x^6 + 6\,de^7x^5 + 15\,d^2e^6x^4 + 20\,d^3e^5x^3 + 15\,d^4e^4x^2 + 6\,d^5e^3x + d^6e^2)} + \frac{12\,be^5nx^5 + 66\,bde^4nx^4 + 148\,bd^2e^3nx^3 + 171\,bd^3e^2nx^2 + 90\,bd^4enx - 72\,bd^4ex\log(c) + 13\,bd^5n - 72}{360\,(d^4e^8x^6 + 6\,d^5e^7x^5 + 15\,d^6e^6x^4 + 20\,d^7e^5x^3 + 15\,d^8e^4x^2 + 6\,d^9e^3x + d^{10}} - \frac{bn\log(ex+d)}{30\,d^5e^2} + \frac{bn\log(x)}{30\,d^5e^2}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

output
```
-1/30*(6*b*e*n*x + b*d*n)*log(x)/(e^8*x^6 + 6*d*e^7*x^5 + 15*d^2*e^6*x^4 +
 20*d^3*e^5*x^3 + 15*d^4*e^4*x^2 + 6*d^5*e^3*x + d^6*e^2) + 1/360*(12*b*e^
5*n*x^5 + 66*b*d*e^4*n*x^4 + 148*b*d^2*e^3*n*x^3 + 171*b*d^3*e^2*n*x^2 + 9
0*b*d^4*e*n*x - 72*b*d^4*e*x*log(c) + 13*b*d^5*n - 72*a*d^4*e*x - 12*b*d^5
*log(c) - 12*a*d^5)/(d^4*e^8*x^6 + 6*d^5*e^7*x^5 + 15*d^6*e^6*x^4 + 20*d^7
*e^5*x^3 + 15*d^8*e^4*x^2 + 6*d^9*e^3*x + d^10*e^2) - 1/30*b*n*log(e*x + d
)/(d^5*e^2) + 1/30*b*n*log(x)/(d^5*e^2)
```

Mupad [B] (verification not implemented)

Time = 26.09 (sec) , antiderivative size = 251, normalized size of antiderivative = 1.44

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^7}\,dx = \frac{\frac{13\,b\,d\,n}{12}-x\left(6\,a\,e-\frac{15\,b\,e\,n}{2}\right)-a\,d+\frac{57\,b\,e^2\,n\,x^2}{4\,d}+\frac{37\,b\,e^3\,n\,x^3}{3\,d^2}+\frac{11\,b\,e^4\,n\,x^4}{2\,d^3}+\frac{b\,e^5\,n\,x^5}{d^4}}{30\,d^6\,e^2+180\,d^5\,e^3\,x+450\,d^4\,e^4\,x^2+600\,d^3\,e^5\,x^3+450\,d^2\,e^6\,x^4+180\,d\,e^7\,x^5+30\,e^8\,x^6} - \frac{\ln(c\,x^n)\,\left(\frac{b\,d}{30\,e^2}+\frac{b\,x}{5\,e}\right)}{d^6+6\,d^5\,e\,x+15\,d^4\,e^2\,x^2+20\,d^3\,e^3\,x^3+15\,d^2\,e^4\,x^4+6\,d\,e^5\,x^5+e^6\,x^6} - \frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{15\,d^5\,e^2}$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

output
```
((13*b*d*n)/12 - x*(6*a*e - (15*b*e*n)/2) - a*d + (57*b*e^2*n*x^2)/(4*d) +
 (37*b*e^3*n*x^3)/(3*d^2) + (11*b*e^4*n*x^4)/(2*d^3) + (b*e^5*n*x^5)/d^4)/
(30*d^6*e^2 + 30*e^8*x^6 + 180*d^5*e^3*x + 180*d*e^7*x^5 + 450*d^4*e^4*x^2
 + 600*d^3*e^5*x^3 + 450*d^2*e^6*x^4) - (log(c*x^n)*((b*d)/(30*e^2) + (b*x
)/(5*e)))/(d^6 + e^6*x^6 + 6*d*e^5*x^5 + 15*d^4*e^2*x^2 + 20*d^3*e^3*x^3 +
 15*d^2*e^4*x^4 + 6*d^5*e*x) - (b*n*atanh((2*e*x)/d + 1))/(15*d^5*e^2)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 353, normalized size of antiderivative = 2.03

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^7}\,dx = \frac{-12\log(ex+d)\,b\,d^6n-72\log(ex+d)\,b\,d^5enx-180\log(ex+d)\,b\,d^4e^2n\,x^2-240\log(ex+d)\,b\,d^3e^3n\,x^3}{}$$

input
```
int(x*(a+b*log(c*x^n))/(e*x+d)^7,x)
```

output
```
( - 12*log(d + e*x)*b*d**6*n - 72*log(d + e*x)*b*d**5*e*n*x - 180*log(d +
e*x)*b*d**4*e**2*n*x**2 - 240*log(d + e*x)*b*d**3*e**3*n*x**3 - 180*log(d
+ e*x)*b*d**2*e**4*n*x**4 - 72*log(d + e*x)*b*d*e**5*n*x**5 - 12*log(d + e
*x)*b*e**6*n*x**6 + 180*log(x**n*c)*b*d**4*e**2*x**2 + 240*log(x**n*c)*b*d
**3*e**3*x**3 + 180*log(x**n*c)*b*d**2*e**4*x**4 + 72*log(x**n*c)*b*d*e**5
*x**5 + 12*log(x**n*c)*b*e**6*x**6 - 12*a*d**6 - 72*a*d**5*e*x + 11*b*d**6
*n + 78*b*d**5*e*n*x + 141*b*d**4*e**2*n*x**2 + 108*b*d**3*e**3*n*x**3 + 3
6*b*d**2*e**4*n*x**4 - 2*b*e**6*n*x**6)/(360*d**5*e**2*(d**6 + 6*d**5*e*x
+ 15*d**4*e**2*x**2 + 20*d**3*e**3*x**3 + 15*d**2*e**4*x**4 + 6*d*e**5*x**
5 + e**6*x**6))
```

3.70 $\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx$

Optimal result 661
Mathematica [A] (verified) 661
Rubi [A] (verified) 662
Maple [B] (verified) 663
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Sympy [B] (verification not implemented) 665
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Giac [A] (verification not implemented) 666
Mupad [B] (verification not implemented) 667
Reduce [B] (verification not implemented) 668

Optimal result

Integrand size = 18, antiderivative size = 152

$$\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx = \frac{bn}{30de(d+ex)^5}+\frac{bn}{24d^2e(d+ex)^4}+\frac{bn}{18d^3e(d+ex)^3}+\frac{bn}{12d^4e(d+ex)^2}+\frac{bn}{6d^5e(d+ex)}+\frac{bn\log(x)}{6d^6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}-\frac{bn\log(d+ex)}{6d^6e}$$

output
```
1/30*b*n/d/e/(e*x+d)^5+1/24*b*n/d^2/e/(e*x+d)^4+1/18*b*n/d^3/e/(e*x+d)^3+1
/12*b*n/d^4/e/(e*x+d)^2+1/6*b*n/d^5/e/(e*x+d)+1/6*b*n*ln(x)/d^6/e-1/6*(a+b
*ln(c*x^n))/e/(e*x+d)^6-1/6*b*n*ln(e*x+d)/d^6/e
```

Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 99, normalized size of antiderivative = 0.65

$$\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx = \frac{-\frac{a+b\log(cx^n)}{(d+ex)^6}+\frac{bn\left(\frac{d(137d^4+385d^3ex+470d^2e^2x^2+270de^3x^3+60e^4x^4)}{(d+ex)^5}+60\log(x)-60\log(d+ex)\right)}{60d^6}}{6e}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x)^7,x]
```

output
```
(-((a + b*Log[c*x^n])/(d + e*x)^6) + (b*n*((d*(137*d^4 + 385*d^3*e*x + 470
*d^2*e^2*x^2 + 270*d*e^3*x^3 + 60*e^4*x^4))/(d + e*x)^5 + 60*Log[x] - 60*L
og[d + e*x]))/(60*d^6))/(6*e)
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 119, normalized size of antiderivative = 0.78, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {2756, 54, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx$$

$$\Big\downarrow \ 2756$$

$$\frac{bn\int \frac{1}{x(d+ex)^6}dx}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}$$

$$\Big\downarrow \ 54$$

$$\frac{bn\int \left(-\frac{e}{d^6(d+ex)}-\frac{e}{d^5(d+ex)^2}-\frac{e}{d^4(d+ex)^3}-\frac{e}{d^3(d+ex)^4}-\frac{e}{d^2(d+ex)^5}-\frac{e}{d(d+ex)^6}+\frac{1}{d^6x}\right)dx}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}$$

$$\Big\downarrow \ 2009$$

$$\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x)^7,x]
```

output
```
-1/6*(a + b*Log[c*x^n])/(e*(d + e*x)^6) + (b*n*(1/(5*d*(d + e*x)^5) + 1/(4
*d^2*(d + e*x)^4) + 1/(3*d^3*(d + e*x)^3) + 1/(2*d^4*(d + e*x)^2) + 1/(d^5
*(d + e*x)) + Log[x]/d^6 - Log[d + e*x]/d^6))/(6*e)
```

Defintions of rubi rules used

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 385 vs. $2(136) = 272$.

Time = 4.09 (sec) , antiderivative size = 386, normalized size of antiderivative = 2.54

method	result
parallelrisch	$\frac{-300xb\,d^5e^6n+360\ln(x)xb\,d^5e^6n-360\ln(ex+d)xb\,d^5e^6n+360\ln(x)x^5bd\,e^{10}n-360\ln(ex+d)x^5bd\,e^{10}n+900\ln(x)x^4b\,d^2e^9n}{}$
risch	$-\frac{b\ln(x^n)}{6e(ex+d)^6}-\frac{30i\pi b\,d^6\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2+30i\pi b\,d^6\,\mathrm{csgn}(ic\,x^n)^2\,\mathrm{csgn}(ic)+900\ln(ex+d)b\,d^2e^4n\,x^4-60\ln(-x)b\,e^6n}{}$

input
```
int((a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
1/360*(-300*x*b*d^5*e^6*n+360*ln(x)*x*b*d^5*e^6*n-360*ln(e*x+d)*x*b*d^5*e^
6*n+360*ln(x)*x^5*b*d*e^10*n-360*ln(e*x+d)*x^5*b*d*e^10*n+900*ln(x)*x^4*b*
d^2*e^9*n+60*ln(x)*b*d^6*e^5*n-60*ln(e*x+d)*b*d^6*e^5*n-1200*x^2*b*d^4*e^7
*n-762*x^5*b*d*e^10*n-1725*x^4*b*d^2*e^9*n-2000*x^3*b*d^3*e^8*n-137*x^6*b*
e^11*n-900*ln(e*x+d)*x^4*b*d^2*e^9*n+1200*ln(x)*x^3*b*d^3*e^8*n-1200*ln(e*
x+d)*x^3*b*d^3*e^8*n+900*ln(x)*x^2*b*d^4*e^7*n-900*ln(e*x+d)*x^2*b*d^4*e^7
*n-60*ln(c*x^n)*b*d^6*e^5+900*x^2*a*d^4*e^7+1200*x^3*a*d^3*e^8+900*x^4*a*d
^2*e^9+360*x^5*a*d*e^10+360*x*a*d^5*e^6+60*ln(x)*x^6*b*e^11*n-60*ln(e*x+d)
*x^6*b*e^11*n+60*x^6*a*e^11)/e^6/d^6/(e*x+d)^6
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 310 vs. $2(136) = 272$.

Time = 0.09 (sec) , antiderivative size = 310, normalized size of antiderivative = 2.04

$$\int \frac{a + b\log(cx^n)}{(d + ex)^7}\,dx$$
$$= \frac{60\,bde^5nx^5 + 330\,bd^2e^4nx^4 + 740\,bd^3e^3nx^3 + 855\,bd^4e^2nx^2 + 522\,bd^5enx + 137\,bd^6n - 60\,bd^6\log(c) - 60}{}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

output
```
1/360*(60*b*d*e^5*n*x^5 + 330*b*d^2*e^4*n*x^4 + 740*b*d^3*e^3*n*x^3 + 855*
b*d^4*e^2*n*x^2 + 522*b*d^5*e*n*x + 137*b*d^6*n - 60*b*d^6*log(c) - 60*a*d
^6 - 60*(b*e^6*n*x^6 + 6*b*d*e^5*n*x^5 + 15*b*d^2*e^4*n*x^4 + 20*b*d^3*e^3
*n*x^3 + 15*b*d^4*e^2*n*x^2 + 6*b*d^5*e*n*x + b*d^6*n)*log(e*x + d) + 60*(
b*e^6*n*x^6 + 6*b*d*e^5*n*x^5 + 15*b*d^2*e^4*n*x^4 + 20*b*d^3*e^3*n*x^3 +
15*b*d^4*e^2*n*x^2 + 6*b*d^5*e*n*x)*log(x))/(d^6*e^7*x^6 + 6*d^7*e^6*x^5 +
 15*d^8*e^5*x^4 + 20*d^9*e^4*x^3 + 15*d^10*e^3*x^2 + 6*d^11*e^2*x + d^12*e
)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1955 vs. $2(133) = 266$.

Time = 93.02 (sec) , antiderivative size = 1955, normalized size of antiderivative = 12.86

$$\int \frac{a + b\log(cx^n)}{(d + ex)^7}\, dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/(e*x+d)**7,x)
```

output
```
Piecewise((zoo*(-a/(6*x**6) - b*n/(36*x**6) - b*log(c*x**n)/(6*x**6)), Eq(
d, 0) & Eq(e, 0)), ((a*x - b*n*x + b*x*log(c*x**n))/d**7, Eq(e, 0)), ((-a/
(6*x**6) - b*n/(36*x**6) - b*log(c*x**n)/(6*x**6))/e**7, Eq(d, 0)), (-60*a
*d**6/(360*d**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9*
e**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6
) - 60*b*d**6*n*log(d/e + x)/(360*d**12*e + 2160*d**11*e**2*x + 5400*d**10
*e**3*x**2 + 7200*d**9*e**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e**6*x*
*5 + 360*d**6*e**7*x**6) + 137*b*d**6*n/(360*d**12*e + 2160*d**11*e**2*x +
 5400*d**10*e**3*x**2 + 7200*d**9*e**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d
**7*e**6*x**5 + 360*d**6*e**7*x**6) - 360*b*d**5*e*n*x*log(d/e + x)/(360*d
**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9*e**4*x**3 +
5400*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6) + 522*b*d*
*5*e*n*x/(360*d**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d*
*9*e**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x
**6) + 360*b*d**5*e*x*log(c*x**n)/(360*d**12*e + 2160*d**11*e**2*x + 5400*
d**10*e**3*x**2 + 7200*d**9*e**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e*
*6*x**5 + 360*d**6*e**7*x**6) - 900*b*d**4*e**2*n*x**2*log(d/e + x)/(360*d
**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9*e**4*x**3 +
5400*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6) + 855*b*d*
*4*e**2*n*x**2/(360*d**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 ...
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 276 vs. 2(136) = 272.

Time = 0.04 (sec) , antiderivative size = 276, normalized size of antiderivative = 1.82

$$\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx$$
$$=\frac{1}{360}\,bn\left(\frac{60\,e^4x^4+270\,de^3x^3+470\,d^2e^2x^2+385\,d^3ex+137\,d^4}{d^5e^6x^5+5\,d^6e^5x^4+10\,d^7e^4x^3+10\,d^8e^3x^2+5\,d^9e^2x+d^{10}e}-\frac{60\,\log(ex+d)}{d^6e}+\frac{60\,\log(x)}{d^6e}\right)$$
$$-\frac{b\log(cx^n)}{6\,(e^7x^6+6\,de^6x^5+15\,d^2e^5x^4+20\,d^3e^4x^3+15\,d^4e^3x^2+6\,d^5e^2x+d^6e)}$$
$$-\frac{a}{6\,(e^7x^6+6\,de^6x^5+15\,d^2e^5x^4+20\,d^3e^4x^3+15\,d^4e^3x^2+6\,d^5e^2x+d^6e)}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

output
```
1/360*b*n*((60*e^4*x^4 + 270*d*e^3*x^3 + 470*d^2*e^2*x^2 + 385*d^3*e*x + 1
37*d^4)/(d^5*e^6*x^5 + 5*d^6*e^5*x^4 + 10*d^7*e^4*x^3 + 10*d^8*e^3*x^2 + 5
*d^9*e^2*x + d^10*e) - 60*log(e*x + d)/(d^6*e) + 60*log(x)/(d^6*e)) - 1/6*
b*log(c*x^n)/(e^7*x^6 + 6*d*e^6*x^5 + 15*d^2*e^5*x^4 + 20*d^3*e^4*x^3 + 15
*d^4*e^3*x^2 + 6*d^5*e^2*x + d^6*e) - 1/6*a/(e^7*x^6 + 6*d*e^6*x^5 + 15*d^
2*e^5*x^4 + 20*d^3*e^4*x^3 + 15*d^4*e^3*x^2 + 6*d^5*e^2*x + d^6*e)
```

Giac [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 252, normalized size of antiderivative = 1.66

$$\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx$$
$$=-\frac{bn\log(x)}{6\,(e^7x^6+6\,de^6x^5+15\,d^2e^5x^4+20\,d^3e^4x^3+15\,d^4e^3x^2+6\,d^5e^2x+d^6e)}$$
$$+\frac{60\,be^5nx^5+330\,bde^4nx^4+740\,bd^2e^3nx^3+855\,bd^3e^2nx^2+522\,bd^4enx+137\,bd^5n-60\,bd^5\log(c)-6}{360\,(d^5e^7x^6+6\,d^6e^6x^5+15\,d^7e^5x^4+20\,d^8e^4x^3+15\,d^9e^3x^2+6\,d^{10}e^2x+d^{11}e)}$$
$$-\frac{bn\log(ex+d)}{6\,d^6e}+\frac{bn\log(x)}{6\,d^6e}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

output
```
-1/6*b*n*log(x)/(e^7*x^6 + 6*d*e^6*x^5 + 15*d^2*e^5*x^4 + 20*d^3*e^4*x^3 +
 15*d^4*e^3*x^2 + 6*d^5*e^2*x + d^6*e) + 1/360*(60*b*e^5*n*x^5 + 330*b*d*e
^4*n*x^4 + 740*b*d^2*e^3*n*x^3 + 855*b*d^3*e^2*n*x^2 + 522*b*d^4*e*n*x + 1
37*b*d^5*n - 60*b*d^5*log(c) - 60*a*d^5)/(d^5*e^7*x^6 + 6*d^6*e^6*x^5 + 15
*d^7*e^5*x^4 + 20*d^8*e^4*x^3 + 15*d^9*e^3*x^2 + 6*d^10*e^2*x + d^11*e) -
1/6*b*n*log(e*x + d)/(d^6*e) + 1/6*b*n*log(x)/(d^6*e)
```

Mupad [B] (verification not implemented)

Time = 26.23 (sec) , antiderivative size = 232, normalized size of antiderivative = 1.53

$$\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx = \frac{\frac{137\,b\,n}{60}-a+\frac{57\,b\,e^2\,n\,x^2}{4\,d^2}+\frac{37\,b\,e^3\,n\,x^3}{3\,d^3}+\frac{11\,b\,e^4\,n\,x^4}{2\,d^4}+\frac{b\,e^5\,n\,x^5}{d^5}+\frac{87\,b\,e\,n\,x}{10\,d}}{6\,d^6\,e+36\,d^5\,e^2\,x+90\,d^4\,e^3\,x^2+120\,d^3\,e^4\,x^3+90\,d^2\,e^5\,x^4+36\,d\,e^6\,x^5+6\,e^7\,x^6} - \frac{b\,\ln(c\,x^n)}{6\,e\,(d^6+6\,d^5\,e\,x+15\,d^4\,e^2\,x^2+20\,d^3\,e^3\,x^3+15\,d^2\,e^4\,x^4+6\,d\,e^5\,x^5+e^6\,x^6)} - \frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{3\,d^6\,e}$$

input
```
int((a + b*log(c*x^n))/(d + e*x)^7,x)
```

output
```
((137*b*n)/60 - a + (57*b*e^2*n*x^2)/(4*d^2) + (37*b*e^3*n*x^3)/(3*d^3) +
(11*b*e^4*n*x^4)/(2*d^4) + (b*e^5*n*x^5)/d^5 + (87*b*e*n*x)/(10*d))/(6*d^6
*e + 6*e^7*x^6 + 36*d^5*e^2*x + 36*d*e^6*x^5 + 90*d^4*e^3*x^2 + 120*d^3*e^
4*x^3 + 90*d^2*e^5*x^4) - (b*log(c*x^n))/(6*e*(d^6 + e^6*x^6 + 6*d*e^5*x^5
 + 15*d^4*e^2*x^2 + 20*d^3*e^3*x^3 + 15*d^2*e^4*x^4 + 6*d^5*e*x)) - (b*n*a
tanh((2*e*x)/d + 1))/(3*d^6*e)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 359, normalized size of antiderivative = 2.36

$$\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx$$
$$= \frac{-60\log(ex+d)\,b\,d^6n-360\log(ex+d)\,b\,d^5enx-900\log(ex+d)\,b\,d^4e^2n\,x^2-1200\log(ex+d)\,b\,d^3e^3n}{}$$

input
```
int((a+b*log(c*x^n))/(e*x+d)^7,x)
```

output
```
( - 60*log(d + e*x)*b*d**6*n - 360*log(d + e*x)*b*d**5*e*n*x - 900*log(d +
 e*x)*b*d**4*e**2*n*x**2 - 1200*log(d + e*x)*b*d**3*e**3*n*x**3 - 900*log(
d + e*x)*b*d**2*e**4*n*x**4 - 360*log(d + e*x)*b*d*e**5*n*x**5 - 60*log(d
+ e*x)*b*e**6*n*x**6 + 360*log(x**n*c)*b*d**5*e*x + 900*log(x**n*c)*b*d**4
*e**2*x**2 + 1200*log(x**n*c)*b*d**3*e**3*x**3 + 900*log(x**n*c)*b*d**2*e*
*4*x**4 + 360*log(x**n*c)*b*d*e**5*x**5 + 60*log(x**n*c)*b*e**6*x**6 - 60*
a*d**6 + 127*b*d**6*n + 462*b*d**5*e*n*x + 705*b*d**4*e**2*n*x**2 + 540*b*
d**3*e**3*n*x**3 + 180*b*d**2*e**4*n*x**4 - 10*b*e**6*n*x**6)/(360*d**6*e*
(d**6 + 6*d**5*e*x + 15*d**4*e**2*x**2 + 20*d**3*e**3*x**3 + 15*d**2*e**4*
x**4 + 6*d*e**5*x**5 + e**6*x**6))
```

3.71 $\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx$

Optimal result 669
Mathematica [A] (verified) 670
Rubi [B] (verified) 670
Maple [C] (warning: unable to verify) 678
Fricas [F] 679
Sympy [A] (verification not implemented) 679
Maxima [F] 680
Giac [F] 681
Mupad [F(-1)] 681
Reduce [F] 681

Optimal result

Integrand size = 21, antiderivative size = 294

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx &= -\frac{bn}{30d^2(d+ex)^5}-\frac{11bn}{120d^3(d+ex)^4}-\frac{37bn}{180d^4(d+ex)^3}\\&\quad-\frac{19bn}{40d^5(d+ex)^2}-\frac{29bn}{20d^6(d+ex)}-\frac{29bn\log(x)}{20d^7}\\&\quad+\frac{a+b\log(cx^n)}{6d(d+ex)^6}+\frac{a+b\log(cx^n)}{5d^2(d+ex)^5}\\&\quad+\frac{a+b\log(cx^n)}{4d^3(d+ex)^4}+\frac{a+b\log(cx^n)}{3d^4(d+ex)^3}+\frac{a+b\log(cx^n)}{2d^5(d+ex)^2}\\&\quad-\frac{ex(a+b\log(cx^n))}{d^7(d+ex)}-\frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^7}\\&\quad+\frac{49bn\log(d+ex)}{20d^7}+\frac{bn\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^7}\end{aligned}$$

output
```
-1/30*b*n/d^2/(e*x+d)^5-11/120*b*n/d^3/(e*x+d)^4-37/180*b*n/d^4/(e*x+d)^3-
19/40*b*n/d^5/(e*x+d)^2-29/20*b*n/d^6/(e*x+d)-29/20*b*n*ln(x)/d^7+1/6*(a+b
*ln(c*x^n))/d/(e*x+d)^6+1/5*(a+b*ln(c*x^n))/d^2/(e*x+d)^5+1/4*(a+b*ln(c*x^
n))/d^3/(e*x+d)^4+1/3*(a+b*ln(c*x^n))/d^4/(e*x+d)^3+1/2*(a+b*ln(c*x^n))/d^
5/(e*x+d)^2-e*x*(a+b*ln(c*x^n))/d^7/(e*x+d)-ln(1+d/e/x)*(a+b*ln(c*x^n))/d^
7+49/20*b*n*ln(e*x+d)/d^7+b*n*polylog(2,-d/e/x)/d^7
```

Mathematica [A] (verified)

Time = 0.45 (sec) , antiderivative size = 349, normalized size of antiderivative = 1.19

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx$$
$$= \frac{\frac{60ad^6}{(d+ex)^6}+\frac{72ad^5}{(d+ex)^5}-\frac{12bd^5n}{(d+ex)^5}+\frac{90ad^4}{(d+ex)^4}-\frac{33bd^4n}{(d+ex)^4}+\frac{120ad^3}{(d+ex)^3}-\frac{74bd^3n}{(d+ex)^3}+\frac{180ad^2}{(d+ex)^2}-\frac{171bd^2n}{(d+ex)^2}+\frac{360ad}{d+ex}-\frac{522bdn}{d+ex}-8}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x)^7),x]
```

output
```
((60*a*d^6)/(d + e*x)^6 + (72*a*d^5)/(d + e*x)^5 - (12*b*d^5*n)/(d + e*x)^
5 + (90*a*d^4)/(d + e*x)^4 - (33*b*d^4*n)/(d + e*x)^4 + (120*a*d^3)/(d + e
*x)^3 - (74*b*d^3*n)/(d + e*x)^3 + (180*a*d^2)/(d + e*x)^2 - (171*b*d^2*n)
/(d + e*x)^2 + (360*a*d)/(d + e*x) - (522*b*d*n)/(d + e*x) - 882*b*n*Log[x
] + (360*a*Log[c*x^n])/n + (60*b*d^6*Log[c*x^n])/(d + e*x)^6 + (72*b*d^5*L
og[c*x^n])/(d + e*x)^5 + (90*b*d^4*Log[c*x^n])/(d + e*x)^4 + (120*b*d^3*Lo
g[c*x^n])/(d + e*x)^3 + (180*b*d^2*Log[c*x^n])/(d + e*x)^2 + (360*b*d*Log[
c*x^n])/(d + e*x) + (180*b*Log[c*x^n]^2)/n + 882*b*n*Log[d + e*x] - 360*a*
Log[1 + (e*x)/d] - 360*b*Log[c*x^n]*Log[1 + (e*x)/d] - 360*b*n*PolyLog[2,
-((e*x)/d)])/(360*d^7)
```

Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 604 vs. 2(294) = 588.

Time = 2.94 (sec) , antiderivative size = 604, normalized size of antiderivative = 2.05, number of steps used = 25, number of rules used = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 1.190$, Rules used = {2789, 2756, 54, 2009, 2789, 2756, 54, 2009, 2789, 2756, 54, 2009, 2789, 2756, 54, 2009, 2789, 2756, 54, 2009, 2789, 2751, 16, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx$$
$$\Big\downarrow \text{2789}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^6}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^7}dx}{d}$$

$\big\downarrow$ 2756

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^6}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(d+ex)^6}dx}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\big\downarrow$ 54

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^6}dx}{d}-\frac{e\left(\frac{bn\int \left(-\frac{e}{d^6(d+ex)}-\frac{e}{d^5(d+ex)^2}-\frac{e}{d^4(d+ex)^3}-\frac{e}{d^3(d+ex)^4}-\frac{e}{d^2(d+ex)^5}-\frac{e}{d(d+ex)^6}+\frac{1}{d^6x}\right)dx}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\big\downarrow$ 2009

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^6}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\big\downarrow$ 2789

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^5}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^6}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\big\downarrow$ 2756

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^5}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(d+ex)^5}dx}{5e}-\frac{a+b\log(cx^n)}{5e(d+ex)^5}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\big\downarrow$ 54

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^5}dx}{d}-\frac{e\left(\frac{bn\int\left(-\frac{e}{d^5(d+ex)}-\frac{e}{d^4(d+ex)^2}-\frac{e}{d^3(d+ex)^3}-\frac{e}{d^2(d+ex)^4}-\frac{e}{d(d+ex)^5}+\frac{1}{d^5x}\right)dx}{5e}-\frac{a+b\log(cx^n)}{5e(d+ex)^5}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\Big\downarrow$ 2009

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^5}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^5}+\frac{\log(x)}{d^5}+\frac{1}{d^4(d+ex)}+\frac{1}{2d^3(d+ex)^2}+\frac{1}{3d^2(d+ex)^3}+\frac{1}{4d(d+ex)^4}\right)}{5e}-\frac{a+b\log(cx^n)}{5e(d+ex)^5}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\Big\downarrow$ 2789

$$\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^4}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^5}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^5}+\frac{\log(x)}{d^5}+\frac{1}{d^4(d+ex)}+\frac{1}{2d^3(d+ex)^2}+\frac{1}{3d^2(d+ex)^3}+\frac{1}{4d(d+ex)^4}\right)}{5e}-\frac{a+b\log(cx^n)}{5e(d+ex)^5}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\Big\downarrow$ 2756

$$\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^4}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(d+ex)^4}dx}{4e}-\frac{a+b\log(cx^n)}{4e(d+ex)^4}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^5}+\frac{\log(x)}{d^5}+\frac{1}{d^4(d+ex)}+\frac{1}{2d^3(d+ex)^2}+\frac{1}{3d^2(d+ex)^3}+\frac{1}{4d(d+ex)^4}\right)}{5e}-\frac{a+b\log}{5e(d+}\right.}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\Big\downarrow$ 54

$$\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^4}dx}{d}-\frac{e\left(\frac{bn\int\left(-\frac{e}{d^4(d+ex)}-\frac{e}{d^3(d+ex)^2}-\frac{e}{d^2(d+ex)^3}-\frac{e}{d(d+ex)^4}+\frac{1}{d^4x}\right)dx}{4e}-\frac{a+b\log(cx^n)}{4e(d+ex)^4}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^5}+\frac{\log(x)}{d^5}+\frac{1}{d^4(d+ex)}+\frac{}{2d\cdots}\cdots\right)}{5e}\cdots\right)}{\cdots}}{d}$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\Big\downarrow$ 2009

$$\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^4}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^4}+\frac{\log(x)}{d^4}+\frac{1}{d^3(d+ex)}+\frac{1}{2d^2(d+ex)^2}+\frac{1}{3d(d+ex)^3}\right)}{4e}-\frac{a+b\log(cx^n)}{4e(d+ex)^4}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^5}+\frac{\log(x)}{d^5}+\frac{1}{d^4(d+ex)}+\frac{}{2d^3\cdots}\cdots\right)}{5e}\cdots\right)}{\cdots}}{d}$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\Big\downarrow$ 2789

$$\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{d}-\frac{e\int\frac{a+b\log(cx^n)}{(d+ex)^4}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^4}+\frac{\log(x)}{d^4}+\frac{1}{d^3(d+ex)}+\frac{1}{2d^2(d+ex)^2}+\frac{1}{3d(d+ex)^3}\right)}{4e}-\frac{a+b\log(cx^n)}{4e(d+ex)^4}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^5}+\cdots\right)}{\cdots}\cdots\right)}{\cdots}}{d}$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\Big\downarrow$ 2756

$$\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{d}-\frac{e\left(\frac{bn\int\frac{1}{x(d+ex)^3}dx}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^4}+\frac{\log(x)}{d^4}+\frac{1}{d^3(d+ex)}+\frac{1}{2d^2(d+ex)^2}+\frac{1}{3d(d+ex)^3}\right)}{4e}-\frac{a+b\log(cx^n)}{4e(d+ex)^4}\right)}{d}}{d}-\frac{e\left(\cdots\right)}{\cdots}}{d}$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\Big\downarrow$ 54

$$\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{d}-\frac{e\left(\frac{bn\int\left(-\frac{e}{d^3(d+ex)}-\frac{e}{d^2(d+ex)^2}-\frac{e}{d(d+ex)^3}+\frac{1}{d^3x}\right)dx}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^4}+\frac{\log(x)}{d^4}+\frac{1}{d^3(d+ex)}+\frac{1}{2d^2(d+ex)^2}+\frac{1}{3d(\cdots}{4e}\cdots\right.}{d}}{d}\cdots$$

$$\cdots d$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \; 2009$$

$$\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^4}+\frac{\log(x)}{d^4}+\frac{1}{d^3(d+ex)}+\frac{1}{2d^2(d+ex)^2}+\frac{1}{3d(d+\cdots}{4e}\cdots\right.}{d}}{d}\cdots$$

$$\cdots d$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \; 2789$$

$$\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\int\frac{a+b\log(cx^n)}{(d+ex)^3}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^4}+\frac{\log(x)}{d^4}+\frac{1}{d^3(d+ex\cdots}{4e}\cdots\right.}{\cdots}\cdots$$

$$\cdots d$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \; 2756$$

$$\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int\frac{1}{x(d+ex)^2}dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^4}\cdots\right.}{\cdots}\cdots\right.}{\cdots}}{d}\cdots$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \; 54$$

$$\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int\left(-\frac{e}{d^2(d+ex)}-\frac{e}{d(d+ex)^2}+\frac{1}{d^2x}\right)dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}}{d}}{d}$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \ 2009$$

$$\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}}{d}-\cdots}{d}$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \ 2789$$

$$\frac{\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\cdots\right)}{3e}\cdots\right)}{d}}{d}}{d}$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \ 2751$$

$$\frac{\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int\frac{1}{d+ex}dx}{d}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+\cdots}\cdots\right)}{3e}\cdots\right)}{\cdots}}{d}}{d}$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \ 16$$

$$\frac{\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+\cdots}\right.}{3e}\right.}{\cdots}}{d}}{d}$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\Big\downarrow$ 2779

$$\frac{\frac{\frac{\frac{\frac{\frac{bn\int\frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\cdots}{\cdots}\right.}{\cdots}}{d}}{d}$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\Big\downarrow$ 2838

$$\frac{\frac{\frac{\frac{\frac{\frac{bn\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\cdots}{\cdots}\right.}{\cdots}}{d}}{d}$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x)^7),x]
```

output
```
-((e*(-1/6*(a + b*Log[c*x^n])/(e*(d + e*x)^6) + (b*n*(1/(5*d*(d + e*x)^5)
+ 1/(4*d^2*(d + e*x)^4) + 1/(3*d^3*(d + e*x)^3) + 1/(2*d^4*(d + e*x)^2) +
1/(d^5*(d + e*x)) + Log[x]/d^6 - Log[d + e*x]/d^6))/(6*e)))/d) + (-((e*(-1
/5*(a + b*Log[c*x^n])/(e*(d + e*x)^5) + (b*n*(1/(4*d*(d + e*x)^4) + 1/(3*d
^2*(d + e*x)^3) + 1/(2*d^3*(d + e*x)^2) + 1/(d^4*(d + e*x)) + Log[x]/d^5 -
 Log[d + e*x]/d^5))/(5*e)))/d) + (-((e*(-1/4*(a + b*Log[c*x^n])/(e*(d + e*
x)^4) + (b*n*(1/(3*d*(d + e*x)^3) + 1/(2*d^2*(d + e*x)^2) + 1/(d^3*(d + e*
x)) + Log[x]/d^4 - Log[d + e*x]/d^4))/(4*e)))/d) + (-((e*(-1/3*(a + b*Log[
c*x^n])/(e*(d + e*x)^3) + (b*n*(1/(2*d*(d + e*x)^2) + 1/(d^2*(d + e*x)) +
Log[x]/d^3 - Log[d + e*x]/d^3))/(3*e)))/d) + (-((e*(-1/2*(a + b*Log[c*x^n]
)/(e*(d + e*x)^2) + (b*n*(1/(d*(d + e*x)) + Log[x]/d^2 - Log[d + e*x]/d^2)
)/(2*e)))/d) + (-((e*((x*(a + b*Log[c*x^n]))/(d*(d + e*x)) - (b*n*Log[d +
e*x])/(d*e)))/d) + (-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d) + (b*n*Poly
Log[2, -(d/(e*x))])/d)/d)/d)/d)/d)/d)/d
```

Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 5.91 (sec) , antiderivative size = 445, normalized size of antiderivative = 1.51

method	result
risch	$-\frac{b\ln(x^n)\ln(ex+d)}{d^7}+\frac{b\ln(x^n)}{d^6(ex+d)}+\frac{b\ln(x^n)}{2d^5(ex+d)^2}+\frac{b\ln(x^n)}{3d^4(ex+d)^3}+\frac{b\ln(x^n)}{4d^3(ex+d)^4}+\frac{b\ln(x^n)}{5d^2(ex+d)^5}+\frac{b\ln(x^n)}{6d(ex+d)^6}+\frac{b\ln(x^n)}{d^7}$

input
```
int((a+b*ln(c*x^n))/x/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)/d^7*ln(e*x+d)+b*ln(x^n)/d^6/(e*x+d)+1/2*b*ln(x^n)/d^5/(e*x+d)^2
+1/3*b*ln(x^n)/d^4/(e*x+d)^3+1/4*b*ln(x^n)/d^3/(e*x+d)^4+1/5*b*ln(x^n)/d^2
/(e*x+d)^5+1/6*b*ln(x^n)/d/(e*x+d)^6+b*ln(x^n)/d^7*ln(x)-29/20*b*n/d^6/(e*
x+d)-19/40*b*n/d^5/(e*x+d)^2-37/180*b*n/d^4/(e*x+d)^3-11/120*b*n/d^3/(e*x+
d)^4+49/20*b*n*ln(e*x+d)/d^7-1/30*b*n/d^2/(e*x+d)^5-49/20*b*n*ln(x)/d^7-1/
2*b*n/d^7*ln(x)^2+b*n/d^7*ln(e*x+d)*ln(-e*x/d)+b*n/d^7*dilog(-e*x/d)+(1/2*
I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*cs
gn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*
ln(c)+a)*(-1/d^7*ln(e*x+d)+1/d^6/(e*x+d)+1/2/d^5/(e*x+d)^2+1/3/d^4/(e*x+d)
^3+1/4/d^3/(e*x+d)^4+1/5/d^2/(e*x+d)^5+1/6/d/(e*x+d)^6+1/d^7*ln(x))
```

Fricas [F]

$$\int \frac{a + b\log\left(cx^n\right)}{x(d + ex)^7}\, dx = \int \frac{b\log\left(cx^n\right) + a}{\left(ex + d\right)^7 x}\, dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^7,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^7*x^8 + 7*d*e^6*x^7 + 21*d^2*e^5*x^6 + 35*d
^3*e^4*x^5 + 35*d^4*e^3*x^4 + 21*d^5*e^2*x^3 + 7*d^6*e*x^2 + d^7*x), x)
```

Sympy [A] (verification not implemented)

Time = 177.25 (sec) , antiderivative size = 1518, normalized size of antiderivative = 5.16

$$\int \frac{a + b\log\left(cx^n\right)}{x(d + ex)^7}\, dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x+d)**7,x)
```

output
```
-a*e*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))/d - a*e*
Piecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))/d**2 - a*e*Pi
ecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True))/d**3 - a*e*Piec
ewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/d**4 - a*e*Piecew
ise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d**5 - a*e*Piecewis
e((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d**6 - a*e*Piecewise((x/d
, Eq(e, 0)), (log(d + e*x)/e, True))/d**7 + a*log(x)/d**7 + b*e**6*n*Piece
wise((-1/(e**7*x), Eq(d, 0)), (-137*d**4/(360*d**5*e**6 + 1800*d**4*e**7*x
 + 3600*d**3*e**8*x**2 + 3600*d**2*e**9*x**3 + 1800*d*e**10*x**4 + 360*e**
11*x**5) - 625*d**3*e*x/(360*d**5*e**6 + 1800*d**4*e**7*x + 3600*d**3*e**8
*x**2 + 3600*d**2*e**9*x**3 + 1800*d*e**10*x**4 + 360*e**11*x**5) - 1100*d
**2*e**2*x**2/(360*d**5*e**6 + 1800*d**4*e**7*x + 3600*d**3*e**8*x**2 + 36
00*d**2*e**9*x**3 + 1800*d*e**10*x**4 + 360*e**11*x**5) - 900*d*e**3*x**3/
(360*d**5*e**6 + 1800*d**4*e**7*x + 3600*d**3*e**8*x**2 + 3600*d**2*e**9*x
**3 + 1800*d*e**10*x**4 + 360*e**11*x**5) - 300*e**4*x**4/(360*d**5*e**6 +
 1800*d**4*e**7*x + 3600*d**3*e**8*x**2 + 3600*d**2*e**9*x**3 + 1800*d*e**
10*x**4 + 360*e**11*x**5) - log(d + e*x)/(6*d*e**6), True))/d**6 - b*e**6*
Piecewise((1/(e**7*x), Eq(d, 0)), (-1/(6*d*(d/x + e)**6), True))*log(c*x**
n)/d**6 - 6*b*e**5*n*Piecewise((-1/(e**6*x), Eq(d, 0)), (-25*d**3/(60*d**4
*e**5 + 240*d**3*e**6*x + 360*d**2*e**7*x**2 + 240*d*e**8*x**3 + 60*e**...
```

Maxima [F]

$$\int \frac{a + b\log(cx^n)}{x(d + ex)^7} dx = \int \frac{b\log(cx^n) + a}{(ex + d)^7 x} dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^7,x, algorithm="maxima")
```

output
```
1/60*a*((60*e^5*x^5 + 330*d*e^4*x^4 + 740*d^2*e^3*x^3 + 855*d^3*e^2*x^2 +
522*d^4*e*x + 147*d^5)/(d^6*e^6*x^6 + 6*d^7*e^5*x^5 + 15*d^8*e^4*x^4 + 20*
d^9*e^3*x^3 + 15*d^10*e^2*x^2 + 6*d^11*e*x + d^12) - 60*log(e*x + d)/d^7 +
 60*log(x)/d^7) + b*integrate((log(c) + log(x^n))/(e^7*x^8 + 7*d*e^6*x^7 +
 21*d^2*e^5*x^6 + 35*d^3*e^4*x^5 + 35*d^4*e^3*x^4 + 21*d^5*e^2*x^3 + 7*d^6
*e*x^2 + d^7*x), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^7x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^7,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^7*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx = \int \frac{a+b\ln(c\,x^n)}{x\,(d+e\,x)^7}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x)^7),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x)^7), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx = \text{Too large to display}$$

input
```
int((a+b*log(c*x^n))/x/(e*x+d)^7,x)
```

output
```
(60*int(log(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 21*d**5*e**2*x**3 + 35*d**4*
e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2*e**5*x**6 + 7*d*e**6*x**7 + e**7*x
**8),x)*b*d**13 + 360*int(log(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 21*d**5*e*
*2*x**3 + 35*d**4*e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2*e**5*x**6 + 7*d*
e**6*x**7 + e**7*x**8),x)*b*d**12*e*x + 900*int(log(x**n*c)/(d**7*x + 7*d*
*6*e*x**2 + 21*d**5*e**2*x**3 + 35*d**4*e**3*x**4 + 35*d**3*e**4*x**5 + 21
*d**2*e**5*x**6 + 7*d*e**6*x**7 + e**7*x**8),x)*b*d**11*e**2*x**2 + 1200*i
nt(log(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 21*d**5*e**2*x**3 + 35*d**4*e**3*
x**4 + 35*d**3*e**4*x**5 + 21*d**2*e**5*x**6 + 7*d*e**6*x**7 + e**7*x**8),
x)*b*d**10*e**3*x**3 + 900*int(log(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 21*d*
*5*e**2*x**3 + 35*d**4*e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2*e**5*x**6 +
 7*d*e**6*x**7 + e**7*x**8),x)*b*d**9*e**4*x**4 + 360*int(log(x**n*c)/(d**
7*x + 7*d**6*e*x**2 + 21*d**5*e**2*x**3 + 35*d**4*e**3*x**4 + 35*d**3*e**4
*x**5 + 21*d**2*e**5*x**6 + 7*d*e**6*x**7 + e**7*x**8),x)*b*d**8*e**5*x**5
 + 60*int(log(x**n*c)/(d**7*x + 7*d**6*e*x**2 + 21*d**5*e**2*x**3 + 35*d**
4*e**3*x**4 + 35*d**3*e**4*x**5 + 21*d**2*e**5*x**6 + 7*d*e**6*x**7 + e**7
*x**8),x)*b*d**7*e**6*x**6 - 60*log(d + e*x)*a*d**6 - 360*log(d + e*x)*a*d
**5*e*x - 900*log(d + e*x)*a*d**4*e**2*x**2 - 1200*log(d + e*x)*a*d**3*e**
3*x**3 - 900*log(d + e*x)*a*d**2*e**4*x**4 - 360*log(d + e*x)*a*d*e**5*x**
5 - 60*log(d + e*x)*a*e**6*x**6 + 60*log(x)*a*d**6 + 360*log(x)*a*d**5*...
```

3.72 $\int \frac{a+b\log(cx^n)}{x^2(d+ex)^7}\,dx$

Optimal result 683
Mathematica [A] (verified) 684
Rubi [A] (verified) 684
Maple [C] (warning: unable to verify) 686
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Sympy [A] (verification not implemented) 687
Maxima [F] 687
Giac [F] 688
Mupad [F(-1)] 688
Reduce [F] 689

Optimal result

Integrand size = 21, antiderivative size = 339

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^2(d+ex)^7}\,dx = & -\frac{bn}{d^7x}+\frac{ben}{30d^3(d+ex)^5}+\frac{17ben}{120d^4(d+ex)^4}+\frac{79ben}{180d^5(d+ex)^3} \\ & +\frac{53ben}{40d^6(d+ex)^2}+\frac{103ben}{20d^7(d+ex)}+\frac{103ben\log(x)}{20d^8} \\ & -\frac{a+b\log(cx^n)}{d^7x}-\frac{e(a+b\log(cx^n))}{6d^2(d+ex)^6}-\frac{2e(a+b\log(cx^n))}{5d^3(d+ex)^5} \\ & -\frac{3e(a+b\log(cx^n))}{4d^4(d+ex)^4}-\frac{4e(a+b\log(cx^n))}{3d^5(d+ex)^3}-\frac{5e(a+b\log(cx^n))}{2d^6(d+ex)^2} \\ & +\frac{6e^2x(a+b\log(cx^n))}{d^8(d+ex)}+\frac{7e\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^8} \\ & -\frac{223ben\log(d+ex)}{20d^8}-\frac{7ben\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^8}\end{aligned}$$

output
```
-b*n/d^7/x+1/30*b*e*n/d^3/(e*x+d)^5+17/120*b*e*n/d^4/(e*x+d)^4+79/180*b*e*
n/d^5/(e*x+d)^3+53/40*b*e*n/d^6/(e*x+d)^2+103/20*b*e*n/d^7/(e*x+d)+103/20*
b*e*n*ln(x)/d^8-(a+b*ln(c*x^n))/d^7/x-1/6*e*(a+b*ln(c*x^n))/d^2/(e*x+d)^6-
2/5*e*(a+b*ln(c*x^n))/d^3/(e*x+d)^5-3/4*e*(a+b*ln(c*x^n))/d^4/(e*x+d)^4-4/
3*e*(a+b*ln(c*x^n))/d^5/(e*x+d)^3-5/2*e*(a+b*ln(c*x^n))/d^6/(e*x+d)^2+6*e^
2*x*(a+b*ln(c*x^n))/d^8/(e*x+d)+7*e*ln(1+d/e/x)*(a+b*ln(c*x^n))/d^8-223/20
*b*e*n*ln(e*x+d)/d^8-7*b*e*n*polylog(2,-d/e/x)/d^8
```

Mathematica [A] (verified)

Time = 0.69 (sec) , antiderivative size = 401, normalized size of antiderivative = 1.18

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^7}\,dx = -\frac{\frac{360ad}{x}+\frac{360bdn}{x}+\frac{60ad^6e}{(d+ex)^6}+\frac{144ad^5e}{(d+ex)^5}-\frac{12bd^5en}{(d+ex)^5}+\frac{270ad^4e}{(d+ex)^4}-\frac{51bd^4en}{(d+ex)^4}+\frac{480ad^3e}{(d+ex)^3}-\frac{158bd^3en}{(d+ex)^3}+\frac{900ad^2e}{(d+ex)^2}-\frac{477bd^2en}{(d+ex)^2}}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x)^7),x]
```

output
```
-1/360*((360*a*d)/x + (360*b*d*n)/x + (60*a*d^6*e)/(d + e*x)^6 + (144*a*d^
5*e)/(d + e*x)^5 - (12*b*d^5*e*n)/(d + e*x)^5 + (270*a*d^4*e)/(d + e*x)^4
- (51*b*d^4*e*n)/(d + e*x)^4 + (480*a*d^3*e)/(d + e*x)^3 - (158*b*d^3*e*n)
/(d + e*x)^3 + (900*a*d^2*e)/(d + e*x)^2 - (477*b*d^2*e*n)/(d + e*x)^2 + (
2160*a*d*e)/(d + e*x) - (1854*b*d*e*n)/(d + e*x) - 4014*b*e*n*Log[x] + (25
20*a*e*Log[c*x^n])/n + (360*b*d*Log[c*x^n])/x + (60*b*d^6*e*Log[c*x^n])/(d
 + e*x)^6 + (144*b*d^5*e*Log[c*x^n])/(d + e*x)^5 + (270*b*d^4*e*Log[c*x^n]
)/(d + e*x)^4 + (480*b*d^3*e*Log[c*x^n])/(d + e*x)^3 + (900*b*d^2*e*Log[c*
x^n])/(d + e*x)^2 + (2160*b*d*e*Log[c*x^n])/(d + e*x) + (1260*b*e*Log[c*x^
n]^2)/n + 4014*b*e*n*Log[d + e*x] - 2520*a*e*Log[1 + (e*x)/d] - 2520*b*e*L
og[c*x^n]*Log[1 + (e*x)/d] - 2520*b*e*n*PolyLog[2, -((e*x)/d)])/d^8
```

Rubi [A] (verified)

Time = 0.87 (sec) , antiderivative size = 339, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^7}\,dx$$

$$\Big\downarrow \; 2793$$

$$\int \left(\frac{6e^2(a+b\log(cx^n))}{d^7(d+ex)^2} - \frac{7e(a+b\log(cx^n))}{d^7x(d+ex)} + \frac{a+b\log(cx^n)}{d^7x^2} + \frac{5e^2(a+b\log(cx^n))}{d^6(d+ex)^3} + \frac{4e^2(a+b\log(cx^n))}{d^5(d+ex)^4} + \right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{6e^2x(a+b\log(cx^n))}{d^8(d+ex)} + \frac{7e\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^8} - \frac{a+b\log(cx^n)}{d^7x} - \frac{5e(a+b\log(cx^n))}{2d^6(d+ex)^2} - \frac{4e(a+b\log(cx^n))}{3d^5(d+ex)^3} - \frac{3e(a+b\log(cx^n))}{4d^4(d+ex)^4} - \frac{2e(a+b\log(cx^n))}{5d^3(d+ex)^5} - \frac{e(a+b\log(cx^n))}{6d^2(d+ex)^6} - \frac{7ben\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^8} + \frac{103ben\log(x)}{20d^8} - \frac{223ben\log(d+ex)}{20d^8} + \frac{103ben}{20d^7(d+ex)} - \frac{bn}{d^7x} + \frac{53ben}{40d^6(d+ex)^2} + \frac{79ben}{180d^5(d+ex)^3} + \frac{17ben}{120d^4(d+ex)^4} + \frac{ben}{30d^3(d+ex)^5}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x)^7),x]
```

output
```
-((b*n)/(d^7*x)) + (b*e*n)/(30*d^3*(d + e*x)^5) + (17*b*e*n)/(120*d^4*(d +
 e*x)^4) + (79*b*e*n)/(180*d^5*(d + e*x)^3) + (53*b*e*n)/(40*d^6*(d + e*x)
^2) + (103*b*e*n)/(20*d^7*(d + e*x)) + (103*b*e*n*Log[x])/(20*d^8) - (a +
b*Log[c*x^n])/(d^7*x) - (e*(a + b*Log[c*x^n]))/(6*d^2*(d + e*x)^6) - (2*e*
(a + b*Log[c*x^n]))/(5*d^3*(d + e*x)^5) - (3*e*(a + b*Log[c*x^n]))/(4*d^4*
(d + e*x)^4) - (4*e*(a + b*Log[c*x^n]))/(3*d^5*(d + e*x)^3) - (5*e*(a + b*
Log[c*x^n]))/(2*d^6*(d + e*x)^2) + (6*e^2*x*(a + b*Log[c*x^n]))/(d^8*(d +
e*x)) + (7*e*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d^8 - (223*b*e*n*Log[d +
 e*x])/(20*d^8) - (7*b*e*n*PolyLog[2, -(d/(e*x))])/d^8
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 7.81 (sec) , antiderivative size = 508, normalized size of antiderivative = 1.50

method	result
risch	$-\frac{b\ln(x^n)e}{6d^2(ex+d)^6}+\frac{7b\ln(x^n)e\ln(ex+d)}{d^8}-\frac{6b\ln(x^n)e}{d^7(ex+d)}-\frac{5b\ln(x^n)e}{2d^6(ex+d)^2}-\frac{4b\ln(x^n)e}{3d^5(ex+d)^3}-\frac{3b\ln(x^n)e}{4d^4(ex+d)^4}-\frac{2b\ln(x^n)e}{5d^3(ex+d)^5}-\frac{b\ln(}{d^7}$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
-1/6*b*ln(x^n)/d^2/(e*x+d)^6*e+7*b*ln(x^n)/d^8*e*ln(e*x+d)-6*b*ln(x^n)/d^7
*e/(e*x+d)-5/2*b*ln(x^n)/d^6/(e*x+d)^2*e-4/3*b*ln(x^n)/d^5/(e*x+d)^3*e-3/4
*b*ln(x^n)/d^4/(e*x+d)^4*e-2/5*b*ln(x^n)/d^3/(e*x+d)^5*e-b*ln(x^n)/d^7/x-7
*b*ln(x^n)/d^8*e*ln(x)+7/2*b*n/d^8*e*ln(x)^2-7*b*n/d^8*e*ln(e*x+d)*ln(-e*x
/d)-7*b*n/d^8*e*dilog(-e*x/d)+103/20*b*e*n/d^7/(e*x+d)-223/20*b*e*n*ln(e*x
+d)/d^8+53/40*b*e*n/d^6/(e*x+d)^2+79/180*b*e*n/d^5/(e*x+d)^3+1/30*b*e*n/d^
3/(e*x+d)^5+17/120*b*e*n/d^4/(e*x+d)^4-b*n/d^7/x+223/20*b*e*n*ln(x)/d^8+(1
/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)
*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)
+b*ln(c)+a)*(-1/6/d^2/(e*x+d)^6*e+7/d^8*e*ln(e*x+d)-6/d^7*e/(e*x+d)-5/2/d^
6/(e*x+d)^2*e-4/3/d^5/(e*x+d)^3*e-3/4/d^4/(e*x+d)^4*e-2/5/d^3/(e*x+d)^5*e-
1/d^7/x-7/d^8*e*ln(x))
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^7}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)^7x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^7,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^7*x^9 + 7*d*e^6*x^8 + 21*d^2*e^5*x^7 + 35*d
^3*e^4*x^6 + 35*d^4*e^3*x^5 + 21*d^5*e^2*x^4 + 7*d^6*e*x^3 + d^7*x^2), x)
```

Sympy [A] (verification not implemented)

Time = 166.18 (sec) , antiderivative size = 1685, normalized size of antiderivative = 4.97

$$\int \frac{a + b \log(cx^n)}{x^2(d + ex)^7} dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x+d)**7,x)
```

output
```
a*e**2*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))/d**2 +
 2*a*e**2*Piecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))/d**
3 + 3*a*e**2*Piecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True))/
d**4 + 4*a*e**2*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True
))/d**5 + 5*a*e**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), T
rue))/d**6 + 6*a*e**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), Tr
ue))/d**7 - a/(d**7*x) + 7*a*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)
/e, True))/d**8 - 7*a*e*log(x)/d**8 - b*e**2*n*Piecewise((x/d**7, Eq(e, 0)
), (-137*d**4/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600
*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 385*d**3*e*x
/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x*
*3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 470*d**2*e**2*x**2/(360*d
**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 18
00*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 270*d*e**3*x**3/(360*d**10*e + 1
800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e*
*5*x**4 + 360*d**5*e**6*x**5) - 60*e**4*x**4/(360*d**10*e + 1800*d**9*e**2
*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360
*d**5*e**6*x**5) - log(x)/(6*d**6*e) + log(d/e + x)/(6*d**6*e), True))/d**
2 + b*e**2*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))*lo
g(c*x**n)/d**2 - 2*b*e**2*n*Piecewise((x/d**6, Eq(e, 0)), (-25*d**3/(60...
```

Maxima [F]

$$\int \frac{a + b \log(cx^n)}{x^2(d + ex)^7} dx = \int \frac{b \log(cx^n) + a}{(ex + d)^7 x^2} dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^7,x, algorithm="maxima")
```

output
```
-1/60*a*((420*e^6*x^6 + 2310*d*e^5*x^5 + 5180*d^2*e^4*x^4 + 5985*d^3*e^3*x
^3 + 3654*d^4*e^2*x^2 + 1029*d^5*e*x + 60*d^6)/(d^7*e^6*x^7 + 6*d^8*e^5*x^
6 + 15*d^9*e^4*x^5 + 20*d^10*e^3*x^4 + 15*d^11*e^2*x^3 + 6*d^12*e*x^2 + d^
13*x) - 420*e*log(e*x + d)/d^8 + 420*e*log(x)/d^8) + b*integrate((log(c) +
 log(x^n))/(e^7*x^9 + 7*d*e^6*x^8 + 21*d^2*e^5*x^7 + 35*d^3*e^4*x^6 + 35*d
^4*e^3*x^5 + 21*d^5*e^2*x^4 + 7*d^6*e*x^3 + d^7*x^2), x)
```

Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^2(d+ex)^7}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex+d\right)^7x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^7,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^7*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^2(d+ex)^7}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^2\,{\left(d+e\,x\right)}^7}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^7),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^7), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^7}\,dx = \text{Too large to display}$$

input
```
int((a+b*log(c*x^n))/x^2/(e*x+d)^7,x)
```

output
```
(60*int(log(x**n*c)/(d**7*x**2 + 7*d**6*e*x**3 + 21*d**5*e**2*x**4 + 35*d*
*4*e**3*x**5 + 35*d**3*e**4*x**6 + 21*d**2*e**5*x**7 + 7*d*e**6*x**8 + e**
7*x**9),x)*b*d**14*x + 360*int(log(x**n*c)/(d**7*x**2 + 7*d**6*e*x**3 + 21
*d**5*e**2*x**4 + 35*d**4*e**3*x**5 + 35*d**3*e**4*x**6 + 21*d**2*e**5*x**
7 + 7*d*e**6*x**8 + e**7*x**9),x)*b*d**13*e*x**2 + 900*int(log(x**n*c)/(d*
*7*x**2 + 7*d**6*e*x**3 + 21*d**5*e**2*x**4 + 35*d**4*e**3*x**5 + 35*d**3*
e**4*x**6 + 21*d**2*e**5*x**7 + 7*d*e**6*x**8 + e**7*x**9),x)*b*d**12*e**2
*x**3 + 1200*int(log(x**n*c)/(d**7*x**2 + 7*d**6*e*x**3 + 21*d**5*e**2*x**
4 + 35*d**4*e**3*x**5 + 35*d**3*e**4*x**6 + 21*d**2*e**5*x**7 + 7*d*e**6*x
**8 + e**7*x**9),x)*b*d**11*e**3*x**4 + 900*int(log(x**n*c)/(d**7*x**2 + 7
*d**6*e*x**3 + 21*d**5*e**2*x**4 + 35*d**4*e**3*x**5 + 35*d**3*e**4*x**6 +
 21*d**2*e**5*x**7 + 7*d*e**6*x**8 + e**7*x**9),x)*b*d**10*e**4*x**5 + 360
*int(log(x**n*c)/(d**7*x**2 + 7*d**6*e*x**3 + 21*d**5*e**2*x**4 + 35*d**4*
e**3*x**5 + 35*d**3*e**4*x**6 + 21*d**2*e**5*x**7 + 7*d*e**6*x**8 + e**7*x
**9),x)*b*d**9*e**5*x**6 + 60*int(log(x**n*c)/(d**7*x**2 + 7*d**6*e*x**3 +
 21*d**5*e**2*x**4 + 35*d**4*e**3*x**5 + 35*d**3*e**4*x**6 + 21*d**2*e**5*
x**7 + 7*d*e**6*x**8 + e**7*x**9),x)*b*d**8*e**6*x**7 + 420*log(d + e*x)*a
*d**6*e*x + 2520*log(d + e*x)*a*d**5*e**2*x**2 + 6300*log(d + e*x)*a*d**4*
e**3*x**3 + 8400*log(d + e*x)*a*d**3*e**4*x**4 + 6300*log(d + e*x)*a*d**2*
e**5*x**5 + 2520*log(d + e*x)*a*d*e**6*x**6 + 420*log(d + e*x)*a*e**7*x...
```

3.73 $\int \frac{a+b\log(cx^n)}{x^3(d+ex)^7}\,dx$

Optimal result . . . 690
Mathematica [A] (verified) . . . 691
Rubi [A] (verified) . . . 692
Maple [C] (warning: unable to verify) . . . 693
Fricas [F] . . . 694
Sympy [A] (verification not implemented) . . . 694
Maxima [F] . . . 695
Giac [F] . . . 696
Mupad [F(-1)] . . . 696
Reduce [F] . . . 696

Optimal result

Integrand size = 21, antiderivative size = 401

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^3(d+ex)^7}\,dx = & -\frac{bn}{4d^7x^2}+\frac{7ben}{d^8x}-\frac{be^2n}{30d^4(d+ex)^5}-\frac{23be^2n}{120d^5(d+ex)^4} \\ & -\frac{34be^2n}{45d^6(d+ex)^3}-\frac{14be^2n}{5d^7(d+ex)^2}-\frac{131be^2n}{10d^8(d+ex)} \\ & -\frac{131be^2n\log(x)}{10d^9}-\frac{a+b\log(cx^n)}{2d^7x^2}+\frac{7e(a+b\log(cx^n))}{d^8x} \\ & +\frac{e^2(a+b\log(cx^n))}{6d^3(d+ex)^6}+\frac{3e^2(a+b\log(cx^n))}{5d^4(d+ex)^5}+\frac{3e^2(a+b\log(cx^n))}{2d^5(d+ex)^4} \\ & +\frac{10e^2(a+b\log(cx^n))}{3d^6(d+ex)^3}+\frac{15e^2(a+b\log(cx^n))}{2d^7(d+ex)^2} \\ & -\frac{21e^3x(a+b\log(cx^n))}{d^9(d+ex)}-\frac{28e^2\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^9} \\ & +\frac{341be^2n\log(d+ex)}{10d^9}+\frac{28be^2n\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^9}\end{aligned}$$

output
```
-1/4*b*n/d^7/x^2+7*b*e*n/d^8/x-1/30*b*e^2*n/d^4/(e*x+d)^5-23/120*b*e^2*n/d
^5/(e*x+d)^4-34/45*b*e^2*n/d^6/(e*x+d)^3-14/5*b*e^2*n/d^7/(e*x+d)^2-131/10
*b*e^2*n/d^8/(e*x+d)-131/10*b*e^2*n*ln(x)/d^9-1/2*(a+b*ln(c*x^n))/d^7/x^2+
7*e*(a+b*ln(c*x^n))/d^8/x+1/6*e^2*(a+b*ln(c*x^n))/d^3/(e*x+d)^6+3/5*e^2*(a
+b*ln(c*x^n))/d^4/(e*x+d)^5+3/2*e^2*(a+b*ln(c*x^n))/d^5/(e*x+d)^4+10/3*e^2
*(a+b*ln(c*x^n))/d^6/(e*x+d)^3+15/2*e^2*(a+b*ln(c*x^n))/d^7/(e*x+d)^2-21*e
^3*x*(a+b*ln(c*x^n))/d^9/(e*x+d)-28*e^2*ln(1+d/e/x)*(a+b*ln(c*x^n))/d^9+34
1/10*b*e^2*n*ln(e*x+d)/d^9+28*b*e^2*n*polylog(2,-d/e/x)/d^9
```

Mathematica [A] (verified)

Time = 0.63 (sec) , antiderivative size = 486, normalized size of antiderivative = 1.21

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^7}\,dx = \frac{-\frac{180ad^2}{x^2}-\frac{90bd^2n}{x^2}+\frac{2520ade}{x}+\frac{2520bden}{x}+\frac{60ad^6e^2}{(d+ex)^6}+\frac{216ad^5e^2}{(d+ex)^5}-\frac{12bd^5e^2n}{(d+ex)^5}+\frac{540ad^4e^2}{(d+ex)^4}-\frac{69bd^4e^2n}{(d+ex)^4}+\frac{1200ad^3e^2}{(d+ex)^3}-\frac{272b}{(d+}}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x)^7),x]
```

output
```
((-180*a*d^2)/x^2 - (90*b*d^2*n)/x^2 + (2520*a*d*e)/x + (2520*b*d*e*n)/x +
 (60*a*d^6*e^2)/(d + e*x)^6 + (216*a*d^5*e^2)/(d + e*x)^5 - (12*b*d^5*e^2*
n)/(d + e*x)^5 + (540*a*d^4*e^2)/(d + e*x)^4 - (69*b*d^4*e^2*n)/(d + e*x)^
4 + (1200*a*d^3*e^2)/(d + e*x)^3 - (272*b*d^3*e^2*n)/(d + e*x)^3 + (2700*a
*d^2*e^2)/(d + e*x)^2 - (1008*b*d^2*e^2*n)/(d + e*x)^2 + (7560*a*d*e^2)/(d
 + e*x) - (4716*b*d*e^2*n)/(d + e*x) - 12276*b*e^2*n*Log[x] + (10080*a*e^2
*Log[c*x^n])/n - (180*b*d^2*Log[c*x^n])/x^2 + (2520*b*d*e*Log[c*x^n])/x +
(60*b*d^6*e^2*Log[c*x^n])/(d + e*x)^6 + (216*b*d^5*e^2*Log[c*x^n])/(d + e*
x)^5 + (540*b*d^4*e^2*Log[c*x^n])/(d + e*x)^4 + (1200*b*d^3*e^2*Log[c*x^n]
)/(d + e*x)^3 + (2700*b*d^2*e^2*Log[c*x^n])/(d + e*x)^2 + (7560*b*d*e^2*Lo
g[c*x^n])/(d + e*x) + (5040*b*e^2*Log[c*x^n]^2)/n + 12276*b*e^2*n*Log[d +
e*x] - 10080*a*e^2*Log[1 + (e*x)/d] - 10080*b*e^2*Log[c*x^n]*Log[1 + (e*x)
/d] - 10080*b*e^2*n*PolyLog[2, -((e*x)/d)])/(360*d^9)
```

Rubi [A] (verified)

Time = 0.95 (sec) , antiderivative size = 401, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^7}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(-\frac{21e^3(a+b\log(cx^n))}{d^8(d+ex)^2}+\frac{28e^2(a+b\log(cx^n))}{d^8x(d+ex)}-\frac{7e(a+b\log(cx^n))}{d^8x^2}-\frac{15e^3(a+b\log(cx^n))}{d^7(d+ex)^3}+\frac{a+b\log(cx^n)}{d^7x^3}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\frac{21e^3x(a+b\log(cx^n))}{d^9(d+ex)}-\frac{28e^2\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^9}+\frac{7e(a+b\log(cx^n))}{d^8x}+\frac{15e^2(a+b\log(cx^n))}{2d^7(d+ex)^2}-\frac{a+b\log(cx^n)}{2d^7x^2}+\frac{10e^2(a+b\log(cx^n))}{3d^6(d+ex)^3}+\frac{3e^2(a+b\log(cx^n))}{2d^5(d+ex)^4}+\frac{3e^2(a+b\log(cx^n))}{5d^4(d+ex)^5}+\frac{e^2(a+b\log(cx^n))}{6d^3(d+ex)^6}+\frac{28be^2n\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^9}-\frac{131be^2n\log(x)}{10d^9}+\frac{341be^2n\log(d+ex)}{10d^9}-\frac{131be^2n}{10d^8(d+ex)}+\frac{7ben}{d^8x}-\frac{14be^2n}{5d^7(d+ex)^2}-\frac{bn}{4d^7x^2}-\frac{34be^2n}{45d^6(d+ex)^3}-\frac{23be^2n}{120d^5(d+ex)^4}-\frac{be^2n}{30d^4(d+ex)^5}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x)^7),x]
```

output
```
-1/4*(b*n)/(d^7*x^2) + (7*b*e*n)/(d^8*x) - (b*e^2*n)/(30*d^4*(d + e*x)^5)
- (23*b*e^2*n)/(120*d^5*(d + e*x)^4) - (34*b*e^2*n)/(45*d^6*(d + e*x)^3) -
 (14*b*e^2*n)/(5*d^7*(d + e*x)^2) - (131*b*e^2*n)/(10*d^8*(d + e*x)) - (13
1*b*e^2*n*Log[x])/(10*d^9) - (a + b*Log[c*x^n])/(2*d^7*x^2) + (7*e*(a + b*
Log[c*x^n]))/(d^8*x) + (e^2*(a + b*Log[c*x^n]))/(6*d^3*(d + e*x)^6) + (3*e
^2*(a + b*Log[c*x^n]))/(5*d^4*(d + e*x)^5) + (3*e^2*(a + b*Log[c*x^n]))/(2
*d^5*(d + e*x)^4) + (10*e^2*(a + b*Log[c*x^n]))/(3*d^6*(d + e*x)^3) + (15*
e^2*(a + b*Log[c*x^n]))/(2*d^7*(d + e*x)^2) - (21*e^3*x*(a + b*Log[c*x^n])
)/(d^9*(d + e*x)) - (28*e^2*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d^9 + (34
1*b*e^2*n*Log[d + e*x])/(10*d^9) + (28*b*e^2*n*PolyLog[2, -(d/(e*x))])/d^9
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 10.52 (sec) , antiderivative size = 594, normalized size of antiderivative = 1.48

method	result
risch	$-\frac{28b\ln(x^n)e^2\ln(ex+d)}{d^9}+\frac{21b\ln(x^n)e^2}{d^8(ex+d)}+\frac{15b\ln(x^n)e^2}{2d^7(ex+d)^2}+\frac{10b\ln(x^n)e^2}{3d^6(ex+d)^3}+\frac{3b\ln(x^n)e^2}{2d^5(ex+d)^4}+\frac{3b\ln(x^n)e^2}{5d^4(ex+d)^5}+\frac{b\ln(x^n)e^2}{6d^3(ex+d)^6}-$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
-28*b*ln(x^n)/d^9*e^2*ln(e*x+d)+21*b*ln(x^n)/d^8*e^2/(e*x+d)+15/2*b*ln(x^n
)/d^7*e^2/(e*x+d)^2+10/3*b*ln(x^n)/d^6/(e*x+d)^3*e^2+3/2*b*ln(x^n)/d^5/(e*
x+d)^4*e^2+3/5*b*ln(x^n)/d^4/(e*x+d)^5*e^2+1/6*b*ln(x^n)/d^3/(e*x+d)^6*e^2
-1/2*b*ln(x^n)/d^7/x^2+28*b*ln(x^n)/d^9*e^2*ln(x)+7*b*ln(x^n)/d^8*e/x-131/
10*b*e^2*n/d^8/(e*x+d)+341/10*b*e^2*n*ln(e*x+d)/d^9-14/5*b*e^2*n/d^7/(e*x+
d)^2-34/45*b*e^2*n/d^6/(e*x+d)^3-23/120*b*e^2*n/d^5/(e*x+d)^4-1/30*b*e^2*n
/d^4/(e*x+d)^5-1/4*b*n/d^7/x^2+7*b*e*n/d^8/x-341/10*b*e^2*n*ln(x)/d^9-14*b
*n/d^9*e^2*ln(x)^2+28*b*n/d^9*e^2*ln(e*x+d)*ln(-e*x/d)+28*b*n/d^9*e^2*dilo
g(-e*x/d)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*c
sgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)
^2*csgn(I*c)+b*ln(c)+a)*(-28/d^9*e^2*ln(e*x+d)+21/d^8*e^2/(e*x+d)+15/2/d^7
*e^2/(e*x+d)^2+10/3/d^6/(e*x+d)^3*e^2+3/2/d^5/(e*x+d)^4*e^2+3/5/d^4/(e*x+d
)^5*e^2+1/6/d^3/(e*x+d)^6*e^2-1/2/d^7/x^2+28/d^9*e^2*ln(x)+7/d^8*e/x)
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^3(d+ex)^7}\,dx=\int \frac{b\log\left(cx^n\right)+a}{(ex+d)^7x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^7,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^7*x^10 + 7*d*e^6*x^9 + 21*d^2*e^5*x^8 + 35*
d^3*e^4*x^7 + 35*d^4*e^3*x^6 + 21*d^5*e^2*x^5 + 7*d^6*e*x^4 + d^7*x^3), x)
```

Sympy [A] (verification not implemented)

Time = 175.82 (sec) , antiderivative size = 1737, normalized size of antiderivative = 4.33

$$\int \frac{a+b\log\left(cx^n\right)}{x^3(d+ex)^7}\,dx=\text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x+d)**7,x)
```

output
```
-a*e**3*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))/d**3
- 3*a*e**3*Piecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))/d*
*4 - 6*a*e**3*Piecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True))
/d**5 - 10*a*e**3*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), Tr
ue))/d**6 - 15*a*e**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2)
, True))/d**7 - a/(2*d**7*x**2) - 21*a*e**3*Piecewise((x/d**2, Eq(e, 0)),
(-1/(d*e + e**2*x), True))/d**8 + 7*a*e/(d**8*x) - 28*a*e**3*Piecewise((x/
d, Eq(e, 0)), (log(d + e*x)/e, True))/d**9 + 28*a*e**2*log(x)/d**9 + b*e**
3*n*Piecewise((x/d**7, Eq(e, 0)), (-137*d**4/(360*d**10*e + 1800*d**9*e**2
*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360
*d**5*e**6*x**5) - 385*d**3*e*x/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**
8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x*
*5) - 470*d**2*e**2*x**2/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*
x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 2
70*d*e**3*x**3/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 360
0*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 60*e**4*x**
4/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x
**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - log(x)/(6*d**6*e) + log(
d/e + x)/(6*d**6*e), True))/d**3 - b*e**3*Piecewise((x/d**7, Eq(e, 0)), (-
1/(6*e*(d + e*x)**6), True))*log(c*x**n)/d**3 + 3*b*e**3*n*Piecewise((x...
```

Maxima [F]

$$\int \frac{a + b\log(cx^n)}{x^3(d + ex)^7} \, dx = \int \frac{b\log(cx^n) + a}{(ex + d)^7 x^3} \, dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^7,x, algorithm="maxima")
```

output
```
1/30*a*((840*e^7*x^7 + 4620*d*e^6*x^6 + 10360*d^2*e^5*x^5 + 11970*d^3*e^4*
x^4 + 7308*d^4*e^3*x^3 + 2058*d^5*e^2*x^2 + 120*d^6*e*x - 15*d^7)/(d^8*e^6
*x^8 + 6*d^9*e^5*x^7 + 15*d^10*e^4*x^6 + 20*d^11*e^3*x^5 + 15*d^12*e^2*x^4
 + 6*d^13*e*x^3 + d^14*x^2) - 840*e^2*log(e*x + d)/d^9 + 840*e^2*log(x)/d^
9) + b*integrate((log(c) + log(x^n))/(e^7*x^10 + 7*d*e^6*x^9 + 21*d^2*e^5*
x^8 + 35*d^3*e^4*x^7 + 35*d^4*e^3*x^6 + 21*d^5*e^2*x^5 + 7*d^6*e*x^4 + d^7
*x^3), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^7}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^7x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^7,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^7*x^3), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^7}\,dx = \int \frac{a+b\ln(c\,x^n)}{x^3\,(d+e\,x)^7}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^7),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^7), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^7}\,dx = \text{Too large to display}$$

input
```
int((a+b*log(c*x^n))/x^3/(e*x+d)^7,x)
```

output

```
(30*int(log(x**n*c)/(d**7*x**3 + 7*d**6*e*x**4 + 21*d**5*e**2*x**5 + 35*d*
*4*e**3*x**6 + 35*d**3*e**4*x**7 + 21*d**2*e**5*x**8 + 7*d*e**6*x**9 + e**
7*x**10),x)*b*d**15*x**2 + 180*int(log(x**n*c)/(d**7*x**3 + 7*d**6*e*x**4
+ 21*d**5*e**2*x**5 + 35*d**4*e**3*x**6 + 35*d**3*e**4*x**7 + 21*d**2*e**5
*x**8 + 7*d*e**6*x**9 + e**7*x**10),x)*b*d**14*e*x**3 + 450*int(log(x**n*c
)/(d**7*x**3 + 7*d**6*e*x**4 + 21*d**5*e**2*x**5 + 35*d**4*e**3*x**6 + 35*
d**3*e**4*x**7 + 21*d**2*e**5*x**8 + 7*d*e**6*x**9 + e**7*x**10),x)*b*d**1
3*e**2*x**4 + 600*int(log(x**n*c)/(d**7*x**3 + 7*d**6*e*x**4 + 21*d**5*e**
2*x**5 + 35*d**4*e**3*x**6 + 35*d**3*e**4*x**7 + 21*d**2*e**5*x**8 + 7*d*e
**6*x**9 + e**7*x**10),x)*b*d**12*e**3*x**5 + 450*int(log(x**n*c)/(d**7*x*
*3 + 7*d**6*e*x**4 + 21*d**5*e**2*x**5 + 35*d**4*e**3*x**6 + 35*d**3*e**4*
x**7 + 21*d**2*e**5*x**8 + 7*d*e**6*x**9 + e**7*x**10),x)*b*d**11*e**4*x**
6 + 180*int(log(x**n*c)/(d**7*x**3 + 7*d**6*e*x**4 + 21*d**5*e**2*x**5 + 3
5*d**4*e**3*x**6 + 35*d**3*e**4*x**7 + 21*d**2*e**5*x**8 + 7*d*e**6*x**9 +
 e**7*x**10),x)*b*d**10*e**5*x**7 + 30*int(log(x**n*c)/(d**7*x**3 + 7*d**6
*e*x**4 + 21*d**5*e**2*x**5 + 35*d**4*e**3*x**6 + 35*d**3*e**4*x**7 + 21*d
**2*e**5*x**8 + 7*d*e**6*x**9 + e**7*x**10),x)*b*d**9*e**6*x**8 - 840*log(
d + e*x)*a*d**6*e**2*x**2 - 5040*log(d + e*x)*a*d**5*e**3*x**3 - 12600*log
(d + e*x)*a*d**4*e**4*x**4 - 16800*log(d + e*x)*a*d**3*e**5*x**5 - 12600*l
og(d + e*x)*a*d**2*e**6*x**6 - 5040*log(d + e*x)*a*d*e**7*x**7 - 840*lo...
```

3.74 $\int \frac{\log(cx)}{1-cx} \, dx$

Optimal result . . . 698
Mathematica [A] (verified) . . . 698
Rubi [A] (verified) . . . 699
Maple [A] (verified) . . . 699
Fricas [A] (verification not implemented) . . . 700
Sympy [F] . . . 700
Maxima [B] (verification not implemented) . . . 701
Giac [F] . . . 701
Mupad [B] (verification not implemented) . . . 701
Reduce [F] . . . 702

Optimal result

Integrand size = 13, antiderivative size = 12

$$\int \frac{\log(cx)}{1-cx} \, dx = \frac{\text{PolyLog}(2,1-cx)}{c}$$

output
```
polylog(2,-c*x+1)/c
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\log(cx)}{1-cx} \, dx = \frac{\text{PolyLog}(2,1-cx)}{c}$$

input
```
Integrate[Log[c*x]/(1 - c*x),x]
```

output
```
PolyLog[2, 1 - c*x]/c
```

Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$, Rules used = $\{2752\}$

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log(cx)}{1-cx} \, dx$$
$$\Big\downarrow \text{ 2752}$$
$$\frac{\text{PolyLog}(2, 1-cx)}{c}$$

input
```
Int[Log[c*x]/(1 - c*x),x]
```

output
```
PolyLog[2, 1 - c*x]/c
```

Defintions of rubi rules used

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Maple [A] (verified)

Time = 0.28 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.75

method	result	size
derivativedivides	$\frac{\text{dilog}(xc)}{c}$	9
default	$\frac{\text{dilog}(xc)}{c}$	9
risch	$\frac{\text{dilog}(xc)}{c}$	9
parts	$-\frac{\ln(xc)\ln(xc-1)}{c}+\frac{\text{dilog}(xc)+\ln(xc-1)\ln(xc)}{c}$	37

input
```
int(ln(x*c)/(-c*x+1),x,method=_RETURNVERBOSE)
```

output
```
1/c*dilog(x*c)
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

$$\int \frac{\log(cx)}{1-cx}\,dx = \frac{\mathrm{Li}_2(-cx+1)}{c}$$

input
```
integrate(log(c*x)/(-c*x+1),x, algorithm="fricas")
```

output
```
dilog(-c*x + 1)/c
```

Sympy [F]

$$\int \frac{\log(cx)}{1-cx}\,dx = -\int \frac{\log(cx)}{cx-1}\,dx$$

input
```
integrate(ln(c*x)/(-c*x+1),x)
```

output
```
-Integral(log(c*x)/(c*x - 1), x)
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. $2(11) = 22$.

Time = 0.03 (sec) , antiderivative size = 48, normalized size of antiderivative = 4.00

$$\int \frac{\log(cx)}{1-cx}\,dx = -\frac{\log(cx-1)\log(cx)}{c} + \frac{\log(cx-1)\log(x)}{c} - \frac{\log(-cx+1)\log(x) + \mathrm{Li}_2(cx)}{c}$$

input
```
integrate(log(c*x)/(-c*x+1),x, algorithm="maxima")
```

output
```
-log(c*x - 1)*log(c*x)/c + log(c*x - 1)*log(x)/c - (log(-c*x + 1)*log(x) +
 dilog(c*x))/c
```

Giac [F]

$$\int \frac{\log(cx)}{1-cx}\,dx = \int -\frac{\log(cx)}{cx-1}\,dx$$

input
```
integrate(log(c*x)/(-c*x+1),x, algorithm="giac")
```

output
```
integrate(-log(c*x)/(c*x - 1), x)
```

Mupad [B] (verification not implemented)

Time = 26.97 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.67

$$\int \frac{\log(cx)}{1-cx}\,dx = \frac{\mathrm{Li}_2(c\,x)}{c}$$

input
```
int(-log(c*x)/(c*x - 1),x)
```

output
```
dilog(c*x)/c
```

Reduce [F]

$$\int \frac{\log(cx)}{1-cx}\,dx = \frac{-2\left(\int \frac{\log(cx)}{c\,x^2-x}dx\right)-\log(cx)^2}{2c}$$

input
```
int(log(c*x)/(-c*x+1),x)
```

output
```
( - 2*int(log(c*x)/(c*x**2 - x),x) - log(c*x)**2)/(2*c)
```

3.75 $\int \frac{\log\left(\frac{x}{c}\right)}{c-x} dx$

Optimal result 703
Mathematica [A] (verified) 703
Rubi [A] (verified) 704
Maple [A] (verified) 704
Fricas [A] (verification not implemented) 705
Sympy [F] 705
Maxima [B] (verification not implemented) 706
Giac [F] 706
Mupad [B] (verification not implemented) 706
Reduce [F] 707

Optimal result

Integrand size = 14, antiderivative size = 10

$$\int \frac{\log\left(\frac{x}{c}\right)}{c-x} dx = \text{PolyLog}\left(2, 1 - \frac{x}{c}\right)$$

output
```
polylog(2,1-x/c)
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 11, normalized size of antiderivative = 1.10

$$\int \frac{\log\left(\frac{x}{c}\right)}{c-x} dx = \text{PolyLog}\left(2, \frac{c-x}{c}\right)$$

input
```
Integrate[Log[x/c]/(c - x),x]
```

output
```
PolyLog[2, (c - x)/c]
```

Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log \left(\frac{x}{c}\right)}{c-x} \, dx$$

$$\Big\downarrow \; 2752$$

$$\text{PolyLog}\left(2,1-\frac{x}{c}\right)$$

input
```
Int[Log[x/c]/(c - x),x]
```

output
```
PolyLog[2, 1 - x/c]
```

Defintions of rubi rules used

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Maple [A] (verified)

Time = 0.46 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.70

method	result	size
derivativedivides	$\operatorname{dilog}\left(\frac{x}{c}\right)$	7
default	$\operatorname{dilog}\left(\frac{x}{c}\right)$	7
risch	$\operatorname{dilog}\left(\frac{x}{c}\right)$	7
parts	$\operatorname{dilog}\left(\frac{x}{c}\right)$	7

input
```
int(ln(x/c)/(c-x),x,method=_RETURNVERBOSE)
```

output
```
dilog(x/c)
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.90

$$\int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx = \text{Li}_2\left(-\frac{x}{c}+1\right)$$

input
```
integrate(log(x/c)/(c-x),x, algorithm="fricas")
```

output
```
dilog(-x/c + 1)
```

Sympy [F]

$$\int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx = -\int \frac{\log\left(\frac{x}{c}\right)}{-c+x}\,dx$$

input
```
integrate(ln(x/c)/(c-x),x)
```

output
```
-Integral(log(x/c)/(-c + x), x)
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. $2(9) = 18$.

Time = 0.03 (sec) , antiderivative size = 45, normalized size of antiderivative = 4.50

$$\int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx = \log(c-x)\log(x) - \log(c-x)\log\left(\frac{x}{c}\right) - \log(x)\log\left(-\frac{x}{c}+1\right) - \mathrm{Li}_2\left(\frac{x}{c}\right)$$

input
```
integrate(log(x/c)/(c-x),x, algorithm="maxima")
```

output
```
log(c - x)*log(x) - log(c - x)*log(x/c) - log(x)*log(-x/c + 1) - dilog(x/c
)
```

Giac [F]

$$\int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx = \int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx$$

input
```
integrate(log(x/c)/(c-x),x, algorithm="giac")
```

output
```
integrate(log(x/c)/(c - x), x)
```

Mupad [B] (verification not implemented)

Time = 28.42 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.60

$$\int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx = \mathrm{Li}_2\left(\frac{x}{c}\right)$$

input
```
int(log(x/c)/(c - x),x)
```

output
```
dilog(x/c)
```

Reduce [F]

$$\int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx = \left(\int \frac{\log\left(\frac{x}{c}\right)}{cx-x^2}dx\right)c - \frac{\log\left(\frac{x}{c}\right)^2}{2}$$

input
```
int(log(x/c)/(c-x),x)
```

output
```
(2*int(log(x/c)/(c*x - x**2),x)*c - log(x/c)**2)/2
```

3.76 $\int x^2(d+ex)(a+b\log(cx^n))^2\,dx$

Optimal result . . . 708
Mathematica [A] (verified) . . . 708
Rubi [A] (verified) . . . 709
Maple [A] (verified) . . . 710
Fricas [B] (verification not implemented) . . . 711
Sympy [A] (verification not implemented) . . . 711
Maxima [A] (verification not implemented) . . . 712
Giac [B] (verification not implemented) . . . 712
Mupad [B] (verification not implemented) . . . 714
Reduce [B] (verification not implemented) . . . 714

Optimal result

Integrand size = 21, antiderivative size = 109

$$\int x^2(d+ex)(a+b\log(cx^n))^2\,dx = \frac{2}{27}b^2dn^2x^3+\frac{1}{32}b^2en^2x^4-\frac{2}{9}bdnx^3(a+b\log(cx^n)) - \frac{1}{8}benx^4(a+b\log(cx^n)) + \frac{1}{3}dx^3(a+b\log(cx^n))^2+\frac{1}{4}ex^4(a+b\log(cx^n))^2$$

output
```
2/27*b^2*d*n^2*x^3+1/32*b^2*e*n^2*x^4-2/9*b*d*n*x^3*(a+b*ln(c*x^n))-1/8*b*
e*n*x^4*(a+b*ln(c*x^n))+1/3*d*x^3*(a+b*ln(c*x^n))^2+1/4*e*x^4*(a+b*ln(c*x^
n))^2
```

Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 82, normalized size of antiderivative = 0.75

$$\int x^2(d+ex)(a+b\log(cx^n))^2\,dx = \frac{1}{864}x^3\left(27benx(-4a+bn-4b\log(cx^n)) + 64bdn(-3a+bn-3b\log(cx^n)) + 288d(a+b\log(cx^n))^2+216ex(a+b\log(cx^n))^2\right)$$

input
```
Integrate[x^2*(d + e*x)*(a + b*Log[c*x^n])^2,x]
```

output
```
(x^3*(27*b*e*n*x*(-4*a + b*n - 4*b*Log[c*x^n]) + 64*b*d*n*(-3*a + b*n - 3*
b*Log[c*x^n]) + 288*d*(a + b*Log[c*x^n])^2 + 216*e*x*(a + b*Log[c*x^n])^2)
)/864
```

Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(dx^2\left(a+b\log\left(cx^n\right)\right)^2+ex^3\left(a+b\log\left(cx^n\right)\right)^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{3}dx^3\left(a+b\log\left(cx^n\right)\right)^2-\frac{2}{9}bdnx^3\left(a+b\log\left(cx^n\right)\right)+\frac{1}{4}ex^4\left(a+b\log\left(cx^n\right)\right)^2-\frac{1}{8}benx^4\left(a+b\log\left(cx^n\right)\right)+\frac{2}{27}b^2dn^2x^3+\frac{1}{32}b^2en^2x^4$$

input
```
Int[x^2*(d + e*x)*(a + b*Log[c*x^n])^2,x]
```

output
```
(2*b^2*d*n^2*x^3)/27 + (b^2*e*n^2*x^4)/32 - (2*b*d*n*x^3*(a + b*Log[c*x^n]
))/9 - (b*e*n*x^4*(a + b*Log[c*x^n]))/8 + (d*x^3*(a + b*Log[c*x^n])^2)/3 +
 (e*x^4*(a + b*Log[c*x^n])^2)/4
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [A] (verified)

Time = 0.42 (sec) , antiderivative size = 156, normalized size of antiderivative = 1.43

method	result
parallelrisch	$\frac{x^4 \ln(c\,x^n)^2 b^2 e}{4}-\frac{\ln(c\,x^n) x^4 n\,b^2 e}{8}+\frac{b^2 e\,n^2 x^4}{32}+\frac{\ln(c\,x^n) x^4 e a b}{2}-\frac{a b e n\,x^4}{8}+\frac{x^3 \ln(c\,x^n)^2 b^2 d}{3}-\frac{2 \ln(c\,x^n) x^3 n\,b^2 d}{9}$
risch	Expression too large to display

input
```
int(x^2*(e*x+d)*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
1/4*x^4*ln(c*x^n)^2*b^2*e-1/8*ln(c*x^n)*x^4*n*b^2*e+1/32*b^2*e*n^2*x^4+1/2
*ln(c*x^n)*x^4*e*a*b-1/8*a*b*e*n*x^4+1/3*x^3*ln(c*x^n)^2*b^2*d-2/9*ln(c*x^
n)*x^3*n*b^2*d+2/27*b^2*d*n^2*x^3+1/4*a^2*e*x^4+2/3*ln(c*x^n)*x^3*d*a*b-2/
9*a*b*d*n*x^3+1/3*a^2*d*x^3
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 219 vs. $2(97) = 194$.

Time = 0.07 (sec) , antiderivative size = 219, normalized size of antiderivative = 2.01

$$
\begin{aligned}
&\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx \\
&= \frac{1}{32}\left(b^2en^2-4\,aben+8\,a^2e\right)x^4+\frac{1}{27}\left(2\,b^2dn^2-6\,abdn+9\,a^2d\right)x^3 \\
&\quad+\frac{1}{12}\left(3\,b^2ex^4+4\,b^2dx^3\right)\log\left(c\right)^2+\frac{1}{12}\left(3\,b^2en^2x^4+4\,b^2dn^2x^3\right)\log\left(x\right)^2 \\
&\quad-\frac{1}{72}\left(9\left(b^2en-4\,abe\right)x^4+16\left(b^2dn-3\,abd\right)x^3\right)\log\left(c\right) \\
&\quad-\frac{1}{72}\left(9\left(b^2en^2-4\,aben\right)x^4+16\left(b^2dn^2-3\,abdn\right)x^3-12\left(3\,b^2enx^4+4\,b^2dnx^3\right)\log\left(c\right)\right)\log\left(x\right)
\end{aligned}
$$

input
```
integrate(x^2*(e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
1/32*(b^2*e*n^2 - 4*a*b*e*n + 8*a^2*e)*x^4 + 1/27*(2*b^2*d*n^2 - 6*a*b*d*n
 + 9*a^2*d)*x^3 + 1/12*(3*b^2*e*x^4 + 4*b^2*d*x^3)*log(c)^2 + 1/12*(3*b^2*
e*n^2*x^4 + 4*b^2*d*n^2*x^3)*log(x)^2 - 1/72*(9*(b^2*e*n - 4*a*b*e)*x^4 +
16*(b^2*d*n - 3*a*b*d)*x^3)*log(c) - 1/72*(9*(b^2*e*n^2 - 4*a*b*e*n)*x^4 +
 16*(b^2*d*n^2 - 3*a*b*d*n)*x^3 - 12*(3*b^2*e*n*x^4 + 4*b^2*d*n*x^3)*log(c
))*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 185, normalized size of antiderivative = 1.70

$$
\begin{aligned}
\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx &= \frac{a^2dx^3}{3}+\frac{a^2ex^4}{4}-\frac{2abdnx^3}{9}+\frac{2abdx^3\log\left(cx^n\right)}{3} \\
&\quad-\frac{abenx^4}{8}+\frac{abex^4\log\left(cx^n\right)}{2}+\frac{2b^2dn^2x^3}{27} \\
&\quad-\frac{2b^2dnx^3\log\left(cx^n\right)}{9}+\frac{b^2dx^3\log\left(cx^n\right)^2}{3} \\
&\quad+\frac{b^2en^2x^4}{32}-\frac{b^2enx^4\log\left(cx^n\right)}{8}+\frac{b^2ex^4\log\left(cx^n\right)^2}{4}
\end{aligned}
$$

input
```
integrate(x**2*(e*x+d)*(a+b*ln(c*x**n))**2,x)
```

output
```
a**2*d*x**3/3 + a**2*e*x**4/4 - 2*a*b*d*n*x**3/9 + 2*a*b*d*x**3*log(c*x**n
)/3 - a*b*e*n*x**4/8 + a*b*e*x**4*log(c*x**n)/2 + 2*b**2*d*n**2*x**3/27 -
2*b**2*d*n*x**3*log(c*x**n)/9 + b**2*d*x**3*log(c*x**n)**2/3 + b**2*e*n**2
*x**4/32 - b**2*e*n*x**4*log(c*x**n)/8 + b**2*e*x**4*log(c*x**n)**2/4
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 151, normalized size of antiderivative = 1.39

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx = \frac{1}{4}\,b^2ex^4\log\left(cx^n\right)^2 - \frac{1}{8}\,abenx^4 + \frac{1}{2}\,abex^4\log\left(cx^n\right) + \frac{1}{3}\,b^2dx^3\log\left(cx^n\right)^2 - \frac{2}{9}\,abdnx^3 + \frac{1}{4}\,a^2ex^4 + \frac{2}{3}\,abdx^3\log\left(cx^n\right) + \frac{1}{3}\,a^2dx^3 + \frac{2}{27}\,\left(n^2x^3 - 3\,nx^3\log\left(cx^n\right)\right)b^2d + \frac{1}{32}\,\left(n^2x^4 - 4\,nx^4\log\left(cx^n\right)\right)b^2e$$

input
```
integrate(x^2*(e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
1/4*b^2*e*x^4*log(c*x^n)^2 - 1/8*a*b*e*n*x^4 + 1/2*a*b*e*x^4*log(c*x^n) +
1/3*b^2*d*x^3*log(c*x^n)^2 - 2/9*a*b*d*n*x^3 + 1/4*a^2*e*x^4 + 2/3*a*b*d*x
^3*log(c*x^n) + 1/3*a^2*d*x^3 + 2/27*(n^2*x^3 - 3*n*x^3*log(c*x^n))*b^2*d
+ 1/32*(n^2*x^4 - 4*n*x^4*log(c*x^n))*b^2*e
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 241 vs. 2(97) = 194.

Time = 0.12 (sec) , antiderivative size = 241, normalized size of antiderivative = 2.21

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx=\frac{1}{4}\,b^2en^2x^4\log\left(x\right)^2-\frac{1}{8}\,b^2en^2x^4\log\left(x\right)+\frac{1}{2}\,b^2enx^4\log\left(c\right)\log\left(x\right)+\frac{1}{3}\,b^2dn^2x^3\log\left(x\right)^2+\frac{1}{32}\,b^2en^2x^4-\frac{1}{8}\,b^2enx^4\log\left(c\right)+\frac{1}{4}\,b^2ex^4\log\left(c\right)^2-\frac{2}{9}\,b^2dn^2x^3\log\left(x\right)+\frac{1}{2}\,abenx^4\log\left(x\right)+\frac{2}{3}\,b^2dnx^3\log\left(c\right)\log\left(x\right)+\frac{2}{27}\,b^2dn^2x^3-\frac{1}{8}\,abenx^4-\frac{2}{9}\,b^2dnx^3\log\left(c\right)+\frac{1}{2}\,abex^4\log\left(c\right)+\frac{1}{3}\,b^2dx^3\log\left(c\right)^2+\frac{2}{3}\,abdnx^3\log\left(x\right)-\frac{2}{9}\,abdnx^3+\frac{1}{4}\,a^2ex^4+\frac{2}{3}\,abdx^3\log\left(c\right)+\frac{1}{3}\,a^2dx^3$$

input
```
integrate(x^2*(e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
1/4*b^2*e*n^2*x^4*log(x)^2 - 1/8*b^2*e*n^2*x^4*log(x) + 1/2*b^2*e*n*x^4*lo
g(c)*log(x) + 1/3*b^2*d*n^2*x^3*log(x)^2 + 1/32*b^2*e*n^2*x^4 - 1/8*b^2*e*
n*x^4*log(c) + 1/4*b^2*e*x^4*log(c)^2 - 2/9*b^2*d*n^2*x^3*log(x) + 1/2*a*b
*e*n*x^4*log(x) + 2/3*b^2*d*n*x^3*log(c)*log(x) + 2/27*b^2*d*n^2*x^3 - 1/8
*a*b*e*n*x^4 - 2/9*b^2*d*n*x^3*log(c) + 1/2*a*b*e*x^4*log(c) + 1/3*b^2*d*x
^3*log(c)^2 + 2/3*a*b*d*n*x^3*log(x) - 2/9*a*b*d*n*x^3 + 1/4*a^2*e*x^4 + 2
/3*a*b*d*x^3*log(c) + 1/3*a^2*d*x^3
```

Mupad [B] (verification not implemented)

Time = 29.02 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.06

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx=\ln\left(c\,x^n\right)^2\left(\frac{e\,b^2\,x^4}{4}+\frac{d\,b^2\,x^3}{3}\right)+\ln\left(c\,x^n\right)\left(\frac{b\,e\,(4\,a-b\,n)\,x^4}{8}+\frac{2\,b\,d\,(3\,a-b\,n)\,x^3}{9}\right)+\frac{d\,x^3\,(9\,a^2-6\,a\,b\,n+2\,b^2\,n^2)}{27}+\frac{e\,x^4\,(8\,a^2-4\,a\,b\,n+b^2\,n^2)}{32}$$

input
```
int(x^2*(a + b*log(c*x^n))^2*(d + e*x),x)
```

output
```
log(c*x^n)^2*((b^2*d*x^3)/3 + (b^2*e*x^4)/4) + log(c*x^n)*((2*b*d*x^3*(3*a
 - b*n))/9 + (b*e*x^4*(4*a - b*n))/8) + (d*x^3*(9*a^2 + 2*b^2*n^2 - 6*a*b*
n))/27 + (e*x^4*(8*a^2 + b^2*n^2 - 4*a*b*n))/32
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 130, normalized size of antiderivative = 1.19

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx$$
$$=\frac{x^3\left(288\log(x^nc)^2\,b^2d+216\log(x^nc)^2\,b^2ex+576\log(x^nc)\,abd+432\log(x^nc)\,abex-192\log(x^nc)\,b^2dn-1\right.}{864}$$

input
```
int(x^2*(e*x+d)*(a+b*log(c*x^n))^2,x)
```

output
```
(x**3*(288*log(x**n*c)**2*b**2*d + 216*log(x**n*c)**2*b**2*e*x + 576*log(x
**n*c)*a*b*d + 432*log(x**n*c)*a*b*e*x - 192*log(x**n*c)*b**2*d*n - 108*lo
g(x**n*c)*b**2*e*n*x + 288*a**2*d + 216*a**2*e*x - 192*a*b*d*n - 108*a*b*e
*n*x + 64*b**2*d*n**2 + 27*b**2*e*n**2*x))/864
```

3.77 $\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx$

Optimal result 715
Mathematica [A] (verified) 715
Rubi [A] (verified) 716
Maple [A] (verified) 717
Fricas [B] (verification not implemented) 718
Sympy [A] (verification not implemented) 718
Maxima [A] (verification not implemented) 719
Giac [B] (verification not implemented) 719
Mupad [B] (verification not implemented) 720
Reduce [B] (verification not implemented) 721

Optimal result

Integrand size = 19, antiderivative size = 109

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx=\frac{1}{4}b^2dn^2x^2+\frac{2}{27}b^2en^2x^3-\frac{1}{2}bdnx^2(a+b\log\left(cx^n\right))-\frac{2}{9}benx^3(a+b\log\left(cx^n\right))+\frac{1}{2}dx^2(a+b\log\left(cx^n\right))^2+\frac{1}{3}ex^3(a+b\log\left(cx^n\right))^2$$

output
```
1/4*b^2*d*n^2*x^2+2/27*b^2*e*n^2*x^3-1/2*b*d*n*x^2*(a+b*ln(c*x^n))-2/9*b*e
*n*x^3*(a+b*ln(c*x^n))+1/2*d*x^2*(a+b*ln(c*x^n))^2+1/3*e*x^3*(a+b*ln(c*x^n
))^2
```

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 82, normalized size of antiderivative = 0.75

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx=\frac{1}{108}x^2\left(8benx(-3a+bn-3b\log\left(cx^n\right))+27bdn(-2a+bn-2b\log\left(cx^n\right))+54d(a+b\log\left(cx^n\right))^2+36ex(a+b\log\left(cx^n\right))^2\right)$$

input
```
Integrate[x*(d + e*x)*(a + b*Log[c*x^n])^2,x]
```

output
```
(x^2*(8*b*e*n*x*(-3*a + b*n - 3*b*Log[c*x^n]) + 27*b*d*n*(-2*a + b*n - 2*b
*Log[c*x^n]) + 54*d*(a + b*Log[c*x^n])^2 + 36*e*x*(a + b*Log[c*x^n])^2))/1
08
```

Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.105$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(dx\left(a+b\log\left(cx^n\right)\right)^2+ex^2\left(a+b\log\left(cx^n\right)\right)^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}dx^2\left(a+b\log\left(cx^n\right)\right)^2-\frac{1}{2}bdnx^2\left(a+b\log\left(cx^n\right)\right)+\frac{1}{3}ex^3\left(a+b\log\left(cx^n\right)\right)^2-\frac{2}{9}benx^3\left(a+b\log\left(cx^n\right)\right)+\frac{1}{4}b^2dn^2x^2+\frac{2}{27}b^2en^2x^3$$

input
```
Int[x*(d + e*x)*(a + b*Log[c*x^n])^2,x]
```

output
```
(b^2*d*n^2*x^2)/4 + (2*b^2*e*n^2*x^3)/27 - (b*d*n*x^2*(a + b*Log[c*x^n]))/
2 - (2*b*e*n*x^3*(a + b*Log[c*x^n]))/9 + (d*x^2*(a + b*Log[c*x^n])^2)/2 +
(e*x^3*(a + b*Log[c*x^n])^2)/3
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [A] (verified)

Time = 0.32 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.42

method	result
parallelrisch	$\frac{x^{3} b^{2} \ln\left(c\,x^{n}\right)^{2} e}{3}-\frac{2 \ln\left(c\,x^{n}\right) x^{3} n\,b^{2} e}{9}+\frac{2 b^{2} e\,n^{2} x^{3}}{27}+\frac{2 x^{3} a b \ln\left(c\,x^{n}\right) e}{3}-\frac{2 n b\,x^{3} a e}{9}+\frac{x^{2} b^{2} \ln\left(c\,x^{n}\right)^{2} d}{2}-\frac{\ln\left(c\,x^{n}\right) x^{2} n\,b}{2}$
risch	Expression too large to display

input
```
int(x*(e*x+d)*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
1/3*x^3*b^2*ln(c*x^n)^2*e-2/9*ln(c*x^n)*x^3*n*b^2*e+2/27*b^2*e*n^2*x^3+2/3
*x^3*a*b*ln(c*x^n)*e-2/9*n*b*x^3*a*e+1/2*x^2*b^2*ln(c*x^n)^2*d-1/2*ln(c*x^
n)*x^2*n*b^2*d+1/4*b^2*d*n^2*x^2+1/3*x^3*a^2*e+x^2*a*b*ln(c*x^n)*d-1/2*n*b
*d*a*x^2+1/2*x^2*a^2*d
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 219 vs. 2(97) = 194.

Time = 0.07 (sec) , antiderivative size = 219, normalized size of antiderivative = 2.01

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx$$
$$=\frac{1}{27}\left(2\,b^2en^2-6\,aben+9\,a^2e\right)x^3+\frac{1}{4}\left(b^2dn^2-2\,abdn+2\,a^2d\right)x^2$$
$$+\frac{1}{6}\left(2\,b^2ex^3+3\,b^2dx^2\right)\log\left(c\right)^2+\frac{1}{6}\left(2\,b^2en^2x^3+3\,b^2dn^2x^2\right)\log\left(x\right)^2$$
$$-\frac{1}{18}\left(4\left(b^2en-3\,abe\right)x^3+9\left(b^2dn-2\,abd\right)x^2\right)\log\left(c\right)$$
$$-\frac{1}{18}\left(4\left(b^2en^2-3\,aben\right)x^3+9\left(b^2dn^2-2\,abdn\right)x^2-6\left(2\,b^2enx^3+3\,b^2dnx^2\right)\log\left(c\right)\right)\log\left(x\right)$$

input
```
integrate(x*(e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
1/27*(2*b^2*e*n^2 - 6*a*b*e*n + 9*a^2*e)*x^3 + 1/4*(b^2*d*n^2 - 2*a*b*d*n
+ 2*a^2*d)*x^2 + 1/6*(2*b^2*e*x^3 + 3*b^2*d*x^2)*log(c)^2 + 1/6*(2*b^2*e*n
^2*x^3 + 3*b^2*d*n^2*x^2)*log(x)^2 - 1/18*(4*(b^2*e*n - 3*a*b*e)*x^3 + 9*(
b^2*d*n - 2*a*b*d)*x^2)*log(c) - 1/18*(4*(b^2*e*n^2 - 3*a*b*e*n)*x^3 + 9*(
b^2*d*n^2 - 2*a*b*d*n)*x^2 - 6*(2*b^2*e*n*x^3 + 3*b^2*d*n*x^2)*log(c))*log
(x)
```

Sympy [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 184, normalized size of antiderivative = 1.69

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx=\frac{a^2dx^2}{2}+\frac{a^2ex^3}{3}-\frac{abdnx^2}{2}+abdx^2\log\left(cx^n\right)$$
$$-\frac{2abenx^3}{9}+\frac{2abex^3\log\left(cx^n\right)}{3}+\frac{b^2dn^2x^2}{4}$$
$$-\frac{b^2dnx^2\log\left(cx^n\right)}{2}+\frac{b^2dx^2\log\left(cx^n\right)^2}{2}+\frac{2b^2en^2x^3}{27}$$
$$-\frac{2b^2enx^3\log\left(cx^n\right)}{9}+\frac{b^2ex^3\log\left(cx^n\right)^2}{3}$$

input
```
integrate(x*(e*x+d)*(a+b*ln(c*x**n))**2,x)
```

output
```
a**2*d*x**2/2 + a**2*e*x**3/3 - a*b*d*n*x**2/2 + a*b*d*x**2*log(c*x**n) -
2*a*b*e*n*x**3/9 + 2*a*b*e*x**3*log(c*x**n)/3 + b**2*d*n**2*x**2/4 - b**2*
d*n*x**2*log(c*x**n)/2 + b**2*d*x**2*log(c*x**n)**2/2 + 2*b**2*e*n**2*x**3
/27 - 2*b**2*e*n*x**3*log(c*x**n)/9 + b**2*e*x**3*log(c*x**n)**2/3
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 150, normalized size of antiderivative = 1.38

$$\begin{aligned}\int x(d+ex)\,(a+b\log{(cx^n)})^2\,dx &= \frac{1}{3}\,b^2ex^3\log{(cx^n)}^2 - \frac{2}{9}\,abenx^3 \\ &\quad + \frac{2}{3}\,abex^3\log{(cx^n)} + \frac{1}{2}\,b^2dx^2\log{(cx^n)}^2 \\ &\quad - \frac{1}{2}\,abdnx^2 + \frac{1}{3}\,a^2ex^3 + abdx^2\log{(cx^n)} \\ &\quad + \frac{1}{2}\,a^2dx^2 + \frac{1}{4}\left(n^2x^2 - 2\,nx^2\log{(cx^n)}\right)b^2d \\ &\quad + \frac{2}{27}\left(n^2x^3 - 3\,nx^3\log{(cx^n)}\right)b^2e\end{aligned}$$

input
```
integrate(x*(e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
1/3*b^2*e*x^3*log(c*x^n)^2 - 2/9*a*b*e*n*x^3 + 2/3*a*b*e*x^3*log(c*x^n) +
1/2*b^2*d*x^2*log(c*x^n)^2 - 1/2*a*b*d*n*x^2 + 1/3*a^2*e*x^3 + a*b*d*x^2*l
og(c*x^n) + 1/2*a^2*d*x^2 + 1/4*(n^2*x^2 - 2*n*x^2*log(c*x^n))*b^2*d + 2/2
7*(n^2*x^3 - 3*n*x^3*log(c*x^n))*b^2*e
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 238 vs. $2(97) = 194$.

Time = 0.12 (sec) , antiderivative size = 238, normalized size of antiderivative = 2.18

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx = \frac{1}{3}b^2en^2x^3\log(x)^2 - \frac{2}{9}b^2en^2x^3\log(x) + \frac{2}{3}b^2enx^3\log(c)\log(x) + \frac{1}{2}b^2dn^2x^2\log(x)^2 + \frac{2}{27}b^2en^2x^3 - \frac{2}{9}b^2enx^3\log(c) + \frac{1}{3}b^2ex^3\log(c)^2 - \frac{1}{2}b^2dn^2x^2\log(x) + \frac{2}{3}abenx^3\log(x) + b^2dnx^2\log(c)\log(x) + \frac{1}{4}b^2dn^2x^2 - \frac{2}{9}abenx^3 - \frac{1}{2}b^2dnx^2\log(c) + \frac{2}{3}abex^3\log(c) + \frac{1}{2}b^2dx^2\log(c)^2 + abdnx^2\log(x) - \frac{1}{2}abdnx^2 + \frac{1}{3}a^2ex^3 + abdx^2\log(c) + \frac{1}{2}a^2dx^2$$

input
```
integrate(x*(e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
1/3*b^2*e*n^2*x^3*log(x)^2 - 2/9*b^2*e*n^2*x^3*log(x) + 2/3*b^2*e*n*x^3*lo
g(c)*log(x) + 1/2*b^2*d*n^2*x^2*log(x)^2 + 2/27*b^2*e*n^2*x^3 - 2/9*b^2*e*
n*x^3*log(c) + 1/3*b^2*e*x^3*log(c)^2 - 1/2*b^2*d*n^2*x^2*log(x) + 2/3*a*b
*e*n*x^3*log(x) + b^2*d*n*x^2*log(c)*log(x) + 1/4*b^2*d*n^2*x^2 - 2/9*a*b*
e*n*x^3 - 1/2*b^2*d*n*x^2*log(c) + 2/3*a*b*e*x^3*log(c) + 1/2*b^2*d*x^2*lo
g(c)^2 + a*b*d*n*x^2*log(x) - 1/2*a*b*d*n*x^2 + 1/3*a^2*e*x^3 + a*b*d*x^2*
log(c) + 1/2*a^2*d*x^2
```

Mupad [B] (verification not implemented)

Time = 27.66 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.06

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx = \ln\left(c\,x^n\right)^2\left(\frac{e\,b^2\,x^3}{3}+\frac{d\,b^2\,x^2}{2}\right) + \ln\left(c\,x^n\right)\left(\frac{2\,b\,e\,(3\,a-b\,n)\,x^3}{9} + \frac{b\,d\,(2\,a-b\,n)\,x^2}{2}\right) + \frac{d\,x^2\,(2\,a^2-2\,a\,b\,n+b^2\,n^2)}{4} + \frac{e\,x^3\,(9\,a^2-6\,a\,b\,n+2\,b^2\,n^2)}{27}$$

input
```
int(x*(a + b*log(c*x^n))^2*(d + e*x),x)
```

output
```
log(c*x^n)^2*((b^2*d*x^2)/2 + (b^2*e*x^3)/3) + log(c*x^n)*((b*d*x^2*(2*a -
 b*n))/2 + (2*b*e*x^3*(3*a - b*n))/9) + (d*x^2*(2*a^2 + b^2*n^2 - 2*a*b*n)
)/4 + (e*x^3*(9*a^2 + 2*b^2*n^2 - 6*a*b*n))/27
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 130, normalized size of antiderivative = 1.19

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx$$
$$=\frac{x^2\left(54\log(x^nc)^2\,b^2d+36\log(x^nc)^2\,b^2ex+108\log(x^nc)\,abd+72\log(x^nc)\,abex-54\log(x^nc)\,b^2dn-24\log}{108}$$

input
```
int(x*(e*x+d)*(a+b*log(c*x^n))^2,x)
```

output
```
(x**2*(54*log(x**n*c)**2*b**2*d + 36*log(x**n*c)**2*b**2*e*x + 108*log(x**
n*c)*a*b*d + 72*log(x**n*c)*a*b*e*x - 54*log(x**n*c)*b**2*d*n - 24*log(x**
n*c)*b**2*e*n*x + 54*a**2*d + 36*a**2*e*x - 54*a*b*d*n - 24*a*b*e*n*x + 27
*b**2*d*n**2 + 8*b**2*e*n**2*x))/108
```

3.78 $\int (d+ex) (a+b\log(cx^n))^2 \, dx$

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Optimal result

Integrand size = 18, antiderivative size = 101

$$\int (d+ex) (a+b\log(cx^n))^2 \, dx = -2abdnx + 2b^2dn^2x + \frac{1}{4}b^2en^2x^2 - 2b^2dnx\log(cx^n) - \frac{1}{2}benx^2(a+b\log(cx^n)) + dx(a+b\log(cx^n))^2 + \frac{1}{2}ex^2(a+b\log(cx^n))^2$$

output
```
-2*a*b*d*n*x+2*b^2*d*n^2*x+1/4*b^2*e*n^2*x^2-2*b^2*d*n*x*ln(c*x^n)-1/2*b*e
*n*x^2*(a+b*ln(c*x^n))+d*x*(a+b*ln(c*x^n))^2+1/2*e*x^2*(a+b*ln(c*x^n))^2
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 77, normalized size of antiderivative = 0.76

$$\int (d+ex) (a+b\log(cx^n))^2 \, dx = \frac{1}{4}x\left(benx(-2a+bn-2b\log(cx^n)) + 4d(a+b\log(cx^n))^2 + 2ex(a+b\log(cx^n))^2 - 8bdn(a-bn+b\log(cx^n))\right)$$

input
```
Integrate[(d + e*x)*(a + b*Log[c*x^n])^2,x]
```

output
```
(x*(b*e*n*x*(-2*a + b*n - 2*b*Log[c*x^n]) + 4*d*(a + b*Log[c*x^n])^2 + 2*e
*x*(a + b*Log[c*x^n])^2 - 8*b*d*n*(a - b*n + b*Log[c*x^n])))/4
```

Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)\,(a+b\log(cx^n))^2\,dx$$

$$\Big\downarrow \text{2767}$$

$$\int \left(d(a+b\log(cx^n))^2+ex(a+b\log(cx^n))^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$dx(a+b\log(cx^n))^2-\frac{1}{2}benx^2(a+b\log(cx^n))+\frac{1}{2}ex^2(a+b\log(cx^n))^2-2abdnx-2b^2dnx\log(cx^n)+2b^2dn^2x+\frac{1}{4}b^2en^2x^2$$

input
```
Int[(d + e*x)*(a + b*Log[c*x^n])^2,x]
```

output
```
-2*a*b*d*n*x + 2*b^2*d*n^2*x + (b^2*e*n^2*x^2)/4 - 2*b^2*d*n*x*Log[c*x^n]
- (b*e*n*x^2*(a + b*Log[c*x^n]))/2 + d*x*(a + b*Log[c*x^n])^2 + (e*x^2*(a
+ b*Log[c*x^n])^2)/2
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Maple [A] (verified)

Time = 0.36 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.40

method	result
parallelrisch	$\frac{b^2\ln(c\,x^n)^2 e\,x^2}{2}-\frac{\ln(c\,x^n)x^2 n\,b^2 e}{2}+\frac{b^2 e\,n^2 x^2}{4}+ab\ln\left(c\,x^n\right)e\,x^2-\frac{nbae\,x^2}{2}+x\,b^2\ln\left(c\,x^n\right)^2 d-2b^2dnx$
risch	Expression too large to display

input
```
int((e*x+d)*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*b^2*ln(c*x^n)^2*e*x^2-1/2*ln(c*x^n)*x^2*n*b^2*e+1/4*b^2*e*n^2*x^2+a*b*
ln(c*x^n)*e*x^2-1/2*n*b*a*e*x^2+x*b^2*ln(c*x^n)^2*d-2*b^2*d*n*x*ln(c*x^n)+
2*b^2*d*n^2*x+1/2*a^2*e*x^2+2*x*a*b*ln(c*x^n)*d-2*a*b*d*n*x+a^2*d*x
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 200 vs. $2(95) = 190$.

Time = 0.07 (sec) , antiderivative size = 200, normalized size of antiderivative = 1.98

$$\begin{aligned}\int (d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx &= \frac{1}{4}\left(b^2en^2-2\,aben+2\,a^2e\right)x^2+\frac{1}{2}\left(b^2ex^2+2\,b^2dx\right)\log\left(c\right)^2\\&\quad+\frac{1}{2}\left(b^2en^2x^2+2\,b^2dn^2x\right)\log\left(x\right)^2+\left(2\,b^2dn^2-2\,abdn+a^2d\right)x\\&\quad-\frac{1}{2}\left(\left(b^2en-2\,abe\right)x^2+4\left(b^2dn-abd\right)x\right)\log\left(c\right)\\&\quad-\frac{1}{2}\left(\left(b^2en^2-2\,aben\right)x^2+4\left(b^2dn^2-abdn\right)x-2\left(b^2enx^2+2\,b^2dnx\right)\log\left(c\right)\right)\log\left(x\right)\end{aligned}$$

input

```
integrate((e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output

```
1/4*(b^2*e*n^2 - 2*a*b*e*n + 2*a^2*e)*x^2 + 1/2*(b^2*e*x^2 + 2*b^2*d*x)*lo
g(c)^2 + 1/2*(b^2*e*n^2*x^2 + 2*b^2*d*n^2*x)*log(x)^2 + (2*b^2*d*n^2 - 2*a
*b*d*n + a^2*d)*x - 1/2*((b^2*e*n - 2*a*b*e)*x^2 + 4*(b^2*d*n - a*b*d)*x)*
log(c) - 1/2*((b^2*e*n^2 - 2*a*b*e*n)*x^2 + 4*(b^2*d*n^2 - a*b*d*n)*x - 2*
(b^2*e*n*x^2 + 2*b^2*d*n*x)*log(c))*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 163, normalized size of antiderivative = 1.61

$$\begin{aligned}\int (d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx &= a^2dx+\frac{a^2ex^2}{2}-2abdnx+2abdx\log\left(cx^n\right)\\&\quad-\frac{abenx^2}{2}+abex^2\log\left(cx^n\right)+2b^2dn^2x\\&\quad-2b^2dnx\log\left(cx^n\right)+b^2dx\log\left(cx^n\right)^2+\frac{b^2en^2x^2}{4}\\&\quad-\frac{b^2enx^2\log\left(cx^n\right)}{2}+\frac{b^2ex^2\log\left(cx^n\right)^2}{2}\end{aligned}$$

input

```
integrate((e*x+d)*(a+b*ln(c*x**n))**2,x)
```

output
```
a**2*d*x + a**2*e*x**2/2 - 2*a*b*d*n*x + 2*a*b*d*x*log(c*x**n) - a*b*e*n*x
**2/2 + a*b*e*x**2*log(c*x**n) + 2*b**2*d*n**2*x - 2*b**2*d*n*x*log(c*x**n
) + b**2*d*x*log(c*x**n)**2 + b**2*e*n**2*x**2/4 - b**2*e*n*x**2*log(c*x**
n)/2 + b**2*e*x**2*log(c*x**n)**2/2
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 136, normalized size of antiderivative = 1.35

$$\int (d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx = \frac{1}{2}\,b^2ex^2\log\left(cx^n\right)^2 - \frac{1}{2}\,abenx^2 + abex^2\log\left(cx^n\right) + b^2dx\log\left(cx^n\right)^2 - 2\,abdnx + \frac{1}{2}\,a^2ex^2 + 2\,abdx\log\left(cx^n\right) + 2\left(n^2x - nx\log\left(cx^n\right)\right)b^2d + \frac{1}{4}\left(n^2x^2 - 2\,nx^2\log\left(cx^n\right)\right)b^2e + a^2dx$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
1/2*b^2*e*x^2*log(c*x^n)^2 - 1/2*a*b*e*n*x^2 + a*b*e*x^2*log(c*x^n) + b^2*
d*x*log(c*x^n)^2 - 2*a*b*d*n*x + 1/2*a^2*e*x^2 + 2*a*b*d*x*log(c*x^n) + 2*
(n^2*x - n*x*log(c*x^n))*b^2*d + 1/4*(n^2*x^2 - 2*n*x^2*log(c*x^n))*b^2*e
+ a^2*d*x
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 215 vs. $2(95) = 190$.

Time = 0.12 (sec) , antiderivative size = 215, normalized size of antiderivative = 2.13

$$\int (d+ex)(a+b\log(cx^n))^2\,dx = \frac{1}{2}b^2en^2x^2\log(x)^2 - \frac{1}{2}b^2en^2x^2\log(x) + b^2enx^2\log(c)\log(x) + b^2dn^2x\log(x)^2 + \frac{1}{4}b^2en^2x^2 - \frac{1}{2}b^2enx^2\log(c) + \frac{1}{2}b^2ex^2\log(c)^2 - 2b^2dn^2x\log(x) + abenx^2\log(x) + 2b^2dnx\log(c)\log(x) + 2b^2dn^2x - \frac{1}{2}abenx^2 - 2b^2dnx\log(c) + abex^2\log(c) + b^2dx\log(c)^2 + 2abdnx\log(x) - 2abdnx + \frac{1}{2}a^2ex^2 + 2abdx\log(c) + a^2dx$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
1/2*b^2*e*n^2*x^2*log(x)^2 - 1/2*b^2*e*n^2*x^2*log(x) + b^2*e*n*x^2*log(c)
*log(x) + b^2*d*n^2*x*log(x)^2 + 1/4*b^2*e*n^2*x^2 - 1/2*b^2*e*n*x^2*log(c
) + 1/2*b^2*e*x^2*log(c)^2 - 2*b^2*d*n^2*x*log(x) + a*b*e*n*x^2*log(x) + 2
*b^2*d*n*x*log(c)*log(x) + 2*b^2*d*n^2*x - 1/2*a*b*e*n*x^2 - 2*b^2*d*n*x*l
og(c) + a*b*e*x^2*log(c) + b^2*d*x*log(c)^2 + 2*a*b*d*n*x*log(x) - 2*a*b*d
*n*x + 1/2*a^2*e*x^2 + 2*a*b*d*x*log(c) + a^2*d*x
```

Mupad [B] (verification not implemented)

Time = 27.52 (sec) , antiderivative size = 104, normalized size of antiderivative = 1.03

$$\int (d+ex)(a+b\log(cx^n))^2\,dx = \ln(c\,x^n)\left(\frac{b\,e\,(2\,a-b\,n)\,x^2}{2} + 2\,b\,d\,(a-b\,n)\,x\right) + \ln(c\,x^n)^2\left(\frac{e\,b^2\,x^2}{2} + d\,b^2\,x\right) + \frac{e\,x^2\,(2\,a^2 - 2\,a\,b\,n + b^2\,n^2)}{4} + d\,x\,(a^2 - 2\,a\,b\,n + 2\,b^2\,n^2)$$

input
```
int((a + b*log(c*x^n))^2*(d + e*x),x)
```

output
```
log(c*x^n)*((b*e*x^2*(2*a - b*n))/2 + 2*b*d*x*(a - b*n)) + log(c*x^n)^2*((
b^2*e*x^2)/2 + b^2*d*x) + (e*x^2*(2*a^2 + b^2*n^2 - 2*a*b*n))/4 + d*x*(a^2
 + 2*b^2*n^2 - 2*a*b*n)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.26

$$\int (d+ex)\,(a+b\log{(cx^n)})^2\,dx$$
$$= \frac{x\left(4\log(x^nc)^2\,b^2d+2\log(x^nc)^2\,b^2ex+8\log(x^nc)\,abd+4\log(x^nc)\,abex-8\log(x^nc)\,b^2dn-2\log(x^nc)\,b^2e\right.}{4}$$

input
```
int((e*x+d)*(a+b*log(c*x^n))^2,x)
```

output
```
(x*(4*log(x**n*c)**2*b**2*d + 2*log(x**n*c)**2*b**2*e*x + 8*log(x**n*c)*a*
b*d + 4*log(x**n*c)*a*b*e*x - 8*log(x**n*c)*b**2*d*n - 2*log(x**n*c)*b**2*
e*n*x + 4*a**2*d + 2*a**2*e*x - 8*a*b*d*n - 2*a*b*e*n*x + 8*b**2*d*n**2 +
b**2*e*n**2*x))/4
```

3.79 $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x}\,dx$

Optimal result 729
Mathematica [A] (verified) 729
Rubi [A] (verified) 730
Maple [A] (verified) 731
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Reduce [B] (verification not implemented) 734

Optimal result

Integrand size = 21, antiderivative size = 70

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x}\,dx = -2abenx+2b^2en^2x-2b^2enx\log\left(cx^n\right) + ex(a+b\log\left(cx^n\right))^2+\frac{d(a+b\log\left(cx^n\right))^3}{3bn}$$

output
```
-2*a*b*e*n*x+2*b^2*e*n^2*x-2*b^2*e*n*x*ln(c*x^n)+e*x*(a+b*ln(c*x^n))^2+1/3
*d*(a+b*ln(c*x^n))^3/b/n
```

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 59, normalized size of antiderivative = 0.84

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x}\,dx = ex(a+b\log\left(cx^n\right))^2+\frac{d(a+b\log\left(cx^n\right))^3}{3bn} - 2benx(a-bn+b\log\left(cx^n\right))$$

input
```
Integrate[((d + e*x)*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
e*x*(a + b*Log[c*x^n])^2 + (d*(a + b*Log[c*x^n])^3)/(3*b*n) - 2*b*e*n*x*(a
 - b*n + b*Log[c*x^n])
```

Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 63, normalized size of antiderivative = 0.90, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238, Rules used = {2788, 2733, 2009, 2739, 15}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x}dx$$

$$\Big\downarrow \text{2788}$$

$$d\int \frac{(a+b\log(cx^n))^2}{x}dx+e\int (a+b\log(cx^n))^2dx$$

$$\Big\downarrow \text{2733}$$

$$d\int \frac{(a+b\log(cx^n))^2}{x}dx+e\left(x(a+b\log(cx^n))^2-2bn\int (a+b\log(cx^n))dx\right)$$

$$\Big\downarrow \text{2009}$$

$$d\int \frac{(a+b\log(cx^n))^2}{x}dx+e\left(x(a+b\log(cx^n))^2-2bn(ax+bx\log(cx^n)-bnx)\right)$$

$$\Big\downarrow \text{2739}$$

$$\frac{d\int (a+b\log(cx^n))^2d(a+b\log(cx^n))}{bn}+e\left(x(a+b\log(cx^n))^2-2bn(ax+bx\log(cx^n)-bnx)\right)$$

$$\Big\downarrow \text{15}$$

$$\frac{d(a+b\log(cx^n))^3}{3bn}+e\left(x(a+b\log(cx^n))^2-2bn(ax+bx\log(cx^n)-bnx)\right)$$

input
```
Int[((d + e*x)*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
(d*(a + b*Log[c*x^n])^3)/(3*b*n) + e*(x*(a + b*Log[c*x^n])^2 - 2*b*n*(a*x
- b*n*x + b*x*Log[c*x^n]))
```

Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2733
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Simp[b*n*p   Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
 FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

rule 2739
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Simp[1/(
b*n)   Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p}
, x]
```

rule 2788
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.))
/(x_), x_Symbol] :> Simp[d   Int[(d + e*x)^(q - 1)*((a + b*Log[c*x^n])^p/x)
, x], x] + Simp[e   Int[(d + e*x)^(q - 1)*(a + b*Log[c*x^n])^p, x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && GtQ[q, 0] && IntegerQ[2*q]
```

Maple [A] (verified)

Time = 0.37 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.63

method	result
parallelrisch	$\frac{3x\ln(c\,x^n)^2b^2en-6x\ln(c\,x^n)b^2e\,n^2+6x\,b^2e\,n^3+6x\ln(c\,x^n)aben-6xabe\,n^2+b^2d\ln(c\,x^n)^3+3\ln(x)a^2dn+3x\,a^2en+3dab\ln(c}{3n}$
risch	Expression too large to display

input
```
int((e*x+d)*(a+b*ln(c*x^n))^2/x,x,method=_RETURNVERBOSE)
```

output
```
1/3*(3*x*ln(c*x^n)^2*b^2*e*n-6*x*ln(c*x^n)*b^2*e*n^2+6*x*b^2*e*n^3+6*x*ln(
c*x^n)*a*b*e*n-6*x*a*b*e*n^2+b^2*d*ln(c*x^n)^3+3*ln(x)*a^2*d*n+3*x*a^2*e*n
+3*d*a*b*ln(c*x^n)^2)/n
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 144 vs. $2(68) = 136$.

Time = 0.07 (sec) , antiderivative size = 144, normalized size of antiderivative = 2.06

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x}\,dx = \frac{1}{3}\,b^2dn^2\log\left(x\right)^3 + b^2ex\log\left(c\right)^2 - 2\left(b^2en - abe\right)x\log\left(c\right) + \left(b^2en^2x + b^2dn\log\left(c\right) + abdn\right)\log\left(x\right)^2 + \left(2\,b^2en^2 - 2\,aben + a^2e\right)x + \left(b^2d\log\left(c\right)^2 + a^2d - 2\left(b^2en^2 - aben\right)x + 2\left(b^2enx + abd\right)\log\left(c\right)\right)\log\left(x\right)$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x,x, algorithm="fricas")
```

output
```
1/3*b^2*d*n^2*log(x)^3 + b^2*e*x*log(c)^2 - 2*(b^2*e*n - a*b*e)*x*log(c) +
 (b^2*e*n^2*x + b^2*d*n*log(c) + a*b*d*n)*log(x)^2 + (2*b^2*e*n^2 - 2*a*b*
e*n + a^2*e)*x + (b^2*d*log(c)^2 + a^2*d - 2*(b^2*e*n^2 - a*b*e*n)*x + 2*(
b^2*e*n*x + a*b*d)*log(c))*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 138, normalized size of antiderivative = 1.97

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x}\,dx = \begin{cases} \frac{a^2d\log\left(cx^n\right)}{n} + a^2ex + \frac{abd\log\left(cx^n\right)^2}{n} - 2abenx + 2abex\log\left(cx^n\right) + \frac{b^2d\log\left(cx^n\right)^3}{3n} + 2b^2en^2x - 2b^2enx\log\left(cx^n\right. \\ \left(a+b\log\left(c\right)\right)^2\left(d\log\left(x\right)+ex\right) \end{cases}$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))**2/x,x)
```

output
```
Piecewise((a**2*d*log(c*x**n)/n + a**2*e*x + a*b*d*log(c*x**n)**2/n - 2*a*
b*e*n*x + 2*a*b*e*x*log(c*x**n) + b**2*d*log(c*x**n)**3/(3*n) + 2*b**2*e*n
**2*x - 2*b**2*e*n*x*log(c*x**n) + b**2*e*x*log(c*x**n)**2, Ne(n, 0)), ((a
 + b*log(c))**2*(d*log(x) + e*x), True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.44

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x}\,dx = b^2ex\log(cx^n)^2 - 2\,abenx + 2\,abex\log(cx^n) + \frac{b^2d\log(cx^n)^3}{3\,n} + 2\left(n^2x - nx\log(cx^n)\right)b^2e + a^2ex + \frac{abd\log(cx^n)^2}{n} + a^2d\log(x)$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x,x, algorithm="maxima")
```

output
```
b^2*e*x*log(c*x^n)^2 - 2*a*b*e*n*x + 2*a*b*e*x*log(c*x^n) + 1/3*b^2*d*log(
c*x^n)^3/n + 2*(n^2*x - n*x*log(c*x^n))*b^2*e + a^2*e*x + a*b*d*log(c*x^n)
^2/n + a^2*d*log(x)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 144 vs. 2(68) = 136.

Time = 0.13 (sec) , antiderivative size = 144, normalized size of antiderivative = 2.06

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x}\,dx = \frac{1}{3}\,b^2dn^2\log(x)^3 - 2\left(b^2en^2 - b^2en\log(c) - aben\right)x\log(x) + \left(b^2en^2x + b^2dn\log(c) + abdn\right)\log(x)^2 + \left(2\,b^2en^2 - 2\,b^2en\log(c) + b^2e\log(c)^2 - 2\,aben + 2\,abe\log(c) + a^2e\right)x + \left(b^2d\log(c)^2 + 2\,abd\log(c) + a^2d\right)\log(x)$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x,x, algorithm="giac")
```

output
```
1/3*b^2*d*n^2*log(x)^3 - 2*(b^2*e*n^2 - b^2*e*n*log(c) - a*b*e*n)*x*log(x)
 + (b^2*e*n^2*x + b^2*d*n*log(c) + a*b*d*n)*log(x)^2 + (2*b^2*e*n^2 - 2*b^
2*e*n*log(c) + b^2*e*log(c)^2 - 2*a*b*e*n + 2*a*b*e*log(c) + a^2*e)*x + (b
^2*d*log(c)^2 + 2*a*b*d*log(c) + a^2*d)*log(x)
```

Mupad [B] (verification not implemented)

Time = 27.71 (sec) , antiderivative size = 85, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x}\,dx = \ln\left(c\,x^n\right)^2\left(b^2\,e\,x+\frac{a\,b\,d}{n}\right)+a^2\,d\,\ln\left(x\right) + e\,x\,\left(a^2-2\,a\,b\,n+2\,b^2\,n^2\right) + \frac{b^2\,d\ln\left(c\,x^n\right)^3}{3\,n}+2\,b\,e\,x\,\ln\left(c\,x^n\right)\,\left(a-b\,n\right)$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x))/x,x)
```

output
```
log(c*x^n)^2*(b^2*e*x + (a*b*d)/n) + a^2*d*log(x) + e*x*(a^2 + 2*b^2*n^2 -
 2*a*b*n) + (b^2*d*log(c*x^n)^3)/(3*n) + 2*b*e*x*log(c*x^n)*(a - b*n)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 113, normalized size of antiderivative = 1.61

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x}\,dx = \frac{\log(x^nc)^3\,b^2d+3\log(x^nc)^2\,abd+3\log(x^nc)^2\,b^2enx+6\log(x^nc)\,abenx-6\log(x^nc)\,b^2e\,n^2x+3\log(x)\,a^2 d}{3n}$$

input
```
int((e*x+d)*(a+b*log(c*x^n))^2/x,x)
```

output
```
(log(x**n*c)**3*b**2*d + 3*log(x**n*c)**2*a*b*d + 3*log(x**n*c)**2*b**2*e*
n*x + 6*log(x**n*c)*a*b*e*n*x - 6*log(x**n*c)*b**2*e*n**2*x + 3*log(x)*a**
2*d*n + 3*a**2*e*n*x - 6*a*b*e*n**2*x + 6*b**2*e*n**3*x)/(3*n)
```

3.80 $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^2}\,dx$

Optimal result . . . 736
Mathematica [A] (verified) . . . 736
Rubi [A] (verified) . . . 737
Maple [A] (verified) . . . 738
Fricas [B] (verification not implemented) . . . 738
Sympy [A] (verification not implemented) . . . 739
Maxima [A] (verification not implemented) . . . 740
Giac [B] (verification not implemented) . . . 740
Mupad [B] (verification not implemented) . . . 741
Reduce [B] (verification not implemented) . . . 741

Optimal result

Integrand size = 21, antiderivative size = 72

$$\int \frac{(d+ex)\,(a+b\log(cx^n))^2}{x^2}\,dx = -\frac{2b^2dn^2}{x}-\frac{2bdn(a+b\log(cx^n))}{x}-\frac{d(a+b\log(cx^n))^2}{x}+\frac{e(a+b\log(cx^n))^3}{3bn}$$

output
```
-2*b^2*d*n^2/x-2*b*d*n*(a+b*ln(c*x^n))/x-d*(a+b*ln(c*x^n))^2/x+1/3*e*(a+b*
ln(c*x^n))^3/b/n
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 63, normalized size of antiderivative = 0.88

$$\int \frac{(d+ex)\,(a+b\log(cx^n))^2}{x^2}\,dx = -\frac{d(a+b\log(cx^n))^2}{x}+\frac{e(a+b\log(cx^n))^3}{3bn}-\frac{2bdn(a+bn+b\log(cx^n))}{x}$$

input
```
Integrate[((d + e*x)*(a + b*Log[c*x^n])^2)/x^2,x]
```

output
```
-((d*(a + b*Log[c*x^n])^2)/x) + (e*(a + b*Log[c*x^n])^3)/(3*b*n) - (2*b*d*
n*(a + b*n + b*Log[c*x^n]))/x
```

Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 72, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^2}dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(\frac{d(a+b\log\left(cx^n\right))^2}{x^2}+\frac{e(a+b\log\left(cx^n\right))^2}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d(a+b\log\left(cx^n\right))^2}{x}-\frac{2bdn(a+b\log\left(cx^n\right))}{x}+\frac{e(a+b\log\left(cx^n\right))^3}{3bn}-\frac{2b^2dn^2}{x}$$

input
```
Int[((d + e*x)*(a + b*Log[c*x^n])^2)/x^2,x]
```

output
```
(-2*b^2*d*n^2)/x - (2*b*d*n*(a + b*Log[c*x^n]))/x - (d*(a + b*Log[c*x^n])^
2)/x + (e*(a + b*Log[c*x^n])^3)/(3*b*n)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [A] (verified)

Time = 0.36 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.58

method	result
parallelrisch	$\frac{e b^2 \ln(c x^n)^3 x+3 \ln(x) x a^2 e n+3 e a b \ln(c x^n)^2 x-3 \ln(c x^n)^2 b^2 d n-6 \ln(c x^n) b^2 d n^2-6 b^2 d n^3-6 \ln(c x^n) a b d n-6 a b d n^2-3 a^2 d}{3 x n}$
risch	Expression too large to display

input
```
int((e*x+d)*(a+b*ln(c*x^n))^2/x^2,x,method=_RETURNVERBOSE)
```

output
```
1/3/x*(e*b^2*ln(c*x^n)^3*x+3*ln(x)*x*a^2*e*n+3*e*a*b*ln(c*x^n)^2*x-3*ln(c*
x^n)^2*b^2*d*n-6*ln(c*x^n)*b^2*d*n^2-6*b^2*d*n^3-6*ln(c*x^n)*a*b*d*n-6*a*b
*d*n^2-3*a^2*d*n)/n
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 149 vs. 2(70) = 140.

Time = 0.07 (sec) , antiderivative size = 149, normalized size of antiderivative = 2.07

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^2}\,dx$$
$$= \frac{b^2en^2x\log\left(x\right)^3-6\,b^2dn^2-3\,b^2d\log\left(c\right)^2-6\,abdn-3\,a^2d+3\left(b^2enx\log\left(c\right)-b^2dn^2+abenx\right)\log\left(x\right)^2-}{3\,x}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^2,x, algorithm="fricas")
```

output
```
1/3*(b^2*e*n^2*x*log(x)^3 - 6*b^2*d*n^2 - 3*b^2*d*log(c)^2 - 6*a*b*d*n - 3
*a^2*d + 3*(b^2*e*n*x*log(c) - b^2*d*n^2 + a*b*e*n*x)*log(x)^2 - 6*(b^2*d*
n + a*b*d)*log(c) + 3*(b^2*e*x*log(c)^2 - 2*b^2*d*n^2 - 2*a*b*d*n + a^2*e*
x - 2*(b^2*d*n - a*b*e*x)*log(c))*log(x))/x
```

Sympy [A] (verification not implemented)

Time = 2.15 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.96

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})^2}{x^2}\,dx = -\frac{a^2d}{x} + a^2e\log{(x)} - \frac{2abdn}{x} - \frac{2abd\log{(cx^n)}}{x} - 2abe\left(\begin{cases} -\log{(c)}\log{(x)} & \text{for}\: n = 0 \\ -\frac{\log{(cx^n)}^2}{2n} & \text{otherwise} \end{cases}\right) - \frac{2b^2dn^2}{x} - \frac{2b^2dn\log{(cx^n)}}{x} - \frac{b^2d\log{(cx^n)}^2}{x} - b^2e\left(\begin{cases} -\log{(c)}^2\log{(x)} & \text{for}\: n = 0 \\ -\frac{\log{(cx^n)}^3}{3n} & \text{otherwise} \end{cases}\right)$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))**2/x**2,x)
```

output
```
-a**2*d/x + a**2*e*log(x) - 2*a*b*d*n/x - 2*a*b*d*log(c*x**n)/x - 2*a*b*e*
Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)) - 2*b
**2*d*n**2/x - 2*b**2*d*n*log(c*x**n)/x - b**2*d*log(c*x**n)**2/x - b**2*e
*Piecewise((-log(c)**2*log(x), Eq(n, 0)), (-log(c*x**n)**3/(3*n), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.58

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^2}\,dx = \frac{b^2e\log\left(cx^n\right)^3}{3\,n} - 2\,b^2d\left(\frac{n^2}{x} + \frac{n\log\left(cx^n\right)}{x}\right) + \frac{abe\log\left(cx^n\right)^2}{n} - \frac{b^2d\log\left(cx^n\right)^2}{x} + a^2e\log\left(x\right) - \frac{2\,abdn}{x} - \frac{2\,abd\log\left(cx^n\right)}{x} - \frac{a^2d}{x}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^2,x, algorithm="maxima")
```

output
```
1/3*b^2*e*log(c*x^n)^3/n - 2*b^2*d*(n^2/x + n*log(c*x^n)/x) + a*b*e*log(c*
x^n)^2/n - b^2*d*log(c*x^n)^2/x + a^2*e*log(x) - 2*a*b*d*n/x - 2*a*b*d*log
(c*x^n)/x - a^2*d/x
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 162 vs. 2(70) = 140.

Time = 0.13 (sec) , antiderivative size = 162, normalized size of antiderivative = 2.25

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^2}\,dx = \frac{1}{3}\,b^2en^2\log\left(x\right)^3 + b^2en\log\left(c\right)\log\left(x\right)^2 - b^2dn^2\left(\frac{\log\left(x\right)^2}{x} + \frac{2\,\log\left(x\right)}{x} + \frac{2}{x}\right) - 2\,b^2dn\left(\frac{\log\left(x\right)}{x} + \frac{1}{x}\right)\log\left(c\right) + aben\log\left(x\right)^2 + b^2e\log\left(c\right)^2\log\left(|x|\right) - 2\,abdn\left(\frac{\log\left(x\right)}{x} + \frac{1}{x}\right) + 2\,abe\log\left(c\right)\log\left(|x|\right) - \frac{b^2d\log\left(c\right)^2}{x} + a^2e\log\left(|x|\right) - \frac{2\,abd\log\left(c\right)}{x} - \frac{a^2d}{x}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^2,x, algorithm="giac")
```

output
```
1/3*b^2*e*n^2*log(x)^3 + b^2*e*n*log(c)*log(x)^2 - b^2*d*n^2*(log(x)^2/x +
 2*log(x)/x + 2/x) - 2*b^2*d*n*(log(x)/x + 1/x)*log(c) + a*b*e*n*log(x)^2
+ b^2*e*log(c)^2*log(abs(x)) - 2*a*b*d*n*(log(x)/x + 1/x) + 2*a*b*e*log(c)
*log(abs(x)) - b^2*d*log(c)^2/x + a^2*e*log(abs(x)) - 2*a*b*d*log(c)/x - a
^2*d/x
```

Mupad [B] (verification not implemented)

Time = 24.17 (sec) , antiderivative size = 138, normalized size of antiderivative = 1.92

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^2}\,dx = \ln\left(x\right)\,\left(e\,a^2+2\,e\,a\,b\,n+2\,e\,b^2\,n^2\right) - \frac{d\,a^2+2\,d\,a\,b\,n+2\,d\,b^2\,n^2}{x} - \ln\left(c\,x^n\right)^2\,\left(\frac{b^2\,d+b^2\,e\,x}{x}-\frac{b\,e\,\left(a+b\,n\right)}{n}\right) - \frac{\ln\left(c\,x^n\right)\,\left(2\,b\,d\,\left(a+b\,n\right)+2\,b\,e\,x\,\left(a+b\,n\right)\right)}{x} + \frac{b^2\,e\,\ln\left(c\,x^n\right)^3}{3\,n}$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x))/x^2,x)
```

output
```
log(x)*(a^2*e + 2*b^2*e*n^2 + 2*a*b*e*n) - (a^2*d + 2*b^2*d*n^2 + 2*a*b*d*
n)/x - log(c*x^n)^2*((b^2*d + b^2*e*x)/x - (b*e*(a + b*n))/n) - (log(c*x^n
)*(2*b*d*(a + b*n) + 2*b*e*x*(a + b*n)))/x + (b^2*e*log(c*x^n)^3)/(3*n)
```

Reduce [B] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 113, normalized size of antiderivative = 1.57

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^2}\,dx = \frac{\log(x^nc)^3\,b^2ex+3\log(x^nc)^2\,abex-3\log(x^nc)^2\,b^2dn-6\log(x^nc)\,abdn-6\log(x^nc)\,b^2d\,n^2+3\log(x)\,a^2en}{3nx}$$

input
```
int((e*x+d)*(a+b*log(c*x^n))^2/x^2,x)
```

output
```
(log(x**n*c)**3*b**2*e*x + 3*log(x**n*c)**2*a*b*e*x - 3*log(x**n*c)**2*b**
2*d*n - 6*log(x**n*c)*a*b*d*n - 6*log(x**n*c)*b**2*d*n**2 + 3*log(x)*a**2*
e*n*x - 3*a**2*d*n - 6*a*b*d*n**2 - 6*b**2*d*n**3)/(3*n*x)
```

3.81 $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^3}\,dx$

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Optimal result

Integrand size = 21, antiderivative size = 103

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^3}\,dx = -\frac{b^2dn^2}{4x^2}-\frac{2b^2en^2}{x}-\frac{bdn(a+b\log\left(cx^n\right))}{2x^2} - \frac{2ben(a+b\log\left(cx^n\right))}{x} - \frac{d(a+b\log\left(cx^n\right))^2}{2x^2}-\frac{e(a+b\log\left(cx^n\right))^2}{x}$$

output
```
-1/4*b^2*d*n^2/x^2-2*b^2*e*n^2/x-1/2*b*d*n*(a+b*ln(c*x^n))/x^2-2*b*e*n*(a+
b*ln(c*x^n))/x-1/2*d*(a+b*ln(c*x^n))^2/x^2-e*(a+b*ln(c*x^n))^2/x
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 90, normalized size of antiderivative = 0.87

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^3}\,dx = -\frac{2a^2(d+2ex)+2abn(d+4ex)+b^2n^2(d+8ex)+2b(2a(d+2ex)+bn(d+4ex))\log\left(cx^n\right)+2b^2(d+}{4x^2}$$

input
```
Integrate[((d + e*x)*(a + b*Log[c*x^n])^2)/x^3,x]
```

output
```
-1/4*(2*a^2*(d + 2*e*x) + 2*a*b*n*(d + 4*e*x) + b^2*n^2*(d + 8*e*x) + 2*b*
(2*a*(d + 2*e*x) + b*n*(d + 4*e*x))*Log[c*x^n] + 2*b^2*(d + 2*e*x)*Log[c*x
^n]^2)/x^2
```

Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 103, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^3}\,dx$$
$$\Big\downarrow \text{2795}$$
$$\int \left(\frac{d\left(a+b\log\left(cx^n\right)\right)^2}{x^3}+\frac{e\left(a+b\log\left(cx^n\right)\right)^2}{x^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-\frac{bdn(a+b\log\left(cx^n\right))}{2x^2}-\frac{d\left(a+b\log\left(cx^n\right)\right)^2}{2x^2}-\frac{2ben(a+b\log\left(cx^n\right))}{x}-\frac{e\left(a+b\log\left(cx^n\right)\right)^2}{x}-\frac{b^2dn^2}{4x^2}-\frac{2b^2en^2}{x}$$

input
```
Int[((d + e*x)*(a + b*Log[c*x^n])^2)/x^3,x]
```

output
```
-1/4*(b^2*d*n^2)/x^2 - (2*b^2*e*n^2)/x - (b*d*n*(a + b*Log[c*x^n]))/(2*x^2
) - (2*b*e*n*(a + b*Log[c*x^n]))/x - (d*(a + b*Log[c*x^n])^2)/(2*x^2) - (e
*(a + b*Log[c*x^n])^2)/x
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [A] (verified)

Time = 0.26 (sec) , antiderivative size = 130, normalized size of antiderivative = 1.26

method	result
parallelrisch	$-\frac{4b^2\ln(cx^n)^2ex+8b^2enx\ln(cx^n)+8b^2en^2x+8ab\ln(cx^n)ex+8abenx+2b^2\ln(cx^n)^2d+2\ln(cx^n)nb^2d+b^2dn^2+4a^2ex+4a}{4x^2}$
risch	Expression too large to display

input
```
int((e*x+d)*(a+b*ln(c*x^n))^2/x^3,x,method=_RETURNVERBOSE)
```

output
```
-1/4/x^2*(4*b^2*ln(c*x^n)^2*e*x+8*b^2*e*n*x*ln(c*x^n)+8*b^2*e*n^2*x+8*a*b*
ln(c*x^n)*e*x+8*a*b*e*n*x+2*b^2*ln(c*x^n)^2*d+2*ln(c*x^n)*n*b^2*d+b^2*d*n^
2+4*a^2*e*x+4*a*b*ln(c*x^n)*d+2*d*a*b*n+2*a^2*d)
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 179, normalized size of antiderivative = 1.74

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^3}\,dx =$$
$$-\frac{b^2dn^2+2\,abdn+2\,a^2d+2\left(2\,b^2ex+b^2d\right)\log\left(c\right)^2+2\left(2\,b^2en^2x+b^2dn^2\right)\log\left(x\right)^2+4\left(2\,b^2en^2+2\,aben\right.}{}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^3,x, algorithm="fricas")
```

output
```
-1/4*(b^2*d*n^2 + 2*a*b*d*n + 2*a^2*d + 2*(2*b^2*e*x + b^2*d)*log(c)^2 + 2
*(2*b^2*e*n^2*x + b^2*d*n^2)*log(x)^2 + 4*(2*b^2*e*n^2 + 2*a*b*e*n + a^2*e
)*x + 2*(b^2*d*n + 2*a*b*d + 4*(b^2*e*n + a*b*e)*x)*log(c) + 2*(b^2*d*n^2
+ 2*a*b*d*n + 4*(b^2*e*n^2 + a*b*e*n)*x + 2*(2*b^2*e*n*x + b^2*d*n)*log(c)
)*log(x))/x^2
```

Sympy [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 165, normalized size of antiderivative = 1.60

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^3}\,dx = -\frac{a^2d}{2x^2} - \frac{a^2e}{x} - \frac{abdn}{2x^2} - \frac{abd\log(cx^n)}{x^2} - \frac{2aben}{x} - \frac{2abe\log(cx^n)}{x} - \frac{b^2dn^2}{4x^2} - \frac{b^2dn\log(cx^n)}{2x^2} - \frac{b^2d\log(cx^n)^2}{2x^2} - \frac{2b^2en^2}{x} - \frac{2b^2en\log(cx^n)}{x} - \frac{b^2e\log(cx^n)^2}{x}$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))**2/x**3,x)
```

output
```
-a**2*d/(2*x**2) - a**2*e/x - a*b*d*n/(2*x**2) - a*b*d*log(c*x**n)/x**2 -
2*a*b*e*n/x - 2*a*b*e*log(c*x**n)/x - b**2*d*n**2/(4*x**2) - b**2*d*n*log(
c*x**n)/(2*x**2) - b**2*d*log(c*x**n)**2/(2*x**2) - 2*b**2*e*n**2/x - 2*b*
*2*e*n*log(c*x**n)/x - b**2*e*log(c*x**n)**2/x
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 150, normalized size of antiderivative = 1.46

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^3}\,dx = -2\,b^2e\left(\frac{n^2}{x} + \frac{n\log(cx^n)}{x}\right) - \frac{1}{4}\,b^2d\left(\frac{n^2}{x^2} + \frac{2\,n\log(cx^n)}{x^2}\right) - \frac{b^2e\log(cx^n)^2}{x} - \frac{2\,aben}{x} - \frac{2\,abe\log(cx^n)}{x} - \frac{b^2d\log(cx^n)^2}{2\,x^2} - \frac{abdn}{2\,x^2} - \frac{a^2e}{x} - \frac{abd\log(cx^n)}{x^2} - \frac{a^2d}{2\,x^2}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^3,x, algorithm="maxima")
```

output
```
-2*b^2*e*(n^2/x + n*log(c*x^n)/x) - 1/4*b^2*d*(n^2/x^2 + 2*n*log(c*x^n)/x^
2) - b^2*e*log(c*x^n)^2/x - 2*a*b*e*n/x - 2*a*b*e*log(c*x^n)/x - 1/2*b^2*d
*log(c*x^n)^2/x^2 - 1/2*a*b*d*n/x^2 - a^2*e/x - a*b*d*log(c*x^n)/x^2 - 1/2
*a^2*d/x^2
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 192, normalized size of antiderivative = 1.86

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^3}\,dx = -\frac{\left(2\,b^2en^2x+b^2dn^2\right)\log\left(x\right)^2}{2\,x^2} - \frac{\left(4\,b^2en^2x+4\,b^2enx\log\left(c\right)+b^2dn^2+4\,abenx+2\,b^2dn\log\left(c\right)+2\,abdn\right)\log\left(x\right)}{2\,x^2} - \frac{8\,b^2en^2x+8\,b^2enx\log\left(c\right)+4\,b^2ex\log\left(c\right)^2+b^2dn^2+8\,abenx+2\,b^2dn\log\left(c\right)+8\,abex\log\left(c\right)+2\,b^2d\,\mathrm{l}}{4\,x^2}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^3,x, algorithm="giac")
```

output
```
-1/2*(2*b^2*e*n^2*x + b^2*d*n^2)*log(x)^2/x^2 - 1/2*(4*b^2*e*n^2*x + 4*b^2
*e*n*x*log(c) + b^2*d*n^2 + 4*a*b*e*n*x + 2*b^2*d*n*log(c) + 2*a*b*d*n)*lo
g(x)/x^2 - 1/4*(8*b^2*e*n^2*x + 8*b^2*e*n*x*log(c) + 4*b^2*e*x*log(c)^2 +
b^2*d*n^2 + 8*a*b*e*n*x + 2*b^2*d*n*log(c) + 8*a*b*e*x*log(c) + 2*b^2*d*lo
g(c)^2 + 2*a*b*d*n + 4*a^2*e*x + 4*a*b*d*log(c) + 2*a^2*d)/x^2
```

Mupad [B] (verification not implemented)

Time = 27.10 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.06

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^3}\,dx = -\frac{x\left(2\,e\,a^2+4\,e\,a\,b\,n+4\,e\,b^2\,n^2\right)+a^2\,d+\frac{b^2\,d\,n^2}{2}+a\,b\,d\,n}{2\,x^2} - \frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d\,\left(2\,a+b\,n\right)}{2}+2\,b\,e\,x\,\left(a+b\,n\right)\right)}{x^2} - \frac{{\ln\left(c\,x^n\right)}^2\,\left(\frac{b^2\,d}{2}+b^2\,e\,x\right)}{x^2}$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x))/x^3,x)
```

output
```
- (x*(2*a^2*e + 4*b^2*e*n^2 + 4*a*b*e*n) + a^2*d + (b^2*d*n^2)/2 + a*b*d*n
)/(2*x^2) - (log(c*x^n)*((b*d*(2*a + b*n))/2 + 2*b*e*x*(a + b*n)))/x^2 - (
log(c*x^n)^2*((b^2*d)/2 + b^2*e*x))/x^2
```

Reduce [B] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 130, normalized size of antiderivative = 1.26

$$\int \frac{(d+ex)\,(a+b\log(cx^n))^2}{x^3}\,dx$$
$$= \frac{-2\log(x^nc)^2\,b^2d-4\log(x^nc)^2\,b^2ex-4\log(x^nc)\,abd-8\log(x^nc)\,abex-2\log(x^nc)\,b^2dn-8\log(x^nc)\,b^2e}{4x^2}$$

input
```
int((e*x+d)*(a+b*log(c*x^n))^2/x^3,x)
```

output
```
( - 2*log(x**n*c)**2*b**2*d - 4*log(x**n*c)**2*b**2*e*x - 4*log(x**n*c)*a*
b*d - 8*log(x**n*c)*a*b*e*x - 2*log(x**n*c)*b**2*d*n - 8*log(x**n*c)*b**2*
e*n*x - 2*a**2*d - 4*a**2*e*x - 2*a*b*d*n - 8*a*b*e*n*x - b**2*d*n**2 - 8*
b**2*e*n**2*x)/(4*x**2)
```

3.82 $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^4}\,dx$

Optimal result . . . 749
Mathematica [A] (verified) . . . 749
Rubi [A] (verified) . . . 750
Maple [A] (verified) . . . 751
Fricas [A] (verification not implemented) . . . 751
Sympy [A] (verification not implemented) . . . 752
Maxima [A] (verification not implemented) . . . 753
Giac [B] (verification not implemented) . . . 753
Mupad [B] (verification not implemented) . . . 754
Reduce [B] (verification not implemented) . . . 754

Optimal result

Integrand size = 21, antiderivative size = 109

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^4}\,dx = -\frac{2b^2dn^2}{27x^3}-\frac{b^2en^2}{4x^2}-\frac{2bdn(a+b\log(cx^n))}{9x^3}-\frac{ben(a+b\log(cx^n))}{2x^2}-\frac{d(a+b\log(cx^n))^2}{3x^3}-\frac{e(a+b\log(cx^n))^2}{2x^2}$$

output
```
-2/27*b^2*d*n^2/x^3-1/4*b^2*e*n^2/x^2-2/9*b*d*n*(a+b*ln(c*x^n))/x^3-1/2*b*
e*n*(a+b*ln(c*x^n))/x^2-1/3*d*(a+b*ln(c*x^n))^2/x^3-1/2*e*(a+b*ln(c*x^n))^
2/x^2
```

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 82, normalized size of antiderivative = 0.75

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^4}\,dx = -\frac{36d(a+b\log(cx^n))^2+54ex(a+b\log(cx^n))^2+27benx(2a+bn+2b\log(cx^n))+8bdn(3a+bn+3b}{108x^3}$$

input
```
Integrate[((d + e*x)*(a + b*Log[c*x^n])^2)/x^4,x]
```

output
```
-1/108*(36*d*(a + b*Log[c*x^n])^2 + 54*e*x*(a + b*Log[c*x^n])^2 + 27*b*e*n
*x*(2*a + b*n + 2*b*Log[c*x^n]) + 8*b*d*n*(3*a + b*n + 3*b*Log[c*x^n]))/x^
3
```

Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^4}\,dx$$

$$\Big\downarrow \ 2795$$

$$\int \left(\frac{d\left(a+b\log\left(cx^n\right)\right)^2}{x^4}+\frac{e\left(a+b\log\left(cx^n\right)\right)^2}{x^3}\right)dx$$

$$\Big\downarrow \ 2009$$

$$-\frac{2bdn(a+b\log\left(cx^n\right))}{9x^3}-\frac{d(a+b\log\left(cx^n\right))^2}{3x^3}-\frac{ben(a+b\log\left(cx^n\right))}{2x^2}-\frac{e(a+b\log\left(cx^n\right))^2}{2x^2}-\frac{2b^2dn^2}{27x^3}-\frac{b^2en^2}{4x^2}$$

input
```
Int[((d + e*x)*(a + b*Log[c*x^n])^2)/x^4,x]
```

output
```
(-2*b^2*d*n^2)/(27*x^3) - (b^2*e*n^2)/(4*x^2) - (2*b*d*n*(a + b*Log[c*x^n]
))/(9*x^3) - (b*e*n*(a + b*Log[c*x^n]))/(2*x^2) - (d*(a + b*Log[c*x^n])^2)
/(3*x^3) - (e*(a + b*Log[c*x^n])^2)/(2*x^2)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [A] (verified)

Time = 0.26 (sec) , antiderivative size = 131, normalized size of antiderivative = 1.20

method	result
parallelrisch	$-\frac{54b^2 \ln(c x^n)^2 ex+54b^2 enx \ln(c x^n)+27b^2 e n^2 x+108ab \ln(c x^n) ex+54abenx+36b^2 \ln(c x^n)^2 d+24 \ln(c x^n) n b^2 d+8b^2 d n^2+}{108x^3}$
risch	Expression too large to display

input
```
int((e*x+d)*(a+b*ln(c*x^n))^2/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/108/x^3*(54*b^2*ln(c*x^n)^2*e*x+54*b^2*e*n*x*ln(c*x^n)+27*b^2*e*n^2*x+1
08*a*b*ln(c*x^n)*e*x+54*a*b*e*n*x+36*b^2*ln(c*x^n)^2*d+24*ln(c*x^n)*n*b^2*
d+8*b^2*d*n^2+54*a^2*e*x+72*a*b*ln(c*x^n)*d+24*d*a*b*n+36*a^2*d)
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 187, normalized size of antiderivative = 1.72

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^4}\,dx = -\frac{8\,b^2dn^2+24\,abdn+36\,a^2d+18\,(3\,b^2ex+2\,b^2d)\log(c)^2+18\,(3\,b^2en^2x+2\,b^2dn^2)\log(x)^2+27\,(b^2en^2}{}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^4,x, algorithm="fricas")
```

output

```
-1/108*(8*b^2*d*n^2 + 24*a*b*d*n + 36*a^2*d + 18*(3*b^2*e*x + 2*b^2*d)*log
(c)^2 + 18*(3*b^2*e*n^2*x + 2*b^2*d*n^2)*log(x)^2 + 27*(b^2*e*n^2 + 2*a*b*
e*n + 2*a^2*e)*x + 6*(4*b^2*d*n + 12*a*b*d + 9*(b^2*e*n + 2*a*b*e)*x)*log(
c) + 6*(4*b^2*d*n^2 + 12*a*b*d*n + 9*(b^2*e*n^2 + 2*a*b*e*n)*x + 6*(3*b^2*
e*n*x + 2*b^2*d*n)*log(c))*log(x))/x^3
```

Sympy [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 185, normalized size of antiderivative = 1.70

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})^2}{x^4}\,dx = -\frac{a^2d}{3x^3} - \frac{a^2e}{2x^2} - \frac{2abdn}{9x^3} - \frac{2abd\log{(cx^n)}}{3x^3} - \frac{aben}{2x^2} - \frac{abe\log{(cx^n)}}{x^2} - \frac{2b^2dn^2}{27x^3} - \frac{2b^2dn\log{(cx^n)}}{9x^3} - \frac{b^2d\log{(cx^n)}^2}{3x^3} - \frac{b^2en^2}{4x^2} - \frac{b^2en\log{(cx^n)}}{2x^2} - \frac{b^2e\log{(cx^n)}^2}{2x^2}$$

input

```
integrate((e*x+d)*(a+b*ln(c*x**n))**2/x**4,x)
```

output

```
-a**2*d/(3*x**3) - a**2*e/(2*x**2) - 2*a*b*d*n/(9*x**3) - 2*a*b*d*log(c*x*
*n)/(3*x**3) - a*b*e*n/(2*x**2) - a*b*e*log(c*x**n)/x**2 - 2*b**2*d*n**2/(
27*x**3) - 2*b**2*d*n*log(c*x**n)/(9*x**3) - b**2*d*log(c*x**n)**2/(3*x**3
) - b**2*e*n**2/(4*x**2) - b**2*e*n*log(c*x**n)/(2*x**2) - b**2*e*log(c*x*
*n)**2/(2*x**2)
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 151, normalized size of antiderivative = 1.39

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^4}\,dx = -\frac{1}{4}\,b^2e\left(\frac{n^2}{x^2}+\frac{2\,n\log(cx^n)}{x^2}\right) - \frac{2}{27}\,b^2d\left(\frac{n^2}{x^3}+\frac{3\,n\log(cx^n)}{x^3}\right) - \frac{b^2e\log(cx^n)^2}{2\,x^2} - \frac{aben}{2\,x^2} - \frac{abe\log(cx^n)}{x^2} - \frac{b^2d\log(cx^n)^2}{3\,x^3} - \frac{2\,abdn}{9\,x^3} - \frac{a^2e}{2\,x^2} - \frac{2\,abd\log(cx^n)}{3\,x^3} - \frac{a^2d}{3\,x^3}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^4,x, algorithm="maxima")
```

output
```
-1/4*b^2*e*(n^2/x^2 + 2*n*log(c*x^n)/x^2) - 2/27*b^2*d*(n^2/x^3 + 3*n*log(
c*x^n)/x^3) - 1/2*b^2*e*log(c*x^n)^2/x^2 - 1/2*a*b*e*n/x^2 - a*b*e*log(c*x
^n)/x^2 - 1/3*b^2*d*log(c*x^n)^2/x^3 - 2/9*a*b*d*n/x^3 - 1/2*a^2*e/x^2 - 2
/3*a*b*d*log(c*x^n)/x^3 - 1/3*a^2*d/x^3
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 195 vs. 2(97) = 194.

Time = 0.12 (sec) , antiderivative size = 195, normalized size of antiderivative = 1.79

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^4}\,dx = -\frac{(3\,b^2en^2x+2\,b^2dn^2)\log(x)^2}{6\,x^3} - \frac{(9\,b^2en^2x+18\,b^2enx\log(c)+4\,b^2dn^2+18\,abenx+12\,b^2dn\log(c)+12\,abdn)\log(x)}{18\,x^3} - \frac{27\,b^2en^2x+54\,b^2enx\log(c)+54\,b^2ex\log(c)^2+8\,b^2dn^2+54\,abenx+24\,b^2dn\log(c)+108\,abex\log(c}{108\,x^3}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^4,x, algorithm="giac")
```

output
```
-1/6*(3*b^2*e*n^2*x + 2*b^2*d*n^2)*log(x)^2/x^3 - 1/18*(9*b^2*e*n^2*x + 18
*b^2*e*n*x*log(c) + 4*b^2*d*n^2 + 18*a*b*e*n*x + 12*b^2*d*n*log(c) + 12*a*
b*d*n)*log(x)/x^3 - 1/108*(27*b^2*e*n^2*x + 54*b^2*e*n*x*log(c) + 54*b^2*e
*x*log(c)^2 + 8*b^2*d*n^2 + 54*a*b*e*n*x + 24*b^2*d*n*log(c) + 108*a*b*e*x
*log(c) + 36*b^2*d*log(c)^2 + 24*a*b*d*n + 54*a^2*e*x + 72*a*b*d*log(c) +
36*a^2*d)/x^3
```

Mupad [B] (verification not implemented)

Time = 28.66 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.05

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^4}\,dx$$
$$= -\frac{x\left(9\,e\,a^2+9\,e\,a\,b\,n+\frac{9\,e\,b^2\,n^2}{2}\right)+6\,a^2\,d+\frac{4\,b^2\,d\,n^2}{3}+4\,a\,b\,d\,n}{18\,x^3} - \frac{\ln\left(c\,x^n\right)\,\left(\frac{2\,b\,d\,(3\,a+b\,n)}{3}+\frac{3\,b\,e\,x\,(2\,a+b\,n)}{2}\right)}{3\,x^3} - \frac{\ln\left(c\,x^n\right)^2\,\left(\frac{b^2\,d}{3}+\frac{b^2\,e\,x}{2}\right)}{x^3}$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x))/x^4,x)
```

output
```
- (x*(9*a^2*e + (9*b^2*e*n^2)/2 + 9*a*b*e*n) + 6*a^2*d + (4*b^2*d*n^2)/3 +
 4*a*b*d*n)/(18*x^3) - (log(c*x^n)*((2*b*d*(3*a + b*n))/3 + (3*b*e*x*(2*a
+ b*n))/2))/(3*x^3) - (log(c*x^n)^2*((b^2*d)/3 + (b^2*e*x)/2))/x^3
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 130, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^4}\,dx$$
$$= \frac{-36\log(x^nc)^2\,b^2d - 54\log(x^nc)^2\,b^2ex - 72\log(x^nc)\,abd - 108\log(x^nc)\,abex - 24\log(x^nc)\,b^2dn - 54\log(}{108x^3}$$

input
```
int((e*x+d)*(a+b*log(c*x^n))^2/x^4,x)
```

output

```
( - 36*log(x**n*c)**2*b**2*d - 54*log(x**n*c)**2*b**2*e*x - 72*log(x**n*c)
*a*b*d - 108*log(x**n*c)*a*b*e*x - 24*log(x**n*c)*b**2*d*n - 54*log(x**n*c
)*b**2*e*n*x - 36*a**2*d - 54*a**2*e*x - 24*a*b*d*n - 54*a*b*e*n*x - 8*b**
2*d*n**2 - 27*b**2*e*n**2*x)/(108*x**3)
```

3.83 $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^5} dx$

Optimal result . . . 756
Mathematica [A] (verified) . . . 756
Rubi [A] (verified) . . . 757
Maple [A] (verified) . . . 758
Fricas [A] (verification not implemented) . . . 758
Sympy [A] (verification not implemented) . . . 759
Maxima [A] (verification not implemented) . . . 760
Giac [B] (verification not implemented) . . . 760
Mupad [B] (verification not implemented) . . . 761
Reduce [B] (verification not implemented) . . . 761

Optimal result

Integrand size = 21, antiderivative size = 109

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})^2}{x^5}\,dx = -\frac{b^2dn^2}{32x^4}-\frac{2b^2en^2}{27x^3}-\frac{bdn(a+b\log{(cx^n)})}{8x^4} - \frac{2ben(a+b\log{(cx^n)})}{9x^3} - \frac{d(a+b\log{(cx^n)})^2}{4x^4}-\frac{e(a+b\log{(cx^n)})^2}{3x^3}$$

output
```
-1/32*b^2*d*n^2/x^4-2/27*b^2*e*n^2/x^3-1/8*b*d*n*(a+b*ln(c*x^n))/x^4-2/9*b
*e*n*(a+b*ln(c*x^n))/x^3-1/4*d*(a+b*ln(c*x^n))^2/x^4-1/3*e*(a+b*ln(c*x^n))
^2/x^3
```

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 82, normalized size of antiderivative = 0.75

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})^2}{x^5}\,dx = -\frac{216d(a+b\log{(cx^n)})^2+288ex(a+b\log{(cx^n)})^2+64benx(3a+bn+3b\log{(cx^n)})+27bdn(4a+bn+}{864x^4}$$

input
```
Integrate[((d + e*x)*(a + b*Log[c*x^n])^2)/x^5,x]
```

output
```
-1/864*(216*d*(a + b*Log[c*x^n])^2 + 288*e*x*(a + b*Log[c*x^n])^2 + 64*b*e
*n*x*(3*a + b*n + 3*b*Log[c*x^n]) + 27*b*d*n*(4*a + b*n + 4*b*Log[c*x^n]))
/x^4
```

Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^5}\,dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(\frac{d(a+b\log\left(cx^n\right))^2}{x^5}+\frac{e(a+b\log\left(cx^n\right))^2}{x^4}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{bdn(a+b\log\left(cx^n\right))}{8x^4}-\frac{d(a+b\log\left(cx^n\right))^2}{4x^4}-\frac{2ben(a+b\log\left(cx^n\right))}{9x^3}-\frac{e(a+b\log\left(cx^n\right))^2}{3x^3}-\frac{b^2dn^2}{32x^4}-\frac{2b^2en^2}{27x^3}$$

input
```
Int[((d + e*x)*(a + b*Log[c*x^n])^2)/x^5,x]
```

output
```
-1/32*(b^2*d*n^2)/x^4 - (2*b^2*e*n^2)/(27*x^3) - (b*d*n*(a + b*Log[c*x^n])
)/(8*x^4) - (2*b*e*n*(a + b*Log[c*x^n]))/(9*x^3) - (d*(a + b*Log[c*x^n])^2
)/(4*x^4) - (e*(a + b*Log[c*x^n])^2)/(3*x^3)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [A] (verified)

Time = 0.27 (sec) , antiderivative size = 131, normalized size of antiderivative = 1.20

method	result
parallelrisch	$-\frac{288b^2\ln(cx^n)^2ex+192b^2enx\ln(cx^n)+64b^2en^2x+576ab\ln(cx^n)ex+192abenx+216b^2\ln(cx^n)^2d+108\ln(cx^n)nb^2d+27b}{864x^4}$
risch	Expression too large to display

input
```
int((e*x+d)*(a+b*ln(c*x^n))^2/x^5,x,method=_RETURNVERBOSE)
```

output
```
-1/864/x^4*(288*b^2*ln(c*x^n)^2*e*x+192*b^2*e*n*x*ln(c*x^n)+64*b^2*e*n^2*x
+576*a*b*ln(c*x^n)*e*x+192*a*b*e*n*x+216*b^2*ln(c*x^n)^2*d+108*ln(c*x^n)*n
*b^2*d+27*b^2*d*n^2+288*a^2*e*x+432*a*b*ln(c*x^n)*d+108*d*a*b*n+216*a^2*d)
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 188, normalized size of antiderivative = 1.72

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^5}\,dx =$$
$$-\frac{27\,b^2dn^2+108\,abdn+216\,a^2d+72\,(4\,b^2ex+3\,b^2d)\log\left(c\right)^2+72\,(4\,b^2en^2x+3\,b^2dn^2)\log\left(x\right)^2+32\,(2}{}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^5,x, algorithm="fricas")
```

output
```
-1/864*(27*b^2*d*n^2 + 108*a*b*d*n + 216*a^2*d + 72*(4*b^2*e*x + 3*b^2*d)*
log(c)^2 + 72*(4*b^2*e*n^2*x + 3*b^2*d*n^2)*log(x)^2 + 32*(2*b^2*e*n^2 + 6
*a*b*e*n + 9*a^2*e)*x + 12*(9*b^2*d*n + 36*a*b*d + 16*(b^2*e*n + 3*a*b*e)*
x)*log(c) + 12*(9*b^2*d*n^2 + 36*a*b*d*n + 16*(b^2*e*n^2 + 3*a*b*e*n)*x +
12*(4*b^2*e*n*x + 3*b^2*d*n)*log(c))*log(x))/x^4
```

Sympy [A] (verification not implemented)

Time = 0.53 (sec) , antiderivative size = 187, normalized size of antiderivative = 1.72

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^5}\,dx = -\frac{a^2d}{4x^4} - \frac{a^2e}{3x^3} - \frac{abdn}{8x^4} - \frac{abd\log(cx^n)}{2x^4} - \frac{2aben}{9x^3} - \frac{2abe\log(cx^n)}{3x^3} - \frac{b^2dn^2}{32x^4} - \frac{b^2dn\log(cx^n)}{8x^4} - \frac{b^2d\log(cx^n)^2}{4x^4} - \frac{2b^2en^2}{27x^3} - \frac{2b^2en\log(cx^n)}{9x^3} - \frac{b^2e\log(cx^n)^2}{3x^3}$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))**2/x**5,x)
```

output
```
-a**2*d/(4*x**4) - a**2*e/(3*x**3) - a*b*d*n/(8*x**4) - a*b*d*log(c*x**n)/
(2*x**4) - 2*a*b*e*n/(9*x**3) - 2*a*b*e*log(c*x**n)/(3*x**3) - b**2*d*n**2
/(32*x**4) - b**2*d*n*log(c*x**n)/(8*x**4) - b**2*d*log(c*x**n)**2/(4*x**4
) - 2*b**2*e*n**2/(27*x**3) - 2*b**2*e*n*log(c*x**n)/(9*x**3) - b**2*e*log
(c*x**n)**2/(3*x**3)
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 151, normalized size of antiderivative = 1.39

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})^2}{x^5}\,dx = -\frac{2}{27}\,b^2e\left(\frac{n^2}{x^3}+\frac{3\,n\log{(cx^n)}}{x^3}\right) - \frac{1}{32}\,b^2d\left(\frac{n^2}{x^4}+\frac{4\,n\log{(cx^n)}}{x^4}\right) - \frac{b^2e\log{(cx^n)}^2}{3\,x^3} - \frac{2\,aben}{9\,x^3} - \frac{2\,abe\log{(cx^n)}}{3\,x^3} - \frac{b^2d\log{(cx^n)}^2}{4\,x^4} - \frac{abdn}{8\,x^4} - \frac{a^2e}{3\,x^3} - \frac{abd\log{(cx^n)}}{2\,x^4} - \frac{a^2d}{4\,x^4}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^5,x, algorithm="maxima")
```

output
```
-2/27*b^2*e*(n^2/x^3 + 3*n*log(c*x^n)/x^3) - 1/32*b^2*d*(n^2/x^4 + 4*n*log
(c*x^n)/x^4) - 1/3*b^2*e*log(c*x^n)^2/x^3 - 2/9*a*b*e*n/x^3 - 2/3*a*b*e*lo
g(c*x^n)/x^3 - 1/4*b^2*d*log(c*x^n)^2/x^4 - 1/8*a*b*d*n/x^4 - 1/3*a^2*e/x^
3 - 1/2*a*b*d*log(c*x^n)/x^4 - 1/4*a^2*d/x^4
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 195 vs. 2(97) = 194.

Time = 0.12 (sec) , antiderivative size = 195, normalized size of antiderivative = 1.79

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})^2}{x^5}\,dx = -\frac{(4\,b^2en^2x+3\,b^2dn^2)\log{(x)}^2}{12\,x^4} - \frac{(16\,b^2en^2x+48\,b^2enx\log{(c)}+9\,b^2dn^2+48\,abenx+36\,b^2dn\log{(c)}+36\,abdn)\log{(x)}}{72\,x^4} - \frac{64\,b^2en^2x+192\,b^2enx\log{(c)}+288\,b^2ex\log{(c)}^2+27\,b^2dn^2+192\,abenx+108\,b^2dn\log{(c)}+576\,abex}{864\,x^4}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^5,x, algorithm="giac")
```

output
```
-1/12*(4*b^2*e*n^2*x + 3*b^2*d*n^2)*log(x)^2/x^4 - 1/72*(16*b^2*e*n^2*x +
48*b^2*e*n*x*log(c) + 9*b^2*d*n^2 + 48*a*b*e*n*x + 36*b^2*d*n*log(c) + 36*
a*b*d*n)*log(x)/x^4 - 1/864*(64*b^2*e*n^2*x + 192*b^2*e*n*x*log(c) + 288*b
^2*e*x*log(c)^2 + 27*b^2*d*n^2 + 192*a*b*e*n*x + 108*b^2*d*n*log(c) + 576*
a*b*e*x*log(c) + 216*b^2*d*log(c)^2 + 108*a*b*d*n + 288*a^2*e*x + 432*a*b*
d*log(c) + 216*a^2*d)/x^4
```

Mupad [B] (verification not implemented)

Time = 26.97 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.05

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^5}\,dx$$
$$= -\frac{x\left(24\,e\,a^2+16\,e\,a\,b\,n+\frac{16\,e\,b^2\,n^2}{3}\right)+18\,a^2\,d+\frac{9\,b^2\,d\,n^2}{4}+9\,a\,b\,d\,n}{72\,x^4} - \frac{\ln(c\,x^n)\,\left(\frac{3\,b\,d\,(4\,a+b\,n)}{4}+\frac{4\,b\,e\,x\,(3\,a+b\,n)}{3}\right)}{6\,x^4} - \frac{\ln(c\,x^n)^2\,\left(\frac{b^2\,d}{4}+\frac{b^2\,e\,x}{3}\right)}{x^4}$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x))/x^5,x)
```

output
```
- (x*(24*a^2*e + (16*b^2*e*n^2)/3 + 16*a*b*e*n) + 18*a^2*d + (9*b^2*d*n^2)
/4 + 9*a*b*d*n)/(72*x^4) - (log(c*x^n)*((3*b*d*(4*a + b*n))/4 + (4*b*e*x*(
3*a + b*n))/3))/(6*x^4) - (log(c*x^n)^2*((b^2*d)/4 + (b^2*e*x)/3))/x^4
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 130, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^5}\,dx$$
$$= \frac{-216\log(x^nc)^2\,b^2d-288\log(x^nc)^2\,b^2ex-432\log(x^nc)\,abd-576\log(x^nc)\,abex-108\log(x^nc)\,b^2dn-19}{864x^4}$$

input
```
int((e*x+d)*(a+b*log(c*x^n))^2/x^5,x)
```

output
```
( - 216*log(x**n*c)**2*b**2*d - 288*log(x**n*c)**2*b**2*e*x - 432*log(x**n
*c)*a*b*d - 576*log(x**n*c)*a*b*e*x - 108*log(x**n*c)*b**2*d*n - 192*log(x
**n*c)*b**2*e*n*x - 216*a**2*d - 288*a**2*e*x - 108*a*b*d*n - 192*a*b*e*n*
x - 27*b**2*d*n**2 - 64*b**2*e*n**2*x)/(864*x**4)
```

3.84 $\int x^2(d+ex)^2 (a+b\log(cx^n))^2 \, dx$

Optimal result 763
Mathematica [A] (verified) 764
Rubi [A] (verified) 764
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Optimal result

Integrand size = 23, antiderivative size = 178

$$\begin{aligned}\int x^2(d+ex)^2 (a+b\log(cx^n))^2 \, dx = {} & \frac{2}{27}b^2d^2n^2x^3 + \frac{1}{16}b^2den^2x^4 + \frac{2}{125}b^2e^2n^2x^5 \\ & - \frac{2}{9}bd^2nx^3(a+b\log(cx^n)) \\ & - \frac{1}{4}bdenx^4(a+b\log(cx^n)) \\ & - \frac{2}{25}be^2nx^5(a+b\log(cx^n)) \\ & + \frac{1}{3}d^2x^3(a+b\log(cx^n))^2 \\ & + \frac{1}{2}dex^4(a+b\log(cx^n))^2 + \frac{1}{5}e^2x^5(a+b\log(cx^n))^2\end{aligned}$$

output
```
2/27*b^2*d^2*n^2*x^3+1/16*b^2*d*e*n^2*x^4+2/125*b^2*e^2*n^2*x^5-2/9*b*d^2*
n*x^3*(a+b*ln(c*x^n))-1/4*b*d*e*n*x^4*(a+b*ln(c*x^n))-2/25*b*e^2*n*x^5*(a+
b*ln(c*x^n))+1/3*d^2*x^3*(a+b*ln(c*x^n))^2+1/2*d*e*x^4*(a+b*ln(c*x^n))^2+1
/5*e^2*x^5*(a+b*ln(c*x^n))^2
```

Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 149, normalized size of antiderivative = 0.84

$$\int x^2(d+ex)^2 \left(a+b\log \left(cx^n\right)\right)^2 \, dx = \frac{2}{125}be^2nx^5(-5a+bn-5b\log \left(cx^n\right)) + \frac{1}{16}bdenx^4(-4a+bn-4b\log \left(cx^n\right)) + \frac{2}{27}bd^2nx^3(-3a+bn-3b\log \left(cx^n\right)) + \frac{1}{3}d^2x^3(a+b\log \left(cx^n\right))^2 + \frac{1}{2}dex^4(a+b\log \left(cx^n\right))^2 + \frac{1}{5}e^2x^5(a+b\log \left(cx^n\right))^2$$

input
```
Integrate[x^2*(d + e*x)^2*(a + b*Log[c*x^n])^2,x]
```

output
```
(2*b*e^2*n*x^5*(-5*a + b*n - 5*b*Log[c*x^n]))/125 + (b*d*e*n*x^4*(-4*a + b
*n - 4*b*Log[c*x^n]))/16 + (2*b*d^2*n*x^3*(-3*a + b*n - 3*b*Log[c*x^n]))/2
7 + (d^2*x^3*(a + b*Log[c*x^n])^2)/3 + (d*e*x^4*(a + b*Log[c*x^n])^2)/2 +
(e^2*x^5*(a + b*Log[c*x^n])^2)/5
```

Rubi [A] (verified)

Time = 0.46 (sec) , antiderivative size = 178, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2(d+ex)^2 \left(a+b\log \left(cx^n\right)\right)^2 \, dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(d^2x^2(a+b\log \left(cx^n\right))^2+2dex^3(a+b\log \left(cx^n\right))^2+e^2x^4(a+b\log \left(cx^n\right))^2\right) dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{3}d^2x^3(a+b\log(cx^n))^2-\frac{2}{9}bd^2nx^3(a+b\log(cx^n))+\frac{1}{2}dex^4(a+b\log(cx^n))^2-\frac{1}{4}bdenx^4(a+b\log(cx^n))+\frac{1}{5}e^2x^5(a+b\log(cx^n))^2-\frac{2}{25}be^2nx^5(a+b\log(cx^n))+\frac{2}{27}b^2d^2n^2x^3+\frac{1}{16}b^2den^2x^4+\frac{2}{125}b^2e^2n^2x^5$$

input
```
Int[x^2*(d + e*x)^2*(a + b*Log[c*x^n])^2,x]
```

output
```
(2*b^2*d^2*n^2*x^3)/27 + (b^2*d*e*n^2*x^4)/16 + (2*b^2*e^2*n^2*x^5)/125 -
(2*b*d^2*n*x^3*(a + b*Log[c*x^n]))/9 - (b*d*e*n*x^4*(a + b*Log[c*x^n]))/4
- (2*b*e^2*n*x^5*(a + b*Log[c*x^n]))/25 + (d^2*x^3*(a + b*Log[c*x^n])^2)/3
 + (d*e*x^4*(a + b*Log[c*x^n])^2)/2 + (e^2*x^5*(a + b*Log[c*x^n])^2)/5
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [A] (verified)

Time = 192.59 (sec) , antiderivative size = 262, normalized size of antiderivative = 1.47

method	result
parallelrisch	$\frac{x^5\ln(c\,x^n)^2b^2e^2}{5}-\frac{2\ln(c\,x^n)x^5n\,b^2e^2}{25}+\frac{2b^2e^2n^2x^5}{125}+\frac{2\ln(c\,x^n)x^5a\,e^2b}{5}-\frac{2ab\,e^2n\,x^5}{25}+\frac{x^4\ln(c\,x^n)^2b^2de}{2}-\frac{\ln(c\,x^n}{}$
risch	Expression too large to display

input
```
int(x^2*(e*x+d)^2*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
1/5*x^5*ln(c*x^n)^2*b^2*e^2-2/25*ln(c*x^n)*x^5*n*b^2*e^2+2/125*b^2*e^2*n^2
*x^5+2/5*ln(c*x^n)*x^5*a*e^2*b-2/25*a*b*e^2*n*x^5+1/2*x^4*ln(c*x^n)^2*b^2*
d*e-1/4*ln(c*x^n)*x^4*n*d*e*b^2+1/16*b^2*d*e*n^2*x^4+1/5*a^2*e^2*x^5+ln(c*
x^n)*x^4*d*e*a*b-1/4*a*b*d*e*n*x^4+1/3*x^3*ln(c*x^n)^2*b^2*d^2-2/9*ln(c*x^
n)*x^3*n*b^2*d^2+2/27*b^2*d^2*n^2*x^3+1/2*a^2*d*e*x^4+2/3*ln(c*x^n)*x^3*a*
b*d^2-2/9*a*b*d^2*n*x^3+1/3*a^2*d^2*x^3
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 364 vs. $2(160) = 320$.

Time = 0.08 (sec) , antiderivative size = 364, normalized size of antiderivative = 2.04

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx$$
$$=\frac{1}{125}\left(2\,b^2e^2n^2-10\,abe^2n+25\,a^2e^2\right)x^5+\frac{1}{16}\left(b^2den^2-4\,abden+8\,a^2de\right)x^4$$
$$+\frac{1}{27}\left(2\,b^2d^2n^2-6\,abd^2n+9\,a^2d^2\right)x^3+\frac{1}{30}\left(6\,b^2e^2x^5+15\,b^2dex^4+10\,b^2d^2x^3\right)\log\left(c\right)^2$$
$$+\frac{1}{30}\left(6\,b^2e^2n^2x^5+15\,b^2den^2x^4+10\,b^2d^2n^2x^3\right)\log\left(x\right)^2$$
$$-\frac{1}{900}\left(72\left(b^2e^2n-5\,abe^2\right)x^5+225\left(b^2den-4\,abde\right)x^4+200\left(b^2d^2n-3\,abd^2\right)x^3\right)\log\left(c\right)$$
$$-\frac{1}{900}\left(72\left(b^2e^2n^2-5\,abe^2n\right)x^5+225\left(b^2den^2-4\,abden\right)x^4+200\left(b^2d^2n^2-3\,abd^2n\right)x^3-60\left(6\,b^2e^2nx\right.\right.$$

input
```
integrate(x^2*(e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
1/125*(2*b^2*e^2*n^2 - 10*a*b*e^2*n + 25*a^2*e^2)*x^5 + 1/16*(b^2*d*e*n^2
- 4*a*b*d*e*n + 8*a^2*d*e)*x^4 + 1/27*(2*b^2*d^2*n^2 - 6*a*b*d^2*n + 9*a^2
*d^2)*x^3 + 1/30*(6*b^2*e^2*x^5 + 15*b^2*d*e*x^4 + 10*b^2*d^2*x^3)*log(c)^
2 + 1/30*(6*b^2*e^2*n^2*x^5 + 15*b^2*d*e*n^2*x^4 + 10*b^2*d^2*n^2*x^3)*log
(x)^2 - 1/900*(72*(b^2*e^2*n - 5*a*b*e^2)*x^5 + 225*(b^2*d*e*n - 4*a*b*d*e
)*x^4 + 200*(b^2*d^2*n - 3*a*b*d^2)*x^3)*log(c) - 1/900*(72*(b^2*e^2*n^2 -
 5*a*b*e^2*n)*x^5 + 225*(b^2*d*e*n^2 - 4*a*b*d*e*n)*x^4 + 200*(b^2*d^2*n^2
 - 3*a*b*d^2*n)*x^3 - 60*(6*b^2*e^2*n*x^5 + 15*b^2*d*e*n*x^4 + 10*b^2*d^2*
n*x^3)*log(c))*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.55 (sec) , antiderivative size = 311, normalized size of antiderivative = 1.75

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx=\frac{a^2d^2x^3}{3}+\frac{a^2dex^4}{2}+\frac{a^2e^2x^5}{5}-\frac{2abd^2nx^3}{9}+\frac{2abd^2x^3\log\left(cx^n\right)}{3}-\frac{abdenx^4}{4}+abdex^4\log\left(cx^n\right)-\frac{2abe^2nx^5}{25}+\frac{2abe^2x^5\log\left(cx^n\right)}{5}+\frac{2b^2d^2n^2x^3}{27}-\frac{2b^2d^2nx^3\log\left(cx^n\right)}{9}+\frac{b^2d^2x^3\log\left(cx^n\right)^2}{3}+\frac{b^2den^2x^4}{16}-\frac{b^2denx^4\log\left(cx^n\right)}{4}+\frac{b^2dex^4\log\left(cx^n\right)^2}{2}+\frac{2b^2e^2n^2x^5}{125}-\frac{2b^2e^2nx^5\log\left(cx^n\right)}{25}+\frac{b^2e^2x^5\log\left(cx^n\right)^2}{5}$$

input
```
integrate(x**2*(e*x+d)**2*(a+b*ln(c*x**n))**2,x)
```

output
```
a**2*d**2*x**3/3 + a**2*d*e*x**4/2 + a**2*e**2*x**5/5 - 2*a*b*d**2*n*x**3/
9 + 2*a*b*d**2*x**3*log(c*x**n)/3 - a*b*d*e*n*x**4/4 + a*b*d*e*x**4*log(c*
x**n) - 2*a*b*e**2*n*x**5/25 + 2*a*b*e**2*x**5*log(c*x**n)/5 + 2*b**2*d**2
*n**2*x**3/27 - 2*b**2*d**2*n*x**3*log(c*x**n)/9 + b**2*d**2*x**3*log(c*x*
*n)**2/3 + b**2*d*e*n**2*x**4/16 - b**2*d*e*n*x**4*log(c*x**n)/4 + b**2*d*
e*x**4*log(c*x**n)**2/2 + 2*b**2*e**2*n**2*x**5/125 - 2*b**2*e**2*n*x**5*l
og(c*x**n)/25 + b**2*e**2*x**5*log(c*x**n)**2/5
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 250, normalized size of antiderivative = 1.40

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx=\frac{1}{5}\,b^2e^2x^5\log\left(cx^n\right)^2-\frac{2}{25}\,abe^2nx^5+\frac{2}{5}\,abe^2x^5\log\left(cx^n\right)+\frac{1}{2}\,b^2dex^4\log\left(cx^n\right)^2-\frac{1}{4}\,abdenx^4+\frac{1}{5}\,a^2e^2x^5+abdex^4\log\left(cx^n\right)+\frac{1}{3}\,b^2d^2x^3\log\left(cx^n\right)^2-\frac{2}{9}\,abd^2nx^3+\frac{1}{2}\,a^2dex^4+\frac{2}{3}\,abd^2x^3\log\left(cx^n\right)+\frac{1}{3}\,a^2d^2x^3+\frac{2}{27}\left(n^2x^3-3\,nx^3\log\left(cx^n\right)\right)b^2d^2+\frac{1}{16}\left(n^2x^4-4\,nx^4\log\left(cx^n\right)\right)b^2de+\frac{2}{125}\left(n^2x^5-5\,nx^5\log\left(cx^n\right)\right)b^2e^2$$

input
```
integrate(x^2*(e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
1/5*b^2*e^2*x^5*log(c*x^n)^2 - 2/25*a*b*e^2*n*x^5 + 2/5*a*b*e^2*x^5*log(c*
x^n) + 1/2*b^2*d*e*x^4*log(c*x^n)^2 - 1/4*a*b*d*e*n*x^4 + 1/5*a^2*e^2*x^5
+ a*b*d*e*x^4*log(c*x^n) + 1/3*b^2*d^2*x^3*log(c*x^n)^2 - 2/9*a*b*d^2*n*x^
3 + 1/2*a^2*d*e*x^4 + 2/3*a*b*d^2*x^3*log(c*x^n) + 1/3*a^2*d^2*x^3 + 2/27*
(n^2*x^3 - 3*n*x^3*log(c*x^n))*b^2*d^2 + 1/16*(n^2*x^4 - 4*n*x^4*log(c*x^n
))*b^2*d*e + 2/125*(n^2*x^5 - 5*n*x^5*log(c*x^n))*b^2*e^2
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 408 vs. 2(160) = 320.

Time = 0.12 (sec) , antiderivative size = 408, normalized size of antiderivative = 2.29

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx = \frac{1}{5}\,b^2e^2n^2x^5\log\left(x\right)^2-\frac{2}{25}\,b^2e^2n^2x^5\log\left(x\right)+\frac{2}{5}\,b^2e^2nx^5\log\left(c\right)\log\left(x\right)+\frac{1}{2}\,b^2den^2x^4\log\left(x\right)^2+\frac{2}{125}\,b^2e^2n^2x^5-\frac{2}{25}\,b^2e^2nx^5\log\left(c\right)+\frac{1}{5}\,b^2e^2x^5\log\left(c\right)^2-\frac{1}{4}\,b^2den^2x^4\log\left(x\right)+\frac{2}{5}\,abe^2nx^5\log\left(x\right)+b^2denx^4\log\left(c\right)\log\left(x\right)+\frac{1}{3}\,b^2d^2n^2x^3\log\left(x\right)^2+\frac{1}{16}\,b^2den^2x^4-\frac{2}{25}\,abe^2nx^5-\frac{1}{4}\,b^2denx^4\log\left(c\right)+\frac{2}{5}\,abe^2x^5\log\left(c\right)+\frac{1}{2}\,b^2dex^4\log\left(c\right)^2-\frac{2}{9}\,b^2d^2n^2x^3\log\left(x\right)+abdenx^4\log\left(x\right)+\frac{2}{3}\,b^2d^2nx^3\log\left(c\right)\log\left(x\right)+\frac{2}{27}\,b^2d^2n^2x^3-\frac{1}{4}\,abdenx^4+\frac{1}{5}\,a^2e^2x^5-\frac{2}{9}\,b^2d^2nx^3\log\left(c\right)+abdex^4\log\left(c\right)+\frac{1}{3}\,b^2d^2x^3\log\left(c\right)^2+\frac{2}{3}\,abd^2nx^3\log\left(x\right)-\frac{2}{9}\,abd^2nx^3+\frac{1}{2}\,a^2dex^4+\frac{2}{3}\,abd^2x^3\log\left(c\right)+\frac{1}{3}\,a^2d^2x^3$$

input
```
integrate(x^2*(e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
1/5*b^2*e^2*n^2*x^5*log(x)^2 - 2/25*b^2*e^2*n^2*x^5*log(x) + 2/5*b^2*e^2*n
*x^5*log(c)*log(x) + 1/2*b^2*d*e*n^2*x^4*log(x)^2 + 2/125*b^2*e^2*n^2*x^5
- 2/25*b^2*e^2*n*x^5*log(c) + 1/5*b^2*e^2*x^5*log(c)^2 - 1/4*b^2*d*e*n^2*x
^4*log(x) + 2/5*a*b*e^2*n*x^5*log(x) + b^2*d*e*n*x^4*log(c)*log(x) + 1/3*b
^2*d^2*n^2*x^3*log(x)^2 + 1/16*b^2*d*e*n^2*x^4 - 2/25*a*b*e^2*n*x^5 - 1/4*
b^2*d*e*n*x^4*log(c) + 2/5*a*b*e^2*x^5*log(c) + 1/2*b^2*d*e*x^4*log(c)^2 -
 2/9*b^2*d^2*n^2*x^3*log(x) + a*b*d*e*n*x^4*log(x) + 2/3*b^2*d^2*n*x^3*log
(c)*log(x) + 2/27*b^2*d^2*n^2*x^3 - 1/4*a*b*d*e*n*x^4 + 1/5*a^2*e^2*x^5 -
2/9*b^2*d^2*n*x^3*log(c) + a*b*d*e*x^4*log(c) + 1/3*b^2*d^2*x^3*log(c)^2 +
 2/3*a*b*d^2*n*x^3*log(x) - 2/9*a*b*d^2*n*x^3 + 1/2*a^2*d*e*x^4 + 2/3*a*b*
d^2*x^3*log(c) + 1/3*a^2*d^2*x^3
```

Mupad [B] (verification not implemented)

Time = 27.15 (sec) , antiderivative size = 180, normalized size of antiderivative = 1.01

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx = \ln\left(c\,x^n\right)\left(\frac{2\,b\,(3\,a-b\,n)\,d^2\,x^3}{9}+\frac{b\,(4\,a-b\,n)\,d\,e\,x^4}{4}+\frac{2\,b\,(5\,a-b\,n)\,e^2\,x^5}{25}\right)+\ln\left(c\,x^n\right)^2\left(\frac{b^2\,d^2\,x^3}{3}+\frac{b^2\,d\,e\,x^4}{2}+\frac{b^2\,e^2\,x^5}{5}\right)+\frac{d^2\,x^3\,(9\,a^2-6\,a\,b\,n+2\,b^2\,n^2)}{27}+\frac{e^2\,x^5\,(25\,a^2-10\,a\,b\,n+2\,b^2\,n^2)}{125}+\frac{d\,e\,x^4\,(8\,a^2-4\,a\,b\,n+b^2\,n^2)}{16}$$

input
```
int(x^2*(a + b*log(c*x^n))^2*(d + e*x)^2,x)
```

output
```
log(c*x^n)*((2*b*d^2*x^3*(3*a - b*n))/9 + (2*b*e^2*x^5*(5*a - b*n))/25 + (
b*d*e*x^4*(4*a - b*n))/4) + log(c*x^n)^2*((b^2*d^2*x^3)/3 + (b^2*e^2*x^5)/
5 + (b^2*d*e*x^4)/2) + (d^2*x^3*(9*a^2 + 2*b^2*n^2 - 6*a*b*n))/27 + (e^2*x
^5*(25*a^2 + 2*b^2*n^2 - 10*a*b*n))/125 + (d*e*x^4*(8*a^2 + b^2*n^2 - 4*a*
b*n))/16
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 237, normalized size of antiderivative = 1.33

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx$$
$$=\frac{x^3\left(18000\log(x^nc)^2\,b^2d^2+27000\log(x^nc)^2\,b^2dex+10800\log(x^nc)^2\,b^2e^2x^2+36000\log(x^nc)\,ab\,d^2+54000\right.}{}$$

input
```
int(x^2*(e*x+d)^2*(a+b*log(c*x^n))^2,x)
```

output
```
(x**3*(18000*log(x**n*c)**2*b**2*d**2 + 27000*log(x**n*c)**2*b**2*d*e*x +
10800*log(x**n*c)**2*b**2*e**2*x**2 + 36000*log(x**n*c)*a*b*d**2 + 54000*l
og(x**n*c)*a*b*d*e*x + 21600*log(x**n*c)*a*b*e**2*x**2 - 12000*log(x**n*c)
*b**2*d**2*n - 13500*log(x**n*c)*b**2*d*e*n*x - 4320*log(x**n*c)*b**2*e**2
*n*x**2 + 18000*a**2*d**2 + 27000*a**2*d*e*x + 10800*a**2*e**2*x**2 - 1200
0*a*b*d**2*n - 13500*a*b*d*e*n*x - 4320*a*b*e**2*n*x**2 + 4000*b**2*d**2*n
**2 + 3375*b**2*d*e*n**2*x + 864*b**2*e**2*n**2*x**2))/54000
```

3.85 $\int x(d+ex)^2 (a+b\log(cx^n))^2 \, dx$

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Optimal result

Integrand size = 21, antiderivative size = 178

$$\begin{aligned}\int x(d+ex)^2 (a+b\log(cx^n))^2 \, dx = {} & \frac{1}{4}b^2d^2n^2x^2 + \frac{4}{27}b^2den^2x^3 + \frac{1}{32}b^2e^2n^2x^4 \\ & - \frac{1}{2}bd^2nx^2(a+b\log(cx^n)) \\ & - \frac{4}{9}bdenx^3(a+b\log(cx^n)) \\ & - \frac{1}{8}be^2nx^4(a+b\log(cx^n)) + \frac{1}{2}d^2x^2(a+b\log(cx^n))^2 \\ & + \frac{2}{3}dex^3(a+b\log(cx^n))^2 + \frac{1}{4}e^2x^4(a+b\log(cx^n))^2\end{aligned}$$

output
```
1/4*b^2*d^2*n^2*x^2+4/27*b^2*d*e*n^2*x^3+1/32*b^2*e^2*n^2*x^4-1/2*b*d^2*n*
x^2*(a+b*ln(c*x^n))-4/9*b*d*e*n*x^3*(a+b*ln(c*x^n))-1/8*b*e^2*n*x^4*(a+b*l
n(c*x^n))+1/2*d^2*x^2*(a+b*ln(c*x^n))^2+2/3*d*e*x^3*(a+b*ln(c*x^n))^2+1/4*
e^2*x^4*(a+b*ln(c*x^n))^2
```

Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 134, normalized size of antiderivative = 0.75

$$\int x(d+ex)^2 (a+b\log(cx^n))^2 \, dx = \frac{1}{864}x^2\left(27be^2nx^2(-4a+bn-4b\log(cx^n)) + 128bdenx(-3a+bn-3b\log(cx^n)) + 216bd^2n(-2a+bn-2b\log(cx^n)) + 432d^2(a+b\log(cx^n))^2 + 576dex(a+b\log(cx^n))^2 + 216e^2x^2(a+b\log(cx^n))^2\right)$$

input
```
Integrate[x*(d + e*x)^2*(a + b*Log[c*x^n])^2,x]
```

output
```
(x^2*(27*b*e^2*n*x^2*(-4*a + b*n - 4*b*Log[c*x^n]) + 128*b*d*e*n*x*(-3*a +
 b*n - 3*b*Log[c*x^n]) + 216*b*d^2*n*(-2*a + b*n - 2*b*Log[c*x^n]) + 432*d
^2*(a + b*Log[c*x^n])^2 + 576*d*e*x*(a + b*Log[c*x^n])^2 + 216*e^2*x^2*(a
+ b*Log[c*x^n])^2))/864
```

Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 178, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex)^2 (a+b\log(cx^n))^2 \, dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(d^2x(a+b\log(cx^n))^2 + 2dex^2(a+b\log(cx^n))^2 + e^2x^3(a+b\log(cx^n))^2\right) dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}d^2x^2(a+b\log(cx^n))^2-\frac{1}{2}bd^2nx^2(a+b\log(cx^n))+\frac{2}{3}dex^3(a+b\log(cx^n))^2-\frac{4}{9}bdenx^3(a+b\log(cx^n))+\frac{1}{4}e^2x^4(a+b\log(cx^n))^2-\frac{1}{8}be^2nx^4(a+b\log(cx^n))+\frac{1}{4}b^2d^2n^2x^2+\frac{4}{27}b^2den^2x^3+\frac{1}{32}b^2e^2n^2x^4$$

input
```
Int[x*(d + e*x)^2*(a + b*Log[c*x^n])^2,x]
```

output
```
(b^2*d^2*n^2*x^2)/4 + (4*b^2*d*e*n^2*x^3)/27 + (b^2*e^2*n^2*x^4)/32 - (b*d
^2*n*x^2*(a + b*Log[c*x^n]))/2 - (4*b*d*e*n*x^3*(a + b*Log[c*x^n]))/9 - (b
*e^2*n*x^4*(a + b*Log[c*x^n]))/8 + (d^2*x^2*(a + b*Log[c*x^n])^2)/2 + (2*d
*e*x^3*(a + b*Log[c*x^n])^2)/3 + (e^2*x^4*(a + b*Log[c*x^n])^2)/4
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [A] (verified)

Time = 104.67 (sec) , antiderivative size = 262, normalized size of antiderivative = 1.47

method	result
parallelrisch	$\frac{x^4b^2\ln(cx^n)^2e^2}{4}-\frac{\ln(cx^n)x^4nb^2e^2}{8}+\frac{b^2e^2n^2x^4}{32}+\frac{x^4ab\ln(cx^n)e^2}{2}-\frac{abe^2nx^4}{8}+\frac{2x^3b^2\ln(cx^n)^2ed}{3}-\frac{4\ln(cx^n)x}{9}$
risch	Expression too large to display

input
```
int(x*(e*x+d)^2*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
1/4*x^4*b^2*ln(c*x^n)^2*e^2-1/8*ln(c*x^n)*x^4*n*b^2*e^2+1/32*b^2*e^2*n^2*x
^4+1/2*x^4*a*b*ln(c*x^n)*e^2-1/8*a*b*e^2*n*x^4+2/3*x^3*b^2*ln(c*x^n)^2*e*d
-4/9*ln(c*x^n)*x^3*n*d*e*b^2+4/27*b^2*d*e*n^2*x^3+1/4*x^4*a^2*e^2+4/3*x^3*
a*b*ln(c*x^n)*e*d-4/9*a*b*d*e*n*x^3+1/2*x^2*b^2*ln(c*x^n)^2*d^2-1/2*ln(c*x
^n)*x^2*n*b^2*d^2+1/4*b^2*d^2*n^2*x^2+2/3*x^3*a^2*e*d+x^2*a*b*ln(c*x^n)*d^
2-1/2*a*b*d^2*n*x^2+1/2*x^2*a^2*d^2
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 363 vs. $2(160) = 320$.

Time = 0.07 (sec) , antiderivative size = 363, normalized size of antiderivative = 2.04

$$\int x(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx$$
$$= \frac{1}{32}\left(b^2e^2n^2-4\,abe^2n+8\,a^2e^2\right)x^4+\frac{2}{27}\left(2\,b^2den^2-6\,abden+9\,a^2de\right)x^3$$
$$+\frac{1}{4}\left(b^2d^2n^2-2\,abd^2n+2\,a^2d^2\right)x^2+\frac{1}{12}\left(3\,b^2e^2x^4+8\,b^2dex^3+6\,b^2d^2x^2\right)\log\left(c\right)^2$$
$$+\frac{1}{12}\left(3\,b^2e^2n^2x^4+8\,b^2den^2x^3+6\,b^2d^2n^2x^2\right)\log\left(x\right)^2$$
$$-\frac{1}{72}\left(9\left(b^2e^2n-4\,abe^2\right)x^4+32\left(b^2den-3\,abde\right)x^3+36\left(b^2d^2n-2\,abd^2\right)x^2\right)\log\left(c\right)$$
$$-\frac{1}{72}\left(9\left(b^2e^2n^2-4\,abe^2n\right)x^4+32\left(b^2den^2-3\,abden\right)x^3+36\left(b^2d^2n^2-2\,abd^2n\right)x^2-12\left(3\,b^2e^2nx^4+8\right.\right.$$

input
```
integrate(x*(e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
1/32*(b^2*e^2*n^2 - 4*a*b*e^2*n + 8*a^2*e^2)*x^4 + 2/27*(2*b^2*d*e*n^2 - 6
*a*b*d*e*n + 9*a^2*d*e)*x^3 + 1/4*(b^2*d^2*n^2 - 2*a*b*d^2*n + 2*a^2*d^2)*
x^2 + 1/12*(3*b^2*e^2*x^4 + 8*b^2*d*e*x^3 + 6*b^2*d^2*x^2)*log(c)^2 + 1/12
*(3*b^2*e^2*n^2*x^4 + 8*b^2*d*e*n^2*x^3 + 6*b^2*d^2*n^2*x^2)*log(x)^2 - 1/
72*(9*(b^2*e^2*n - 4*a*b*e^2)*x^4 + 32*(b^2*d*e*n - 3*a*b*d*e)*x^3 + 36*(b
^2*d^2*n - 2*a*b*d^2)*x^2)*log(c) - 1/72*(9*(b^2*e^2*n^2 - 4*a*b*e^2*n)*x^
4 + 32*(b^2*d*e*n^2 - 3*a*b*d*e*n)*x^3 + 36*(b^2*d^2*n^2 - 2*a*b*d^2*n)*x^
2 - 12*(3*b^2*e^2*n*x^4 + 8*b^2*d*e*n*x^3 + 6*b^2*d^2*n*x^2)*log(c))*log(x
)
```

Sympy [A] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 308, normalized size of antiderivative = 1.73

$$\int x(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx = \frac{a^2d^2x^2}{2}+\frac{2a^2dex^3}{3}+\frac{a^2e^2x^4}{4}-\frac{abd^2nx^2}{2}+abd^2x^2\log\left(cx^n\right)-\frac{4abdenx^3}{9}+\frac{4abdex^3\log\left(cx^n\right)}{3}-\frac{abe^2nx^4}{8}+\frac{abe^2x^4\log\left(cx^n\right)}{2}+\frac{b^2d^2n^2x^2}{4}-\frac{b^2d^2nx^2\log\left(cx^n\right)}{2}+\frac{b^2d^2x^2\log\left(cx^n\right)^2}{2}+\frac{4b^2den^2x^3}{27}-\frac{4b^2denx^3\log\left(cx^n\right)}{9}+\frac{2b^2dex^3\log\left(cx^n\right)^2}{3}+\frac{b^2e^2n^2x^4}{32}-\frac{b^2e^2nx^4\log\left(cx^n\right)}{8}+\frac{b^2e^2x^4\log\left(cx^n\right)^2}{4}$$

input
```
integrate(x*(e*x+d)**2*(a+b*ln(c*x**n))**2,x)
```

output
```
a**2*d**2*x**2/2 + 2*a**2*d*e*x**3/3 + a**2*e**2*x**4/4 - a*b*d**2*n*x**2/
2 + a*b*d**2*x**2*log(c*x**n) - 4*a*b*d*e*n*x**3/9 + 4*a*b*d*e*x**3*log(c*
x**n)/3 - a*b*e**2*n*x**4/8 + a*b*e**2*x**4*log(c*x**n)/2 + b**2*d**2*n**2
*x**2/4 - b**2*d**2*n*x**2*log(c*x**n)/2 + b**2*d**2*x**2*log(c*x**n)**2/2
 + 4*b**2*d*e*n**2*x**3/27 - 4*b**2*d*e*n*x**3*log(c*x**n)/9 + 2*b**2*d*e*
x**3*log(c*x**n)**2/3 + b**2*e**2*n**2*x**4/32 - b**2*e**2*n*x**4*log(c*x*
*n)/8 + b**2*e**2*x**4*log(c*x**n)**2/4
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 250, normalized size of antiderivative = 1.40

$$\int x(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx = \frac{1}{4}\,b^2e^2x^4\log\left(cx^n\right)^2-\frac{1}{8}\,abe^2nx^4+\frac{1}{2}\,abe^2x^4\log\left(cx^n\right)+\frac{2}{3}\,b^2dex^3\log\left(cx^n\right)^2-\frac{4}{9}\,abdenx^3+\frac{1}{4}\,a^2e^2x^4+\frac{4}{3}\,abdex^3\log\left(cx^n\right)+\frac{1}{2}\,b^2d^2x^2\log\left(cx^n\right)^2-\frac{1}{2}\,abd^2nx^2+\frac{2}{3}\,a^2dex^3+abd^2x^2\log\left(cx^n\right)+\frac{1}{2}\,a^2d^2x^2+\frac{1}{4}\left(n^2x^2-2\,nx^2\log\left(cx^n\right)\right)b^2d^2+\frac{4}{27}\left(n^2x^3-3\,nx^3\log\left(cx^n\right)\right)b^2de+\frac{1}{32}\left(n^2x^4-4\,nx^4\log\left(cx^n\right)\right)b^2e^2$$

input
```
integrate(x*(e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
1/4*b^2*e^2*x^4*log(c*x^n)^2 - 1/8*a*b*e^2*n*x^4 + 1/2*a*b*e^2*x^4*log(c*x
^n) + 2/3*b^2*d*e*x^3*log(c*x^n)^2 - 4/9*a*b*d*e*n*x^3 + 1/4*a^2*e^2*x^4 +
 4/3*a*b*d*e*x^3*log(c*x^n) + 1/2*b^2*d^2*x^2*log(c*x^n)^2 - 1/2*a*b*d^2*n
*x^2 + 2/3*a^2*d*e*x^3 + a*b*d^2*x^2*log(c*x^n) + 1/2*a^2*d^2*x^2 + 1/4*(n
^2*x^2 - 2*n*x^2*log(c*x^n))*b^2*d^2 + 4/27*(n^2*x^3 - 3*n*x^3*log(c*x^n))
*b^2*d*e + 1/32*(n^2*x^4 - 4*n*x^4*log(c*x^n))*b^2*e^2
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 408 vs. 2(160) = 320.

Time = 0.12 (sec) , antiderivative size = 408, normalized size of antiderivative = 2.29

$$\int x(d+ex)^2 (a+b\log(cx^n))^2\,dx = \frac{1}{4}\,b^2e^2n^2x^4\log(x)^2 - \frac{1}{8}\,b^2e^2n^2x^4\log(x) + \frac{1}{2}\,b^2e^2nx^4\log(c)\log(x) + \frac{2}{3}\,b^2den^2x^3\log(x)^2 + \frac{1}{32}\,b^2e^2n^2x^4 - \frac{1}{8}\,b^2e^2nx^4\log(c) + \frac{1}{4}\,b^2e^2x^4\log(c)^2 - \frac{4}{9}\,b^2den^2x^3\log(x) + \frac{1}{2}\,abe^2nx^4\log(x) + \frac{4}{3}\,b^2denx^3\log(c)\log(x) + \frac{1}{2}\,b^2d^2n^2x^2\log(x)^2 + \frac{4}{27}\,b^2den^2x^3 - \frac{1}{8}\,abe^2nx^4 - \frac{4}{9}\,b^2denx^3\log(c) + \frac{1}{2}\,abe^2x^4\log(c) + \frac{2}{3}\,b^2dex^3\log(c)^2 - \frac{1}{2}\,b^2d^2n^2x^2\log(x) + \frac{4}{3}\,abdenx^3\log(x) + b^2d^2nx^2\log(c)\log(x) + \frac{1}{4}\,b^2d^2n^2x^2 - \frac{4}{9}\,abdenx^3 + \frac{1}{4}\,a^2e^2x^4 - \frac{1}{2}\,b^2d^2nx^2\log(c) + \frac{4}{3}\,abdex^3\log(c) + \frac{1}{2}\,b^2d^2x^2\log(c)^2 + abd^2nx^2\log(x) - \frac{1}{2}\,abd^2nx^2 + \frac{2}{3}\,a^2dex^3 + abd^2x^2\log(c) + \frac{1}{2}\,a^2d^2x^2$$

input
```
integrate(x*(e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
1/4*b^2*e^2*n^2*x^4*log(x)^2 - 1/8*b^2*e^2*n^2*x^4*log(x) + 1/2*b^2*e^2*n*
x^4*log(c)*log(x) + 2/3*b^2*d*e*n^2*x^3*log(x)^2 + 1/32*b^2*e^2*n^2*x^4 -
1/8*b^2*e^2*n*x^4*log(c) + 1/4*b^2*e^2*x^4*log(c)^2 - 4/9*b^2*d*e*n^2*x^3*
log(x) + 1/2*a*b*e^2*n*x^4*log(x) + 4/3*b^2*d*e*n*x^3*log(c)*log(x) + 1/2*
b^2*d^2*n^2*x^2*log(x)^2 + 4/27*b^2*d*e*n^2*x^3 - 1/8*a*b*e^2*n*x^4 - 4/9*
b^2*d*e*n*x^3*log(c) + 1/2*a*b*e^2*x^4*log(c) + 2/3*b^2*d*e*x^3*log(c)^2 -
 1/2*b^2*d^2*n^2*x^2*log(x) + 4/3*a*b*d*e*n*x^3*log(x) + b^2*d^2*n*x^2*log
(c)*log(x) + 1/4*b^2*d^2*n^2*x^2 - 4/9*a*b*d*e*n*x^3 + 1/4*a^2*e^2*x^4 - 1
/2*b^2*d^2*n*x^2*log(c) + 4/3*a*b*d*e*x^3*log(c) + 1/2*b^2*d^2*x^2*log(c)^
2 + a*b*d^2*n*x^2*log(x) - 1/2*a*b*d^2*n*x^2 + 2/3*a^2*d*e*x^3 + a*b*d^2*x
^2*log(c) + 1/2*a^2*d^2*x^2
```

Mupad [B] (verification not implemented)

Time = 26.24 (sec) , antiderivative size = 179, normalized size of antiderivative = 1.01

$$\int x(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx = \ln\left(c\,x^n\right)\left(\frac{b\,(2\,a-b\,n)\,d^2\,x^2}{2}+\frac{4\,b\,(3\,a-b\,n)\,d\,e\,x^3}{9}+\frac{b\,(4\,a-b\,n)\,e^2\,x^4}{8}\right)+\ln\left(c\,x^n\right)^2\left(\frac{b^2\,d^2\,x^2}{2}+\frac{2\,b^2\,d\,e\,x^3}{3}+\frac{b^2\,e^2\,x^4}{4}\right)+\frac{d^2\,x^2\,(2\,a^2-2\,a\,b\,n+b^2\,n^2)}{4}+\frac{e^2\,x^4\,(8\,a^2-4\,a\,b\,n+b^2\,n^2)}{32}+\frac{2\,d\,e\,x^3\,(9\,a^2-6\,a\,b\,n+2\,b^2\,n^2)}{27}$$

input
```
int(x*(a + b*log(c*x^n))^2*(d + e*x)^2,x)
```

output
```
log(c*x^n)*((b*d^2*x^2*(2*a - b*n))/2 + (b*e^2*x^4*(4*a - b*n))/8 + (4*b*d
*e*x^3*(3*a - b*n))/9) + log(c*x^n)^2*((b^2*d^2*x^2)/2 + (b^2*e^2*x^4)/4 +
 (2*b^2*d*e*x^3)/3) + (d^2*x^2*(2*a^2 + b^2*n^2 - 2*a*b*n))/4 + (e^2*x^4*(
8*a^2 + b^2*n^2 - 4*a*b*n))/32 + (2*d*e*x^3*(9*a^2 + 2*b^2*n^2 - 6*a*b*n))
/27
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 237, normalized size of antiderivative = 1.33

$$\int x(d+ex)^2 \left(a+b\log\left(cx^n\right)\right)^2 \, dx$$
$$= \frac{x^2\left(432\log(x^nc)^2 b^2d^2+576\log(x^nc)^2 b^2dex+216\log(x^nc)^2 b^2e^2x^2+864\log(x^nc)\,ab\,d^2+1152\log(x^nc)\,a\right.}{}$$

input
```
int(x*(e*x+d)^2*(a+b*log(c*x^n))^2,x)
```

output
```
(x**2*(432*log(x**n*c)**2*b**2*d**2 + 576*log(x**n*c)**2*b**2*d*e*x + 216*
log(x**n*c)**2*b**2*e**2*x**2 + 864*log(x**n*c)*a*b*d**2 + 1152*log(x**n*c
)*a*b*d*e*x + 432*log(x**n*c)*a*b*e**2*x**2 - 432*log(x**n*c)*b**2*d**2*n
- 384*log(x**n*c)*b**2*d*e*n*x - 108*log(x**n*c)*b**2*e**2*n*x**2 + 432*a*
*2*d**2 + 576*a**2*d*e*x + 216*a**2*e**2*x**2 - 432*a*b*d**2*n - 384*a*b*d
*e*n*x - 108*a*b*e**2*n*x**2 + 216*b**2*d**2*n**2 + 128*b**2*d*e*n**2*x +
27*b**2*e**2*n**2*x**2))/864
```

3.86 $\int (d+ex)^2 \left(a+b\log\left(cx^n\right)\right)^2 \,dx$

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Rubi [A] (verified) 782
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Optimal result

Integrand size = 20, antiderivative size = 173

$$\begin{aligned}\int (d+ex)^2 \left(a+b\log\left(cx^n\right)\right)^2 \,dx &= 2b^2d^2n^2x+\frac{1}{2}b^2den^2x^2+\frac{2}{27}b^2e^2n^2x^3 \\ &\quad +\frac{b^2d^3n^2\log^2(x)}{3e}-2bd^2nx(a+b\log\left(cx^n\right)) \\ &\quad -bdenx^2(a+b\log\left(cx^n\right))-\frac{2}{9}be^2nx^3(a+b\log\left(cx^n\right)) \\ &\quad -\frac{2bd^3n\log(x)\left(a+b\log\left(cx^n\right)\right)}{3e} \\ &\quad +\frac{(d+ex)^3\left(a+b\log\left(cx^n\right)\right)^2}{3e}\end{aligned}$$

output
```
2*b^2*d^2*n^2*x+1/2*b^2*d*e*n^2*x^2+2/27*b^2*e^2*n^2*x^3+1/3*b^2*d^3*n^2*l
n(x)^2/e-2*b*d^2*n*x*(a+b*ln(c*x^n))-b*d*e*n*x^2*(a+b*ln(c*x^n))-2/9*b*e^2
*n*x^3*(a+b*ln(c*x^n))-2/3*b*d^3*n*ln(x)*(a+b*ln(c*x^n))/e+1/3*(e*x+d)^3*(
a+b*ln(c*x^n))^2/e
```

Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 135, normalized size of antiderivative = 0.78

$$\int (d+ex)^2 (a+b\log(cx^n))^2 \, dx = \frac{2}{27}be^2nx^3(-3a+bn-3b\log(cx^n)) + \frac{1}{2}bdenx^2(-2a+bn-2b\log(cx^n)) + d^2x(a+b\log(cx^n))^2 + dex^2(a+b\log(cx^n))^2 + \frac{1}{3}e^2x^3(a+b\log(cx^n))^2 - 2bd^2nx(a-bn+b\log(cx^n))$$

input
```
Integrate[(d + e*x)^2*(a + b*Log[c*x^n])^2,x]
```

output
```
(2*b*e^2*n*x^3*(-3*a + b*n - 3*b*Log[c*x^n]))/27 + (b*d*e*n*x^2*(-2*a + b*
n - 2*b*Log[c*x^n]))/2 + d^2*x*(a + b*Log[c*x^n])^2 + d*e*x^2*(a + b*Log[c
*x^n])^2 + (e^2*x^3*(a + b*Log[c*x^n])^2)/3 - 2*b*d^2*n*x*(a - b*n + b*Log
[c*x^n])
```

Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 155, normalized size of antiderivative = 0.90, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.150$, Rules used = {2756, 2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)^2 (a+b\log(cx^n))^2 \, dx$$

$$\Big\downarrow \text{2756}$$

$$\frac{(d+ex)^3 (a+b\log(cx^n))^2}{3e} - \frac{2bn \int \frac{(d+ex)^3(a+b\log(cx^n))}{x}dx}{3e}$$

$$\Big\downarrow \text{2772}$$

$$\frac{(d+ex)^3(a+b\log(cx^n))^2}{3e} - \frac{2bn\left(-bn\int\left(\frac{\log(x)d^3}{x}+\frac{1}{6}e(18d^2+9exd+2e^2x^2)\right)dx+d^3\log(x)(a+b\log(cx^n))+3d^2ex(a+b\log(cx^n))+\frac{3}{2}d\right.}{3e}$$

$$\Big\downarrow \text{2009}$$

$$\frac{(d+ex)^3(a+b\log(cx^n))^2}{3e} - \frac{2bn\left(d^3\log(x)(a+b\log(cx^n))+3d^2ex(a+b\log(cx^n))+\frac{3}{2}de^2x^2(a+b\log(cx^n))+\frac{1}{3}e^3x^3(a+b\log(cx^n))-bn\right.}{3e}$$

input
```
Int[(d + e*x)^2*(a + b*Log[c*x^n])^2,x]
```

output
```
((d + e*x)^3*(a + b*Log[c*x^n])^2)/(3*e) - (2*b*n*(-(b*n*(3*d^2*e*x + (3*d
*e^2*x^2)/4 + (e^3*x^3)/9 + (d^3*Log[x]^2)/2)) + 3*d^2*e*x*(a + b*Log[c*x^
n]) + (3*d*e^2*x^2*(a + b*Log[c*x^n]))/2 + (e^3*x^3*(a + b*Log[c*x^n]))/3
+ d^3*Log[x]*(a + b*Log[c*x^n])))/(3*e)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.77 (sec) , antiderivative size = 247, normalized size of antiderivative = 1.43

method	result
parallelrisch	$\frac{b^2\ln(c\,x^n)^2 e^2 x^3}{3}-\frac{2\ln(c\,x^n)x^3 n\,b^2e^2}{9}+\frac{2b^2e^2n^2x^3}{27}+\frac{2ab\ln(c\,x^n)e^2x^3}{3}-\frac{2nba\,e^2x^3}{9}+b^2\ln\left(c\,x^n\right)^2 e\,x^2 d-x$
risch	Expression too large to display

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
1/3*b^2*ln(c*x^n)^2*e^2*x^3-2/9*ln(c*x^n)*x^3*n*b^2*e^2+2/27*b^2*e^2*n^2*x
^3+2/3*a*b*ln(c*x^n)*e^2*x^3-2/9*n*b*a*e^2*x^3+b^2*ln(c*x^n)^2*e*x^2*d-x^2
*ln(c*x^n)*b^2*d*e*n+1/2*b^2*d*e*n^2*x^2+1/3*a^2*e^2*x^3+2*a*b*ln(c*x^n)*e
*x^2*d-a*b*d*e*n*x^2+x*b^2*ln(c*x^n)^2*d^2-2*x*ln(c*x^n)*b^2*d^2*n+2*b^2*d
^2*n^2*x+a^2*e*x^2*d+2*x*a*b*ln(c*x^n)*d^2-2*n*b*a*d^2*x+x*a^2*d^2
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 347 vs. 2(161) = 322.

Time = 0.07 (sec) , antiderivative size = 347, normalized size of antiderivative = 2.01

$$\begin{aligned}\int (d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx &= \frac{1}{27}\left(2\,b^2e^2n^2-6\,abe^2n+9\,a^2e^2\right)x^3\\ &+\frac{1}{2}\left(b^2den^2-2\,abden+2\,a^2de\right)x^2+\frac{1}{3}\left(b^2e^2x^3+3\,b^2dex^2+3\,b^2d^2x\right)\log\left(c\right)^2\\ &+\frac{1}{3}\left(b^2e^2n^2x^3+3\,b^2den^2x^2+3\,b^2d^2n^2x\right)\log\left(x\right)^2+\left(2\,b^2d^2n^2-2\,abd^2n+a^2d^2\right)x\\ &-\frac{1}{9}\left(2\left(b^2e^2n-3\,abe^2\right)x^3+9\left(b^2den-2\,abde\right)x^2+18\left(b^2d^2n-abd^2\right)x\right)\log\left(c\right)\\ &-\frac{1}{9}\left(2\left(b^2e^2n^2-3\,abe^2n\right)x^3+9\left(b^2den^2-2\,abden\right)x^2+18\left(b^2d^2n^2-abd^2n\right)x-6\left(b^2e^2nx^3+3\,b^2denx\right.\right.\end{aligned}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
1/27*(2*b^2*e^2*n^2 - 6*a*b*e^2*n + 9*a^2*e^2)*x^3 + 1/2*(b^2*d*e*n^2 - 2*
a*b*d*e*n + 2*a^2*d*e)*x^2 + 1/3*(b^2*e^2*x^3 + 3*b^2*d*e*x^2 + 3*b^2*d^2*
x)*log(c)^2 + 1/3*(b^2*e^2*n^2*x^3 + 3*b^2*d*e*n^2*x^2 + 3*b^2*d^2*n^2*x)*
log(x)^2 + (2*b^2*d^2*n^2 - 2*a*b*d^2*n + a^2*d^2)*x - 1/9*(2*(b^2*e^2*n -
 3*a*b*e^2)*x^3 + 9*(b^2*d*e*n - 2*a*b*d*e)*x^2 + 18*(b^2*d^2*n - a*b*d^2)
*x)*log(c) - 1/9*(2*(b^2*e^2*n^2 - 3*a*b*e^2*n)*x^3 + 9*(b^2*d*e*n^2 - 2*a
*b*d*e*n)*x^2 + 18*(b^2*d^2*n^2 - a*b*d^2*n)*x - 6*(b^2*e^2*n*x^3 + 3*b^2*
d*e*n*x^2 + 3*b^2*d^2*n*x)*log(c))*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 286, normalized size of antiderivative = 1.65

$$\begin{aligned}\int (d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx = {} & a^2d^2x+a^2dex^2+\frac{a^2e^2x^3}{3}-2abd^2nx \\ & +2abd^2x\log\left(cx^n\right)-abdenx^2+2abdex^2\log\left(cx^n\right) \\ & -\frac{2abe^2nx^3}{9}+\frac{2abe^2x^3\log\left(cx^n\right)}{3}+2b^2d^2n^2x \\ & -2b^2d^2nx\log\left(cx^n\right)+b^2d^2x\log\left(cx^n\right)^2+\frac{b^2den^2x^2}{2} \\ & -b^2denx^2\log\left(cx^n\right)+b^2dex^2\log\left(cx^n\right)^2+\frac{2b^2e^2n^2x^3}{27} \\ & -\frac{2b^2e^2nx^3\log\left(cx^n\right)}{9}+\frac{b^2e^2x^3\log\left(cx^n\right)^2}{3}\end{aligned}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))**2,x)
```

output
```
a**2*d**2*x + a**2*d*e*x**2 + a**2*e**2*x**3/3 - 2*a*b*d**2*n*x + 2*a*b*d*
*2*x*log(c*x**n) - a*b*d*e*n*x**2 + 2*a*b*d*e*x**2*log(c*x**n) - 2*a*b*e**
2*n*x**3/9 + 2*a*b*e**2*x**3*log(c*x**n)/3 + 2*b**2*d**2*n**2*x - 2*b**2*d
**2*n*x*log(c*x**n) + b**2*d**2*x*log(c*x**n)**2 + b**2*d*e*n**2*x**2/2 -
b**2*d*e*n*x**2*log(c*x**n) + b**2*d*e*x**2*log(c*x**n)**2 + 2*b**2*e**2*n
**2*x**3/27 - 2*b**2*e**2*n*x**3*log(c*x**n)/9 + b**2*e**2*x**3*log(c*x**n
)**2/3
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 235, normalized size of antiderivative = 1.36

$$\int (d+ex)^2 (a+b\log(cx^n))^2 \, dx = \frac{1}{3} b^2e^2x^3\log(cx^n)^2 - \frac{2}{9} abe^2nx^3 + \frac{2}{3} abe^2x^3\log(cx^n) + b^2dex^2\log(cx^n)^2 - abdenx^2 + \frac{1}{3} a^2e^2x^3 + 2\,abdex^2\log(cx^n) + b^2d^2x\log(cx^n)^2 - 2\,abd^2nx + a^2dex^2 + 2\,abd^2x\log(cx^n) + 2\left(n^2x - nx\log(cx^n)\right)b^2d^2 + \frac{1}{2}\left(n^2x^2 - 2\,nx^2\log(cx^n)\right)b^2de + \frac{2}{27}\left(n^2x^3 - 3\,nx^3\log(cx^n)\right)b^2e^2 + a^2d^2x$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
1/3*b^2*e^2*x^3*log(c*x^n)^2 - 2/9*a*b*e^2*n*x^3 + 2/3*a*b*e^2*x^3*log(c*x
^n) + b^2*d*e*x^2*log(c*x^n)^2 - a*b*d*e*n*x^2 + 1/3*a^2*e^2*x^3 + 2*a*b*d
*e*x^2*log(c*x^n) + b^2*d^2*x*log(c*x^n)^2 - 2*a*b*d^2*n*x + a^2*d*e*x^2 +
 2*a*b*d^2*x*log(c*x^n) + 2*(n^2*x - n*x*log(c*x^n))*b^2*d^2 + 1/2*(n^2*x^
2 - 2*n*x^2*log(c*x^n))*b^2*d*e + 2/27*(n^2*x^3 - 3*n*x^3*log(c*x^n))*b^2*
e^2 + a^2*d^2*x
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 385 vs. $2(161) = 322$.

Time = 0.12 (sec) , antiderivative size = 385, normalized size of antiderivative = 2.23

$$\int (d+ex)^2 (a+b\log(cx^n))^2 \, dx = \frac{1}{3} b^2e^2n^2x^3 \log(x)^2 - \frac{2}{9} b^2e^2n^2x^3 \log(x) + \frac{2}{3} b^2e^2nx^3 \log(c) \log(x) + b^2den^2x^2 \log(x)^2 + \frac{2}{27} b^2e^2n^2x^3 - \frac{2}{9} b^2e^2nx^3 \log(c) + \frac{1}{3} b^2e^2x^3 \log(c)^2 - b^2den^2x^2 \log(x) + \frac{2}{3} abe^2nx^3 \log(x) + 2 b^2denx^2 \log(c) \log(x) + b^2d^2n^2x \log(x)^2 + \frac{1}{2} b^2den^2x^2 - \frac{2}{9} abe^2nx^3 - b^2denx^2 \log(c) + \frac{2}{3} abe^2x^3 \log(c) + b^2dex^2 \log(c)^2 - 2 b^2d^2n^2x \log(x) + 2 abdenx^2 \log(x) + 2 b^2d^2nx \log(c) \log(x) + 2 b^2d^2n^2x - abdenx^2 + \frac{1}{3} a^2e^2x^3 - 2 b^2d^2nx \log(c) + 2 abdex^2 \log(c) + b^2d^2x \log(c)^2 + 2 abd^2nx \log(x) - 2 abd^2nx + a^2dex^2 + 2 abd^2x \log(c) + a^2d^2x$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
1/3*b^2*e^2*n^2*x^3*log(x)^2 - 2/9*b^2*e^2*n^2*x^3*log(x) + 2/3*b^2*e^2*n*
x^3*log(c)*log(x) + b^2*d*e*n^2*x^2*log(x)^2 + 2/27*b^2*e^2*n^2*x^3 - 2/9*
b^2*e^2*n*x^3*log(c) + 1/3*b^2*e^2*x^3*log(c)^2 - b^2*d*e*n^2*x^2*log(x) +
 2/3*a*b*e^2*n*x^3*log(x) + 2*b^2*d*e*n*x^2*log(c)*log(x) + b^2*d^2*n^2*x*
log(x)^2 + 1/2*b^2*d*e*n^2*x^2 - 2/9*a*b*e^2*n*x^3 - b^2*d*e*n*x^2*log(c)
+ 2/3*a*b*e^2*x^3*log(c) + b^2*d*e*x^2*log(c)^2 - 2*b^2*d^2*n^2*x*log(x) +
 2*a*b*d*e*n*x^2*log(x) + 2*b^2*d^2*n*x*log(c)*log(x) + 2*b^2*d^2*n^2*x -
a*b*d*e*n*x^2 + 1/3*a^2*e^2*x^3 - 2*b^2*d^2*n*x*log(c) + 2*a*b*d*e*x^2*log
(c) + b^2*d^2*x*log(c)^2 + 2*a*b*d^2*n*x*log(x) - 2*a*b*d^2*n*x + a^2*d*e*
x^2 + 2*a*b*d^2*x*log(c) + a^2*d^2*x
```

Mupad [B] (verification not implemented)

Time = 26.49 (sec) , antiderivative size = 166, normalized size of antiderivative = 0.96

$$\int (d+ex)^2 (a+b\log(cx^n))^2\,dx = \ln(c\,x^n)^2 \left(b^2\,d^2\,x+b^2\,d\,e\,x^2+\frac{b^2\,e^2\,x^3}{3}\right) + \ln(c\,x^n)\left(2\,b\,(a-b\,n)\,d^2\,x+b\,(2\,a-b\,n)\,d\,e\,x^2 + \frac{2\,b\,(3\,a-b\,n)\,e^2\,x^3}{9}\right)+d^2\,x\,\left(a^2-2\,a\,b\,n+2\,b^2\,n^2\right) + \frac{e^2\,x^3\,(9\,a^2-6\,a\,b\,n+2\,b^2\,n^2)}{27} + \frac{d\,e\,x^2\,(2\,a^2-2\,a\,b\,n+b^2\,n^2)}{2}$$

input
```
int((a + b*log(c*x^n))^2*(d + e*x)^2,x)
```

output
```
log(c*x^n)^2*(b^2*d^2*x + (b^2*e^2*x^3)/3 + b^2*d*e*x^2) + log(c*x^n)*((2*
b*e^2*x^3*(3*a - b*n))/9 + 2*b*d^2*x*(a - b*n) + b*d*e*x^2*(2*a - b*n)) +
d^2*x*(a^2 + 2*b^2*n^2 - 2*a*b*n) + (e^2*x^3*(9*a^2 + 2*b^2*n^2 - 6*a*b*n)
)/27 + (d*e*x^2*(2*a^2 + b^2*n^2 - 2*a*b*n))/2
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 235, normalized size of antiderivative = 1.36

$$\int (d+ex)^2 (a+b\log(cx^n))^2\,dx = \frac{x\big(54\log(x^n c)^2 b^2 d^2+54\log(x^n c)^2 b^2 dex+18\log(x^n c)^2 b^2 e^2 x^2+108\log(x^n c)\,ab\,d^2+108\log(x^n c)\,abdex$$

input
```
int((e*x+d)^2*(a+b*log(c*x^n))^2,x)
```

output
```
(x*(54*log(x**n*c)**2*b**2*d**2 + 54*log(x**n*c)**2*b**2*d*e*x + 18*log(x*
*n*c)**2*b**2*e**2*x**2 + 108*log(x**n*c)*a*b*d**2 + 108*log(x**n*c)*a*b*d
*e*x + 36*log(x**n*c)*a*b*e**2*x**2 - 108*log(x**n*c)*b**2*d**2*n - 54*log
(x**n*c)*b**2*d*e*n*x - 12*log(x**n*c)*b**2*e**2*n*x**2 + 54*a**2*d**2 + 5
4*a**2*d*e*x + 18*a**2*e**2*x**2 - 108*a*b*d**2*n - 54*a*b*d*e*n*x - 12*a*
b*e**2*n*x**2 + 108*b**2*d**2*n**2 + 27*b**2*d*e*n**2*x + 4*b**2*e**2*n**2
*x**2))/54
```

3.87 $\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x}\,dx$

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Optimal result

Integrand size = 23, antiderivative size = 137

$$\int \frac{(d+ex)^2\,(a+b\log{(cx^n)})^2}{x}\,dx = -4abdenx+4b^2den^2x+\frac{1}{4}b^2e^2n^2x^2 - 4b^2denx\log{(cx^n)}-\frac{1}{2}be^2nx^2(a+b\log{(cx^n)}) + 2dex(a+b\log{(cx^n)})^2+\frac{1}{2}e^2x^2(a + b\log{(cx^n)})^2+\frac{d^2(a+b\log{(cx^n)})^3}{3bn}$$

output
```
-4*a*b*d*e*n*x+4*b^2*d*e*n^2*x+1/4*b^2*e^2*n^2*x^2-4*b^2*d*e*n*x*ln(c*x^n)
-1/2*b*e^2*n*x^2*(a+b*ln(c*x^n))+2*d*e*x*(a+b*ln(c*x^n))^2+1/2*e^2*x^2*(a+
b*ln(c*x^n))^2+1/3*d^2*(a+b*ln(c*x^n))^3/b/n
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 114, normalized size of antiderivative = 0.83

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x} dx = \frac{1}{4}be^2nx^2(-2a+bn-2b\log(cx^n)) + 2dex(a+b\log(cx^n))^2 + \frac{1}{2}e^2x^2(a+b\log(cx^n))^2 + \frac{d^2(a+b\log(cx^n))^3}{3bn} - 4bdenx(a-bn+b\log(cx^n))$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
(b*e^2*n*x^2*(-2*a + b*n - 2*b*Log[c*x^n]))/4 + 2*d*e*x*(a + b*Log[c*x^n])
^2 + (e^2*x^2*(a + b*Log[c*x^n])^2)/2 + (d^2*(a + b*Log[c*x^n])^3)/(3*b*n)
 - 4*b*d*e*n*x*(a - b*n + b*Log[c*x^n])
```

Rubi [A] (verified)

Time = 0.70 (sec) , antiderivative size = 169, normalized size of antiderivative = 1.23, number of steps used = 9, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {2788, 2767, 2009, 2788, 2733, 2009, 2739, 15}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x} dx$$

$$\Big\downarrow \text{2788}$$

$$e\int (d+ex)(a+b\log(cx^n))^2 dx + d\int \frac{(d+ex)(a+b\log(cx^n))^2}{x} dx$$

$$\Big\downarrow \text{2767}$$

$$d\int \frac{(d+ex)(a+b\log(cx^n))^2}{x} dx + e\int \left(d(a+b\log(cx^n))^2 + ex(a+b\log(cx^n))^2\right) dx$$

$$\Big\downarrow \text{2009}$$

$$d\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x}dx+$$
$$e\left(dx(a+b\log\left(cx^n\right))^2-\frac{1}{2}benx^2(a+b\log\left(cx^n\right))+\frac{1}{2}ex^2(a+b\log\left(cx^n\right))^2-2abdnx-2b^2dnx\log\left(cx^n\right)+2b^2dn\right.$$

$$\Big\downarrow \ 2788$$

$$d\left(d\int \frac{\left(a+b\log\left(cx^n\right)\right)^2}{x}dx+e\int \left(a+b\log\left(cx^n\right)\right)^2dx\right)+$$
$$e\left(dx(a+b\log\left(cx^n\right))^2-\frac{1}{2}benx^2(a+b\log\left(cx^n\right))+\frac{1}{2}ex^2(a+b\log\left(cx^n\right))^2-2abdnx-2b^2dnx\log\left(cx^n\right)+2b^2dn\right.$$

$$\Big\downarrow \ 2733$$

$$d\left(d\int \frac{\left(a+b\log\left(cx^n\right)\right)^2}{x}dx+e\left(x(a+b\log\left(cx^n\right))^2-2bn\int \left(a+b\log\left(cx^n\right)\right)dx\right)\right)+$$
$$e\left(dx(a+b\log\left(cx^n\right))^2-\frac{1}{2}benx^2(a+b\log\left(cx^n\right))+\frac{1}{2}ex^2(a+b\log\left(cx^n\right))^2-2abdnx-2b^2dnx\log\left(cx^n\right)+2b^2dn\right.$$

$$\Big\downarrow \ 2009$$

$$d\left(d\int \frac{\left(a+b\log\left(cx^n\right)\right)^2}{x}dx+e\left(x(a+b\log\left(cx^n\right))^2-2bn(ax+bx\log\left(cx^n\right)-bnx)\right)\right)+$$
$$e\left(dx(a+b\log\left(cx^n\right))^2-\frac{1}{2}benx^2(a+b\log\left(cx^n\right))+\frac{1}{2}ex^2(a+b\log\left(cx^n\right))^2-2abdnx-2b^2dnx\log\left(cx^n\right)+2b^2dn\right.$$

$$\Big\downarrow \ 2739$$

$$d\left(\frac{d\int \left(a+b\log\left(cx^n\right)\right)^2d(a+b\log\left(cx^n\right))}{bn}+e\left(x(a+b\log\left(cx^n\right))^2-2bn(ax+bx\log\left(cx^n\right)-bnx)\right)\right)+$$
$$e\left(dx(a+b\log\left(cx^n\right))^2-\frac{1}{2}benx^2(a+b\log\left(cx^n\right))+\frac{1}{2}ex^2(a+b\log\left(cx^n\right))^2-2abdnx-2b^2dnx\log\left(cx^n\right)+2b^2dn\right.$$

$$\Big\downarrow \ 15$$

$$e\left(dx(a+b\log\left(cx^n\right))^2-\frac{1}{2}benx^2(a+b\log\left(cx^n\right))+\frac{1}{2}ex^2(a+b\log\left(cx^n\right))^2-2abdnx-2b^2dnx\log\left(cx^n\right)+2b^2dn\right.$$
$$d\left(\frac{d(a+b\log\left(cx^n\right))^3}{3bn}+e\left(x(a+b\log\left(cx^n\right))^2-2bn(ax+bx\log\left(cx^n\right)-bnx)\right)\right)$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
e*(-2*a*b*d*n*x + 2*b^2*d*n^2*x + (b^2*e*n^2*x^2)/4 - 2*b^2*d*n*x*Log[c*x^
n] - (b*e*n*x^2*(a + b*Log[c*x^n]))/2 + d*x*(a + b*Log[c*x^n])^2 + (e*x^2*
(a + b*Log[c*x^n])^2)/2) + d*((d*(a + b*Log[c*x^n])^3)/(3*b*n) + e*(x*(a +
 b*Log[c*x^n])^2 - 2*b*n*(a*x - b*n*x + b*x*Log[c*x^n])))
```

Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2733
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Simp[b*n*p   Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
 FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

rule 2739
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Simp[1/(
b*n)   Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p}
, x]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

rule 2788
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.))
/(x_), x_Symbol] :> Simp[d   Int[(d + e*x)^(q - 1)*((a + b*Log[c*x^n])^p/x)
, x], x] + Simp[e   Int[(d + e*x)^(q - 1)*(a + b*Log[c*x^n])^p, x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && GtQ[q, 0] && IntegerQ[2*q]
```

Maple [A] (verified)

Time = 0.82 (sec) , antiderivative size = 223, normalized size of antiderivative = 1.63

method	result
parallelrisch	$\frac{6x^2\ln(c\,x^n)^2b^2e^2n-6x^2\ln(c\,x^n)b^2e^2n^2+3x^2b^2e^2n^3+12x^2\ln(c\,x^n)ab\,e^2n-6x^2ab\,e^2n^2+24x\ln(c\,x^n)^2b^2den-48x\ln(c\,x^n)b^2}{}$
risch	Expression too large to display

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))^2/x,x,method=_RETURNVERBOSE)
```

output
```
1/12*(6*x^2*ln(c*x^n)^2*b^2*e^2*n-6*x^2*ln(c*x^n)*b^2*e^2*n^2+3*x^2*b^2*e^
2*n^3+12*x^2*ln(c*x^n)*a*b*e^2*n-6*x^2*a*b*e^2*n^2+24*x*ln(c*x^n)^2*b^2*d*
e*n-48*x*ln(c*x^n)*b^2*d*e*n^2+48*x*b^2*d*e*n^3+6*x^2*a^2*e^2*n+48*x*ln(c*
x^n)*a*b*d*e*n-48*x*a*b*d*e*n^2+4*b^2*d^2*ln(c*x^n)^3+12*ln(x)*a^2*d^2*n+2
4*x*a^2*d*e*n+12*a*b*d^2*ln(c*x^n)^2)/n
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 293 vs. 2(129) = 258.

Time = 0.27 (sec) , antiderivative size = 293, normalized size of antiderivative = 2.14

$$\int \frac{(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2}{x}\,dx$$
$$= \frac{1}{3}b^2d^2n^2\log(x)^3 + \frac{1}{4}\left(b^2e^2n^2 - 2\,abe^2n + 2\,a^2e^2\right)x^2 + \frac{1}{2}\left(b^2e^2x^2 + 4\,b^2dex\right)\log(c)^2$$
$$+ \frac{1}{2}\left(b^2e^2n^2x^2 + 4\,b^2den^2x + 2\,b^2d^2n\log(c) + 2\,abd^2n\right)\log(x)^2$$
$$+ 2\left(2\,b^2den^2 - 2\,abden + a^2de\right)x$$
$$- \frac{1}{2}\left(\left(b^2e^2n - 2\,abe^2\right)x^2 + 8\left(b^2den - abde\right)x\right)\log(c)$$
$$+ \frac{1}{2}\left(2\,b^2d^2\log(c)^2 + 2\,a^2d^2 - \left(b^2e^2n^2 - 2\,abe^2n\right)x^2 - 8\left(b^2den^2 - abden\right)x + 2\left(b^2e^2nx^2 + 4\,b^2denx + 2\right.\right.$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x,x, algorithm="fricas")
```

output
```
1/3*b^2*d^2*n^2*log(x)^3 + 1/4*(b^2*e^2*n^2 - 2*a*b*e^2*n + 2*a^2*e^2)*x^2
 + 1/2*(b^2*e^2*x^2 + 4*b^2*d*e*x)*log(c)^2 + 1/2*(b^2*e^2*n^2*x^2 + 4*b^2
*d*e*n^2*x + 2*b^2*d^2*n*log(c) + 2*a*b*d^2*n)*log(x)^2 + 2*(2*b^2*d*e*n^2
 - 2*a*b*d*e*n + a^2*d*e)*x - 1/2*((b^2*e^2*n - 2*a*b*e^2)*x^2 + 8*(b^2*d*
e*n - a*b*d*e)*x)*log(c) + 1/2*(2*b^2*d^2*log(c)^2 + 2*a^2*d^2 - (b^2*e^2*
n^2 - 2*a*b*e^2*n)*x^2 - 8*(b^2*d*e*n^2 - a*b*d*e*n)*x + 2*(b^2*e^2*n*x^2
+ 4*b^2*d*e*n*x + 2*a*b*d^2)*log(c))*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.43 (sec) , antiderivative size = 269, normalized size of antiderivative = 1.96

$$\int \frac{(d+ex)^2\,(a+b\log{(cx^n)})^2}{x}\,dx$$
$$= \begin{cases} \frac{a^2d^2\log{(cx^n)}}{n} + 2a^2dex + \frac{a^2e^2x^2}{2} + \frac{abd^2\log{(cx^n)}^2}{n} - 4abdenx + 4abdex\log{(cx^n)} - \frac{abe^2nx^2}{2} + abe^2x^2\log{(cx^n} \\ (a+b\log{(c)})^2\left(d^2\log{(x)} + 2dex + \frac{e^2x^2}{2}\right) \end{cases}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))**2/x,x)
```

output
```
Piecewise((a**2*d**2*log(c*x**n)/n + 2*a**2*d*e*x + a**2*e**2*x**2/2 + a*b
*d**2*log(c*x**n)**2/n - 4*a*b*d*e*n*x + 4*a*b*d*e*x*log(c*x**n) - a*b*e**
2*n*x**2/2 + a*b*e**2*x**2*log(c*x**n) + b**2*d**2*log(c*x**n)**3/(3*n) +
4*b**2*d*e*n**2*x - 4*b**2*d*e*n*x*log(c*x**n) + 2*b**2*d*e*x*log(c*x**n)*
*2 + b**2*e**2*n**2*x**2/4 - b**2*e**2*n*x**2*log(c*x**n)/2 + b**2*e**2*x*
*2*log(c*x**n)**2/2, Ne(n, 0)), ((a + b*log(c))**2*(d**2*log(x) + 2*d*e*x
+ e**2*x**2/2), True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 198, normalized size of antiderivative = 1.45

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x}\,dx = \frac{1}{2}b^2e^2x^2\log(cx^n)^2 - \frac{1}{2}abe^2nx^2 + abe^2x^2\log(cx^n) + 2b^2dex\log(cx^n)^2 - 4abdenx + \frac{1}{2}a^2e^2x^2 + 4abdex\log(cx^n) + \frac{b^2d^2\log(cx^n)^3}{3n} + 4\left(n^2x - nx\log(cx^n)\right)b^2de + \frac{1}{4}\left(n^2x^2 - 2nx^2\log(cx^n)\right)b^2e^2 + 2a^2dex + \frac{abd^2\log(cx^n)^2}{n} + a^2d^2\log(x)$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x,x, algorithm="maxima")
```

output
```
1/2*b^2*e^2*x^2*log(c*x^n)^2 - 1/2*a*b*e^2*n*x^2 + a*b*e^2*x^2*log(c*x^n)
+ 2*b^2*d*e*x*log(c*x^n)^2 - 4*a*b*d*e*n*x + 1/2*a^2*e^2*x^2 + 4*a*b*d*e*x
*log(c*x^n) + 1/3*b^2*d^2*log(c*x^n)^3/n + 4*(n^2*x - n*x*log(c*x^n))*b^2*
d*e + 1/4*(n^2*x^2 - 2*n*x^2*log(c*x^n))*b^2*e^2 + 2*a^2*d*e*x + a*b*d^2*l
og(c*x^n)^2/n + a^2*d^2*log(x)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 285 vs. 2(129) = 258.

Time = 0.13 (sec) , antiderivative size = 285, normalized size of antiderivative = 2.08

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x}\,dx = \frac{1}{3}b^2d^2n^2\log(x)^3 + \frac{1}{4}\left(b^2e^2n^2 - 2b^2e^2n\log(c) + 2b^2e^2\log(c)^2 - 2abe^2n + 4abe^2\log(c) + 2a^2e^2\right)x^2 + \frac{1}{2}\left(b^2e^2n^2x^2 + 4b^2den^2x + 2b^2d^2n\log(c) + 2abd^2n\right)\log(x)^2 + 2\left(2b^2den^2 - 2b^2den\log(c) + b^2de\log(c)^2 - 2abden + 2abde\log(c) + a^2de\right)x + \left(b^2d^2\log(c)^2 + 2abd^2\log(c) + a^2d^2\right)\log(x) - \frac{1}{2}\left(\left(b^2e^2n^2 - 2b^2e^2n\log(c) - 2abe^2n\right)x^2 + 8\left(b^2den^2 - b^2den\log(c) - abden\right)x\right)\log(x)$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x,x, algorithm="giac")
```

output
```
1/3*b^2*d^2*n^2*log(x)^3 + 1/4*(b^2*e^2*n^2 - 2*b^2*e^2*n*log(c) + 2*b^2*e
^2*log(c)^2 - 2*a*b*e^2*n + 4*a*b*e^2*log(c) + 2*a^2*e^2)*x^2 + 1/2*(b^2*e
^2*n^2*x^2 + 4*b^2*d*e*n^2*x + 2*b^2*d^2*n*log(c) + 2*a*b*d^2*n)*log(x)^2
+ 2*(2*b^2*d*e*n^2 - 2*b^2*d*e*n*log(c) + b^2*d*e*log(c)^2 - 2*a*b*d*e*n +
 2*a*b*d*e*log(c) + a^2*d*e)*x + (b^2*d^2*log(c)^2 + 2*a*b*d^2*log(c) + a^
2*d^2)*log(x) - 1/2*((b^2*e^2*n^2 - 2*b^2*e^2*n*log(c) - 2*a*b*e^2*n)*x^2
+ 8*(b^2*d*e*n^2 - b^2*d*e*n*log(c) - a*b*d*e*n)*x)*log(x)
```

Mupad [B] (verification not implemented)

Time = 26.81 (sec) , antiderivative size = 152, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x} \, dx = \ln(c\,x^n)^2 \left(\frac{b^2\,e^2\,x^2}{2} + 2\,b^2\,d\,e\,x + \frac{a\,b\,d^2}{n}\right) + \ln(c\,x^n) \left(\frac{b\,(2\,a-b\,n)\,e^2\,x^2}{2} + 4\,b\,d\,(a-b\,n)\,e\,x\right) + a^2\,d^2\,\ln(x) + \frac{e^2\,x^2\,(2\,a^2-2\,a\,b\,n+b^2\,n^2)}{4} + 2\,d\,e\,x\,(a^2-2\,a\,b\,n+2\,b^2\,n^2) + \frac{b^2\,d^2\ln(c\,x^n)^3}{3\,n}$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x)^2)/x,x)
```

output
```
log(c*x^n)^2*((b^2*e^2*x^2)/2 + 2*b^2*d*e*x + (a*b*d^2)/n) + log(c*x^n)*((
b*e^2*x^2*(2*a - b*n))/2 + 4*b*d*e*x*(a - b*n)) + a^2*d^2*log(x) + (e^2*x^
2*(2*a^2 + b^2*n^2 - 2*a*b*n))/4 + 2*d*e*x*(a^2 + 2*b^2*n^2 - 2*a*b*n) + (
b^2*d^2*log(c*x^n)^3)/(3*n)
```

Reduce [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 222, normalized size of antiderivative = 1.62

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x}\,dx$$
$$= \frac{4\log(x^n c)^3 b^2 d^2 + 12\log(x^n c)^2 ab\,d^2 + 24\log(x^n c)^2 b^2 denx + 6\log(x^n c)^2 b^2 e^2 n\,x^2 + 48\log(x^n c)\,abdenx + }{}$$

input
```
int((e*x+d)^2*(a+b*log(c*x^n))^2/x,x)
```

output
```
(4*log(x**n*c)**3*b**2*d**2 + 12*log(x**n*c)**2*a*b*d**2 + 24*log(x**n*c)*
*2*b**2*d*e*n*x + 6*log(x**n*c)**2*b**2*e**2*n*x**2 + 48*log(x**n*c)*a*b*d
*e*n*x + 12*log(x**n*c)*a*b*e**2*n*x**2 - 48*log(x**n*c)*b**2*d*e*n**2*x -
 6*log(x**n*c)*b**2*e**2*n**2*x**2 + 12*log(x)*a**2*d**2*n + 24*a**2*d*e*n
*x + 6*a**2*e**2*n*x**2 - 48*a*b*d*e*n**2*x - 6*a*b*e**2*n**2*x**2 + 48*b*
*2*d*e*n**3*x + 3*b**2*e**2*n**3*x**2)/(12*n)
```

3.88 $\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^2}\,dx$

Optimal result 799
Mathematica [A] (verified) 799
Rubi [A] (verified) 800
Maple [A] (verified) 801
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Sympy [A] (verification not implemented) 802
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Reduce [B] (verification not implemented) 805

Optimal result

Integrand size = 23, antiderivative size = 133

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))^2}{x^2}\,dx = -\frac{2b^2d^2n^2}{x} - 2abe^2nx + 2b^2e^2n^2x - 2b^2e^2nx\log(cx^n) - \frac{2bd^2n(a+b\log(cx^n))}{x} - \frac{d^2(a+b\log(cx^n))^2}{x} + e^2x(a+b\log(cx^n))^2 + \frac{2de(a+b\log(cx^n))^3}{3bn}$$

output
```
-2*b^2*d^2*n^2/x-2*a*b*e^2*n*x+2*b^2*e^2*n^2*x-2*b^2*e^2*n*x*ln(c*x^n)-2*b
*d^2*n*(a+b*ln(c*x^n))/x-d^2*(a+b*ln(c*x^n))^2/x+e^2*x*(a+b*ln(c*x^n))^2+2
/3*d*e*(a+b*ln(c*x^n))^3/b/n
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 107, normalized size of antiderivative = 0.80

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))^2}{x^2}\,dx = -\frac{d^2(a+b\log(cx^n))^2}{x} + e^2x(a+b\log(cx^n))^2 + \frac{2de(a+b\log(cx^n))^3}{3bn} - 2be^2nx(a-bn+b\log(cx^n)) - \frac{2bd^2n(a+bn+b\log(cx^n))}{x}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^2,x]
```

output
```
-((d^2*(a + b*Log[c*x^n])^2)/x) + e^2*x*(a + b*Log[c*x^n])^2 + (2*d*e*(a +
 b*Log[c*x^n])^3)/(3*b*n) - 2*b*e^2*n*x*(a - b*n + b*Log[c*x^n]) - (2*b*d^
2*n*(a + b*n + b*Log[c*x^n]))/x
```

Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^2} \, dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(\frac{d^2(a+b\log(cx^n))^2}{x^2}+\frac{2de(a+b\log(cx^n))^2}{x}+e^2(a+b\log(cx^n))^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))^2}{x}-\frac{2bd^2n(a+b\log(cx^n))}{x}+\frac{2de(a+b\log(cx^n))^3}{3bn}+e^2x(a+b\log(cx^n))^2-2abe^2nx-2b^2e^2nx\log(cx^n)-\frac{2b^2d^2n^2}{x}+2b^2e^2n^2x$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^2,x]
```

output
```
(-2*b^2*d^2*n^2)/x - 2*a*b*e^2*n*x + 2*b^2*e^2*n^2*x - 2*b^2*e^2*n*x*Log[c
*x^n] - (2*b*d^2*n*(a + b*Log[c*x^n]))/x - (d^2*(a + b*Log[c*x^n])^2)/x +
e^2*x*(a + b*Log[c*x^n])^2 + (2*d*e*(a + b*Log[c*x^n])^3)/(3*b*n)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [A] (verified)

Time = 0.75 (sec) , antiderivative size = 226, normalized size of antiderivative = 1.70

method	result
parallelrisch	$\frac{3x^2\ln(c\,x^n)^2b^2e^2n-6x^2\ln(c\,x^n)b^2e^2n^2+6x^2b^2e^2n^3+6x^2\ln(c\,x^n)ab\,e^2n-6x^2ab\,e^2n^2+2de\,b^2\ln(c\,x^n)^3x+6\ln(x)x\,a^2den+3}{3xn}$
risch	Expression too large to display

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))^2/x^2,x,method=_RETURNVERBOSE)
```

output
```
1/3/x*(3*x^2*ln(c*x^n)^2*b^2*e^2*n-6*x^2*ln(c*x^n)*b^2*e^2*n^2+6*x^2*b^2*e
^2*n^3+6*x^2*ln(c*x^n)*a*b*e^2*n-6*x^2*a*b*e^2*n^2+2*d*e*b^2*ln(c*x^n)^3*x
+6*ln(x)*x*a^2*d*e*n+3*x^2*a^2*e^2*n+6*d*e*a*b*ln(c*x^n)^2*x-3*ln(c*x^n)^2
*b^2*d^2*n-6*ln(c*x^n)*b^2*d^2*n^2-6*b^2*d^2*n^3-6*ln(c*x^n)*a*b*d^2*n-6*a
*b*d^2*n^2-3*a^2*d^2*n)/n
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 291 vs. 2(131) = 262.

Time = 0.08 (sec) , antiderivative size = 291, normalized size of antiderivative = 2.19

$$\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^2}\,dx$$
$$= \frac{2\,b^2den^2x\log(x)^3-6\,b^2d^2n^2-6\,abd^2n-3\,a^2d^2+3\,(2\,b^2e^2n^2-2\,abe^2n+a^2e^2)x^2+3\,(b^2e^2x^2-b^2d^2)\,\mathrm{lo}}{}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^2,x, algorithm="fricas")
```

output
```
1/3*(2*b^2*d*e*n^2*x*log(x)^3 - 6*b^2*d^2*n^2 - 6*a*b*d^2*n - 3*a^2*d^2 +
3*(2*b^2*e^2*n^2 - 2*a*b*e^2*n + a^2*e^2)*x^2 + 3*(b^2*e^2*x^2 - b^2*d^2)*
log(c)^2 + 3*(b^2*e^2*n^2*x^2 + 2*b^2*d*e*n*x*log(c) - b^2*d^2*n^2 + 2*a*b
*d*e*n*x)*log(x)^2 - 6*(b^2*d^2*n + a*b*d^2 + (b^2*e^2*n - a*b*e^2)*x^2)*l
og(c) + 6*(b^2*d*e*x*log(c)^2 - b^2*d^2*n^2 - a*b*d^2*n + a^2*d*e*x - (b^2
*e^2*n^2 - a*b*e^2*n)*x^2 + (b^2*e^2*n*x^2 - b^2*d^2*n + 2*a*b*d*e*x)*log(
c))*log(x))/x
```

Sympy [A] (verification not implemented)

Time = 0.64 (sec) , antiderivative size = 255, normalized size of antiderivative = 1.92

$$\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^2}\,dx$$
$$= \begin{cases} -\frac{a^2d^2}{x} + \frac{2a^2de\log(cx^n)}{n} + a^2e^2x - \frac{2abd^2n}{x} - \frac{2abd^2\log(cx^n)}{x} + \frac{2abde\log(cx^n)^2}{n} - 2abe^2nx + 2abe^2x\log(cx^n) - 2b \\ (a+b\log(c))^2\left(-\frac{d^2}{x} + 2de\log(x) + e^2x\right) \end{cases}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))**2/x**2,x)
```

output
```
Piecewise((-a**2*d**2/x + 2*a**2*d*e*log(c*x**n)/n + a**2*e**2*x - 2*a*b*d
**2*n/x - 2*a*b*d**2*log(c*x**n)/x + 2*a*b*d*e*log(c*x**n)**2/n - 2*a*b*e*
*2*n*x + 2*a*b*e**2*x*log(c*x**n) - 2*b**2*d**2*n**2/x - 2*b**2*d**2*n*log
(c*x**n)/x - b**2*d**2*log(c*x**n)**2/x + 2*b**2*d*e*log(c*x**n)**3/(3*n)
+ 2*b**2*e**2*n**2*x - 2*b**2*e**2*n*x*log(c*x**n) + b**2*e**2*x*log(c*x**
n)**2, Ne(n, 0)), ((a + b*log(c))**2*(-d**2/x + 2*d*e*log(x) + e**2*x), Tr
ue))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 200, normalized size of antiderivative = 1.50

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^2} dx = b^2e^2x\log(cx^n)^2 - 2abe^2nx + 2abe^2x\log(cx^n) + \frac{2b^2de\log(cx^n)^3}{3n} + 2(n^2x - nx\log(cx^n))b^2e^2 - 2b^2d^2\left(\frac{n^2}{x} + \frac{n\log(cx^n)}{x}\right) + a^2e^2x + \frac{2abde\log(cx^n)^2}{n} - \frac{b^2d^2\log(cx^n)^2}{x} + 2a^2de\log(x) - \frac{2abd^2n}{x} - \frac{2abd^2\log(cx^n)}{x} - \frac{a^2d^2}{x}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^2,x, algorithm="maxima")
```

output
```
b^2*e^2*x*log(c*x^n)^2 - 2*a*b*e^2*n*x + 2*a*b*e^2*x*log(c*x^n) + 2/3*b^2*
d*e*log(c*x^n)^3/n + 2*(n^2*x - n*x*log(c*x^n))*b^2*e^2 - 2*b^2*d^2*(n^2/x
 + n*log(c*x^n)/x) + a^2*e^2*x + 2*a*b*d*e*log(c*x^n)^2/n - b^2*d^2*log(c*
x^n)^2/x + 2*a^2*d*e*log(x) - 2*a*b*d^2*n/x - 2*a*b*d^2*log(c*x^n)/x - a^2
*d^2/x
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 274 vs. 2(131) = 262.

Time = 0.14 (sec) , antiderivative size = 274, normalized size of antiderivative = 2.06

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^2} dx = \frac{2}{3} b^2 den^2 \log(x)^3 + 2 b^2 den \log(c) \log(x)^2 + \left(x \log(x)^2 - 2 x \log(x) + 2 x\right) b^2 e^2 n^2 - b^2 d^2 n^2 \left(\frac{\log(x)^2}{x} + \frac{2 \log(x)}{x} + \frac{2}{x}\right) + 2 (x \log(x) - x) b^2 e^2 n \log(c) - 2 b^2 d^2 n \left(\frac{\log(x)}{x} + \frac{1}{x}\right) \log(c) + b^2 e^2 x \log(c)^2 + 2 abden \log(x)^2 + 2 b^2 de \log(c)^2 \log(|x|) + 2 (x \log(x) - x) abe^2 n - 2 abd^2 n \left(\frac{\log(x)}{x} + \frac{1}{x}\right) + 2 abe^2 x \log(c) + 4 abde \log(c) \log(|x|) + a^2 e^2 x - \frac{b^2 d^2 \log(c)^2}{x} + 2 a^2 de \log(|x|) - \frac{2 abd^2 \log(c)}{x} - \frac{a^2 d^2}{x}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^2,x, algorithm="giac")
```

output
```
2/3*b^2*d*e*n^2*log(x)^3 + 2*b^2*d*e*n*log(c)*log(x)^2 + (x*log(x)^2 - 2*x
*log(x) + 2*x)*b^2*e^2*n^2 - b^2*d^2*n^2*(log(x)^2/x + 2*log(x)/x + 2/x) +
 2*(x*log(x) - x)*b^2*e^2*n*log(c) - 2*b^2*d^2*n*(log(x)/x + 1/x)*log(c) +
 b^2*e^2*x*log(c)^2 + 2*a*b*d*e*n*log(x)^2 + 2*b^2*d*e*log(c)^2*log(abs(x)
) + 2*(x*log(x) - x)*a*b*e^2*n - 2*a*b*d^2*n*(log(x)/x + 1/x) + 2*a*b*e^2*
x*log(c) + 4*a*b*d*e*log(c)*log(abs(x)) + a^2*e^2*x - b^2*d^2*log(c)^2/x +
 2*a^2*d*e*log(abs(x)) - 2*a*b*d^2*log(c)/x - a^2*d^2/x
```

Mupad [B] (verification not implemented)

Time = 26.90 (sec) , antiderivative size = 228, normalized size of antiderivative = 1.71

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^2}\,dx$$
$$= \ln(x)\left(2\,d\,e\,a^2+4\,d\,e\,a\,b\,n+4\,d\,e\,b^2\,n^2\right) - \frac{a^2\,d^2+2\,a\,b\,d^2\,n+2\,b^2\,d^2\,n^2}{x} - \ln(c\,x^n)\left(\frac{2\,b\,(a+b\,n)\,d^2+4\,b\,(a+b\,n)\,d\,e\,x+2\,b\,(a-b\,n)\,e^2\,x^2}{x} - 4\,b\,e^2\,x\,(a-b\,n)\right) + \ln(c\,x^n)^2\left(2\,b^2\,e^2\,x - \frac{b^2\,d^2+2\,b^2\,d\,e\,x+b^2\,e^2\,x^2}{x} + \frac{2\,b\,d\,e\,(a+b\,n)}{n}\right) + e^2\,x\left(a^2-2\,a\,b\,n+2\,b^2\,n^2\right) + \frac{2\,b^2\,d\,e\ln(c\,x^n)^3}{3\,n}$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x)^2)/x^2,x)
```

output
```
log(x)*(2*a^2*d*e + 4*b^2*d*e*n^2 + 4*a*b*d*e*n) - (a^2*d^2 + 2*b^2*d^2*n^
2 + 2*a*b*d^2*n)/x - log(c*x^n)*((2*b*d^2*(a + b*n) + 2*b*e^2*x^2*(a - b*n
) + 4*b*d*e*x*(a + b*n))/x - 4*b*e^2*x*(a - b*n)) + log(c*x^n)^2*(2*b^2*e^
2*x - (b^2*d^2 + b^2*e^2*x^2 + 2*b^2*d*e*x)/x + (2*b*d*e*(a + b*n))/n) + e
^2*x*(a^2 + 2*b^2*n^2 - 2*a*b*n) + (2*b^2*d*e*log(c*x^n)^3)/(3*n)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 225, normalized size of antiderivative = 1.69

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^2}\,dx$$
$$= \frac{2\log(x^n c)^3 b^2 dex + 6\log(x^n c)^2 abdex - 3\log(x^n c)^2 b^2 d^2 n + 3\log(x^n c)^2 b^2 e^2 n\,x^2 - 6\log(x^n c)\,ab\,d^2 n + 6\,\text{lo}}{}$$

input
```
int((e*x+d)^2*(a+b*log(c*x^n))^2/x^2,x)
```

output
```
(2*log(x**n*c)**3*b**2*d*e*x + 6*log(x**n*c)**2*a*b*d*e*x - 3*log(x**n*c)*
*2*b**2*d**2*n + 3*log(x**n*c)**2*b**2*e**2*n*x**2 - 6*log(x**n*c)*a*b*d**
2*n + 6*log(x**n*c)*a*b*e**2*n*x**2 - 6*log(x**n*c)*b**2*d**2*n**2 - 6*log
(x**n*c)*b**2*e**2*n**2*x**2 + 6*log(x)*a**2*d*e*n*x - 3*a**2*d**2*n + 3*a
**2*e**2*n*x**2 - 6*a*b*d**2*n**2 - 6*a*b*e**2*n**2*x**2 - 6*b**2*d**2*n**
3 + 6*b**2*e**2*n**3*x**2)/(3*n*x)
```

3.89 $\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^3}\,dx$

Optimal result 807
Mathematica [A] (verified) 807
Rubi [A] (verified) 808
Maple [A] (verified) 809
Fricas [B] (verification not implemented) 809
Sympy [A] (verification not implemented) 810
Maxima [A] (verification not implemented) 811
Giac [B] (verification not implemented) 812
Mupad [B] (verification not implemented) 813
Reduce [B] (verification not implemented) 813

Optimal result

Integrand size = 23, antiderivative size = 137

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^3}\,dx = -\frac{b^2d^2n^2}{4x^2} - \frac{4b^2den^2}{x} - \frac{bd^2n(a+b\log(cx^n))}{2x^2} - \frac{4bden(a+b\log(cx^n))}{x} - \frac{d^2(a+b\log(cx^n))^2}{2x^2} - \frac{2de(a+b\log(cx^n))^2}{x} + \frac{e^2(a+b\log(cx^n))^3}{3bn}$$

output
```
-1/4*b^2*d^2*n^2/x^2-4*b^2*d*e*n^2/x-1/2*b*d^2*n*(a+b*ln(c*x^n))/x^2-4*b*d
*e*n*(a+b*ln(c*x^n))/x-1/2*d^2*(a+b*ln(c*x^n))^2/x^2-2*d*e*(a+b*ln(c*x^n))
^2/x+1/3*e^2*(a+b*ln(c*x^n))^3/b/n
```

Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 117, normalized size of antiderivative = 0.85

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^3}\,dx = -\frac{d^2(a+b\log(cx^n))^2}{2x^2} - \frac{2de(a+b\log(cx^n))^2}{x} + \frac{e^2(a+b\log(cx^n))^3}{3bn} - \frac{4bden(a+bn+b\log(cx^n))}{x} - \frac{bd^2n(2a+bn+2b\log(cx^n))}{4x^2}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^3,x]
```

output
```
-1/2*(d^2*(a + b*Log[c*x^n])^2)/x^2 - (2*d*e*(a + b*Log[c*x^n])^2)/x + (e^
2*(a + b*Log[c*x^n])^3)/(3*b*n) - (4*b*d*e*n*(a + b*n + b*Log[c*x^n]))/x -
 (b*d^2*n*(2*a + b*n + 2*b*Log[c*x^n]))/(4*x^2)
```

Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 137, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^3} \, dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(\frac{d^2(a+b\log(cx^n))^2}{x^3}+\frac{2de(a+b\log(cx^n))^2}{x^2}+\frac{e^2(a+b\log(cx^n))^2}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))^2}{2x^2}-\frac{bd^2n(a+b\log(cx^n))}{2x^2}-\frac{2de(a+b\log(cx^n))^2}{x}-\frac{4bden(a+b\log(cx^n))}{x}+\frac{e^2(a+b\log(cx^n))^3}{3bn}-\frac{b^2d^2n^2}{4x^2}-\frac{4b^2den^2}{x}$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^3,x]
```

output
```
-1/4*(b^2*d^2*n^2)/x^2 - (4*b^2*d*e*n^2)/x - (b*d^2*n*(a + b*Log[c*x^n]))/
(2*x^2) - (4*b*d*e*n*(a + b*Log[c*x^n]))/x - (d^2*(a + b*Log[c*x^n])^2)/(2
*x^2) - (2*d*e*(a + b*Log[c*x^n])^2)/x + (e^2*(a + b*Log[c*x^n])^3)/(3*b*n
)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [A] (verified)

Time = 0.70 (sec) , antiderivative size = 217, normalized size of antiderivative = 1.58

method	result
parallelrisch	$\frac{4b^2e^2\ln(c\,x^n)^3x^2+12\ln(x)x^2a^2e^2n+12a\,e^2b\ln(c\,x^n)^2x^2-24x\ln(c\,x^n)^2b^2den-48x\ln(c\,x^n)b^2de\,n^2-48x\,b^2de\,n^3-48x\ln(c\,x}{12x^2}$
risch	Expression too large to display

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))^2/x^3,x,method=_RETURNVERBOSE)
```

output
```
1/12/x^2*(4*b^2*e^2*ln(c*x^n)^3*x^2+12*ln(x)*x^2*a^2*e^2*n+12*a*e^2*b*ln(c
*x^n)^2*x^2-24*x*ln(c*x^n)^2*b^2*d*e*n-48*x*ln(c*x^n)*b^2*d*e*n^2-48*x*b^2
*d*e*n^3-48*x*ln(c*x^n)*a*b*d*e*n-48*x*a*b*d*e*n^2-6*ln(c*x^n)^2*b^2*d^2*n
-6*ln(c*x^n)*b^2*d^2*n^2-3*b^2*d^2*n^3-24*x*a^2*d*e*n-12*ln(c*x^n)*a*b*d^2
*n-6*a*b*d^2*n^2-6*a^2*d^2*n)/n
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 291 vs. 2(129) = 258.

Time = 0.10 (sec) , antiderivative size = 291, normalized size of antiderivative = 2.12

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))^2}{x^3}\,dx$$
$$= \frac{4\,b^2e^2n^2x^2\log(x)^3-3\,b^2d^2n^2-6\,abd^2n-6\,a^2d^2-6\,(4\,b^2dex+b^2d^2)\log(c)^2+6\,(2\,b^2e^2nx^2\log(c)-4\,b}{}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^3,x, algorithm="fricas")
```

output
```
1/12*(4*b^2*e^2*n^2*x^2*log(x)^3 - 3*b^2*d^2*n^2 - 6*a*b*d^2*n - 6*a^2*d^2
 - 6*(4*b^2*d*e*x + b^2*d^2)*log(c)^2 + 6*(2*b^2*e^2*n*x^2*log(c) - 4*b^2*
d*e*n^2*x + 2*a*b*e^2*n*x^2 - b^2*d^2*n^2)*log(x)^2 - 24*(2*b^2*d*e*n^2 +
2*a*b*d*e*n + a^2*d*e)*x - 6*(b^2*d^2*n + 2*a*b*d^2 + 8*(b^2*d*e*n + a*b*d
*e)*x)*log(c) + 6*(2*b^2*e^2*x^2*log(c)^2 - b^2*d^2*n^2 + 2*a^2*e^2*x^2 -
2*a*b*d^2*n - 8*(b^2*d*e*n^2 + a*b*d*e*n)*x - 2*(4*b^2*d*e*n*x - 2*a*b*e^2
*x^2 + b^2*d^2*n)*log(c))*log(x))/x^2
```

Sympy [A] (verification not implemented)

Time = 3.06 (sec) , antiderivative size = 258, normalized size of antiderivative = 1.88

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^3}\,dx = -\frac{a^2d^2}{2x^2} - \frac{2a^2de}{x} + a^2e^2\log(x) - \frac{abd^2n}{2x^2} - \frac{abd^2\log(cx^n)}{x^2} - \frac{4abden}{x} - \frac{4abde\log(cx^n)}{x} - 2abe^2\left(\begin{cases} -\log(c)\log(x) & \text{for } n=0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right) - \frac{b^2d^2n^2}{4x^2} - \frac{b^2d^2n\log(cx^n)}{2x^2} - \frac{b^2d^2\log(cx^n)^2}{2x^2} - \frac{4b^2den^2}{x} - \frac{4b^2den\log(cx^n)}{x} - \frac{2b^2de\log(cx^n)^2}{x} - b^2e^2\left(\begin{cases} -\log(c)^2\log(x) & \text{for } n=0 \\ -\frac{\log(cx^n)^3}{3n} & \text{otherwise} \end{cases}\right)$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))**2/x**3,x)
```

output
```
-a**2*d**2/(2*x**2) - 2*a**2*d*e/x + a**2*e**2*log(x) - a*b*d**2*n/(2*x**2
) - a*b*d**2*log(c*x**n)/x**2 - 4*a*b*d*e*n/x - 4*a*b*d*e*log(c*x**n)/x -
2*a*b*e**2*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), T
rue)) - b**2*d**2*n**2/(4*x**2) - b**2*d**2*n*log(c*x**n)/(2*x**2) - b**2*
d**2*log(c*x**n)**2/(2*x**2) - 4*b**2*d*e*n**2/x - 4*b**2*d*e*n*log(c*x**n
)/x - 2*b**2*d*e*log(c*x**n)**2/x - b**2*e**2*Piecewise((-log(c)**2*log(x)
, Eq(n, 0)), (-log(c*x**n)**3/(3*n), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 210, normalized size of antiderivative = 1.53

$$\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^3}\,dx = \frac{b^2e^2\log(cx^n)^3}{3n} - 4b^2de\left(\frac{n^2}{x}+\frac{n\log(cx^n)}{x}\right) - \frac{1}{4}b^2d^2\left(\frac{n^2}{x^2}+\frac{2n\log(cx^n)}{x^2}\right) + \frac{abe^2\log(cx^n)^2}{n} - \frac{2b^2de\log(cx^n)^2}{x} + a^2e^2\log(x) - \frac{4abden}{x} - \frac{4abde\log(cx^n)}{x} - \frac{b^2d^2\log(cx^n)^2}{2x^2} - \frac{abd^2n}{2x^2} - \frac{2a^2de}{x} - \frac{abd^2\log(cx^n)}{x^2} - \frac{a^2d^2}{2x^2}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^3,x, algorithm="maxima")
```

output
```
1/3*b^2*e^2*log(c*x^n)^3/n - 4*b^2*d*e*(n^2/x + n*log(c*x^n)/x) - 1/4*b^2*
d^2*(n^2/x^2 + 2*n*log(c*x^n)/x^2) + a*b*e^2*log(c*x^n)^2/n - 2*b^2*d*e*lo
g(c*x^n)^2/x + a^2*e^2*log(x) - 4*a*b*d*e*n/x - 4*a*b*d*e*log(c*x^n)/x - 1
/2*b^2*d^2*log(c*x^n)^2/x^2 - 1/2*a*b*d^2*n/x^2 - 2*a^2*d*e/x - a*b*d^2*lo
g(c*x^n)/x^2 - 1/2*a^2*d^2/x^2
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 290 vs. $2(129) = 258$.

Time = 0.14 (sec) , antiderivative size = 290, normalized size of antiderivative = 2.12

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^3}\,dx = \frac{1}{3}\,b^2e^2n^2\log(x)^3 + b^2e^2n\log(c)\log(x)^2 - 2\,b^2den^2\left(\frac{\log(x)^2}{x} + \frac{2\,\log(x)}{x} + \frac{2}{x}\right) - \frac{1}{4}\,b^2d^2n^2\left(\frac{2\,\log(x)^2}{x^2} + \frac{2\,\log(x)}{x^2} + \frac{1}{x^2}\right) - 4\,b^2den\left(\frac{\log(x)}{x} + \frac{1}{x}\right)\log(c) - \frac{1}{2}\,b^2d^2n\left(\frac{2\,\log(x)}{x^2} + \frac{1}{x^2}\right)\log(c) + abe^2n\log(x)^2 + b^2e^2\log(c)^2\log(|x|) - 4\,abden\left(\frac{\log(x)}{x} + \frac{1}{x}\right) - \frac{1}{2}\,abd^2n\left(\frac{2\,\log(x)}{x^2} + \frac{1}{x^2}\right) + 2\,abe^2\log(c)\log(|x|) - \frac{2\,b^2de\log(c)^2}{x} + a^2e^2\log(|x|) - \frac{4\,abde\log(c)}{x} - \frac{b^2d^2\log(c)^2}{2\,x^2} - \frac{2\,a^2de}{x} - \frac{abd^2\log(c)}{x^2} - \frac{a^2d^2}{2\,x^2}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^3,x, algorithm="giac")
```

output
```
1/3*b^2*e^2*n^2*log(x)^3 + b^2*e^2*n*log(c)*log(x)^2 - 2*b^2*d*e*n^2*(log(
x)^2/x + 2*log(x)/x + 2/x) - 1/4*b^2*d^2*n^2*(2*log(x)^2/x^2 + 2*log(x)/x^
2 + 1/x^2) - 4*b^2*d*e*n*(log(x)/x + 1/x)*log(c) - 1/2*b^2*d^2*n*(2*log(x)
/x^2 + 1/x^2)*log(c) + a*b*e^2*n*log(x)^2 + b^2*e^2*log(c)^2*log(abs(x)) -
 4*a*b*d*e*n*(log(x)/x + 1/x) - 1/2*a*b*d^2*n*(2*log(x)/x^2 + 1/x^2) + 2*a
*b*e^2*log(c)*log(abs(x)) - 2*b^2*d*e*log(c)^2/x + a^2*e^2*log(abs(x)) - 4
*a*b*d*e*log(c)/x - 1/2*b^2*d^2*log(c)^2/x^2 - 2*a^2*d*e/x - a*b*d^2*log(c
)/x^2 - 1/2*a^2*d^2/x^2
```

Mupad [B] (verification not implemented)

Time = 26.34 (sec) , antiderivative size = 221, normalized size of antiderivative = 1.61

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^3} dx$$
$$= \ln(x) \left(a^2 e^2 + 3 a b e^2 n + \frac{9 b^2 e^2 n^2}{2}\right) - \frac{x (4 d e a^2 + 8 d e a b n + 8 d e b^2 n^2) + a^2 d^2 + \frac{b^2 d^2 n^2}{2} + a b d^2 n}{2 x^2} - \ln(c x^n)^2 \left(\frac{\frac{b^2 d^2}{2} + 2 b^2 d e x + \frac{3 b^2 e^2 x^2}{2}}{x^2} - \frac{b e^2 (2 a + 3 b n)}{2 n}\right) - \frac{\ln(c x^n) \left(\frac{b (2 a + b n) d^2}{2} + 4 b (a + b n) d e x + \frac{3 b (2 a + 3 b n) e^2 x^2}{2}\right)}{x^2} + \frac{b^2 e^2 \ln(c x^n)^3}{3 n}$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x)^2)/x^3,x)
```

output
```
log(x)*(a^2*e^2 + (9*b^2*e^2*n^2)/2 + 3*a*b*e^2*n) - (x*(4*a^2*d*e + 8*b^2
*d*e*n^2 + 8*a*b*d*e*n) + a^2*d^2 + (b^2*d^2*n^2)/2 + a*b*d^2*n)/(2*x^2) -
 log(c*x^n)^2*(((b^2*d^2)/2 + (3*b^2*e^2*x^2)/2 + 2*b^2*d*e*x)/x^2 - (b*e^
2*(2*a + 3*b*n))/(2*n)) - (log(c*x^n)*((b*d^2*(2*a + b*n))/2 + (3*b*e^2*x^
2*(2*a + 3*b*n))/2 + 4*b*d*e*x*(a + b*n)))/x^2 + (b^2*e^2*log(c*x^n)^3)/(3
*n)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 216, normalized size of antiderivative = 1.58

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^3} dx$$
$$= \frac{4\log(x^n c)^3 b^2 e^2 x^2 + 12\log(x^n c)^2 a b e^2 x^2 - 6\log(x^n c)^2 b^2 d^2 n - 24\log(x^n c)^2 b^2 d e n x - 12\log(x^n c) a b d^2 n -}{}$$

input
```
int((e*x+d)^2*(a+b*log(c*x^n))^2/x^3,x)
```

output
```
(4*log(x**n*c)**3*b**2*e**2*x**2 + 12*log(x**n*c)**2*a*b*e**2*x**2 - 6*log
(x**n*c)**2*b**2*d**2*n - 24*log(x**n*c)**2*b**2*d*e*n*x - 12*log(x**n*c)*
a*b*d**2*n - 48*log(x**n*c)*a*b*d*e*n*x - 6*log(x**n*c)*b**2*d**2*n**2 - 4
8*log(x**n*c)*b**2*d*e*n**2*x + 12*log(x)*a**2*e**2*n*x**2 - 6*a**2*d**2*n
 - 24*a**2*d*e*n*x - 6*a*b*d**2*n**2 - 48*a*b*d*e*n**2*x - 3*b**2*d**2*n**
3 - 48*b**2*d*e*n**3*x)/(12*n*x**2)
```

3.90 $\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^4}\,dx$

Optimal result 815
Mathematica [A] (verified) 816
Rubi [A] (verified) 816
Maple [A] (verified) 817
Fricas [B] (verification not implemented) 818
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Reduce [B] (verification not implemented) 821

Optimal result

Integrand size = 23, antiderivative size = 168

$$\begin{aligned}\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^4}\,dx = &-\frac{2b^2d^2n^2}{27x^3}-\frac{b^2den^2}{2x^2}-\frac{2b^2e^2n^2}{x} \\ &-\frac{2bd^2n(a+b\log(cx^n))}{9x^3}-\frac{bden(a+b\log(cx^n))}{x^2} \\ &-\frac{2be^2n(a+b\log(cx^n))}{x}-\frac{d^2(a+b\log(cx^n))^2}{3x^3} \\ &-\frac{de(a+b\log(cx^n))^2}{x^2}-\frac{e^2(a+b\log(cx^n))^2}{x}\end{aligned}$$

output
```
-2/27*b^2*d^2*n^2/x^3-1/2*b^2*d*e*n^2/x^2-2*b^2*e^2*n^2/x-2/9*b*d^2*n*(a+b
*ln(c*x^n))/x^3-b*d*e*n*(a+b*ln(c*x^n))/x^2-2*b*e^2*n*(a+b*ln(c*x^n))/x-1/
3*d^2*(a+b*ln(c*x^n))^2/x^3-d*e*(a+b*ln(c*x^n))^2/x^2-e^2*(a+b*ln(c*x^n))^
2/x
```

Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 131, normalized size of antiderivative = 0.78

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^4}\,dx = -\frac{18d^2(a+b\log(cx^n))^2+54dex(a+b\log(cx^n))^2+54e^2x^2(a+b\log(cx^n))^2+108be^2nx^2(a+bn+b\log(cx^n))}{54x^3}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^4,x]
```

output
```
-1/54*(18*d^2*(a + b*Log[c*x^n])^2 + 54*d*e*x*(a + b*Log[c*x^n])^2 + 54*e^
2*x^2*(a + b*Log[c*x^n])^2 + 108*b*e^2*n*x^2*(a + b*n + b*Log[c*x^n]) + 27
*b*d*e*n*x*(2*a + b*n + 2*b*Log[c*x^n]) + 4*b*d^2*n*(3*a + b*n + 3*b*Log[c
*x^n]))/x^3
```

Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 168, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^4}\,dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(\frac{d^2(a+b\log(cx^n))^2}{x^4}+\frac{2de(a+b\log(cx^n))^2}{x^3}+\frac{e^2(a+b\log(cx^n))^2}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))^2}{3x^3}-\frac{2bd^2n(a+b\log(cx^n))}{9x^3}-\frac{de(a+b\log(cx^n))^2}{x^2}-\frac{bden(a+b\log(cx^n))}{x^2}-\frac{e^2(a+b\log(cx^n))^2}{x}-\frac{2be^2n(a+b\log(cx^n))}{x}-\frac{2b^2d^2n^2}{27x^3}-\frac{b^2den^2}{2x^2}-\frac{2b^2e^2n^2}{x}$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^4,x]
```

output
```
(-2*b^2*d^2*n^2)/(27*x^3) - (b^2*d*e*n^2)/(2*x^2) - (2*b^2*e^2*n^2)/x - (2
*b*d^2*n*(a + b*Log[c*x^n]))/(9*x^3) - (b*d*e*n*(a + b*Log[c*x^n]))/x^2 -
(2*b*e^2*n*(a + b*Log[c*x^n]))/x - (d^2*(a + b*Log[c*x^n])^2)/(3*x^3) - (d
*e*(a + b*Log[c*x^n])^2)/x^2 - (e^2*(a + b*Log[c*x^n])^2)/x
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [A] (verified)

Time = 0.61 (sec) , antiderivative size = 238, normalized size of antiderivative = 1.42

method	result
parallelrisch	$-\frac{54b^2\ln(c\,x^n)^2e^2x^2+108x^2\ln(c\,x^n)b^2e^2n+108b^2e^2n^2x^2+108ab\ln(c\,x^n)e^2x^2+108nb\,x^2a\,e^2+54b^2\ln(c\,x^n)^2exd+54b^2denx}{}$
risch	Expression too large to display

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))^2/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/54/x^3*(54*b^2*ln(c*x^n)^2*e^2*x^2+108*x^2*ln(c*x^n)*b^2*e^2*n+108*b^2*
e^2*n^2*x^2+108*a*b*ln(c*x^n)*e^2*x^2+108*n*b*x^2*a*e^2+54*b^2*ln(c*x^n)^2
*e*x*d+54*b^2*d*e*n*x*ln(c*x^n)+27*b^2*d*e*n^2*x+54*a^2*e^2*x^2+108*a*b*ln
(c*x^n)*e*x*d+54*a*b*d*e*n*x+18*b^2*ln(c*x^n)^2*d^2+12*ln(c*x^n)*n*b^2*d^2
+4*b^2*d^2*n^2+54*a^2*e*x*d+36*a*b*ln(c*x^n)*d^2+12*b*d^2*n*a+18*a^2*d^2)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 326 vs. 2(160) = 320.

Time = 0.08 (sec) , antiderivative size = 326, normalized size of antiderivative = 1.94

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^4}\,dx = -\frac{4\,b^2d^2n^2 + 12\,abd^2n + 18\,a^2d^2 + 54\,(2\,b^2e^2n^2 + 2\,abe^2n + a^2e^2)x^2 + 18\,(3\,b^2e^2x^2 + 3\,b^2dex + b^2d^2)\log}{}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^4,x, algorithm="fricas")
```

output
```
-1/54*(4*b^2*d^2*n^2 + 12*a*b*d^2*n + 18*a^2*d^2 + 54*(2*b^2*e^2*n^2 + 2*a
*b*e^2*n + a^2*e^2)*x^2 + 18*(3*b^2*e^2*x^2 + 3*b^2*d*e*x + b^2*d^2)*log(c
)^2 + 18*(3*b^2*e^2*n^2*x^2 + 3*b^2*d*e*n^2*x + b^2*d^2*n^2)*log(x)^2 + 27
*(b^2*d*e*n^2 + 2*a*b*d*e*n + 2*a^2*d*e)*x + 6*(2*b^2*d^2*n + 6*a*b*d^2 +
18*(b^2*e^2*n + a*b*e^2)*x^2 + 9*(b^2*d*e*n + 2*a*b*d*e)*x)*log(c) + 6*(2*
b^2*d^2*n^2 + 6*a*b*d^2*n + 18*(b^2*e^2*n^2 + a*b*e^2*n)*x^2 + 9*(b^2*d*e*
n^2 + 2*a*b*d*e*n)*x + 6*(3*b^2*e^2*n*x^2 + 3*b^2*d*e*n*x + b^2*d^2*n)*log
(c))*log(x))/x^3
```

Sympy [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 287, normalized size of antiderivative = 1.71

$$\begin{aligned}\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^4}\,dx = {}& -\frac{a^2d^2}{3x^3} - \frac{a^2de}{x^2} - \frac{a^2e^2}{x} - \frac{2abd^2n}{9x^3} \\ & - \frac{2abd^2\log(cx^n)}{3x^3} - \frac{abden}{x^2} - \frac{2abde\log(cx^n)}{x^2} \\ & - \frac{2abe^2n}{x} - \frac{2abe^2\log(cx^n)}{x} - \frac{2b^2d^2n^2}{27x^3} \\ & - \frac{2b^2d^2n\log(cx^n)}{9x^3} - \frac{b^2d^2\log(cx^n)^2}{3x^3} \\ & - \frac{b^2den^2}{2x^2} - \frac{b^2den\log(cx^n)}{x^2} - \frac{b^2de\log(cx^n)^2}{x^2} \\ & - \frac{2b^2e^2n^2}{x} - \frac{2b^2e^2n\log(cx^n)}{x} - \frac{b^2e^2\log(cx^n)^2}{x}\end{aligned}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))**2/x**4,x)
```

output
```
-a**2*d**2/(3*x**3) - a**2*d*e/x**2 - a**2*e**2/x - 2*a*b*d**2*n/(9*x**3)
- 2*a*b*d**2*log(c*x**n)/(3*x**3) - a*b*d*e*n/x**2 - 2*a*b*d*e*log(c*x**n)
/x**2 - 2*a*b*e**2*n/x - 2*a*b*e**2*log(c*x**n)/x - 2*b**2*d**2*n**2/(27*x
**3) - 2*b**2*d**2*n*log(c*x**n)/(9*x**3) - b**2*d**2*log(c*x**n)**2/(3*x*
*3) - b**2*d*e*n**2/(2*x**2) - b**2*d*e*n*log(c*x**n)/x**2 - b**2*d*e*log(
c*x**n)**2/x**2 - 2*b**2*e**2*n**2/x - 2*b**2*e**2*n*log(c*x**n)/x - b**2*
e**2*log(c*x**n)**2/x
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 250, normalized size of antiderivative = 1.49

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^4}\,dx = -2\,b^2e^2\left(\frac{n^2}{x}+\frac{n\log(cx^n)}{x}\right) - \frac{1}{2}\,b^2de\left(\frac{n^2}{x^2}+\frac{2\,n\log(cx^n)}{x^2}\right) - \frac{2}{27}\,b^2d^2\left(\frac{n^2}{x^3}+\frac{3\,n\log(cx^n)}{x^3}\right) - \frac{b^2e^2\log(cx^n)^2}{x} - \frac{2\,abe^2n}{x} - \frac{2\,abe^2\log(cx^n)}{x} - \frac{b^2de\log(cx^n)^2}{x^2} - \frac{abden}{x^2} - \frac{a^2e^2}{x} - \frac{2\,abde\log(cx^n)}{x^2} - \frac{b^2d^2\log(cx^n)^2}{3\,x^3} - \frac{2\,abd^2n}{9\,x^3} - \frac{a^2de}{x^2} - \frac{2\,abd^2\log(cx^n)}{3\,x^3} - \frac{a^2d^2}{3\,x^3}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^4,x, algorithm="maxima")
```

output
```
-2*b^2*e^2*(n^2/x + n*log(c*x^n)/x) - 1/2*b^2*d*e*(n^2/x^2 + 2*n*log(c*x^n
)/x^2) - 2/27*b^2*d^2*(n^2/x^3 + 3*n*log(c*x^n)/x^3) - b^2*e^2*log(c*x^n)^
2/x - 2*a*b*e^2*n/x - 2*a*b*e^2*log(c*x^n)/x - b^2*d*e*log(c*x^n)^2/x^2 -
a*b*d*e*n/x^2 - a^2*e^2/x - 2*a*b*d*e*log(c*x^n)/x^2 - 1/3*b^2*d^2*log(c*x
^n)^2/x^3 - 2/9*a*b*d^2*n/x^3 - a^2*d*e/x^2 - 2/3*a*b*d^2*log(c*x^n)/x^3 -
 1/3*a^2*d^2/x^3
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 354 vs. $2(160) = 320$.

Time = 0.13 (sec) , antiderivative size = 354, normalized size of antiderivative = 2.11

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^4}\,dx = -\frac{(3\,b^2e^2n^2x^2 + 3\,b^2den^2x + b^2d^2n^2)\log(x)^2}{3\,x^3} - \frac{(18\,b^2e^2n^2x^2 + 18\,b^2e^2nx^2\log(c) + 9\,b^2den^2x + 18\,abe^2nx^2 + 18\,b^2denx\log(c) + 2\,b^2d^2n^2 + 18\,abdenx}{9\,x^3} - \frac{108\,b^2e^2n^2x^2 + 108\,b^2e^2nx^2\log(c) + 54\,b^2e^2x^2\log(c)^2 + 27\,b^2den^2x + 108\,abe^2nx^2 + 54\,b^2denx\log(c)}{}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^4,x, algorithm="giac")
```

output
```
-1/3*(3*b^2*e^2*n^2*x^2 + 3*b^2*d*e*n^2*x + b^2*d^2*n^2)*log(x)^2/x^3 - 1/
9*(18*b^2*e^2*n^2*x^2 + 18*b^2*e^2*n*x^2*log(c) + 9*b^2*d*e*n^2*x + 18*a*b
*e^2*n*x^2 + 18*b^2*d*e*n*x*log(c) + 2*b^2*d^2*n^2 + 18*a*b*d*e*n*x + 6*b^
2*d^2*n*log(c) + 6*a*b*d^2*n)*log(x)/x^3 - 1/54*(108*b^2*e^2*n^2*x^2 + 108
*b^2*e^2*n*x^2*log(c) + 54*b^2*e^2*x^2*log(c)^2 + 27*b^2*d*e*n^2*x + 108*a
*b*e^2*n*x^2 + 54*b^2*d*e*n*x*log(c) + 108*a*b*e^2*x^2*log(c) + 54*b^2*d*e
*x*log(c)^2 + 4*b^2*d^2*n^2 + 54*a*b*d*e*n*x + 54*a^2*e^2*x^2 + 12*b^2*d^2
*n*log(c) + 108*a*b*d*e*x*log(c) + 18*b^2*d^2*log(c)^2 + 12*a*b*d^2*n + 54
*a^2*d*e*x + 36*a*b*d^2*log(c) + 18*a^2*d^2)/x^3
```

Mupad [B] (verification not implemented)

Time = 27.20 (sec) , antiderivative size = 184, normalized size of antiderivative = 1.10

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^4}\,dx = -\frac{x\left(9\,d\,e\,a^2 + 9\,d\,e\,a\,b\,n + \frac{9\,d\,e\,b^2\,n^2}{2}\right) + x^2\left(9\,a^2\,e^2 + 18\,a\,b\,e^2\,n + 18\,b^2\,e^2\,n^2\right) + 3\,a^2\,d^2 + \frac{2\,b^2\,d^2\,n^2}{3} + 2\,a\,b\,a}{9\,x^3} - \frac{\ln(c\,x^n)^2\left(\frac{b^2\,d^2}{3} + b^2\,d\,e\,x + b^2\,e^2\,x^2\right)}{x^3} - \frac{\ln(c\,x^n)\left(\frac{2\,b\,(3\,a+b\,n)\,d^2}{3} + 3\,b\,(2\,a+b\,n)\,d\,e\,x + 6\,b\,(a+b\,n)\,e^2\,x^2\right)}{3\,x^3}$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x)^2)/x^4,x)
```

output
```
- (x*(9*a^2*d*e + (9*b^2*d*e*n^2)/2 + 9*a*b*d*e*n) + x^2*(9*a^2*e^2 + 18*b
^2*e^2*n^2 + 18*a*b*e^2*n) + 3*a^2*d^2 + (2*b^2*d^2*n^2)/3 + 2*a*b*d^2*n)/
(9*x^3) - (log(c*x^n)^2*((b^2*d^2)/3 + b^2*e^2*x^2 + b^2*d*e*x))/x^3 - (lo
g(c*x^n)*((2*b*d^2*(3*a + b*n))/3 + 6*b*e^2*x^2*(a + b*n) + 3*b*d*e*x*(2*a
 + b*n)))/(3*x^3)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 237, normalized size of antiderivative = 1.41

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^4} dx = \frac{-18\log(x^n c)^2 b^2 d^2 - 54\log(x^n c)^2 b^2 dex - 54\log(x^n c)^2 b^2 e^2 x^2 - 36\log(x^n c) ab d^2 - 108\log(x^n c) abdex -}{}$$

input
```
int((e*x+d)^2*(a+b*log(c*x^n))^2/x^4,x)
```

output
```
( - 18*log(x**n*c)**2*b**2*d**2 - 54*log(x**n*c)**2*b**2*d*e*x - 54*log(x*
*n*c)**2*b**2*e**2*x**2 - 36*log(x**n*c)*a*b*d**2 - 108*log(x**n*c)*a*b*d*
e*x - 108*log(x**n*c)*a*b*e**2*x**2 - 12*log(x**n*c)*b**2*d**2*n - 54*log(
x**n*c)*b**2*d*e*n*x - 108*log(x**n*c)*b**2*e**2*n*x**2 - 18*a**2*d**2 - 5
4*a**2*d*e*x - 54*a**2*e**2*x**2 - 12*a*b*d**2*n - 54*a*b*d*e*n*x - 108*a*
b*e**2*n*x**2 - 4*b**2*d**2*n**2 - 27*b**2*d*e*n**2*x - 108*b**2*e**2*n**2
*x**2)/(54*x**3)
```

3.91 $\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^5}\,dx$

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Mupad [B] (verification not implemented) 828
Reduce [B] (verification not implemented) 829

Optimal result

Integrand size = 23, antiderivative size = 178

$$\begin{aligned}\int \frac{(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2}{x^5}\,dx = & -\frac{b^2d^2n^2}{32x^4}-\frac{4b^2den^2}{27x^3}-\frac{b^2e^2n^2}{4x^2} \\ & -\frac{bd^2n(a+b\log\left(cx^n\right))}{8x^4}-\frac{4bden(a+b\log\left(cx^n\right))}{9x^3} \\ & -\frac{be^2n(a+b\log\left(cx^n\right))}{2x^2}-\frac{d^2\left(a+b\log\left(cx^n\right)\right)^2}{4x^4} \\ & -\frac{2de\left(a+b\log\left(cx^n\right)\right)^2}{3x^3}-\frac{e^2\left(a+b\log\left(cx^n\right)\right)^2}{2x^2}\end{aligned}$$

output
```
-1/32*b^2*d^2*n^2/x^4-4/27*b^2*d*e*n^2/x^3-1/4*b^2*e^2*n^2/x^2-1/8*b*d^2*n
*(a+b*ln(c*x^n))/x^4-4/9*b*d*e*n*(a+b*ln(c*x^n))/x^3-1/2*b*e^2*n*(a+b*ln(c
*x^n))/x^2-1/4*d^2*(a+b*ln(c*x^n))^2/x^4-2/3*d*e*(a+b*ln(c*x^n))^2/x^3-1/2
*e^2*(a+b*ln(c*x^n))^2/x^2
```

Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 134, normalized size of antiderivative = 0.75

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^5}\,dx = -\frac{216d^2(a+b\log(cx^n))^2 + 576dex(a+b\log(cx^n))^2 + 432e^2x^2(a+b\log(cx^n))^2 + 216be^2nx^2(2a+bn-}{864x^4}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^5,x]
```

output
```
-1/864*(216*d^2*(a + b*Log[c*x^n])^2 + 576*d*e*x*(a + b*Log[c*x^n])^2 + 43
2*e^2*x^2*(a + b*Log[c*x^n])^2 + 216*b*e^2*n*x^2*(2*a + b*n + 2*b*Log[c*x^
n]) + 128*b*d*e*n*x*(3*a + b*n + 3*b*Log[c*x^n]) + 27*b*d^2*n*(4*a + b*n +
 4*b*Log[c*x^n]))/x^4
```

Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 178, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^5}\,dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(\frac{d^2(a+b\log(cx^n))^2}{x^5} + \frac{2de(a+b\log(cx^n))^2}{x^4} + \frac{e^2(a+b\log(cx^n))^2}{x^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))^2}{4x^4} - \frac{bd^2n(a+b\log(cx^n))}{8x^4} - \frac{2de(a+b\log(cx^n))^2}{3x^3} - \frac{4bden(a+b\log(cx^n))}{9x^3} - \frac{e^2(a+b\log(cx^n))^2}{2x^2} - \frac{be^2n(a+b\log(cx^n))}{2x^2} - \frac{b^2d^2n^2}{32x^4} - \frac{4b^2den^2}{27x^3} - \frac{b^2e^2n^2}{4x^2}$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^5,x]
```

output
```
-1/32*(b^2*d^2*n^2)/x^4 - (4*b^2*d*e*n^2)/(27*x^3) - (b^2*e^2*n^2)/(4*x^2)
 - (b*d^2*n*(a + b*Log[c*x^n]))/(8*x^4) - (4*b*d*e*n*(a + b*Log[c*x^n]))/(
9*x^3) - (b*e^2*n*(a + b*Log[c*x^n]))/(2*x^2) - (d^2*(a + b*Log[c*x^n])^2)
/(4*x^4) - (2*d*e*(a + b*Log[c*x^n])^2)/(3*x^3) - (e^2*(a + b*Log[c*x^n])^
2)/(2*x^2)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [A] (verified)

Time = 0.59 (sec) , antiderivative size = 238, normalized size of antiderivative = 1.34

method	result
parallelrisch	$-\frac{432b^2\ln(c\,x^n)^2e^2x^2+432x^2\ln(c\,x^n)b^2e^2n+216b^2e^2n^2x^2+864ab\ln(c\,x^n)e^2x^2+432nb\,x^2a\,e^2+576b^2\ln(c\,x^n)^2exd+384b^2d}{}$
risch	Expression too large to display

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))^2/x^5,x,method=_RETURNVERBOSE)
```

output
```
-1/864/x^4*(432*b^2*ln(c*x^n)^2*e^2*x^2+432*x^2*ln(c*x^n)*b^2*e^2*n+216*b^
2*e^2*n^2*x^2+864*a*b*ln(c*x^n)*e^2*x^2+432*n*b*x^2*a*e^2+576*b^2*ln(c*x^n
)^2*e*x*d+384*b^2*d*e*n*x*ln(c*x^n)+128*b^2*d*e*n^2*x+432*a^2*e^2*x^2+1152
*a*b*ln(c*x^n)*e*x*d+384*a*b*d*e*n*x+216*b^2*ln(c*x^n)^2*d^2+108*ln(c*x^n)
*n*b^2*d^2+27*b^2*d^2*n^2+576*a^2*e*x*d+432*a*b*ln(c*x^n)*d^2+108*b*d^2*n*
a+216*a^2*d^2)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 332 vs. $2(160) = 320$.

Time = 0.08 (sec) , antiderivative size = 332, normalized size of antiderivative = 1.87

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^5} dx =$$
$$-\frac{27 b^2 d^2 n^2 + 108 abd^2 n + 216 a^2 d^2 + 216 (b^2 e^2 n^2 + 2 abe^2 n + 2 a^2 e^2) x^2 + 72 (6 b^2 e^2 x^2 + 8 b^2 dex + 3 b^2 d}{}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^5,x, algorithm="fricas")
```

output
```
-1/864*(27*b^2*d^2*n^2 + 108*a*b*d^2*n + 216*a^2*d^2 + 216*(b^2*e^2*n^2 +
2*a*b*e^2*n + 2*a^2*e^2)*x^2 + 72*(6*b^2*e^2*x^2 + 8*b^2*d*e*x + 3*b^2*d^2
)*log(c)^2 + 72*(6*b^2*e^2*n^2*x^2 + 8*b^2*d*e*n^2*x + 3*b^2*d^2*n^2)*log(
x)^2 + 64*(2*b^2*d*e*n^2 + 6*a*b*d*e*n + 9*a^2*d*e)*x + 12*(9*b^2*d^2*n +
36*a*b*d^2 + 36*(b^2*e^2*n + 2*a*b*e^2)*x^2 + 32*(b^2*d*e*n + 3*a*b*d*e)*x
)*log(c) + 12*(9*b^2*d^2*n^2 + 36*a*b*d^2*n + 36*(b^2*e^2*n^2 + 2*a*b*e^2*
n)*x^2 + 32*(b^2*d*e*n^2 + 3*a*b*d*e*n)*x + 12*(6*b^2*e^2*n*x^2 + 8*b^2*d*
e*n*x + 3*b^2*d^2*n)*log(c))*log(x))/x^4
```

Sympy [A] (verification not implemented)

Time = 0.67 (sec) , antiderivative size = 309, normalized size of antiderivative = 1.74

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^5}\,dx = -\frac{a^2d^2}{4x^4} - \frac{2a^2de}{3x^3} - \frac{a^2e^2}{2x^2} - \frac{abd^2n}{8x^4} - \frac{abd^2\log(cx^n)}{2x^4} - \frac{4abden}{9x^3} - \frac{4abde\log(cx^n)}{3x^3} - \frac{abe^2n}{2x^2} - \frac{abe^2\log(cx^n)}{x^2} - \frac{b^2d^2n^2}{32x^4} - \frac{b^2d^2n\log(cx^n)}{8x^4} - \frac{b^2d^2\log(cx^n)^2}{4x^4} - \frac{4b^2den^2}{27x^3} - \frac{4b^2den\log(cx^n)}{9x^3} - \frac{2b^2de\log(cx^n)^2}{3x^3} - \frac{b^2e^2n^2}{4x^2} - \frac{b^2e^2n\log(cx^n)}{2x^2} - \frac{b^2e^2\log(cx^n)^2}{2x^2}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))**2/x**5,x)
```

output
```
-a**2*d**2/(4*x**4) - 2*a**2*d*e/(3*x**3) - a**2*e**2/(2*x**2) - a*b*d**2*
n/(8*x**4) - a*b*d**2*log(c*x**n)/(2*x**4) - 4*a*b*d*e*n/(9*x**3) - 4*a*b*
d*e*log(c*x**n)/(3*x**3) - a*b*e**2*n/(2*x**2) - a*b*e**2*log(c*x**n)/x**2
 - b**2*d**2*n**2/(32*x**4) - b**2*d**2*n*log(c*x**n)/(8*x**4) - b**2*d**2
*log(c*x**n)**2/(4*x**4) - 4*b**2*d*e*n**2/(27*x**3) - 4*b**2*d*e*n*log(c*
x**n)/(9*x**3) - 2*b**2*d*e*log(c*x**n)**2/(3*x**3) - b**2*e**2*n**2/(4*x*
*2) - b**2*e**2*n*log(c*x**n)/(2*x**2) - b**2*e**2*log(c*x**n)**2/(2*x**2)
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 251, normalized size of antiderivative = 1.41

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^5}\,dx = -\frac{1}{4}b^2e^2\left(\frac{n^2}{x^2}+\frac{2n\log(cx^n)}{x^2}\right) - \frac{4}{27}b^2de\left(\frac{n^2}{x^3}+\frac{3n\log(cx^n)}{x^3}\right) - \frac{1}{32}b^2d^2\left(\frac{n^2}{x^4}+\frac{4n\log(cx^n)}{x^4}\right) - \frac{b^2e^2\log(cx^n)^2}{2x^2} - \frac{abe^2n}{2x^2} - \frac{abe^2\log(cx^n)}{x^2} - \frac{2b^2de\log(cx^n)^2}{3x^3} - \frac{4abden}{9x^3} - \frac{a^2e^2}{2x^2} - \frac{4abde\log(cx^n)}{3x^3} - \frac{b^2d^2\log(cx^n)^2}{4x^4} - \frac{abd^2n}{8x^4} - \frac{2a^2de}{3x^3} - \frac{abd^2\log(cx^n)}{2x^4} - \frac{a^2d^2}{4x^4}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^5,x, algorithm="maxima")
```

output
```
-1/4*b^2*e^2*(n^2/x^2 + 2*n*log(c*x^n)/x^2) - 4/27*b^2*d*e*(n^2/x^3 + 3*n*
log(c*x^n)/x^3) - 1/32*b^2*d^2*(n^2/x^4 + 4*n*log(c*x^n)/x^4) - 1/2*b^2*e^
2*log(c*x^n)^2/x^2 - 1/2*a*b*e^2*n/x^2 - a*b*e^2*log(c*x^n)/x^2 - 2/3*b^2*
d*e*log(c*x^n)^2/x^3 - 4/9*a*b*d*e*n/x^3 - 1/2*a^2*e^2/x^2 - 4/3*a*b*d*e*l
og(c*x^n)/x^3 - 1/4*b^2*d^2*log(c*x^n)^2/x^4 - 1/8*a*b*d^2*n/x^4 - 2/3*a^2
*d*e/x^3 - 1/2*a*b*d^2*log(c*x^n)/x^4 - 1/4*a^2*d^2/x^4
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 355 vs. 2(160) = 320.

Time = 0.12 (sec) , antiderivative size = 355, normalized size of antiderivative = 1.99

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^5}\,dx = -\frac{(6b^2e^2n^2x^2+8b^2den^2x+3b^2d^2n^2)\log(x)^2}{12x^4} - \frac{(36b^2e^2n^2x^2+72b^2e^2nx^2\log(c)+32b^2den^2x+72abe^2nx^2+96b^2denx\log(c)+9b^2d^2n^2+96abde}{72x^4} - \frac{216b^2e^2n^2x^2+432b^2e^2nx^2\log(c)+432b^2e^2x^2\log(c)^2+128b^2den^2x+432abe^2nx^2+384b^2denx\log}{}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^5,x, algorithm="giac")
```

output
```
-1/12*(6*b^2*e^2*n^2*x^2 + 8*b^2*d*e*n^2*x + 3*b^2*d^2*n^2)*log(x)^2/x^4 -
 1/72*(36*b^2*e^2*n^2*x^2 + 72*b^2*e^2*n*x^2*log(c) + 32*b^2*d*e*n^2*x + 7
2*a*b*e^2*n*x^2 + 96*b^2*d*e*n*x*log(c) + 9*b^2*d^2*n^2 + 96*a*b*d*e*n*x +
 36*b^2*d^2*n*log(c) + 36*a*b*d^2*n)*log(x)/x^4 - 1/864*(216*b^2*e^2*n^2*x
^2 + 432*b^2*e^2*n*x^2*log(c) + 432*b^2*e^2*x^2*log(c)^2 + 128*b^2*d*e*n^2
*x + 432*a*b*e^2*n*x^2 + 384*b^2*d*e*n*x*log(c) + 864*a*b*e^2*x^2*log(c) +
 576*b^2*d*e*x*log(c)^2 + 27*b^2*d^2*n^2 + 384*a*b*d*e*n*x + 432*a^2*e^2*x
^2 + 108*b^2*d^2*n*log(c) + 1152*a*b*d*e*x*log(c) + 216*b^2*d^2*log(c)^2 +
 108*a*b*d^2*n + 576*a^2*d*e*x + 432*a*b*d^2*log(c) + 216*a^2*d^2)/x^4
```

Mupad [B] (verification not implemented)

Time = 27.10 (sec) , antiderivative size = 188, normalized size of antiderivative = 1.06

$$\int \frac{(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2}{x^5}\,dx =$$
$$-\frac{x\left(48\,d\,e\,a^2+32\,d\,e\,a\,b\,n+\frac{32\,d\,e\,b^2\,n^2}{3}\right)+x^2\left(36\,a^2\,e^2+36\,a\,b\,e^2\,n+18\,b^2\,e^2\,n^2\right)+18\,a^2\,d^2+\frac{9\,b^2\,d^2\,n^2}{4}+}{72\,x^4}$$
$$-\frac{\ln\left(c\,x^n\right)^2\left(\frac{b^2\,d^2}{4}+\frac{2\,b^2\,d\,e\,x}{3}+\frac{b^2\,e^2\,x^2}{2}\right)}{x^4}$$
$$-\frac{\ln\left(c\,x^n\right)\,\left(\frac{3\,b\,(4\,a+b\,n)\,d^2}{4}+\frac{8\,b\,(3\,a+b\,n)\,d\,e\,x}{3}+3\,b\,(2\,a+b\,n)\,e^2\,x^2\right)}{6\,x^4}$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x)^2)/x^5,x)
```

output
```
- (x*(48*a^2*d*e + (32*b^2*d*e*n^2)/3 + 32*a*b*d*e*n) + x^2*(36*a^2*e^2 +
18*b^2*e^2*n^2 + 36*a*b*e^2*n) + 18*a^2*d^2 + (9*b^2*d^2*n^2)/4 + 9*a*b*d^
2*n)/(72*x^4) - (log(c*x^n)^2*((b^2*d^2)/4 + (b^2*e^2*x^2)/2 + (2*b^2*d*e*
x)/3))/x^4 - (log(c*x^n)*((3*b*d^2*(4*a + b*n))/4 + 3*b*e^2*x^2*(2*a + b*n
) + (8*b*d*e*x*(3*a + b*n))/3))/(6*x^4)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 237, normalized size of antiderivative = 1.33

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^5}\,dx$$
$$= \frac{-216\log(x^nc)^2 b^2d^2 - 576\log(x^nc)^2 b^2dex - 432\log(x^nc)^2 b^2e^2x^2 - 432\log(x^nc)\,ab\,d^2 - 1152\log(x^nc)\,ab\cdots}{}$$

input
```
int((e*x+d)^2*(a+b*log(c*x^n))^2/x^5,x)
```

output
```
( - 216*log(x**n*c)**2*b**2*d**2 - 576*log(x**n*c)**2*b**2*d*e*x - 432*log
(x**n*c)**2*b**2*e**2*x**2 - 432*log(x**n*c)*a*b*d**2 - 1152*log(x**n*c)*a
*b*d*e*x - 864*log(x**n*c)*a*b*e**2*x**2 - 108*log(x**n*c)*b**2*d**2*n - 3
84*log(x**n*c)*b**2*d*e*n*x - 432*log(x**n*c)*b**2*e**2*n*x**2 - 216*a**2*
d**2 - 576*a**2*d*e*x - 432*a**2*e**2*x**2 - 108*a*b*d**2*n - 384*a*b*d*e*
n*x - 432*a*b*e**2*n*x**2 - 27*b**2*d**2*n**2 - 128*b**2*d*e*n**2*x - 216*
b**2*e**2*n**2*x**2)/(864*x**4)
```

3.92 $\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx$

Optimal result 830
Mathematica [A] (verified) 831
Rubi [A] (verified) 831
Maple [C] (warning: unable to verify) 833
Fricas [F] 833
Sympy [F] 834
Maxima [F] 834
Giac [F] 834
Mupad [F(-1)] 835
Reduce [F] 835

Optimal result

Integrand size = 23, antiderivative size = 271

$$\begin{aligned}\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx &= -\frac{2abd^2nx}{e^3}+\frac{2b^2d^2n^2x}{e^3}-\frac{b^2dn^2x^2}{4e^2}+\frac{2b^2n^2x^3}{27e} \\ &-\frac{2b^2d^2nx\log(cx^n)}{e^3}+\frac{bdnx^2(a+b\log(cx^n))}{2e^2} \\ &-\frac{2bnx^3(a+b\log(cx^n))}{9e}+\frac{d^2x(a+b\log(cx^n))^2}{e^3} \\ &-\frac{dx^2(a+b\log(cx^n))^2}{2e^2}+\frac{x^3(a+b\log(cx^n))^2}{3e} \\ &-\frac{d^3(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^4} \\ &-\frac{2bd^3n(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4} \\ &+\frac{2b^2d^3n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}\end{aligned}$$

output
```
-2*a*b*d^2*n*x/e^3+2*b^2*d^2*n^2*x/e^3-1/4*b^2*d*n^2*x^2/e^2+2/27*b^2*n^2*
x^3/e-2*b^2*d^2*n*x*ln(c*x^n)/e^3+1/2*b*d*n*x^2*(a+b*ln(c*x^n))/e^2-2/9*b*
n*x^3*(a+b*ln(c*x^n))/e+d^2*x*(a+b*ln(c*x^n))^2/e^3-1/2*d*x^2*(a+b*ln(c*x^
n))^2/e^2+1/3*x^3*(a+b*ln(c*x^n))^2/e-d^3*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/e^
4-2*b*d^3*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/e^4+2*b^2*d^3*n^2*polylog(3,
-e*x/d)/e^4
```

Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 211, normalized size of antiderivative = 0.78

$$\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx =$$
$$-\frac{-108d^2ex(a+b\log(cx^n))^2+54de^2x^2(a+b\log(cx^n))^2-36e^3x^3(a+b\log(cx^n))^2+216bd^2enx(a-b}{}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x),x]
```

output
```
-1/108*(-108*d^2*e*x*(a + b*Log[c*x^n])^2 + 54*d*e^2*x^2*(a + b*Log[c*x^n]
)^2 - 36*e^3*x^3*(a + b*Log[c*x^n])^2 + 216*b*d^2*e*n*x*(a - b*n + b*Log[c
*x^n]) - 8*b*e^3*n*x^3*(b*n - 3*(a + b*Log[c*x^n])) + 27*b*d*e^2*n*x^2*(b*
n - 2*(a + b*Log[c*x^n])) + 108*d^3*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d]
+ 216*b*d^3*n*((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3,
-((e*x)/d)]))/e^4
```

Rubi [A] (verified)

Time = 0.57 (sec) , antiderivative size = 271, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(-\frac{d^3(a+b\log(cx^n))^2}{e^3(d+ex)}+\frac{d^2(a+b\log(cx^n))^2}{e^3}-\frac{dx(a+b\log(cx^n))^2}{e^2}+\frac{x^2(a+b\log(cx^n))^2}{e}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{2bd^3n\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^4}-\frac{d^3\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^4}+\frac{d^2x(a+b\log(cx^n))^2}{e^3}-\frac{dx^2(a+b\log(cx^n))^2}{2e^2}+\frac{bdnx^2(a+b\log(cx^n))}{2e^2}+\frac{x^3(a+b\log(cx^n))^2}{3e}-\frac{2bnx^3(a+b\log(cx^n))}{9e}-\frac{2abd^2nx}{e^3}-\frac{2b^2d^2nx\log(cx^n)}{e^3}+\frac{2b^2d^3n^2\,\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}+\frac{2b^2d^2n^2x}{e^3}-\frac{b^2dn^2x^2}{4e^2}+\frac{2b^2n^2x^3}{27e}$$

input
```
Int[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x),x]
```

output
```
(-2*a*b*d^2*n*x)/e^3 + (2*b^2*d^2*n^2*x)/e^3 - (b^2*d*n^2*x^2)/(4*e^2) + (
2*b^2*n^2*x^3)/(27*e) - (2*b^2*d^2*n*x*Log[c*x^n])/e^3 + (b*d*n*x^2*(a + b
*Log[c*x^n]))/(2*e^2) - (2*b*n*x^3*(a + b*Log[c*x^n]))/(9*e) + (d^2*x*(a +
 b*Log[c*x^n])^2)/e^3 - (d*x^2*(a + b*Log[c*x^n])^2)/(2*e^2) + (x^3*(a + b
*Log[c*x^n])^2)/(3*e) - (d^3*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e^4 -
(2*b*d^3*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)])/e^4 + (2*b^2*d^3*n^2
*PolyLog[3, -((e*x)/d)])/e^4
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.93 (sec) , antiderivative size = 732, normalized size of antiderivative = 2.70

method	result
risch	$\frac{b^2 \ln(x^n)^2 x^3}{3e} - \frac{b^2 \ln(x^n)^2 d\,x^2}{2e^2} + \frac{b^2 \ln(x^n)^2 x\,d^2}{e^3} - \frac{b^2 \ln(x^n)^2 d^3 \ln(ex+d)}{e^4} - \frac{2b^2 n \ln(x^n) x^3}{9e} + \frac{b^2 n \ln(x^n) d\,x^2}{2e^2} - \frac{2b^2 n \ln(x}{e^3}$

input
```
int(x^3*(a+b*ln(c*x^n))^2/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
1/3*b^2*ln(x^n)^2/e*x^3-1/2*b^2*ln(x^n)^2/e^2*d*x^2+b^2*ln(x^n)^2/e^3*x*d^
2-b^2*ln(x^n)^2*d^3/e^4*ln(e*x+d)-2/9*b^2*n*ln(x^n)/e*x^3+1/2*b^2*n*ln(x^n
)/e^2*d*x^2-2*b^2*n*ln(x^n)/e^3*x*d^2+2/27*b^2*n^2*x^3/e-1/4*b^2*d*n^2*x^2
/e^2+2*b^2*d^2*n^2*x/e^3-2*b^2*d^3/e^4*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2-2*b^
2*d^3/e^4*ln(x)*dilog(-e*x/d)*n^2+2*b^2*n*d^3/e^4*ln(x^n)*ln(e*x+d)*ln(-e*
x/d)+2*b^2*n*d^3/e^4*ln(x^n)*dilog(-e*x/d)+b^2*d^3/e^4*n^2*ln(e*x+d)*ln(x)
^2-b^2*d^3/e^4*n^2*ln(x)^2*ln(1+e*x/d)-2*b^2*d^3/e^4*n^2*ln(x)*polylog(2,-
e*x/d)+2*b^2*d^3*n^2*polylog(3,-e*x/d)/e^4+(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^
n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*P
i*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*(1/3*ln(x^n)/e*x^3-1/2*ln(x
^n)/e^2*d*x^2+ln(x^n)/e^3*x*d^2-ln(x^n)*d^3/e^4*ln(e*x+d)-n*(1/6/e^4*(2/3*
(e*x+d)^3-7/2*d*(e*x+d)^2+11*d^2*(e*x+d))-d^3/e^4*(dilog(-e*x/d)+ln(e*x+d)
*ln(-e*x/d))))+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*
csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn
(I*c)+2*b*ln(c)+2*a)^2*(1/e^3*(1/3*e^2*x^3-1/2*e*x^2*d+d^2*x)-d^3/e^4*ln(e
*x+d))
```

Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)^2x^3}{ex+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b^2*x^3*log(c*x^n)^2 + 2*a*b*x^3*log(c*x^n) + a^2*x^3)/(e*x + d)
, x)
```

Sympy [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx=\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx$$

input
```
integrate(x**3*(a+b*ln(c*x**n))**2/(e*x+d),x)
```

output
```
Integral(x**3*(a + b*log(c*x**n))**2/(d + e*x), x)
```

Maxima [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx=\int \frac{(b\log(cx^n)+a)^2x^3}{ex+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="maxima")
```

output
```
-1/6*a^2*(6*d^3*log(e*x + d)/e^4 - (2*e^2*x^3 - 3*d*e*x^2 + 6*d^2*x)/e^3)
+ integrate((b^2*x^3*log(x^n)^2 + 2*(b^2*log(c) + a*b)*x^3*log(x^n) + (b^2
*log(c)^2 + 2*a*b*log(c))*x^3)/(e*x + d), x)
```

Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx=\int \frac{(b\log(cx^n)+a)^2x^3}{ex+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x^3/(e*x + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))^2}{d+e\,x}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n))^2)/(d + e*x),x)
```

output
```
int((x^3*(a + b*log(c*x^n))^2)/(d + e*x), x)
```

Reduce [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx = \frac{108\left(\int \frac{\log(x^nc)^2}{e\,x^2+dx}dx\right)b^2d^4n + 216\left(\int \frac{\log(x^nc)}{e\,x^2+dx}dx\right)ab\,d^4n - 108\log(ex+d)\,a^2d^3n - 36\log(x^nc)^3\,b^2d^3 - 108\mathrm{lc}}{}$$

input
```
int(x^3*(a+b*log(c*x^n))^2/(e*x+d),x)
```

output
```
(108*int(log(x**n*c)**2/(d*x + e*x**2),x)*b**2*d**4*n + 216*int(log(x**n*c
)/(d*x + e*x**2),x)*a*b*d**4*n - 108*log(d + e*x)*a**2*d**3*n - 36*log(x**
n*c)**3*b**2*d**3 - 108*log(x**n*c)**2*a*b*d**3 + 108*log(x**n*c)**2*b**2*
d**2*e*n*x - 54*log(x**n*c)**2*b**2*d*e**2*n*x**2 + 36*log(x**n*c)**2*b**2
*e**3*n*x**3 + 216*log(x**n*c)*a*b*d**2*e*n*x - 108*log(x**n*c)*a*b*d*e**2
*n*x**2 + 72*log(x**n*c)*a*b*e**3*n*x**3 - 216*log(x**n*c)*b**2*d**2*e*n**
2*x + 54*log(x**n*c)*b**2*d*e**2*n**2*x**2 - 24*log(x**n*c)*b**2*e**3*n**2
*x**3 + 108*a**2*d**2*e*n*x - 54*a**2*d*e**2*n*x**2 + 36*a**2*e**3*n*x**3
- 216*a*b*d**2*e*n**2*x + 54*a*b*d*e**2*n**2*x**2 - 24*a*b*e**3*n**2*x**3
+ 216*b**2*d**2*e*n**3*x - 27*b**2*d*e**2*n**3*x**2 + 8*b**2*e**3*n**3*x**
3)/(108*e**4*n)
```

3.93 $\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx$

Optimal result 836
Mathematica [A] (verified) 837
Rubi [A] (verified) 837
Maple [C] (warning: unable to verify) 838
Fricas [F] 839
Sympy [F] 840
Maxima [F] 840
Giac [F] 840
Mupad [F(-1)] 841
Reduce [F] 841

Optimal result

Integrand size = 23, antiderivative size = 200

$$\begin{aligned}\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx = {} & \frac{2abdnx}{e^2}-\frac{2b^2dn^2x}{e^2}+\frac{b^2n^2x^2}{4e}+\frac{2b^2dnx\log(cx^n)}{e^2} \\ & -\frac{bnx^2(a+b\log(cx^n))}{2e}-\frac{dx(a+b\log(cx^n))^2}{e^2} \\ & +\frac{x^2(a+b\log(cx^n))^2}{2e}+\frac{d^2(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^3} \\ & +\frac{2bd^2n(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3} \\ & -\frac{2b^2d^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^3}\end{aligned}$$

output
```
2*a*b*d*n*x/e^2-2*b^2*d*n^2*x/e^2+1/4*b^2*n^2*x^2/e+2*b^2*d*n*x*ln(c*x^n)/
e^2-1/2*b*n*x^2*(a+b*ln(c*x^n))/e-d*x*(a+b*ln(c*x^n))^2/e^2+1/2*x^2*(a+b*l
n(c*x^n))^2/e+d^2*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/e^3+2*b*d^2*n*(a+b*ln(c*x^
n))*polylog(2,-e*x/d)/e^3-2*b^2*d^2*n^2*polylog(3,-e*x/d)/e^3
```

Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 158, normalized size of antiderivative = 0.79

$$\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx$$
$$= \frac{-4dex(a+b\log(cx^n))^2+2e^2x^2(a+b\log(cx^n))^2+8bdenx(a-bn+b\log(cx^n))+be^2nx^2(bn-2(a+b\log(cx^n)))+\dots}{}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x),x]
```

output
```
(-4*d*e*x*(a + b*Log[c*x^n])^2 + 2*e^2*x^2*(a + b*Log[c*x^n])^2 + 8*b*d*e*
n*x*(a - b*n + b*Log[c*x^n]) + b*e^2*n*x^2*(b*n - 2*(a + b*Log[c*x^n])) +
4*d^2*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 8*b*d^2*n*((a + b*Log[c*x^n]
)*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -((e*x)/d)]))/(4*e^3)
```

Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 200, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx$$
$$\Big\downarrow \text{2795}$$
$$\int \left(\frac{d^2(a+b\log(cx^n))^2}{e^2(d+ex)}-\frac{d(a+b\log(cx^n))^2}{e^2}+\frac{x(a+b\log(cx^n))^2}{e}\right)dx$$
$$\Big\downarrow \text{2009}$$

$$\frac{2bd^2n\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^3}+\frac{d^2\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^3}-\frac{dx(a+b\log(cx^n))^2}{e^2}-\frac{bnx^2(a+b\log(cx^n))}{2e}+\frac{x^2(a+b\log(cx^n))^2}{2e}+\frac{2abdnx}{e^2}+\frac{2b^2dnx\log(cx^n)}{e^2}-\frac{2b^2d^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^3}-\frac{2b^2dn^2x}{e^2}+\frac{b^2n^2x^2}{4e}$$

input
```
Int[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x),x]
```

output
```
(2*a*b*d*n*x)/e^2 - (2*b^2*d*n^2*x)/e^2 + (b^2*n^2*x^2)/(4*e) + (2*b^2*d*n
*x*Log[c*x^n])/e^2 - (b*n*x^2*(a + b*Log[c*x^n]))/(2*e) - (d*x*(a + b*Log[
c*x^n])^2)/e^2 + (x^2*(a + b*Log[c*x^n])^2)/(2*e) + (d^2*(a + b*Log[c*x^n]
)^2*Log[1 + (e*x)/d])/e^3 + (2*b*d^2*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*
x)/d)])/e^3 - (2*b^2*d^2*n^2*PolyLog[3, -((e*x)/d)])/e^3
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.79 (sec) , antiderivative size = 637, normalized size of antiderivative = 3.18

method	result
risch	$\frac{b^2\ln(x^n)^2x^2}{2e}-\frac{b^2\ln(x^n)^2dx}{e^2}+\frac{b^2\ln(x^n)^2d^2\ln(ex+d)}{e^3}+\frac{2b^2d^2\ln(x)\ln(ex+d)\ln\left(-\frac{ex}{d}\right)n^2}{e^3}+\frac{2b^2d^2\ln(x)\operatorname{dilog}\left(-\frac{ex}{d}\right)n^2}{e^3}-$

input
```
int(x^2*(a+b*ln(c*x^n))^2/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
1/2*b^2*ln(x^n)^2/e*x^2-b^2*ln(x^n)^2/e^2*d*x+b^2*ln(x^n)^2*d^2/e^3*ln(e*x
+d)+2*b^2*d^2/e^3*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2+2*b^2*d^2/e^3*ln(x)*dilog
(-e*x/d)*n^2-2*b^2*n*d^2/e^3*ln(x^n)*ln(e*x+d)*ln(-e*x/d)-2*b^2*n*d^2/e^3*
ln(x^n)*dilog(-e*x/d)-b^2*d^2/e^3*n^2*ln(e*x+d)*ln(x)^2+b^2*d^2/e^3*n^2*ln
(x)^2*ln(1+e*x/d)+2*b^2*d^2/e^3*n^2*ln(x)*polylog(2,-e*x/d)-2*b^2*d^2*n^2*
polylog(3,-e*x/d)/e^3-1/2*b^2*n*ln(x^n)/e*x^2+2*b^2*n*ln(x^n)/e^2*d*x+1/4*
b^2*n^2*x^2/e-2*b^2*d*n^2*x/e^2+(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b
*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*
c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*(1/2*ln(x^n)/e*x^2-ln(x^n)/e^2*d*x+ln(
x^n)*d^2/e^3*ln(e*x+d)-n*(d^2/e^3*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))+1/2
/e^3*(1/2*(e*x+d)^2-3*d*(e*x+d))))+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2
-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*
csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^2*(1/e^2*(1/2*e*x^2-d*x)+d^2/e^3*
ln(e*x+d))
```

Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx=\int \frac{(b\log(cx^n)+a)^2x^2}{ex+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b^2*x^2*log(c*x^n)^2 + 2*a*b*x^2*log(c*x^n) + a^2*x^2)/(e*x + d)
, x)
```

Sympy [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))**2/(e*x+d),x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))**2/(d + e*x), x)
```

Maxima [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{ex+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="maxima")
```

output
```
1/2*a^2*(2*d^2*log(e*x + d)/e^3 + (e*x^2 - 2*d*x)/e^2) + integrate((b^2*x^
2*log(x^n)^2 + 2*(b^2*log(c) + a*b)*x^2*log(x^n) + (b^2*log(c)^2 + 2*a*b*l
og(c))*x^2)/(e*x + d), x)
```

Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{ex+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x^2/(e*x + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))^2}{d+e\,x}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n))^2)/(d + e*x),x)
```

output
```
int((x^2*(a + b*log(c*x^n))^2)/(d + e*x), x)
```

Reduce [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx = \frac{-12\left(\int \frac{\log(x^nc)^2}{e\,x^2+dx}dx\right)b^2d^3n-24\left(\int \frac{\log(x^nc)}{e\,x^2+dx}dx\right)ab\,d^3n+12\log(ex+d)\,a^2d^2n+4\log(x^nc)^3\,b^2d^2+12\log(x^n$$

input
```
int(x^2*(a+b*log(c*x^n))^2/(e*x+d),x)
```

output
```
( - 12*int(log(x**n*c)**2/(d*x + e*x**2),x)*b**2*d**3*n - 24*int(log(x**n*
c)/(d*x + e*x**2),x)*a*b*d**3*n + 12*log(d + e*x)*a**2*d**2*n + 4*log(x**n
*c)**3*b**2*d**2 + 12*log(x**n*c)**2*a*b*d**2 - 12*log(x**n*c)**2*b**2*d*e
*n*x + 6*log(x**n*c)**2*b**2*e**2*n*x**2 - 24*log(x**n*c)*a*b*d*e*n*x + 12
*log(x**n*c)*a*b*e**2*n*x**2 + 24*log(x**n*c)*b**2*d*e*n**2*x - 6*log(x**n
*c)*b**2*e**2*n**2*x**2 - 12*a**2*d*e*n*x + 6*a**2*e**2*n*x**2 + 24*a*b*d*
e*n**2*x - 6*a*b*e**2*n**2*x**2 - 24*b**2*d*e*n**3*x + 3*b**2*e**2*n**3*x*
*2)/(12*e**3*n)
```

3.94 $\int \frac{x(a+b\log(cx^n))^2}{d+ex} dx$

Optimal result 842
Mathematica [A] (verified) 843
Rubi [A] (verified) 843
Maple [C] (warning: unable to verify) 844
Fricas [F] 845
Sympy [F] 845
Maxima [F] 846
Giac [F] 846
Mupad [F(-1)] 846
Reduce [F] 847

Optimal result

Integrand size = 21, antiderivative size = 130

$$\int \frac{x(a+b\log(cx^n))^2}{d+ex} dx = -\frac{2abnx}{e} + \frac{2b^2n^2x}{e} - \frac{2b^2nx\log(cx^n)}{e} + \frac{x(a+b\log(cx^n))^2}{e} - \frac{d(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^2} - \frac{2bdn(a+b\log(cx^n))\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2} + \frac{2b^2dn^2\,\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^2}$$

output
```
-2*a*b*n*x/e+2*b^2*n^2*x/e-2*b^2*n*x*ln(c*x^n)/e+x*(a+b*ln(c*x^n))^2/e-d*(
a+b*ln(c*x^n))^2*ln(1+e*x/d)/e^2-2*b*d*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)
/e^2+2*b^2*d*n^2*polylog(3,-e*x/d)/e^2
```

Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 103, normalized size of antiderivative = 0.79

$$\int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx$$
$$= \frac{ex(a+b\log(cx^n))^2 - 2benx(a-bn+b\log(cx^n)) - d(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right) - 2bdn\left((a+b\log(\right.}{e^2}$$

input
```
Integrate[(x*(a + b*Log[c*x^n])^2)/(d + e*x),x]
```

output
```
(e*x*(a + b*Log[c*x^n])^2 - 2*b*e*n*x*(a - b*n + b*Log[c*x^n]) - d*(a + b*
Log[c*x^n])^2*Log[1 + (e*x)/d] - 2*b*d*n*((a + b*Log[c*x^n])*PolyLog[2, -(
(e*x)/d)] - b*n*PolyLog[3, -((e*x)/d)]))/e^2
```

Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 130, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx$$
$$\Big\downarrow \text{2795}$$
$$\int \left(\frac{(a+b\log(cx^n))^2}{e} - \frac{d(a+b\log(cx^n))^2}{e(d+ex)}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-\frac{2bdn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^2} - \frac{d\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^2} + \frac{x(a+b\log(cx^n))^2}{e} - \frac{2abnx}{e} - \frac{2b^2nx\log(cx^n)}{e} + \frac{2b^2dn^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^2} + \frac{2b^2n^2x}{e}$$

input
```
Int[(x*(a + b*Log[c*x^n])^2)/(d + e*x),x]
```

output
```
(-2*a*b*n*x)/e + (2*b^2*n^2*x)/e - (2*b^2*n*x*Log[c*x^n])/e + (x*(a + b*Lo
g[c*x^n])^2)/e - (d*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e^2 - (2*b*d*n*
(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)])/e^2 + (2*b^2*d*n^2*PolyLog[3, -
((e*x)/d)])/e^2
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.70 (sec) , antiderivative size = 528, normalized size of antiderivative = 4.06

method	result
risch	$\frac{b^2\ln(x^n)^2 x}{e}-\frac{b^2\ln(x^n)^2 d\ln(ex+d)}{e^2}-\frac{2b^2 n\ln(x^n)x}{e}+\frac{2b^2n^2x}{e}-\frac{2b^2 d\ln(x)\ln(ex+d)\ln\left(-\frac{ex}{d}\right)n^2}{e^2}-\frac{2b^2 d\ln(x)\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{e^2}$

input
```
int(x*(a+b*ln(c*x^n))^2/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
b^2*ln(x^n)^2/e*x-b^2*ln(x^n)^2*d/e^2*ln(e*x+d)-2*b^2*n*ln(x^n)/e*x+2*b^2*
n^2*x/e-2*b^2*d/e^2*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2-2*b^2*d/e^2*ln(x)*dilog
(-e*x/d)*n^2+2*b^2*n*d/e^2*ln(x^n)*ln(e*x+d)*ln(-e*x/d)+2*b^2*n*d/e^2*ln(x
^n)*dilog(-e*x/d)+b^2*d/e^2*n^2*ln(e*x+d)*ln(x)^2-b^2*d/e^2*n^2*ln(x)^2*ln
(1+e*x/d)-2*b^2*d/e^2*n^2*ln(x)*polylog(2,-e*x/d)+2*b^2*d*n^2*polylog(3,-e
*x/d)/e^2+(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*
x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b
*ln(c)+2*a)*b*(ln(x^n)/e*x-ln(x^n)*d/e^2*ln(e*x+d)-n*((e*x+d)/e^2-d/e^2*(d
ilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))))+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)
^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*
b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^2*(x/e-d/e^2*ln(e*x+d))
```

Fricas [F]

$$\int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)^2x}{ex+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b^2*x*log(c*x^n)^2 + 2*a*b*x*log(c*x^n) + a^2*x)/(e*x + d), x)
```

Sympy [F]

$$\int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx$$

input
```
integrate(x*(a+b*ln(c*x**n))**2/(e*x+d),x)
```

output
```
Integral(x*(a + b*log(c*x**n))**2/(d + e*x), x)
```

Maxima [F]

$$\int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)^2x}{ex+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="maxima")
```

output
```
a^2*(x/e - d*log(e*x + d)/e^2) + integrate((b^2*x*log(x^n)^2 + 2*(b^2*log(
c) + a*b)*x*log(x^n) + (b^2*log(c)^2 + 2*a*b*log(c))*x)/(e*x + d), x)
```

Giac [F]

$$\int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)^2x}{ex+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x/(e*x + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))^2}{d+e\,x}\,dx$$

input
```
int((x*(a + b*log(c*x^n))^2)/(d + e*x),x)
```

output
```
int((x*(a + b*log(c*x^n))^2)/(d + e*x), x)
```

Reduce [F]

$$\int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx$$
$$= \frac{3\left(\int \frac{\log(x^nc)^2}{e\,x^2+dx}dx\right)b^2d^2n + 6\left(\int \frac{\log(x^nc)}{e\,x^2+dx}dx\right)ab\,d^2n - 3\log(ex+d)\,a^2dn - \log(x^nc)^3\,b^2d - 3\log(x^nc)^2\,abd +}{3e^2n}$$

input
```
int(x*(a+b*log(c*x^n))^2/(e*x+d),x)
```

output
```
(3*int(log(x**n*c)**2/(d*x + e*x**2),x)*b**2*d**2*n + 6*int(log(x**n*c)/(d
*x + e*x**2),x)*a*b*d**2*n - 3*log(d + e*x)*a**2*d*n - log(x**n*c)**3*b**2
*d - 3*log(x**n*c)**2*a*b*d + 3*log(x**n*c)**2*b**2*e*n*x + 6*log(x**n*c)*
a*b*e*n*x - 6*log(x**n*c)*b**2*e*n**2*x + 3*a**2*e*n*x - 6*a*b*e*n**2*x +
6*b**2*e*n**3*x)/(3*e**2*n)
```

3.95 $\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx$

Optimal result 848
Mathematica [A] (verified) 848
Rubi [A] (verified) 849
Maple [C] (warning: unable to verify) 850
Fricas [F] 851
Sympy [F] 851
Maxima [F] 852
Giac [F] 852
Mupad [F(-1)] 852
Reduce [F] 853

Optimal result

Integrand size = 20, antiderivative size = 72

$$\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx = \frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e} + \frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e} - \frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e}$$

output
```
(a+b*ln(c*x^n))^2*ln(1+e*x/d)/e+2*b*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/e-
2*b^2*n^2*polylog(3,-e*x/d)/e
```

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 68, normalized size of antiderivative = 0.94

$$\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx = \frac{(a+b\log(cx^n))^2\log\left(\frac{d+ex}{d}\right)}{e} - \frac{2bn\left(-\left((a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)\right)+bn\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)\right)}{e}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(d + e*x),x]
```

output
```
((a + b*Log[c*x^n])^2*Log[(d + e*x)/d])/e - (2*b*n*(-((a + b*Log[c*x^n])*P
olyLog[2, -((e*x)/d)]) + b*n*PolyLog[3, -((e*x)/d)]))/e
```

Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 67, normalized size of antiderivative = 0.93, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.150$, Rules used = {2754, 2821, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx$$

$$\Big\downarrow \text{2754}$$

$$\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\int \frac{(a+b\log(cx^n))\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}$$

$$\Big\downarrow \text{2821}$$

$$\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\left(bn\int \frac{\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{x}dx-\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))\right)}{e}$$

$$\Big\downarrow \text{7143}$$

$$\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\left(bn\,\text{PolyLog}\left(3,-\frac{ex}{d}\right)-\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))\right)}{e}$$

input
```
Int[(a + b*Log[c*x^n])^2/(d + e*x),x]
```

output
```
((a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e - (2*b*n*(-((a + b*Log[c*x^n])*P
olyLog[2, -((e*x)/d)]) + b*n*PolyLog[3, -((e*x)/d)]))/e
```

Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.61 (sec) , antiderivative size = 445, normalized size of antiderivative = 6.18

method	result
risch	$\frac{b^2\ln(x^n)^2\ln(ex+d)}{e}+\frac{2b^2n^2\ln(x)\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e}+\frac{2b^2n^2\ln(x)\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{e}-\frac{2b^2n\ln(x^n)\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e}-\frac{2b^2n\ln}{}$

input
```
int((a+b*ln(c*x^n))^2/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
b^2*ln(x^n)^2*ln(e*x+d)/e+2*b^2/e*n^2*ln(x)*ln(e*x+d)*ln(-e*x/d)+2*b^2/e*n
^2*ln(x)*dilog(-e*x/d)-2*b^2/e*n*ln(x^n)*ln(e*x+d)*ln(-e*x/d)-2*b^2/e*n*ln
(x^n)*dilog(-e*x/d)-b^2/e*n^2*ln(e*x+d)*ln(x)^2+b^2/e*n^2*ln(x)^2*ln(1+e*x
/d)+2*b^2/e*n^2*ln(x)*polylog(2,-e*x/d)-2*b^2*n^2*polylog(3,-e*x/d)/e+(I*P
i*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)
-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*
(ln(x^n)*ln(e*x+d)/e-1/e*n*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d)))+1/4*(I*Pi
*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-
I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^2*l
n(e*x+d)/e
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx=\int \frac{(b\log(cx^n)+a)^2}{ex+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e*x + d), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx=\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/(e*x+d),x)
```

output
```
Integral((a + b*log(c*x**n))**2/(d + e*x), x)
```

Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)^2}{ex+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d),x, algorithm="maxima")
```

output
```
a^2*log(e*x + d)/e + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(
c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e*x + d), x)
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)^2}{ex+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/(e*x + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{d+e\,x}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(d + e*x),x)
```

output
```
int((a + b*log(c*x^n))^2/(d + e*x), x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx$$
$$= \frac{-3\left(\int \frac{\log(x^n c)^2}{e\,x^2+dx}dx\right)b^2dn - 6\left(\int \frac{\log(x^n c)}{e\,x^2+dx}dx\right)abdn + 3\log(ex+d)\,a^2n + \log(x^n c)^3\,b^2 + 3\log(x^n c)^2\,ab}{3en}$$

input
```
int((a+b*log(c*x^n))^2/(e*x+d),x)
```

output
```
( - 3*int(log(x**n*c)**2/(d*x + e*x**2),x)*b**2*d*n - 6*int(log(x**n*c)/(d
*x + e*x**2),x)*a*b*d*n + 3*log(d + e*x)*a**2*n + log(x**n*c)**3*b**2 + 3*
log(x**n*c)**2*a*b)/(3*e*n)
```

3.96 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx$

Optimal result 854
Mathematica [A] (verified) 854
Rubi [A] (verified) 855
Maple [C] (warning: unable to verify) 856
Fricas [F] 857
Sympy [F] 857
Maxima [F] 858
Giac [F] 858
Mupad [F(-1)] 858
Reduce [F] 859

Optimal result

Integrand size = 23, antiderivative size = 79

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx = -\frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d} + \frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d} + \frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d}$$

output
```
-ln(1+d/e/x)*(a+b*ln(c*x^n))^2/d+2*b*n*(a+b*ln(c*x^n))*polylog(2,-d/e/x)/d
+2*b^2*n^2*polylog(3,-d/e/x)/d
```

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 94, normalized size of antiderivative = 1.19

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx = \frac{(a+b\log(cx^n))^3}{3bdn} - \frac{(a+b\log(cx^n))^2\log\left(\frac{d+ex}{d}\right)}{d} - \frac{2bn\left((a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)-bn\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)\right)}{d}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x)),x]
```

output
```
(a + b*Log[c*x^n])^3/(3*b*d*n) - ((a + b*Log[c*x^n])^2*Log[(d + e*x)/d])/d
 - (2*b*n*((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -((e
*x)/d)]))/d
```

Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 73, normalized size of antiderivative = 0.92, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.130$, Rules used = {2779, 2821, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx$$

$$\Big\downarrow \text{ 2779}$$

$$\frac{2bn\int \frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}$$

$$\Big\downarrow \text{ 2821}$$

$$\frac{2bn\left(\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int \frac{\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}$$

$$\Big\downarrow \text{ 7143}$$

$$\frac{2bn\left(\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))+bn\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x*(d + e*x)),x]
```

output
```
-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d) + (2*b*n*((a + b*Log[c*x^n])*
PolyLog[2, -(d/(e*x))] + b*n*PolyLog[3, -(d/(e*x))]))/d
```

Defintions of rubi rules used

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.64 (sec) , antiderivative size = 528, normalized size of antiderivative = 6.68

method	result
risch	$-\frac{b^2 \ln(x^n)^2 \ln(ex+d)}{d} + \frac{b^2 \ln(x^n)^2 \ln(x)}{d} - \frac{b^2 n \ln(x^n) \ln(x)^2}{d} + \frac{b^2 \ln(x)^3 n^2}{3d} - \frac{2b^2 \ln(x) \ln(ex+d) \ln(-\frac{ex}{d}) n^2}{d} - \frac{2b^2 \ln(x)}{}$

input
```
int((a+b*ln(c*x^n))^2/x/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
-b^2*ln(x^n)^2/d*ln(e*x+d)+b^2*ln(x^n)^2/d*ln(x)-b^2*n/d*ln(x^n)*ln(x)^2+1
/3*b^2/d*ln(x)^3*n^2-2*b^2/d*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2-2*b^2/d*ln(x)*
dilog(-e*x/d)*n^2+2*b^2*n/d*ln(x^n)*ln(e*x+d)*ln(-e*x/d)+2*b^2*n/d*ln(x^n)
*dilog(-e*x/d)+b^2/d*n^2*ln(e*x+d)*ln(x)^2-b^2/d*n^2*ln(x)^2*ln(1+e*x/d)-2
*b^2/d*n^2*ln(x)*polylog(2,-e*x/d)+2*b^2/d*n^2*polylog(3,-e*x/d)+(I*Pi*b*c
sgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi
*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*(-ln(
x^n)/d*ln(e*x+d)+ln(x^n)/d*ln(x)-n*(1/2/d*ln(x)^2-1/d*ln(e*x+d)*ln(-e*x/d)
-1/d*dilog(-e*x/d)))+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I
*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^
2*csgn(I*c)+2*b*ln(c)+2*a)^2*(-1/d*ln(e*x+d)+1/d*ln(x))
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e*x^2 + d*x), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx = \int \frac{(a+b\log(cx^n))^2}{x\,(d+ex)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x/(e*x+d),x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x*(d + e*x)), x)
```

Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d),x, algorithm="maxima")
```

output
```
-a^2*(log(e*x + d)/d - log(x)/d) + integrate((b^2*log(c)^2 + b^2*log(x^n)^
2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e*x^2 + d*x), x)
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x\,(d+e\,x)}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x*(d + e*x)),x)
```

output
```
int((a + b*log(c*x^n))^2/(x*(d + e*x)), x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx$$
$$= \frac{\left(\int \frac{\log(x^n c)^2}{e\,x^2+dx}dx\right)b^2d+2\left(\int \frac{\log(x^n c)}{e\,x^2+dx}dx\right)abd-\log(ex+d)\,a^2+\log(x)\,a^2}{d}$$

input
```
int((a+b*log(c*x^n))^2/x/(e*x+d),x)
```

output
```
(int(log(x**n*c)**2/(d*x + e*x**2),x)*b**2*d + 2*int(log(x**n*c)/(d*x + e*
x**2),x)*a*b*d - log(d + e*x)*a**2 + log(x)*a**2)/d
```

3.97 $\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx$

Optimal result . . . 860
Mathematica [A] (verified) . . . 861
Rubi [A] (verified) . . . 861
Maple [C] (warning: unable to verify) . . . 864
Fricas [F] . . . 864
Sympy [F] . . . 865
Maxima [F] . . . 865
Giac [F] . . . 865
Mupad [F(-1)] . . . 866
Reduce [F] . . . 866

Optimal result

Integrand size = 23, antiderivative size = 135

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx = -\frac{2b^2n^2}{dx} - \frac{2bn(a+b\log(cx^n))}{dx} - \frac{(a+b\log(cx^n))^2}{dx} + \frac{e\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d^2} - \frac{2ben(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^2} - \frac{2b^2en^2\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^2}$$

output
```
-2*b^2*n^2/d/x-2*b*n*(a+b*ln(c*x^n))/d/x-(a+b*ln(c*x^n))^2/d/x+e*ln(1+d/e/
x)*(a+b*ln(c*x^n))^2/d^2-2*b*e*n*(a+b*ln(c*x^n))*polylog(2,-d/e/x)/d^2-2*b
^2*e*n^2*polylog(3,-d/e/x)/d^2
```

Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 130, normalized size of antiderivative = 0.96

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx = -\frac{\frac{3d(a+b\log(cx^n))^2}{x}+\frac{e(a+b\log(cx^n))^3}{bn}+\frac{6bdn(a+bn+b\log(cx^n))}{x}-3e(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)-6ben\big((a+b\,\mathrm{l}}{3d^2}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)),x]
```

output
```
-1/3*((3*d*(a + b*Log[c*x^n])^2)/x + (e*(a + b*Log[c*x^n])^3)/(b*n) + (6*b
*d*n*(a + b*n + b*Log[c*x^n]))/x - 3*e*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/
d] - 6*b*e*n*((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -
((e*x)/d)]))/d^2
```

Rubi [A] (verified)

Time = 0.83 (sec) , antiderivative size = 129, normalized size of antiderivative = 0.96, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2780, 2742, 2741, 2779, 2821, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx$$

$$\Big\downarrow \; 2780$$

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x^2}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}$$

$$\Big\downarrow \; 2742$$

$$\frac{2bn\int \frac{a+b\log(cx^n)}{x^2}dx-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}$$

$$\Big\downarrow \; 2741$$

$$\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}$$

$$\Big\downarrow \ 2779$$

$$\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\left(\frac{2bn\int\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}\right)}{d}$$

$$\Big\downarrow \ 2821$$

$$\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\left(\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}\right)}{d}$$

$$\Big\downarrow \ 7143$$

$$\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\left(\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))+bn\,\text{PolyLog}\left(3,-\frac{d}{ex}\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)),x]
```

output
```
(-((a + b*Log[c*x^n])^2/x) + 2*b*n*(-((b*n)/x) - (a + b*Log[c*x^n])/x))/d
- (e*(-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d) + (2*b*n*((a + b*Log[c*
x^n])*PolyLog[2, -(d/(e*x))] + b*n*PolyLog[3, -(d/(e*x))]))/d))/d
```

Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2742
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Simp[b*n*
(p/(m + 1))   Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b
, c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.66 (sec) , antiderivative size = 615, normalized size of antiderivative = 4.56

method	result
risch	$\frac{b^2 \ln(x^n)^2 e \ln(ex+d)}{d^2} - \frac{b^2 \ln(x^n)^2}{dx} - \frac{b^2 \ln(x^n)^2 e \ln(x)}{d^2} + \frac{2b^2 e \ln(x) \ln(ex+d) \ln(-\frac{ex}{d}) n^2}{d^2} + \frac{2b^2 e \ln(x) \operatorname{dilog}(-\frac{ex}{d}) n^2}{d^2} - 2b$

input
```
int((a+b*ln(c*x^n))^2/x^2/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
b^2*ln(x^n)^2*e/d^2*ln(e*x+d)-b^2*ln(x^n)^2/d/x-b^2*ln(x^n)^2*e/d^2*ln(x)+
2*b^2*e/d^2*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2+2*b^2*e/d^2*ln(x)*dilog(-e*x/d)
*n^2-2*b^2*n*e/d^2*ln(x^n)*ln(e*x+d)*ln(-e*x/d)-2*b^2*n*e/d^2*ln(x^n)*dilo
g(-e*x/d)-b^2*e/d^2*n^2*ln(e*x+d)*ln(x)^2+b^2*e/d^2*n^2*ln(x)^2*ln(1+e*x/d
)+2*b^2*e/d^2*n^2*ln(x)*polylog(2,-e*x/d)-2*b^2*e/d^2*n^2*polylog(3,-e*x/d
)-2*b^2*n*ln(x^n)/d/x-2*b^2*n^2/d/x+b^2*n*e/d^2*ln(x^n)*ln(x)^2-1/3*b^2*e/
d^2*ln(x)^3*n^2+(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csg
n(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*
c)+2*b*ln(c)+2*a)*b*(ln(x^n)*e/d^2*ln(e*x+d)-ln(x^n)/d/x-ln(x^n)*e/d^2*ln(
x)-n*(e/d^2*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))+1/d/x-1/2*e/d^2*ln(x)^2))
+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*
csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c
)+2*a)^2*(e/d^2*ln(e*x+d)-1/d/x-e/d^2*ln(x))
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e*x^3 + d*x^2), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx = \int \frac{(a+b\log(cx^n))^2}{x^2\,(d+ex)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x**2/(e*x+d),x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x**2*(d + e*x)), x)
```

Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d),x, algorithm="maxima")
```

output
```
a^2*(e*log(e*x + d)/d^2 - e*log(x)/d^2 - 1/(d*x)) + integrate((b^2*log(c)^
2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e*x^3
+ d*x^2), x)
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x^2\,(d+e\,x)}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x^2*(d + e*x)),x)
```

output
```
int((a + b*log(c*x^n))^2/(x^2*(d + e*x)), x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx = \frac{\left(\int \frac{\log(x^n c)^2}{e\,x^3+d\,x^2}dx\right)b^2d^2x+2\left(\int \frac{\log(x^n c)}{e\,x^3+d\,x^2}dx\right)ab\,d^2x+\log(ex+d)\,a^2ex-\log(x)\,a^2ex-a^2d}{d^2x}$$

input
```
int((a+b*log(c*x^n))^2/x^2/(e*x+d),x)
```

output
```
(int(log(x**n*c)**2/(d*x**2 + e*x**3),x)*b**2*d**2*x + 2*int(log(x**n*c)/(
d*x**2 + e*x**3),x)*a*b*d**2*x + log(d + e*x)*a**2*e*x - log(x)*a**2*e*x -
 a**2*d)/(d**2*x)
```

3.98 $\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx$

Optimal result 867
Mathematica [A] (verified) 868
Rubi [A] (verified) 868
Maple [C] (warning: unable to verify) 871
Fricas [F] 872
Sympy [F] 872
Maxima [F] 873
Giac [F] 873
Mupad [F(-1)] 873
Reduce [F] 874

Optimal result

Integrand size = 23, antiderivative size = 204

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx = &-\frac{b^2n^2}{4dx^2}+\frac{2b^2en^2}{d^2x}-\frac{bn(a+b\log(cx^n))}{2dx^2}\\&+\frac{2ben(a+b\log(cx^n))}{d^2x}-\frac{(a+b\log(cx^n))^2}{2dx^2}\\&+\frac{e(a+b\log(cx^n))^2}{d^2x}-\frac{e^2\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d^3}\\&+\frac{2be^2n(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^3}\\&+\frac{2b^2e^2n^2\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^3}\end{aligned}$$

output
```
-1/4*b^2*n^2/d/x^2+2*b^2*e*n^2/d^2/x-1/2*b*n*(a+b*ln(c*x^n))/d/x^2+2*b*e*n
*(a+b*ln(c*x^n))/d^2/x-1/2*(a+b*ln(c*x^n))^2/d/x^2+e*(a+b*ln(c*x^n))^2/d^2
/x-e^2*ln(1+d/e/x)*(a+b*ln(c*x^n))^2/d^3+2*b*e^2*n*(a+b*ln(c*x^n))*polylog
(2,-d/e/x)/d^3+2*b^2*e^2*n^2*polylog(3,-d/e/x)/d^3
```

Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 185, normalized size of antiderivative = 0.91

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx = \frac{-\frac{6d^2(a+b\log(cx^n))^2}{x^2}+\frac{12de(a+b\log(cx^n))^2}{x}+\frac{4e^2(a+b\log(cx^n))^3}{bn}+\frac{24bden(a+bn+b\log(cx^n))}{x}-\frac{3bd^2n(2a+bn+2b\log(cx^n))}{x^2}-12}{12d}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x^3*(d + e*x)),x]
```

output
```
((-6*d^2*(a + b*Log[c*x^n])^2)/x^2 + (12*d*e*(a + b*Log[c*x^n])^2)/x + (4*
e^2*(a + b*Log[c*x^n])^3)/(b*n) + (24*b*d*e*n*(a + b*n + b*Log[c*x^n]))/x
- (3*b*d^2*n*(2*a + b*n + 2*b*Log[c*x^n]))/x^2 - 12*e^2*(a + b*Log[c*x^n])
^2*Log[1 + (e*x)/d] - 24*b*e^2*n*((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)
] - b*n*PolyLog[3, -((e*x)/d)]))/(12*d^3)
```

Rubi [A] (verified)

Time = 1.19 (sec) , antiderivative size = 190, normalized size of antiderivative = 0.93, number of steps used = 9, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.391$, Rules used = {2780, 2742, 2741, 2780, 2742, 2741, 2779, 2821, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x^3}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2742}$$

$$\frac{bn\int \frac{a+b\log(cx^n)}{x^3}dx-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x^2(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2780}$$

$$\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{\int\frac{(a+b\log(cx^n))^2}{x^2}dx}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2742}$$

$$\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\int\frac{a+b\log(cx^n)}{x^2}dx-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\left(\frac{2bn\int\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{2821}$$

$$\frac{\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\left(\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}\right)}{d}\right)}{d}$$

$$\Big\downarrow \; 7143$$

$$\frac{\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\left(\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))+bn\,\text{PolyLog}\left(3,-\frac{d}{ex}\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}\right)}{d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x^3*(d + e*x)),x]
```

output
```
(-1/2*(a + b*Log[c*x^n])^2/x^2 + b*n*(-1/4*(b*n)/x^2 - (a + b*Log[c*x^n])/
(2*x^2)))/d - (e*((-((a + b*Log[c*x^n])^2/x) + 2*b*n*(-((b*n)/x) - (a + b*
Log[c*x^n])/x))/d - (e*(-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d) + (2*
b*n*((a + b*Log[c*x^n])*PolyLog[2, -(d/(e*x))] + b*n*PolyLog[3, -(d/(e*x))
]))/d))/d))/d
```

Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2742
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Simp[b*n*
(p/(m + 1))   Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b
, c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.79 (sec) , antiderivative size = 731, normalized size of antiderivative = 3.58

method	result
risch	$-\frac{b^{2}\ln\left(x^{n}\right)^{2}e^{2}\ln\left(ex+d\right)}{d^{3}}-\frac{b^{2}\ln\left(x^{n}\right)^{2}}{2d\,x^{2}}+\frac{b^{2}\ln\left(x^{n}\right)^{2}e^{2}\ln\left(x\right)}{d^{3}}+\frac{b^{2}\ln\left(x^{n}\right)^{2}e}{d^{2}x}+\frac{2b^{2}n\ln\left(x^{n}\right)e}{d^{2}x}-\frac{b^{2}n\ln\left(x^{n}\right)}{2d\,x^{2}}+\frac{2b^{2}e\,n^{2}}{d^{2}x}-$

input
```
int((a+b*ln(c*x^n))^2/x^3/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
-b^2*ln(x^n)^2*e^2/d^3*ln(e*x+d)-1/2*b^2*ln(x^n)^2/d/x^2+b^2*ln(x^n)^2*e^2
/d^3*ln(x)+b^2*ln(x^n)^2*e/d^2/x+2*b^2*n*ln(x^n)*e/d^2/x-1/2*b^2*n*ln(x^n)
/d/x^2+2*b^2*e*n^2/d^2/x-1/4*b^2*n^2/d/x^2-b^2*n*e^2/d^3*ln(x^n)*ln(x)^2+1
/3*b^2*e^2/d^3*ln(x)^3*n^2-2*b^2*e^2/d^3*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2-2*
b^2*e^2/d^3*ln(x)*dilog(-e*x/d)*n^2+2*b^2*n*e^2/d^3*ln(x^n)*ln(e*x+d)*ln(-
e*x/d)+2*b^2*n*e^2/d^3*ln(x^n)*dilog(-e*x/d)+b^2*e^2/d^3*n^2*ln(e*x+d)*ln(
x)^2-b^2*e^2/d^3*n^2*ln(x)^2*ln(1+e*x/d)-2*b^2*e^2/d^3*n^2*ln(x)*polylog(2
,-e*x/d)+2*b^2*e^2/d^3*n^2*polylog(3,-e*x/d)+(I*Pi*b*csgn(I*x^n)*csgn(I*c*
x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I
*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*(-ln(x^n)*e^2/d^3*ln(e*x+
d)-1/2*ln(x^n)/d/x^2+ln(x^n)*e^2/d^3*ln(x)+ln(x^n)*e/d^2/x-1/2*n*(1/d^2*(-
2*e/x+1/2*d/x^2)+e^2/d^3*ln(x)^2-2*e^2/d^3*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*
x/d))))+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*
c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2
*b*ln(c)+2*a)^2*(-e^2/d^3*ln(e*x+d)-1/2/d/x^2+e^2/d^3*ln(x)+e/d^2/x)
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^3/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e*x^4 + d*x^3), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx = \int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x**3/(e*x+d),x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x**3*(d + e*x)), x)
```

Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^3/(e*x+d),x, algorithm="maxima")
```

output
```
-1/2*a^2*(2*e^2*log(e*x + d)/d^3 - 2*e^2*log(x)/d^3 - (2*e*x - d)/(d^2*x^2
)) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(
c) + a*b)*log(x^n))/(e*x^4 + d*x^3), x)
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^3/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)*x^3), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x^3\,(d+e\,x)}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x^3*(d + e*x)),x)
```

output
```
int((a + b*log(c*x^n))^2/(x^3*(d + e*x)), x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx$$
$$= \frac{2\left(\int \frac{\log(x^n c)^2}{e\,x^4+d\,x^3}dx\right)b^2d^3x^2 + 4\left(\int \frac{\log(x^n c)}{e\,x^4+d\,x^3}dx\right)ab\,d^3x^2 - 2\log(ex+d)\,a^2e^2x^2 + 2\log(x)\,a^2e^2x^2 - a^2d^2 + 2a^2}{2d^3x^2}$$

input
```
int((a+b*log(c*x^n))^2/x^3/(e*x+d),x)
```

output
```
(2*int(log(x**n*c)**2/(d*x**3 + e*x**4),x)*b**2*d**3*x**2 + 4*int(log(x**n
*c)/(d*x**3 + e*x**4),x)*a*b*d**3*x**2 - 2*log(d + e*x)*a**2*e**2*x**2 + 2
*log(x)*a**2*e**2*x**2 - a**2*d**2 + 2*a**2*d*e*x)/(2*d**3*x**2)
```

3.99 $\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx$

Optimal result . . . 875
Mathematica [A] (verified) . . . 876
Rubi [A] (verified) . . . 876
Maple [C] (warning: unable to verify) . . . 881
Fricas [F] . . . 882
Sympy [F] . . . 882
Maxima [F] . . . 882
Giac [F] . . . 883
Mupad [F(-1)] . . . 883
Reduce [F] . . . 883

Optimal result

Integrand size = 23, antiderivative size = 273

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx = &-\frac{2b^2n^2}{27dx^3}+\frac{b^2en^2}{4d^2x^2}-\frac{2b^2e^2n^2}{d^3x}-\frac{2bn(a+b\log(cx^n))}{9dx^3}\\ &+\frac{ben(a+b\log(cx^n))}{2d^2x^2}-\frac{2be^2n(a+b\log(cx^n))}{d^3x}\\ &-\frac{(a+b\log(cx^n))^2}{3dx^3}+\frac{e(a+b\log(cx^n))^2}{2d^2x^2}\\ &-\frac{e^2(a+b\log(cx^n))^2}{d^3x}+\frac{e^3\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d^4}\\ &-\frac{2be^3n(a+b\log(cx^n))\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}\\ &-\frac{2b^2e^3n^2\,\mathrm{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^4}\end{aligned}$$

output

```
-2/27*b^2*n^2/d/x^3+1/4*b^2*e*n^2/d^2/x^2-2*b^2*e^2*n^2/d^3/x-2/9*b*n*(a+b
*ln(c*x^n))/d/x^3+1/2*b*e*n*(a+b*ln(c*x^n))/d^2/x^2-2*b*e^2*n*(a+b*ln(c*x^
n))/d^3/x-1/3*(a+b*ln(c*x^n))^2/d/x^3+1/2*e*(a+b*ln(c*x^n))^2/d^2/x^2-e^2*
(a+b*ln(c*x^n))^2/d^3/x+e^3*ln(1+d/e/x)*(a+b*ln(c*x^n))^2/d^4-2*b*e^3*n*(a
+b*ln(c*x^n))*polylog(2,-d/e/x)/d^4-2*b^2*e^3*n^2*polylog(3,-d/e/x)/d^4
```

Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 237, normalized size of antiderivative = 0.87

$$\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx$$
$$= \frac{-\frac{36d^3(a+b\log(cx^n))^2}{x^3}+\frac{54d^2e(a+b\log(cx^n))^2}{x^2}-\frac{108de^2(a+b\log(cx^n))^2}{x}-\frac{36e^3(a+b\log(cx^n))^3}{bn}-\frac{216bde^2n(a+bn+b\log(cx^n))}{x}+2}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x^4*(d + e*x)),x]
```

output
```
((-36*d^3*(a + b*Log[c*x^n])^2)/x^3 + (54*d^2*e*(a + b*Log[c*x^n])^2)/x^2
- (108*d*e^2*(a + b*Log[c*x^n])^2)/x - (36*e^3*(a + b*Log[c*x^n])^3)/(b*n)
 - (216*b*d*e^2*n*(a + b*n + b*Log[c*x^n]))/x + (27*b*d^2*e*n*(2*a + b*n +
 2*b*Log[c*x^n]))/x^2 - (8*b*d^3*n*(3*a + b*n + 3*b*Log[c*x^n]))/x^3 + 108
*e^3*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 216*b*e^3*n*((a + b*Log[c*x^n
])*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -((e*x)/d)]))/(108*d^4)
```

Rubi [A] (verified)

Time = 1.64 (sec) , antiderivative size = 254, normalized size of antiderivative = 0.93, number of steps used = 12, number of rules used = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.522$, Rules used = {2780, 2742, 2741, 2780, 2742, 2741, 2780, 2742, 2741, 2779, 2821, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx$$
$$\Big\downarrow \text{2780}$$
$$\frac{\int \frac{(a+b\log(cx^n))^2}{x^4}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}dx}{d}$$
$$\Big\downarrow \text{2742}$$
$$\frac{\frac{2}{3}bn\int \frac{a+b\log(cx^n)}{x^4}dx-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x^3(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2780}$$

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\left(\frac{\int\frac{(a+b\log(cx^n))^2}{x^3}dx}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x^2(d+ex)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2742}$$

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\left(\frac{bn\int\frac{a+b\log(cx^n)}{x^3}dx-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x^2(d+ex)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\left(\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x^2(d+ex)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2780}$$

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\left(\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{\int\frac{(a+b\log(cx^n))^2}{x^2}dx}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{2742}$$

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\left(\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\int\frac{a+b\log(cx^n)}{x^2}dx-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}\right)}{d}\right)}{d}$$

$\Big\downarrow$ 2741

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\left(\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}\right)}{d}\right)}{d}$$

$\Big\downarrow$ 2779

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\left(\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\left(\frac{2bn\int\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+\right.}{}\right.}{d}\right.}{d}\right.}{d}$$

$\Big\downarrow$ 2821

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\left(\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\left(\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int \cdots\right.}{d}\cdots\right.}{\cdots}\right)}{d}\right)}{d}$$

↓ 7143

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\left(\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\left(\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))+bn\,\text{PolyL}\cdots\right.}{d}\cdots\right)}{d}\right)}{d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x^4*(d + e*x)),x]
```

output
```
(-1/3*(a + b*Log[c*x^n])^2/x^3 + (2*b*n*(-1/9*(b*n)/x^3 - (a + b*Log[c*x^n
])/(3*x^3)))/3)/d - (e*((-1/2*(a + b*Log[c*x^n])^2/x^2 + b*n*(-1/4*(b*n)/x
^2 - (a + b*Log[c*x^n])/(2*x^2)))/d - (e*((-((a + b*Log[c*x^n])^2/x) + 2*b
*n*(-((b*n)/x) - (a + b*Log[c*x^n])/x))/d - (e*(-((Log[1 + d/(e*x)]*(a + b
*Log[c*x^n])^2)/d) + (2*b*n*((a + b*Log[c*x^n])*PolyLog[2, -(d/(e*x))] + b
*n*PolyLog[3, -(d/(e*x))]))/d))/d))/d))/d
```

Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2742
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Simp[b*n*
(p/(m + 1))   Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b
, c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.70 (sec) , antiderivative size = 828, normalized size of antiderivative = 3.03

method	result
risch	$\frac{b^2\ln(x^n)^2 e^3 \ln(ex+d)}{d^4} - \frac{b^2\ln(x^n)^2}{3d\,x^3} - \frac{b^2\ln(x^n)^2 e^2}{d^3 x} + \frac{b^2\ln(x^n)^2 e}{2d^2 x^2} - \frac{b^2\ln(x^n)^2 e^3 \ln(x)}{d^4} - \frac{2b^2 n\ln(x^n) e^2}{d^3 x} + \frac{b^2 n\ln(x^n) e}{2d^2 x^2}$

input

```
int((a+b*ln(c*x^n))^2/x^4/(e*x+d),x,method=_RETURNVERBOSE)
```

output

```
b^2*ln(x^n)^2*e^3/d^4*ln(e*x+d)-1/3*b^2*ln(x^n)^2/d/x^3-b^2*ln(x^n)^2*e^2/
d^3/x+1/2*b^2*ln(x^n)^2*e/d^2/x^2-b^2*ln(x^n)^2*e^3/d^4*ln(x)-2*b^2*n*ln(x
^n)*e^2/d^3/x+1/2*b^2*n*ln(x^n)*e/d^2/x^2-2/9*b^2*n*ln(x^n)/d/x^3-2*b^2*e^
2*n^2/d^3/x+1/4*b^2*e*n^2/d^2/x^2-2/27*b^2*n^2/d/x^3+b^2*n*e^3/d^4*ln(x^n)
*ln(x)^2-1/3*b^2*e^3/d^4*ln(x)^3*n^2+2*b^2*e^3/d^4*ln(x)*ln(e*x+d)*ln(-e*x
/d)*n^2+2*b^2*e^3/d^4*ln(x)*dilog(-e*x/d)*n^2-2*b^2*n*e^3/d^4*ln(x^n)*ln(e
*x+d)*ln(-e*x/d)-2*b^2*n*e^3/d^4*ln(x^n)*dilog(-e*x/d)-b^2*e^3/d^4*n^2*ln(
e*x+d)*ln(x)^2+b^2*e^3/d^4*n^2*ln(x)^2*ln(1+e*x/d)+2*b^2*e^3/d^4*n^2*ln(x)
*polylog(2,-e*x/d)-2*b^2*e^3/d^4*n^2*polylog(3,-e*x/d)+(I*Pi*b*csgn(I*x^n)
*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*
c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*(ln(x^n)*e^3/d^
4*ln(e*x+d)-1/3*ln(x^n)/d/x^3-ln(x^n)*e^2/d^3/x+1/2*ln(x^n)*e/d^2/x^2-ln(x
^n)*e^3/d^4*ln(x)-1/6*n*(-1/d^3*(-6*e^2/x+3/2*d*e/x^2-2/3*d^2/x^3)-3*e^3/d
^4*ln(x)^2+6*e^3/d^4*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))))+1/4*(I*Pi*b*cs
gn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*
b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^2*(e^3/d
^4*ln(e*x+d)-1/3/d/x^3-e^2/d^3/x+1/2*e/d^2/x^2-e^3/d^4*ln(x))
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^4/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e*x^5 + d*x^4), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx = \int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x**4/(e*x+d),x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x**4*(d + e*x)), x)
```

Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^4/(e*x+d),x, algorithm="maxima")
```

output
```
1/6*a^2*(6*e^3*log(e*x + d)/d^4 - 6*e^3*log(x)/d^4 - (6*e^2*x^2 - 3*d*e*x
+ 2*d^2)/(d^3*x^3)) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log
(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e*x^5 + d*x^4), x)
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^4/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)*x^4), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x^4\,(d+e\,x)}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x^4*(d + e*x)),x)
```

output
```
int((a + b*log(c*x^n))^2/(x^4*(d + e*x)), x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx$$
$$= \frac{6\left(\int \frac{\log(x^n c)^2}{e\,x^5+d\,x^4}dx\right) b^2d^4x^3 + 12\left(\int \frac{\log(x^n c)}{e\,x^5+d\,x^4}dx\right) ab\,d^4x^3 + 6\log(ex+d)\,a^2e^3x^3 - 6\log(x)\,a^2e^3x^3 - 2a^2d^3 + 3}{6d^4x^3}$$

input
```
int((a+b*log(c*x^n))^2/x^4/(e*x+d),x)
```

output
```
(6*int(log(x**n*c)**2/(d*x**4 + e*x**5),x)*b**2*d**4*x**3 + 12*int(log(x**
n*c)/(d*x**4 + e*x**5),x)*a*b*d**4*x**3 + 6*log(d + e*x)*a**2*e**3*x**3 -
6*log(x)*a**2*e**3*x**3 - 2*a**2*d**3 + 3*a**2*d**2*e*x - 6*a**2*d*e**2*x*
*2)/(6*d**4*x**3)
```

3.100 $\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$

Optimal result 884
Mathematica [A] (verified) 885
Rubi [A] (verified) 885
Maple [C] (warning: unable to verify) 887
Fricas [F] 887
Sympy [F] 888
Maxima [F] 888
Giac [F] 889
Mupad [F(-1)] 889
Reduce [F] 889

Optimal result

Integrand size = 23, antiderivative size = 281

$$
\begin{aligned}
\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2}\,dx &= \frac{4abdnx}{e^3}-\frac{4b^2dn^2x}{e^3}+\frac{b^2n^2x^2}{4e^2}+\frac{4b^2dnx\log(cx^n)}{e^3}\\
&\quad-\frac{bnx^2(a+b\log(cx^n))}{2e^2}-\frac{2dx(a+b\log(cx^n))^2}{e^3}\\
&\quad+\frac{x^2(a+b\log(cx^n))^2}{2e^2}-\frac{d^2x(a+b\log(cx^n))^2}{e^3(d+ex)}\\
&\quad+\frac{2bd^2n(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^4}\\
&\quad+\frac{3d^2(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^4}\\
&\quad+\frac{2b^2d^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}\\
&\quad+\frac{6bd^2n(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}\\
&\quad-\frac{6b^2d^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}
\end{aligned}
$$

output
```
4*a*b*d*n*x/e^3-4*b^2*d*n^2*x/e^3+1/4*b^2*n^2*x^2/e^2+4*b^2*d*n*x*ln(c*x^n
)/e^3-1/2*b*n*x^2*(a+b*ln(c*x^n))/e^2-2*d*x*(a+b*ln(c*x^n))^2/e^3+1/2*x^2*
(a+b*ln(c*x^n))^2/e^2-d^2*x*(a+b*ln(c*x^n))^2/e^3/(e*x+d)+2*b*d^2*n*(a+b*l
n(c*x^n))*ln(1+e*x/d)/e^4+3*d^2*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/e^4+2*b^2*d^
2*n^2*polylog(2,-e*x/d)/e^4+6*b*d^2*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/e^
4-6*b^2*d^2*n^2*polylog(3,-e*x/d)/e^4
```

Mathematica [A] (verified)

Time = 0.25 (sec) , antiderivative size = 240, normalized size of antiderivative = 0.85

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$
$$= \frac{-8dex(a+b\log(cx^n))^2+2e^2x^2(a+b\log(cx^n))^2+\frac{4d^3(a+b\log(cx^n))^2}{d+ex}+16bdenx(a-bn+b\log(cx^n))+b\cdots}{}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x)^2,x]
```

output
```
(-8*d*e*x*(a + b*Log[c*x^n])^2 + 2*e^2*x^2*(a + b*Log[c*x^n])^2 + (4*d^3*(
a + b*Log[c*x^n])^2)/(d + e*x) + 16*b*d*e*n*x*(a - b*n + b*Log[c*x^n]) + b
*e^2*n*x^2*(b*n - 2*(a + b*Log[c*x^n])) + 12*d^2*(a + b*Log[c*x^n])^2*Log[
1 + (e*x)/d] + 4*d^2*(-((a + b*Log[c*x^n])*(a + b*Log[c*x^n] - 2*b*n*Log[1
 + (e*x)/d])) + 2*b^2*n^2*PolyLog[2, -((e*x)/d)]) + 24*b*d^2*n*((a + b*Log
[c*x^n])*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -((e*x)/d)]))/(4*e^4)
```

Rubi [A] (verified)

Time = 0.58 (sec) , antiderivative size = 281, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(-\frac{d^3(a+b\log(cx^n))^2}{e^3(d+ex)^2}+\frac{3d^2(a+b\log(cx^n))^2}{e^3(d+ex)}-\frac{2d(a+b\log(cx^n))^2}{e^3}+\frac{x(a+b\log(cx^n))^2}{e^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{6bd^2n\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^4}+\frac{2bd^2n\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^4}+\frac{3d^2\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^4}-\frac{d^2x(a+b\log(cx^n))^2}{e^3(d+ex)}-\frac{2dx(a+b\log(cx^n))^2}{e^3}-\frac{bnx^2(a+b\log(cx^n))}{2e^2}+\frac{x^2(a+b\log(cx^n))^2}{2e^2}+\frac{4abdnx}{e^3}+\frac{4b^2dnx\log(cx^n)}{e^3}+\frac{2b^2d^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}-\frac{6b^2d^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}-\frac{4b^2dn^2x}{e^3}+\frac{b^2n^2x^2}{4e^2}$$

input
```
Int[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x)^2,x]
```

output
```
(4*a*b*d*n*x)/e^3 - (4*b^2*d*n^2*x)/e^3 + (b^2*n^2*x^2)/(4*e^2) + (4*b^2*d
*n*x*Log[c*x^n])/e^3 - (b*n*x^2*(a + b*Log[c*x^n]))/(2*e^2) - (2*d*x*(a +
b*Log[c*x^n])^2)/e^3 + (x^2*(a + b*Log[c*x^n])^2)/(2*e^2) - (d^2*x*(a + b*
Log[c*x^n])^2)/(e^3*(d + e*x)) + (2*b*d^2*n*(a + b*Log[c*x^n])*Log[1 + (e*
x)/d])/e^4 + (3*d^2*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e^4 + (2*b^2*d^
2*n^2*PolyLog[2, -((e*x)/d)])/e^4 + (6*b*d^2*n*(a + b*Log[c*x^n])*PolyLog[
2, -((e*x)/d)])/e^4 - (6*b^2*d^2*n^2*PolyLog[3, -((e*x)/d)])/e^4
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.92 (sec) , antiderivative size = 824, normalized size of antiderivative = 2.93

method	result	size
risch	Expression too large to display	824

input
```
int(x^3*(a+b*ln(c*x^n))^2/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*b^2*ln(x^n)^2/e^2*x^2-2*b^2*ln(x^n)^2/e^3*d*x+b^2*ln(x^n)^2*d^3/e^4/(e
*x+d)+3*b^2*ln(x^n)^2/e^4*d^2*ln(e*x+d)+6*b^2/e^4*d^2*ln(x)*ln(e*x+d)*ln(-
e*x/d)*n^2+6*b^2/e^4*d^2*ln(x)*dilog(-e*x/d)*n^2-6*b^2*n/e^4*d^2*ln(x^n)*l
n(e*x+d)*ln(-e*x/d)-6*b^2*n/e^4*d^2*ln(x^n)*dilog(-e*x/d)-3*b^2/e^4*d^2*n^
2*ln(e*x+d)*ln(x)^2+3*b^2/e^4*d^2*n^2*ln(x)^2*ln(1+e*x/d)+6*b^2/e^4*d^2*n^
2*ln(x)*polylog(2,-e*x/d)-6*b^2*d^2*n^2*polylog(3,-e*x/d)/e^4-1/2*b^2*n*ln
(x^n)/e^2*x^2+4*b^2*n*ln(x^n)/e^3*d*x+2*b^2*n*ln(x^n)/e^4*d^2*ln(e*x+d)-2*
b^2*n/e^4*ln(x^n)*d^2*ln(x)+1/4*b^2*n^2*x^2/e^2-4*b^2*d*n^2*x/e^3+b^2/e^4*
n^2*d^2*ln(x)^2-2*b^2/e^4*n^2*ln(e*x+d)*ln(-e*x/d)*d^2-2*b^2/e^4*n^2*dilog
(-e*x/d)*d^2+(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I
*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+
2*b*ln(c)+2*a)*b*(1/2*ln(x^n)/e^2*x^2-2*ln(x^n)/e^3*d*x+ln(x^n)*d^3/e^4/(e
*x+d)+3*ln(x^n)/e^4*d^2*ln(e*x+d)-n*(3/e^4*d^2*(dilog(-e*x/d)+ln(e*x+d)*ln
(-e*x/d))+1/2/e^4*(1/2*(e*x+d)^2-5*d*(e*x+d)-2*d^2*ln(e*x+d)+2*d^2*ln(e*x)
)))+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^
n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*l
n(c)+2*a)^2*(1/e^3*(1/2*e*x^2-2*d*x)+d^3/e^4/(e*x+d)+3/e^4*d^2*ln(e*x+d))
```

Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2x^3}{(ex+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*x^3*log(c*x^n)^2 + 2*a*b*x^3*log(c*x^n) + a^2*x^3)/(e^2*x^2
+ 2*d*e*x + d^2), x)
```

Sympy [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$

input
```
integrate(x**3*(a+b*ln(c*x**n))**2/(e*x+d)**2,x)
```

output
```
Integral(x**3*(a + b*log(c*x**n))**2/(d + e*x)**2, x)
```

Maxima [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2x^3}{(ex+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="maxima")
```

output
```
1/2*(2*d^3/(e^5*x + d*e^4) + 6*d^2*log(e*x + d)/e^4 + (e*x^2 - 4*d*x)/e^3)
*a^2 + integrate((b^2*x^3*log(x^n)^2 + 2*(b^2*log(c) + a*b)*x^3*log(x^n) +
 (b^2*log(c)^2 + 2*a*b*log(c))*x^3)/(e^2*x^2 + 2*d*e*x + d^2), x)
```

Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2}\,dx=\int \frac{(b\log(cx^n)+a)^2x^3}{(ex+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x^3/(e*x + d)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2}\,dx=\int \frac{x^3\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^2}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n))^2)/(d + e*x)^2,x)
```

output
```
int((x^3*(a + b*log(c*x^n))^2)/(d + e*x)^2, x)
```

Reduce [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2}\,dx=\text{Too large to display}$$

input
```
int(x^3*(a+b*log(c*x^n))^2/(e*x+d)^2,x)
```

output
```
( - 12*int(log(x**n*c)**2/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b**2*d**5*n
 - 12*int(log(x**n*c)**2/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b**2*d**4*e*
n*x - 24*int(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*a*b*d**5*n -
 24*int(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*a*b*d**4*e*n*x -
32*int(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b**2*d**5*n**2 - 3
2*int(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b**2*d**4*e*n**2*x
+ 12*log(d + e*x)*a**2*d**3*n + 12*log(d + e*x)*a**2*d**2*e*n*x + 32*log(d
 + e*x)*a*b*d**3*n**2 + 32*log(d + e*x)*a*b*d**2*e*n**2*x + 32*log(d + e*x
)*b**2*d**3*n**3 + 32*log(d + e*x)*b**2*d**2*e*n**3*x + 4*log(x**n*c)**3*b
**2*d**3 + 4*log(x**n*c)**3*b**2*d**2*e*x + 12*log(x**n*c)**2*a*b*d**3 + 1
2*log(x**n*c)**2*a*b*d**2*e*x + 16*log(x**n*c)**2*b**2*d**3*n - 8*log(x**n
*c)**2*b**2*d**2*e*n*x - 6*log(x**n*c)**2*b**2*d*e**2*n*x**2 + 2*log(x**n*
c)**2*b**2*e**3*n*x**3 - 48*log(x**n*c)*a*b*d**2*e*n*x - 12*log(x**n*c)*a*
b*d*e**2*n*x**2 + 4*log(x**n*c)*a*b*e**3*n*x**3 - 16*log(x**n*c)*b**2*d**2
*e*n**2*x + 14*log(x**n*c)*b**2*d*e**2*n**2*x**2 - 2*log(x**n*c)*b**2*e**3
*n**2*x**3 - 12*a**2*d**2*e*n*x - 6*a**2*d*e**2*n*x**2 + 2*a**2*e**3*n*x**
3 + 16*a*b*d**2*e*n**2*x + 14*a*b*d*e**2*n**2*x**2 - 2*a*b*e**3*n**2*x**3
- 16*b**2*d**2*e*n**3*x - 15*b**2*d*e**2*n**3*x**2 + b**2*e**3*n**3*x**3)/
(4*e**4*n*(d + e*x))
```

3.101 $\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2} dx$

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Mathematica [A] (verified) 892
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Optimal result

Integrand size = 23, antiderivative size = 203

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2} dx = -\frac{2abnx}{e^2} + \frac{2b^2n^2x}{e^2} - \frac{2b^2nx\log(cx^n)}{e^2} + \frac{x(a+b\log(cx^n))^2}{e^2} + \frac{dx(a+b\log(cx^n))^2}{e^2(d+ex)} - \frac{2bdn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^3} - \frac{2d(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^3} - \frac{2b^2dn^2\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3} - \frac{4bdn(a+b\log(cx^n))\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3} + \frac{4b^2dn^2\,\mathrm{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^3}$$

output
```
-2*a*b*n*x/e^2+2*b^2*n^2*x/e^2-2*b^2*n*x*ln(c*x^n)/e^2+x*(a+b*ln(c*x^n))^2
/e^2+d*x*(a+b*ln(c*x^n))^2/e^2/(e*x+d)-2*b*d*n*(a+b*ln(c*x^n))*ln(1+e*x/d)
/e^3-2*d*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/e^3-2*b^2*d*n^2*polylog(2,-e*x/d)/e
^3-4*b*d*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/e^3+4*b^2*d*n^2*polylog(3,-e*
x/d)/e^3
```

Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 186, normalized size of antiderivative = 0.92

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$
$$= \frac{d(a+b\log(cx^n))^2 + ex(a+b\log(cx^n))^2 - \frac{d^2(a+b\log(cx^n))^2}{d+ex} - 2benx(a-bn+b\log(cx^n)) - 2bdn(a+b\,\mathrm{lo}}{}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x)^2,x]
```

output
```
(d*(a + b*Log[c*x^n])^2 + e*x*(a + b*Log[c*x^n])^2 - (d^2*(a + b*Log[c*x^n
])^2)/(d + e*x) - 2*b*e*n*x*(a - b*n + b*Log[c*x^n]) - 2*b*d*n*(a + b*Log[
c*x^n])*Log[1 + (e*x)/d] - 2*d*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] - 2*b
^2*d*n^2*PolyLog[2, -((e*x)/d)] - 4*b*d*n*(a + b*Log[c*x^n])*PolyLog[2, -(
(e*x)/d)] + 4*b^2*d*n^2*PolyLog[3, -((e*x)/d)])/e^3
```

Rubi [A] (verified)

Time = 0.50 (sec) , antiderivative size = 203, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$

$$\Big\downarrow \text{ 2795}$$

$$\int \left(\frac{d^2(a+b\log(cx^n))^2}{e^2(d+ex)^2} - \frac{2d(a+b\log(cx^n))^2}{e^2(d+ex)} + \frac{(a+b\log(cx^n))^2}{e^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{4bdn \operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^3}-\frac{2bdn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^3}-\frac{2d\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^3}+\frac{dx(a+b\log(cx^n))^2}{e^2(d+ex)}+\frac{x(a+b\log(cx^n))^2}{e^2}-\frac{2abnx}{e^2}-\frac{2b^2nx\log(cx^n)}{e^2}-\frac{2b^2dn^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}+\frac{4b^2dn^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^3}+\frac{2b^2n^2x}{e^2}$$

input
```
Int[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x)^2,x]
```

output
```
(-2*a*b*n*x)/e^2 + (2*b^2*n^2*x)/e^2 - (2*b^2*n*x*Log[c*x^n])/e^2 + (x*(a
+ b*Log[c*x^n])^2)/e^2 + (d*x*(a + b*Log[c*x^n])^2)/(e^2*(d + e*x)) - (2*b
*d*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/e^3 - (2*d*(a + b*Log[c*x^n])^2*
Log[1 + (e*x)/d])/e^3 - (2*b^2*d*n^2*PolyLog[2, -((e*x)/d)])/e^3 - (4*b*d*
n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)])/e^3 + (4*b^2*d*n^2*PolyLog[3,
 -((e*x)/d)])/e^3
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.83 (sec) , antiderivative size = 700, normalized size of antiderivative = 3.45

method	result
risch	$\frac{b^2\ln(x^n)^2 x}{e^2}-\frac{b^2\ln(x^n)^2 d^2}{e^3(ex+d)}-\frac{2b^2\ln(x^n)^2 d\ln(ex+d)}{e^3}+\frac{2b^2 n\ln(x)\ln(x^n)d}{e^3}-\frac{2b^2 n\ln(x^n)d\ln(ex+d)}{e^3}-\frac{2b^2 n\ln(x^n)x}{e^2}+$ 2

input
```
int(x^2*(a+b*ln(c*x^n))^2/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
b^2*ln(x^n)^2/e^2*x-b^2*ln(x^n)^2/e^3*d^2/(e*x+d)-2*b^2*ln(x^n)^2/e^3*d*ln
(e*x+d)+2*b^2*n/e^3*ln(x)*ln(x^n)*d-2*b^2*n*ln(x^n)/e^3*d*ln(e*x+d)-2*b^2*
n*ln(x^n)/e^2*x+2*b^2*n^2*x/e^2+2*b^2/e^3*n^2*ln(e*x+d)*ln(-e*x/d)*d+2*b^2
/e^3*n^2*dilog(-e*x/d)*d-b^2/e^3*n^2*d*ln(x)^2-4*b^2/e^3*d*ln(x)*ln(e*x+d)
*ln(-e*x/d)*n^2-4*b^2/e^3*d*ln(x)*dilog(-e*x/d)*n^2+4*b^2*n/e^3*d*ln(x^n)*
ln(e*x+d)*ln(-e*x/d)+4*b^2*n/e^3*d*ln(x^n)*dilog(-e*x/d)+2*b^2/e^3*d*n^2*l
n(e*x+d)*ln(x)^2-2*b^2/e^3*d*n^2*ln(x)^2*ln(1+e*x/d)-4*b^2/e^3*d*n^2*ln(x)
*polylog(2,-e*x/d)+4*b^2*d*n^2*polylog(3,-e*x/d)/e^3+(I*Pi*b*csgn(I*x^n)*c
sgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*
x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*(ln(x^n)/e^2*x-ln
(x^n)/e^3*d^2/(e*x+d)-2*ln(x^n)/e^3*d*ln(e*x+d)-n*(1/e^3*(e*x+d+d*ln(e*x+d
)-d*ln(e*x))-2/e^3*d*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))))+1/4*(I*Pi*b*cs
gn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*
b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^2*(x/e^2
-1/e^3*d^2/(e*x+d)-2/e^3*d*ln(e*x+d))
```

Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{(ex+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*x^2*log(c*x^n)^2 + 2*a*b*x^2*log(c*x^n) + a^2*x^2)/(e^2*x^2
+ 2*d*e*x + d^2), x)
```

Sympy [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))**2/(e*x+d)**2,x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))**2/(d + e*x)**2, x)
```

Maxima [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{(ex+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="maxima")
```

output
```
-a^2*(d^2/(e^4*x + d*e^3) - x/e^2 + 2*d*log(e*x + d)/e^3) + integrate((b^2
*x^2*log(x^n)^2 + 2*(b^2*log(c) + a*b)*x^2*log(x^n) + (b^2*log(c)^2 + 2*a*
b*log(c))*x^2)/(e^2*x^2 + 2*d*e*x + d^2), x)
```

Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{(ex+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x^2/(e*x + d)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx=\int \frac{x^2\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^2}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n))^2)/(d + e*x)^2,x)
```

output
```
int((x^2*(a + b*log(c*x^n))^2)/(d + e*x)^2, x)
```

Reduce [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$
$$=\frac{6a^2denx-6ab\,e^2n^2x^2+6b^2de\,n^3x+12\left(\int \frac{\log(x^nc)}{e^2x^3+2de\,x^2+d^2x}dx\right)ab\,d^4n-2\log(x^nc)^3\,b^2d^2+3\log(x^nc)^2\,b^2de}{}$$

input
```
int(x^2*(a+b*log(c*x^n))^2/(e*x+d)^2,x)
```

output
```
(6*int(log(x**n*c)**2/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b**2*d**4*n + 6
*int(log(x**n*c)**2/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b**2*d**3*e*n*x +
 12*int(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*a*b*d**4*n + 12*i
nt(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*a*b*d**3*e*n*x + 18*in
t(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b**2*d**4*n**2 + 18*int
(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b**2*d**3*e*n**2*x - 6*l
og(d + e*x)*a**2*d**2*n - 6*log(d + e*x)*a**2*d*e*n*x - 18*log(d + e*x)*a*
b*d**2*n**2 - 18*log(d + e*x)*a*b*d*e*n**2*x - 18*log(d + e*x)*b**2*d**2*n
**3 - 18*log(d + e*x)*b**2*d*e*n**3*x - 2*log(x**n*c)**3*b**2*d**2 - 2*log
(x**n*c)**3*b**2*d*e*x - 6*log(x**n*c)**2*a*b*d**2 - 6*log(x**n*c)**2*a*b*
d*e*x - 9*log(x**n*c)**2*b**2*d**2*n + 3*log(x**n*c)**2*b**2*d*e*n*x + 3*l
og(x**n*c)**2*b**2*e**2*n*x**2 + 24*log(x**n*c)*a*b*d*e*n*x + 6*log(x**n*c
)*a*b*e**2*n*x**2 + 12*log(x**n*c)*b**2*d*e*n**2*x - 6*log(x**n*c)*b**2*e*
*2*n**2*x**2 + 6*a**2*d*e*n*x + 3*a**2*e**2*n*x**2 - 6*a*b*d*e*n**2*x - 6*
a*b*e**2*n**2*x**2 + 6*b**2*d*e*n**3*x + 6*b**2*e**2*n**3*x**2)/(3*e**3*n*
(d + e*x))
```

3.102 $\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$

Optimal result 897
Mathematica [A] (verified) 898
Rubi [A] (verified) 898
Maple [C] (warning: unable to verify) 899
Fricas [F] 900
Sympy [F] 900
Maxima [F] 901
Giac [F] 901
Mupad [F(-1)] 901
Reduce [F] 902

Optimal result

Integrand size = 21, antiderivative size = 143

$$\begin{aligned}\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = &-\frac{x(a+b\log(cx^n))^2}{e(d+ex)}+\frac{2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^2}\\ &+\frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^2}+\frac{2b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}\\ &+\frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}\\ &-\frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^2}\end{aligned}$$

output
```
-x*(a+b*ln(c*x^n))^2/e/(e*x+d)+2*b*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^2+(a+b*
ln(c*x^n))^2*ln(1+e*x/d)/e^2+2*b^2*n^2*polylog(2,-e*x/d)/e^2+2*b*n*(a+b*ln
(c*x^n))*polylog(2,-e*x/d)/e^2-2*b^2*n^2*polylog(3,-e*x/d)/e^2
```

Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 142, normalized size of antiderivative = 0.99

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$
$$= \frac{-(a+b\log(cx^n))^2 + \frac{d(a+b\log(cx^n))^2}{d+ex} + 2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) + (a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right) -}{e^2}$$

input
```
Integrate[(x*(a + b*Log[c*x^n])^2)/(d + e*x)^2,x]
```

output
```
(-(a + b*Log[c*x^n])^2 + (d*(a + b*Log[c*x^n])^2)/(d + e*x) + 2*b*n*(a + b
*Log[c*x^n])*Log[1 + (e*x)/d] + (a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 2*
b^2*n^2*PolyLog[2, -((e*x)/d)] + 2*b*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*
x)/d)] - 2*b^2*n^2*PolyLog[3, -((e*x)/d)])/e^2
```

Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$
$$\Big\downarrow \; 2795$$
$$\int \left(\frac{(a+b\log(cx^n))^2}{e(d+ex)} - \frac{d(a+b\log(cx^n))^2}{e(d+ex)^2}\right)dx$$
$$\Big\downarrow \; 2009$$

$$\frac{2bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^2}+\frac{2bn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^2}+\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^2}-\frac{x(a+b\log(cx^n))^2}{e(d+ex)}+\frac{2b^2n^2\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}-\frac{2b^2n^2\,\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^2}$$

input
```
Int[(x*(a + b*Log[c*x^n])^2)/(d + e*x)^2,x]
```

output
```
-((x*(a + b*Log[c*x^n])^2)/(e*(d + e*x))) + (2*b*n*(a + b*Log[c*x^n])*Log[
1 + (e*x)/d])/e^2 + ((a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e^2 + (2*b^2*n
^2*PolyLog[2, -((e*x)/d)])/e^2 + (2*b*n*(a + b*Log[c*x^n])*PolyLog[2, -((e
*x)/d)])/e^2 - (2*b^2*n^2*PolyLog[3, -((e*x)/d)])/e^2
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.70 (sec) , antiderivative size = 609, normalized size of antiderivative = 4.26

method	result
risch	$\frac{b^2\ln(x^n)^2 d}{e^2(ex+d)}+\frac{b^2\ln(x^n)^2\ln(ex+d)}{e^2}+\frac{2b^2\ln(x)\ln(ex+d)\ln\left(-\frac{ex}{d}\right)n^2}{e^2}+\frac{2b^2\ln(x)\,\text{dilog}\left(-\frac{ex}{d}\right)n^2}{e^2}-\frac{2b^2n\ln(x^n)\ln(ex+d)\ln(-}{e^2}$

input
```
int(x*(a+b*ln(c*x^n))^2/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
b^2*ln(x^n)^2/e^2*d/(e*x+d)+b^2*ln(x^n)^2/e^2*ln(e*x+d)+2*b^2/e^2*ln(x)*ln
(e*x+d)*ln(-e*x/d)*n^2+2*b^2/e^2*ln(x)*dilog(-e*x/d)*n^2-2*b^2*n/e^2*ln(x^
n)*ln(e*x+d)*ln(-e*x/d)-2*b^2*n/e^2*ln(x^n)*dilog(-e*x/d)-b^2/e^2*n^2*ln(e
*x+d)*ln(x)^2+b^2/e^2*n^2*ln(x)^2*ln(1+e*x/d)+2*b^2/e^2*n^2*ln(x)*polylog(
2,-e*x/d)-2*b^2*n^2*polylog(3,-e*x/d)/e^2+2*b^2*n*ln(x^n)/e^2*ln(e*x+d)-2*
b^2*n/e^2*ln(x^n)*ln(x)+b^2/e^2*n^2*ln(x)^2-2*b^2/e^2*n^2*ln(e*x+d)*ln(-e*
x/d)-2*b^2/e^2*n^2*dilog(-e*x/d)+(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*
b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I
*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*(ln(x^n)/e^2*d/(e*x+d)+ln(x^n)/e^2*ln
(e*x+d)-n*(1/e^2*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))-1/e^2*ln(e*x+d)+1/e^
2*ln(e*x)))+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csg
n(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*
c)+2*b*ln(c)+2*a)^2*(1/e^2*d/(e*x+d)+1/e^2*ln(e*x+d))
```

Fricas [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2x}{(ex+d)^2}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*x*log(c*x^n)^2 + 2*a*b*x*log(c*x^n) + a^2*x)/(e^2*x^2 + 2*d*
e*x + d^2), x)
```

Sympy [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$

input
```
integrate(x*(a+b*ln(c*x**n))**2/(e*x+d)**2,x)
```

output
```
Integral(x*(a + b*log(c*x**n))**2/(d + e*x)**2, x)
```

Maxima [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2 x}{(ex+d)^2}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="maxima")
```

output
```
a^2*(d/(e^3*x + d*e^2) + log(e*x + d)/e^2) + integrate((b^2*x*log(x^n)^2 +
 2*(b^2*log(c) + a*b)*x*log(x^n) + (b^2*log(c)^2 + 2*a*b*log(c))*x)/(e^2*x
^2 + 2*d*e*x + d^2), x)
```

Giac [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2 x}{(ex+d)^2}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x/(e*x + d)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^2}\,dx$$

input
```
int((x*(a + b*log(c*x^n))^2)/(d + e*x)^2,x)
```

output
```
int((x*(a + b*log(c*x^n))^2)/(d + e*x)^2, x)
```

Reduce [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$
$$= \frac{-3\left(\int \frac{\log(x^n c)^2}{e^2x^3+2de\,x^2+d^2x}dx\right)b^2d^3n - 3\left(\int \frac{\log(x^n c)^2}{e^2x^3+2de\,x^2+d^2x}dx\right)b^2d^2enx - 6\left(\int \frac{\log(x^n c)}{e^2x^3+2de\,x^2+d^2x}dx\right)ab\,d^3n - 6\left(\int\right.}{}$$

input
```
int(x*(a+b*log(c*x^n))^2/(e*x+d)^2,x)
```

output
```
( - 3*int(log(x**n*c)**2/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b**2*d**3*n
- 3*int(log(x**n*c)**2/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b**2*d**2*e*n*
x - 6*int(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*a*b*d**3*n - 6*
int(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*a*b*d**2*e*n*x - 12*i
nt(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b**2*d**3*n**2 - 12*in
t(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b**2*d**2*e*n**2*x + 3*
log(d + e*x)*a**2*d*n + 3*log(d + e*x)*a**2*e*n*x + 12*log(d + e*x)*a*b*d*
n**2 + 12*log(d + e*x)*a*b*e*n**2*x + 12*log(d + e*x)*b**2*d*n**3 + 12*log
(d + e*x)*b**2*e*n**3*x + log(x**n*c)**3*b**2*d + log(x**n*c)**3*b**2*e*x
+ 3*log(x**n*c)**2*a*b*d + 3*log(x**n*c)**2*a*b*e*x + 6*log(x**n*c)**2*b**
2*d*n - 12*log(x**n*c)*a*b*e*n*x - 12*log(x**n*c)*b**2*e*n**2*x - 3*a**2*e
*n*x)/(3*e**2*n*(d + e*x))
```

3.103 $\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$

Optimal result 903
Mathematica [A] (verified) 903
Rubi [A] (verified) 904
Maple [C] (warning: unable to verify) 905
Fricas [F] 906
Sympy [F] 906
Maxima [F] 906
Giac [F] 907
Mupad [F(-1)] 907
Reduce [F] 907

Optimal result

Integrand size = 20, antiderivative size = 77

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \frac{x(a+b\log(cx^n))^2}{d(d+ex)} - \frac{2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{de} - \frac{2b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{de}$$

output
```
x*(a+b*ln(c*x^n))^2/d/(e*x+d)-2*b*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d/e-2*b^2*
n^2*polylog(2,-e*x/d)/d/e
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 81, normalized size of antiderivative = 1.05

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \frac{(a+b\log(cx^n))\left(aex+bex\log(cx^n)-2bn(d+ex)\log\left(1+\frac{ex}{d}\right)\right)-2b^2n^2(d+ex)\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{de(d+ex)}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(d + e*x)^2,x]
```

output
```
((a + b*Log[c*x^n])*(a*e*x + b*e*x*Log[c*x^n] - 2*b*n*(d + e*x)*Log[1 + (e
*x)/d]) - 2*b^2*n^2*(d + e*x)*PolyLog[2, -((e*x)/d)])/(d*e*(d + e*x))
```

Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 71, normalized size of antiderivative = 0.92, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.150$, Rules used = {2755, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$

$$\Big\downarrow \text{2755}$$

$$\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\int \frac{a+b\log(cx^n)}{d+ex}dx}{d}$$

$$\Big\downarrow \text{2754}$$

$$\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-\frac{bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}+\frac{bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])^2/(d + e*x)^2,x]
```

output
```
(x*(a + b*Log[c*x^n])^2)/(d*(d + e*x)) - (2*b*n*(((a + b*Log[c*x^n])*Log[1
 + (e*x)/d])/e + (b*n*PolyLog[2, -((e*x)/d)])/e))/d
```

Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2755
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Simp[b*n*(p/d)
 Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e,
n, p}, x] && GtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.51 (sec) , antiderivative size = 369, normalized size of antiderivative = 4.79

method	result
risch	$-\frac{b^2 \ln(x^n)^2}{e(ex+d)} - \frac{2b^2 n \ln(x^n)\ln(ex+d)}{ed} + \frac{2b^2 n \ln(x^n)\ln(x)}{ed} - \frac{b^2 n^2 \ln(x)^2}{ed} + \frac{2b^2 n^2 \ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{ed} + \frac{2b^2 n^2 \operatorname{dilog}\left(-\frac{ex}{d}\right)}{ed}$

input
```
int((a+b*ln(c*x^n))^2/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-b^2*ln(x^n)^2/e/(e*x+d)-2*b^2/e*n*ln(x^n)/d*ln(e*x+d)+2*b^2/e*n*ln(x^n)/d
*ln(x)-b^2/e*n^2/d*ln(x)^2+2*b^2/e*n^2/d*ln(e*x+d)*ln(-e*x/d)+2*b^2/e*n^2/
d*dilog(-e*x/d)+(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csg
n(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*
c)+2*b*ln(c)+2*a)*b*(-ln(x^n)/e/(e*x+d)+1/e*n*(-1/d*ln(e*x+d)+1/d*ln(x)))-
1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*c
sgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)
+2*a)^2/(e*x+d)/e
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^2*x^2 + 2*d*e*x +
d^2), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/(e*x+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(d + e*x)**2, x)
```

Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="maxima")
```

output
```
-2*a*b*n*(log(e*x + d)/(d*e) - log(x)/(d*e)) - b^2*(log(x^n)^2/(e^2*x + d*
e) - integrate((e*x*log(c)^2 + 2*(d*n + (e*n + e*log(c))*x)*log(x^n))/(e^3
*x^3 + 2*d*e^2*x^2 + d^2*e*x), x)) - 2*a*b*log(c*x^n)/(e^2*x + d*e) - a^2/
(e^2*x + d*e)
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/(e*x + d)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(d + e*x)^2,x)
```

output
```
int((a + b*log(c*x^n))^2/(d + e*x)^2, x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$
$$= \frac{2\left(\int \frac{\log(x^nc)}{e^2x^3+2de\,x^2+d^2x}dx\right)b^2d^3n + 2\left(\int \frac{\log(x^nc)}{e^2x^3+2de\,x^2+d^2x}dx\right)b^2d^2enx - 2\log(ex+d)\,abdn - 2\log(ex+d)\,abe}{de}$$

input
```
int((a+b*log(c*x^n))^2/(e*x+d)^2,x)
```

output
```
(2*int(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b**2*d**3*n + 2*in
t(log(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b**2*d**2*e*n*x - 2*log
(d + e*x)*a*b*d*n - 2*log(d + e*x)*a*b*e*n*x - 2*log(d + e*x)*b**2*d*n**2
- 2*log(d + e*x)*b**2*e*n**2*x - log(x**n*c)**2*b**2*d + 2*log(x**n*c)*a*b
*e*x + 2*log(x**n*c)*b**2*e*n*x + a**2*e*x)/(d*e*(d + e*x))
```

3.104 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx$

Optimal result 909
Mathematica [A] (verified) 910
Rubi [A] (verified) 910
Maple [C] (warning: unable to verify) 913
Fricas [F] 914
Sympy [F] 914
Maxima [F] 915
Giac [F] 915
Mupad [F(-1)] 915
Reduce [F] 916

Optimal result

Integrand size = 23, antiderivative size = 151

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx &= -\frac{ex(a+b\log(cx^n))^2}{d^2(d+ex)} - \frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d^2} \\ &\quad + \frac{2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^2} \\ &\quad + \frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^2} \\ &\quad + \frac{2b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^2} + \frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^2}\end{aligned}$$

output
```
-e*x*(a+b*ln(c*x^n))^2/d^2/(e*x+d)-ln(1+d/e/x)*(a+b*ln(c*x^n))^2/d^2+2*b*n
*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^2+2*b*n*(a+b*ln(c*x^n))*polylog(2,-d/e/x)/d
^2+2*b^2*n^2*polylog(2,-e*x/d)/d^2+2*b^2*n^2*polylog(3,-d/e/x)/d^2
```

Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 166, normalized size of antiderivative = 1.10

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx$$
$$= \frac{-3(a+b\log(cx^n))^2+\frac{3d(a+b\log(cx^n))^2}{d+ex}+\frac{(a+b\log(cx^n))^3}{bn}+6bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)-3(a+b\log(c$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x)^2),x]
```

output
```
(-3*(a + b*Log[c*x^n])^2 + (3*d*(a + b*Log[c*x^n])^2)/(d + e*x) + (a + b*L
og[c*x^n])^3/(b*n) + 6*b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 3*(a + b*
Log[c*x^n])^2*Log[1 + (e*x)/d] + 6*b^2*n^2*PolyLog[2, -((e*x)/d)] - 6*b*n*
(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + 6*b^2*n^2*PolyLog[3, -((e*x)/d
)])/(3*d^2)
```

Rubi [A] (verified)

Time = 0.94 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.03, number of steps used = 7, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {2789, 2755, 2754, 2779, 2821, 2838, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx$$
$$\Big\downarrow \text{2789}$$
$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}dx}{d}$$
$$\Big\downarrow \text{2755}$$
$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\int \frac{a+b\log(cx^n)}{d+ex}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2754}$$

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-\frac{bn\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{\frac{2bn\int\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-\frac{bn\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{2821}$$

$$\frac{\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-\frac{bn\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}+\frac{bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{7143}$$

$$\frac{\frac{2bn\left(\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))+bn\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}+\frac{bn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}\right)}{d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x*(d + e*x)^2),x]
```

output
```
-((e*((x*(a + b*Log[c*x^n])^2)/(d*(d + e*x)) - (2*b*n*(((a + b*Log[c*x^n])
*Log[1 + (e*x)/d])/e + (b*n*PolyLog[2, -((e*x)/d)])/e))/d))/d) + (-((Log[1
 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d) + (2*b*n*((a + b*Log[c*x^n])*PolyLog[
2, -(d/(e*x))] + b*n*PolyLog[3, -(d/(e*x))]))/d)/d
```

Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2755
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Simp[b*n*(p/d)
 Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e,
n, p}, x] && GtQ[p, 0]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.72 (sec) , antiderivative size = 683, normalized size of antiderivative = 4.52

method	result
risch	$-\frac{b^2 \ln(x^n)^2 \ln(ex+d)}{d^2} + \frac{b^2 \ln(x^n)^2}{d(ex+d)} + \frac{b^2 \ln(x^n)^2 \ln(x)}{d^2} - \frac{b^2 n \ln(x^n) \ln(x)^2}{d^2} + \frac{b^2 \ln(x)^3 n^2}{3d^2} + \frac{2b^2 n \ln(x^n) \ln(ex+d)}{d^2} - 2b^2$

input
```
int((a+b*ln(c*x^n))^2/x/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-b^2*ln(x^n)^2/d^2*ln(e*x+d)+b^2*ln(x^n)^2/d/(e*x+d)+b^2*ln(x^n)^2/d^2*ln(
x)-b^2*n/d^2*ln(x^n)*ln(x)^2+1/3*b^2/d^2*ln(x)^3*n^2+2*b^2*n*ln(x^n)/d^2*l
n(e*x+d)-2*b^2*n*ln(x^n)/d^2*ln(x)+b^2/d^2*n^2*ln(x)^2-2*b^2/d^2*n^2*ln(e*
x+d)*ln(-e*x/d)-2*b^2/d^2*n^2*dilog(-e*x/d)-2*b^2/d^2*ln(x)*ln(e*x+d)*ln(-
e*x/d)*n^2-2*b^2/d^2*ln(x)*dilog(-e*x/d)*n^2+2*b^2*n/d^2*ln(x^n)*ln(e*x+d)
*ln(-e*x/d)+2*b^2*n/d^2*ln(x^n)*dilog(-e*x/d)+b^2/d^2*n^2*ln(e*x+d)*ln(x)^
2-b^2/d^2*n^2*ln(x)^2*ln(1+e*x/d)-2*b^2/d^2*n^2*ln(x)*polylog(2,-e*x/d)+2*
b^2/d^2*n^2*polylog(3,-e*x/d)+(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*c
sgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*
x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*(-ln(x^n)/d^2*ln(e*x+d)+ln(x^n)/d/(e*x+d
)+ln(x^n)/d^2*ln(x)-n*(1/2/d^2*ln(x)^2-1/d^2*ln(e*x+d)+1/d^2*ln(x)-1/d^2*l
n(e*x+d)*ln(-e*x/d)-1/d^2*dilog(-e*x/d)))+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c
*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+
I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^2*(-1/d^2*ln(e*x+d)+1/d/(e
*x+d)+1/d^2*ln(x))
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^2*x^3 + 2*d*e*x^2
+ d^2*x), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx = \int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x/(e*x+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x*(d + e*x)**2), x)
```

Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d)^2,x, algorithm="maxima")
```

output
```
a^2*(1/(d*e*x + d^2) - log(e*x + d)/d^2 + log(x)/d^2) + integrate((b^2*log
(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e^
2*x^3 + 2*d*e*x^2 + d^2*x), x)
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)^2*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x\,(d+e\,x)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x*(d + e*x)^2),x)
```

output
```
int((a + b*log(c*x^n))^2/(x*(d + e*x)^2), x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx$$
$$= \frac{\left(\int \frac{\log(x^n c)^2}{e^2x^3+2de\,x^2+d^2x}dx\right) b^2d^3 + \left(\int \frac{\log(x^n c)^2}{e^2x^3+2de\,x^2+d^2x}dx\right) b^2d^2ex + 2\left(\int \frac{\log(x^n c)}{e^2x^3+2de\,x^2+d^2x}dx\right) ab\,d^3 + 2\left(\int \frac{\log(x^n}{e^2x^3+2de\,x}\right.}{d^2\,(ex+d)}$$

input
```
int((a+b*log(c*x^n))^2/x/(e*x+d)^2,x)
```

output
```
(int(log(x**n*c)**2/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b**2*d**3 + int(l
og(x**n*c)**2/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b**2*d**2*e*x + 2*int(l
og(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*a*b*d**3 + 2*int(log(x**n*
c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*a*b*d**2*e*x - log(d + e*x)*a**2*d
 - log(d + e*x)*a**2*e*x + log(x)*a**2*d + log(x)*a**2*e*x - a**2*e*x)/(d*
*2*(d + e*x))
```

3.105 $\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx$

Optimal result 917
Mathematica [A] (verified) 918
Rubi [A] (verified) 918
Maple [C] (warning: unable to verify) 919
Fricas [F] 920
Sympy [F] 921
Maxima [F] 921
Giac [F] 921
Mupad [F(-1)] 922
Reduce [F] 922

Optimal result

Integrand size = 23, antiderivative size = 211

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx = &-\frac{2b^2n^2}{d^2x}-\frac{2bn(a+b\log(cx^n))}{d^2x}-\frac{(a+b\log(cx^n))^2}{d^2x}\\ &+\frac{e^2x(a+b\log(cx^n))^2}{d^3(d+ex)}+\frac{2e\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d^3}\\ &-\frac{2ben(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^3}\\ &-\frac{4ben(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^3}\\ &-\frac{2b^2en^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^3}-\frac{4b^2en^2\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^3}\end{aligned}$$

output
```
-2*b^2*n^2/d^2/x-2*b*n*(a+b*ln(c*x^n))/d^2/x-(a+b*ln(c*x^n))^2/d^2/x+e^2*x
*(a+b*ln(c*x^n))^2/d^3/(e*x+d)+2*e*ln(1+d/e/x)*(a+b*ln(c*x^n))^2/d^3-2*b*e
*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^3-4*b*e*n*(a+b*ln(c*x^n))*polylog(2,-d/e/
x)/d^3-2*b^2*e*n^2*polylog(2,-e*x/d)/d^3-4*b^2*e*n^2*polylog(3,-d/e/x)/d^3
```

Mathematica [A] (verified)

Time = 0.35 (sec) , antiderivative size = 223, normalized size of antiderivative = 1.06

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx =$$

$$-\frac{\frac{6b^2dn^2}{x}+\frac{6bdn(a+b\log(cx^n))}{x}-3e(a+b\log(cx^n))^2+\frac{3d(a+b\log(cx^n))^2}{x}+\frac{3de(a+b\log(cx^n))^2}{d+ex}+\frac{2e(a+b\log(cx^n))^3}{bn}+6\ldots}{\ldots}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)^2),x]
```

output
```
-1/3*((6*b^2*d*n^2)/x + (6*b*d*n*(a + b*Log[c*x^n]))/x - 3*e*(a + b*Log[c*
x^n])^2 + (3*d*(a + b*Log[c*x^n])^2)/x + (3*d*e*(a + b*Log[c*x^n])^2)/(d +
 e*x) + (2*e*(a + b*Log[c*x^n])^3)/(b*n) + 6*b*e*n*(a + b*Log[c*x^n])*Log[
1 + (e*x)/d] - 6*e*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 6*b^2*e*n^2*Pol
yLog[2, -((e*x)/d)] - 12*b*e*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] +
 12*b^2*e*n^2*PolyLog[3, -((e*x)/d)])/d^3
```

Rubi [A] (verified)

Time = 0.58 (sec) , antiderivative size = 211, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx$$

$$\Big\downarrow \; 2795$$

$$\int \left(\frac{e^2(a+b\log(cx^n))^2}{d^2(d+ex)^2}-\frac{2e(a+b\log(cx^n))^2}{d^2x(d+ex)}+\frac{(a+b\log(cx^n))^2}{d^2x^2}\right)dx$$

$$\Big\downarrow \; 2009$$

$$\frac{e^2x(a+b\log(cx^n))^2}{d^3(d+ex)}-\frac{4ben\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^3}-\frac{2ben\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{d^3}+\frac{2e\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d^3}-\frac{2bn(a+b\log(cx^n))}{d^2x}-\frac{(a+b\log(cx^n))^2}{d^2x}-\frac{2b^2en^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^3}-\frac{4b^2en^2\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^3}-\frac{2b^2n^2}{d^2x}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)^2),x]
```

output
```
(-2*b^2*n^2)/(d^2*x) - (2*b*n*(a + b*Log[c*x^n]))/(d^2*x) - (a + b*Log[c*x
^n])^2/(d^2*x) + (e^2*x*(a + b*Log[c*x^n])^2)/(d^3*(d + e*x)) + (2*e*Log[1
 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d^3 - (2*b*e*n*(a + b*Log[c*x^n])*Log[1
+ (e*x)/d])/d^3 - (4*b*e*n*(a + b*Log[c*x^n])*PolyLog[2, -(d/(e*x))])/d^3
- (2*b^2*e*n^2*PolyLog[2, -((e*x)/d)])/d^3 - (4*b^2*e*n^2*PolyLog[3, -(d/(
e*x))])/d^3
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.84 (sec) , antiderivative size = 790, normalized size of antiderivative = 3.74

method	result	size
risch	Expression too large to display	790

input
```
int((a+b*ln(c*x^n))^2/x^2/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-b^2*ln(x^n)^2/d^2*e/(e*x+d)+2*b^2*ln(x^n)^2/d^3*e*ln(e*x+d)-b^2*ln(x^n)^2
/d^2/x-2*b^2*ln(x^n)^2/d^3*e*ln(x)+2*b^2*n/d^3*e*ln(x^n)*ln(x)^2-2/3*b^2/d
^3*e*ln(x)^3*n^2+4*b^2/d^3*e*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2+4*b^2/d^3*e*ln
(x)*dilog(-e*x/d)*n^2-4*b^2*n/d^3*e*ln(x^n)*ln(e*x+d)*ln(-e*x/d)-4*b^2*n/d
^3*e*ln(x^n)*dilog(-e*x/d)-2*b^2/d^3*e*n^2*ln(e*x+d)*ln(x)^2+2*b^2/d^3*e*n
^2*ln(x)^2*ln(1+e*x/d)+4*b^2/d^3*e*n^2*ln(x)*polylog(2,-e*x/d)-4*b^2/d^3*e
*n^2*polylog(3,-e*x/d)-2*b^2*n*ln(x^n)/d^3*e*ln(e*x+d)-2*b^2*n*ln(x^n)/d^2
/x+2*b^2*n*ln(x^n)/d^3*e*ln(x)-b^2/d^3*n^2*e*ln(x)^2-2*b^2*n^2/d^2/x+2*b^2
/d^3*n^2*e*ln(e*x+d)*ln(-e*x/d)+2*b^2/d^3*n^2*e*dilog(-e*x/d)+(I*Pi*b*csgn
(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*
csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*(-ln(x^n
)/d^2*e/(e*x+d)+2*ln(x^n)/d^3*e*ln(e*x+d)-ln(x^n)/d^2/x-2*ln(x^n)/d^3*e*ln
(x)-n*(-1/d^3*e*ln(x)^2+2/d^3*e*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))+1/d^3
*e*ln(e*x+d)+1/d^2/x-1/d^3*e*ln(x)))+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)
^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*
b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^2*(-1/d^2*e/(e*x+d)+2/d^3*e*ln(
e*x+d)-1/d^2/x-2/d^3*e*ln(x))
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^2*x^4 + 2*d*e*x^3
+ d^2*x^2), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx = \int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x**2/(e*x+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x**2*(d + e*x)**2), x)
```

Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^2,x, algorithm="maxima")
```

output
```
-a^2*((2*e*x + d)/(d^2*e*x^2 + d^3*x) - 2*e*log(e*x + d)/d^3 + 2*e*log(x)/
d^3) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*lo
g(c) + a*b)*log(x^n))/(e^2*x^4 + 2*d*e*x^3 + d^2*x^2), x)
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)^2*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x^2\,(d+e\,x)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x^2*(d + e*x)^2),x)
```

output
```
int((a + b*log(c*x^n))^2/(x^2*(d + e*x)^2), x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx$$
$$= \frac{\left(\int \frac{\log(x^n c)^2}{e^2x^4+2de\,x^3+d^2x^2}dx\right)b^2d^4x + \left(\int \frac{\log(x^n c)^2}{e^2x^4+2de\,x^3+d^2x^2}dx\right)b^2d^3e\,x^2 + 2\left(\int \frac{\log(x^n c)}{e^2x^4+2de\,x^3+d^2x^2}dx\right)ab\,d^4x + 2\left(\int \frac{\cdots}{e^2\cdots}\right.\cdots}{\cdots}$$

input
```
int((a+b*log(c*x^n))^2/x^2/(e*x+d)^2,x)
```

output
```
(int(log(x**n*c)**2/(d**2*x**2 + 2*d*e*x**3 + e**2*x**4),x)*b**2*d**4*x +
int(log(x**n*c)**2/(d**2*x**2 + 2*d*e*x**3 + e**2*x**4),x)*b**2*d**3*e*x**
2 + 2*int(log(x**n*c)/(d**2*x**2 + 2*d*e*x**3 + e**2*x**4),x)*a*b*d**4*x +
 2*int(log(x**n*c)/(d**2*x**2 + 2*d*e*x**3 + e**2*x**4),x)*a*b*d**3*e*x**2
 + 2*log(d + e*x)*a**2*d*e*x + 2*log(d + e*x)*a**2*e**2*x**2 - 2*log(x)*a*
*2*d*e*x - 2*log(x)*a**2*e**2*x**2 - a**2*d**2 + 2*a**2*e**2*x**2)/(d**3*x
*(d + e*x))
```

3.106 $\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx$

Optimal result 923
Mathematica [A] (verified) 924
Rubi [A] (verified) 924
Maple [C] (warning: unable to verify) 926
Fricas [F] 926
Sympy [F] 927
Maxima [F] 927
Giac [F] 928
Mupad [F(-1)] 928
Reduce [F] 928

Optimal result

Integrand size = 23, antiderivative size = 285

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx = -\frac{b^2n^2}{4d^2x^2}+\frac{4b^2en^2}{d^3x}-\frac{bn(a+b\log(cx^n))}{2d^2x^2}+\frac{4ben(a+b\log(cx^n))}{d^3x}-\frac{(a+b\log(cx^n))^2}{2d^2x^2}+\frac{2e(a+b\log(cx^n))^2}{d^3x}-\frac{e^3x(a+b\log(cx^n))^2}{d^4(d+ex)}-\frac{3e^2\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d^4}+\frac{2be^2n(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^4}+\frac{6be^2n(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}+\frac{2b^2e^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^4}+\frac{6b^2e^2n^2\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^4}$$

output
```
-1/4*b^2*n^2/d^2/x^2+4*b^2*e*n^2/d^3/x-1/2*b*n*(a+b*ln(c*x^n))/d^2/x^2+4*b
*e*n*(a+b*ln(c*x^n))/d^3/x-1/2*(a+b*ln(c*x^n))^2/d^2/x^2+2*e*(a+b*ln(c*x^n
))^2/d^3/x-e^3*x*(a+b*ln(c*x^n))^2/d^4/(e*x+d)-3*e^2*ln(1+d/e/x)*(a+b*ln(c
*x^n))^2/d^4+2*b*e^2*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^4+6*b*e^2*n*(a+b*ln(c
*x^n))*polylog(2,-d/e/x)/d^4+2*b^2*e^2*n^2*polylog(2,-e*x/d)/d^4+6*b^2*e^2
*n^2*polylog(3,-d/e/x)/d^4
```

Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 268, normalized size of antiderivative = 0.94

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx$$
$$= \frac{-\frac{2d^2(a+b\log(cx^n))^2}{x^2}+\frac{8de(a+b\log(cx^n))^2}{x}+\frac{4de^2(a+b\log(cx^n))^2}{d+ex}+\frac{4e^2(a+b\log(cx^n))^3}{bn}+\frac{16bden(a+bn+b\log(cx^n))}{x}-\frac{bd^2n(2a+b}{}}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x^3*(d + e*x)^2),x]
```

output
```
((-2*d^2*(a + b*Log[c*x^n])^2)/x^2 + (8*d*e*(a + b*Log[c*x^n])^2)/x + (4*d
*e^2*(a + b*Log[c*x^n])^2)/(d + e*x) + (4*e^2*(a + b*Log[c*x^n])^3)/(b*n)
+ (16*b*d*e*n*(a + b*n + b*Log[c*x^n]))/x - (b*d^2*n*(2*a + b*n + 2*b*Log[
c*x^n]))/x^2 - 12*e^2*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 4*e^2*(-((a
+ b*Log[c*x^n])*(a + b*Log[c*x^n] - 2*b*n*Log[1 + (e*x)/d])) + 2*b^2*n^2*P
olyLog[2, -((e*x)/d)]) - 24*b*e^2*n*((a + b*Log[c*x^n])*PolyLog[2, -((e*x)
/d)] - b*n*PolyLog[3, -((e*x)/d)]))/(4*d^4)
```

Rubi [A] (verified)

Time = 0.70 (sec) , antiderivative size = 285, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx$$
$$\Big\downarrow \; 2795$$
$$\int \left(-\frac{e^3(a+b\log(cx^n))^2}{d^3(d+ex)^2}+\frac{3e^2(a+b\log(cx^n))^2}{d^3x(d+ex)}-\frac{2e(a+b\log(cx^n))^2}{d^3x^2}+\frac{(a+b\log(cx^n))^2}{d^2x^3}\right)dx$$
$$\Big\downarrow \; 2009$$

$$-\frac{e^3x(a+b\log(cx^n))^2}{d^4(d+ex)}+\frac{6be^2n\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^4}-\frac{3e^2\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d^4}+\frac{2be^2n\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{d^4}+\frac{2e(a+b\log(cx^n))^2}{d^3x}+\frac{4ben(a+b\log(cx^n))}{d^3x}-\frac{(a+b\log(cx^n))^2}{2d^2x^2}-\frac{bn(a+b\log(cx^n))}{2d^2x^2}+\frac{2b^2e^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^4}+\frac{6b^2e^2n^2\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^4}+\frac{4b^2en^2}{d^3x}-\frac{b^2n^2}{4d^2x^2}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x^3*(d + e*x)^2),x]
```

output
```
-1/4*(b^2*n^2)/(d^2*x^2) + (4*b^2*e*n^2)/(d^3*x) - (b*n*(a + b*Log[c*x^n])
)/(2*d^2*x^2) + (4*b*e*n*(a + b*Log[c*x^n]))/(d^3*x) - (a + b*Log[c*x^n])^
2/(2*d^2*x^2) + (2*e*(a + b*Log[c*x^n])^2)/(d^3*x) - (e^3*x*(a + b*Log[c*x
^n])^2)/(d^4*(d + e*x)) - (3*e^2*Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d^
4 + (2*b*e^2*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/d^4 + (6*b*e^2*n*(a +
b*Log[c*x^n])*PolyLog[2, -(d/(e*x))])/d^4 + (2*b^2*e^2*n^2*PolyLog[2, -((e
*x)/d)])/d^4 + (6*b^2*e^2*n^2*PolyLog[3, -(d/(e*x))])/d^4
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.94 (sec) , antiderivative size = 924, normalized size of antiderivative = 3.24

method	result	size
risch	Expression too large to display	924

input
```
int((a+b*ln(c*x^n))^2/x^3/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
b^2/d^4*e^2*ln(x)^3*n^2+6*b^2/d^4*e^2*n^2*polylog(3,-e*x/d)+2*b^2*n*ln(x^n
)/d^4*e^2*ln(e*x+d)-2*b^2*n*ln(x^n)/d^4*e^2*ln(x)-2*b^2/d^4*n^2*e^2*ln(e*x
+d)*ln(-e*x/d)-3*b^2*n/d^4*e^2*ln(x^n)*ln(x)^2-6*b^2/d^4*e^2*ln(x)*dilog(-
e*x/d)*n^2+6*b^2*n/d^4*e^2*ln(x^n)*dilog(-e*x/d)+3*b^2/d^4*e^2*n^2*ln(e*x+
d)*ln(x)^2-3*b^2/d^4*e^2*n^2*ln(x)^2*ln(1+e*x/d)-6*b^2/d^4*e^2*n^2*ln(x)*p
olylog(2,-e*x/d)-2*b^2/d^4*n^2*e^2*dilog(-e*x/d)-3*b^2*ln(x^n)^2/d^4*e^2*l
n(e*x+d)+3*b^2*ln(x^n)^2/d^4*e^2*ln(x)-1/2*b^2*n*ln(x^n)/d^2/x^2+b^2/d^4*n
^2*e^2*ln(x)^2+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*
csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn
(I*c)+2*b*ln(c)+2*a)^2*(-3/d^4*e^2*ln(e*x+d)+1/d^3*e^2/(e*x+d)-1/2/d^2/x^2
+3/d^4*e^2*ln(x)+2/d^3*e/x)-6*b^2/d^4*e^2*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2+6
*b^2*n/d^4*e^2*ln(x^n)*ln(e*x+d)*ln(-e*x/d)-1/2*b^2*ln(x^n)^2/d^2/x^2+2*b^
2*ln(x^n)^2/d^3*e/x+4*b^2*n*ln(x^n)/d^3*e/x+b^2*ln(x^n)^2/d^3*e^2/(e*x+d)+
(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(
I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a
)*b*(-3*ln(x^n)/d^4*e^2*ln(e*x+d)+ln(x^n)/d^3*e^2/(e*x+d)-1/2*ln(x^n)/d^2/
x^2+3*ln(x^n)/d^4*e^2*ln(x)+2*ln(x^n)/d^3*e/x-1/2*n*(-2/d^4*e^2*ln(e*x+d)+
1/2/d^2/x^2-4/d^3*e/x+2/d^4*e^2*ln(x)+3/d^4*e^2*ln(x)^2-6/d^4*e^2*(dilog(-
e*x/d)+ln(e*x+d)*ln(-e*x/d))))+4*b^2*e*n^2/d^3/x-1/4*b^2*n^2/d^2/x^2
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^3/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^2*x^5 + 2*d*e*x^4
+ d^2*x^3), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx = \int \frac{(a+b\log(cx^n))^2}{x^3\,(d+ex)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x**3/(e*x+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x**3*(d + e*x)**2), x)
```

Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^3/(e*x+d)^2,x, algorithm="maxima")
```

output
```
1/2*a^2*((6*e^2*x^2 + 3*d*e*x - d^2)/(d^3*e*x^3 + d^4*x^2) - 6*e^2*log(e*x
 + d)/d^4 + 6*e^2*log(x)/d^4) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 +
 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e^2*x^5 + 2*d*e*x^4 + d^2*
x^3), x)
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^3/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)^2*x^3), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x^3\,(d+e\,x)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x^3*(d + e*x)^2),x)
```

output
```
int((a + b*log(c*x^n))^2/(x^3*(d + e*x)^2), x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx = \frac{2\left(\int \frac{\log(x^nc)^2}{e^2x^5+2de\,x^4+d^2x^3}dx\right)b^2d^5x^2+2\left(\int \frac{\log(x^nc)^2}{e^2x^5+2de\,x^4+d^2x^3}dx\right)b^2d^4e\,x^3+4\left(\int \frac{\log(x^nc)}{e^2x^5+2de\,x^4+d^2x^3}dx\right)ab\,d^5x^2+4\left(\right.}{}$$

input
```
int((a+b*log(c*x^n))^2/x^3/(e*x+d)^2,x)
```

output
```
(2*int(log(x**n*c)**2/(d**2*x**3 + 2*d*e*x**4 + e**2*x**5),x)*b**2*d**5*x*
*2 + 2*int(log(x**n*c)**2/(d**2*x**3 + 2*d*e*x**4 + e**2*x**5),x)*b**2*d**
4*e*x**3 + 4*int(log(x**n*c)/(d**2*x**3 + 2*d*e*x**4 + e**2*x**5),x)*a*b*d
**5*x**2 + 4*int(log(x**n*c)/(d**2*x**3 + 2*d*e*x**4 + e**2*x**5),x)*a*b*d
**4*e*x**3 - 6*log(d + e*x)*a**2*d*e**2*x**2 - 6*log(d + e*x)*a**2*e**3*x*
*3 + 6*log(x)*a**2*d*e**2*x**2 + 6*log(x)*a**2*e**3*x**3 - a**2*d**3 + 3*a
**2*d**2*e*x - 6*a**2*e**3*x**3)/(2*d**4*x**2*(d + e*x))
```

3.107 $\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$

Optimal result 930
Mathematica [A] (verified) 931
Rubi [A] (verified) 931
Maple [C] (warning: unable to verify) 933
Fricas [F] 934
Sympy [F] 935
Maxima [F] 935
Giac [F] 935
Mupad [F(-1)] 936
Reduce [F] 936

Optimal result

Integrand size = 23, antiderivative size = 296

$$\begin{aligned}\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx =& -\frac{2abnx}{e^3}+\frac{2b^2n^2x}{e^3}-\frac{2b^2nx\log(cx^n)}{e^3}+\frac{bdnx(a+b\log(cx^n))}{e^3(d+ex)}\\
&-\frac{d(a+b\log(cx^n))^2}{2e^4}+\frac{x(a+b\log(cx^n))^2}{e^3}\\
&+\frac{d^3(a+b\log(cx^n))^2}{2e^4(d+ex)^2}+\frac{3dx(a+b\log(cx^n))^2}{e^3(d+ex)}\\
&-\frac{b^2dn^2\log(d+ex)}{e^4}-\frac{5bdn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^4}\\
&-\frac{3d(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^4}\\
&-\frac{5b^2dn^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}\\
&-\frac{6bdn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}\\
&+\frac{6b^2dn^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}\end{aligned}$$

output
```
-2*a*b*n*x/e^3+2*b^2*n^2*x/e^3-2*b^2*n*x*ln(c*x^n)/e^3+b*d*n*x*(a+b*ln(c*x
^n))/e^3/(e*x+d)-1/2*d*(a+b*ln(c*x^n))^2/e^4+x*(a+b*ln(c*x^n))^2/e^3+1/2*d
^3*(a+b*ln(c*x^n))^2/e^4/(e*x+d)^2+3*d*x*(a+b*ln(c*x^n))^2/e^3/(e*x+d)-b^2
*d*n^2*ln(e*x+d)/e^4-5*b*d*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^4-3*d*(a+b*ln(c
*x^n))^2*ln(1+e*x/d)/e^4-5*b^2*d*n^2*polylog(2,-e*x/d)/e^4-6*b*d*n*(a+b*ln
(c*x^n))*polylog(2,-e*x/d)/e^4+6*b^2*d*n^2*polylog(3,-e*x/d)/e^4
```

Mathematica [A] (verified)

Time = 0.32 (sec) , antiderivative size = 258, normalized size of antiderivative = 0.87

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \frac{-\frac{2bd^2n(a+b\log(cx^n))}{d+ex}+5d(a+b\log(cx^n))^2+2ex(a+b\log(cx^n))^2+\frac{d^3(a+b\log(cx^n))^2}{(d+ex)^2}-\frac{6d^2(a+b\log(cx^n))^2}{d+ex}-4b\cdots}{\cdots}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

output
```
((-2*b*d^2*n*(a + b*Log[c*x^n]))/(d + e*x) + 5*d*(a + b*Log[c*x^n])^2 + 2*
e*x*(a + b*Log[c*x^n])^2 + (d^3*(a + b*Log[c*x^n])^2)/(d + e*x)^2 - (6*d^2
*(a + b*Log[c*x^n])^2)/(d + e*x) - 4*b*e*n*x*(a - b*n + b*Log[c*x^n]) + 2*
b^2*d*n^2*(Log[x] - Log[d + e*x]) - 10*b*d*n*(a + b*Log[c*x^n])*Log[1 + (e
*x)/d] - 6*d*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] - 10*b^2*d*n^2*PolyLog[
2, -((e*x)/d)] - 12*b*d*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + 12*b
^2*d*n^2*PolyLog[3, -((e*x)/d)])/(2*e^4)
```

Rubi [A] (verified)

Time = 0.78 (sec) , antiderivative size = 327, normalized size of antiderivative = 1.10, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$

$\Big\downarrow$ 2795

$$\int \left(-\frac{d^3(a+b\log(cx^n))^2}{e^3(d+ex)^3}+\frac{3d^2(a+b\log(cx^n))^2}{e^3(d+ex)^2}-\frac{3d(a+b\log(cx^n))^2}{e^3(d+ex)}+\frac{(a+b\log(cx^n))^2}{e^3}\right)dx$$

$\Big\downarrow$ 2009

$$\frac{d^3(a+b\log(cx^n))^2}{2e^4(d+ex)^2}-\frac{6bdn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^4}+\frac{bdn\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{e^4}-\frac{3d\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^4}-\frac{6bdn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^4}+\frac{3dx(a+b\log(cx^n))^2}{e^3(d+ex)}+\frac{bdnx(a+b\log(cx^n))}{e^3(d+ex)}+\frac{x(a+b\log(cx^n))^2}{e^3}-\frac{2abnx}{e^3}-\frac{2b^2nx\log(cx^n)}{e^3}-\frac{b^2dn^2\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{e^4}-\frac{6b^2dn^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}+\frac{6b^2dn^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}-\frac{b^2dn^2\log(d+ex)}{e^4}+\frac{2b^2n^2x}{e^3}$$

input
```
Int[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

output
```
(-2*a*b*n*x)/e^3 + (2*b^2*n^2*x)/e^3 - (2*b^2*n*x*Log[c*x^n])/e^3 + (b*d*n
*x*(a + b*Log[c*x^n]))/(e^3*(d + e*x)) + (b*d*n*Log[1 + d/(e*x)]*(a + b*Lo
g[c*x^n]))/e^4 + (x*(a + b*Log[c*x^n])^2)/e^3 + (d^3*(a + b*Log[c*x^n])^2)
/(2*e^4*(d + e*x)^2) + (3*d*x*(a + b*Log[c*x^n])^2)/(e^3*(d + e*x)) - (b^2
*d*n^2*Log[d + e*x])/e^4 - (6*b*d*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/e
^4 - (3*d*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e^4 - (b^2*d*n^2*PolyLog[
2, -(d/(e*x))])/e^4 - (6*b^2*d*n^2*PolyLog[2, -((e*x)/d)])/e^4 - (6*b*d*n*
(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)])/e^4 + (6*b^2*d*n^2*PolyLog[3, -
((e*x)/d)])/e^4
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.97 (sec) , antiderivative size = 827, normalized size of antiderivative = 2.79

method	result	size
risch	Expression too large to display	827

input
```
int(x^3*(a+b*ln(c*x^n))^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
b^2*ln(x^n)^2*x/e^3-3*b^2*ln(x^n)^2/e^4*d^2/(e*x+d)-3*b^2*ln(x^n)^2/e^4*d*
ln(e*x+d)+1/2*b^2*ln(x^n)^2*d^3/e^4/(e*x+d)^2-2*b^2*n*ln(x^n)*x/e^3-5*b^2*
n*ln(x^n)/e^4*d*ln(e*x+d)-b^2*n*ln(x^n)/e^4*d^2/(e*x+d)+5*b^2*n/e^4*ln(x)*
ln(x^n)*d+2*b^2*n^2*x/e^3-b^2*d*n^2*ln(e*x+d)/e^4+b^2/e^4*n^2*d*ln(x)-5/2*
b^2/e^4*n^2*d*ln(x)^2+5*b^2/e^4*n^2*ln(e*x+d)*ln(-e*x/d)*d+5*b^2/e^4*n^2*d
ilog(-e*x/d)*d-6*b^2/e^4*d*ln(e*x+d)*ln(-e*x/d)*ln(x)*n^2+6*b^2*n/e^4*d*ln
(x^n)*ln(e*x+d)*ln(-e*x/d)-6*b^2/e^4*d*dilog(-e*x/d)*ln(x)*n^2+6*b^2*n/e^4
*d*ln(x^n)*dilog(-e*x/d)+3*b^2/e^4*d*n^2*ln(e*x+d)*ln(x)^2-3*b^2/e^4*d*n^2
*ln(x)^2*ln(1+e*x/d)-6*b^2/e^4*d*n^2*ln(x)*polylog(2,-e*x/d)+6*b^2*d*n^2*p
olylog(3,-e*x/d)/e^4+(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n
)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*cs
gn(I*c)+2*b*ln(c)+2*a)*b*(ln(x^n)*x/e^3-3*ln(x^n)/e^4*d^2/(e*x+d)-3*ln(x^n
)/e^4*d*ln(e*x+d)+1/2*ln(x^n)*d^3/e^4/(e*x+d)^2-1/2*n*(1/e^4*(2*e*x+2*d+5*
d*ln(e*x+d)+d^2/(e*x+d)-5*d*ln(e*x))-6/e^4*d*(dilog(-e*x/d)+ln(e*x+d)*ln(-
e*x/d))))+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(
I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)
+2*b*ln(c)+2*a)^2*(x/e^3-3/e^4*d^2/(e*x+d)-3/e^4*d*ln(e*x+d)+1/2*d^3/e^4/(
e*x+d)^2)
```

Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx=\int \frac{(b\log(cx^n)+a)^2x^3}{(ex+d)^3}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b^2*x^3*log(c*x^n)^2 + 2*a*b*x^3*log(c*x^n) + a^2*x^3)/(e^3*x^3
+ 3*d*e^2*x^2 + 3*d^2*e*x + d^3), x)
```

Sympy [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$

input
```
integrate(x**3*(a+b*ln(c*x**n))**2/(e*x+d)**3,x)
```

output
```
Integral(x**3*(a + b*log(c*x**n))**2/(d + e*x)**3, x)
```

Maxima [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2x^3}{(ex+d)^3}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="maxima")
```

output
```
-1/2*a^2*((6*d^2*e*x + 5*d^3)/(e^6*x^2 + 2*d*e^5*x + d^2*e^4) - 2*x/e^3 +
6*d*log(e*x + d)/e^4) + integrate((b^2*x^3*log(x^n)^2 + 2*(b^2*log(c) + a*
b)*x^3*log(x^n) + (b^2*log(c)^2 + 2*a*b*log(c))*x^3)/(e^3*x^3 + 3*d*e^2*x^
2 + 3*d^2*e*x + d^3), x)
```

Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2x^3}{(ex+d)^3}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x^3/(e*x + d)^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^3}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n))^2)/(d + e*x)^3,x)
```

output
```
int((x^3*(a + b*log(c*x^n))^2)/(d + e*x)^3, x)
```

Reduce [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \text{Too large to display}$$

input
```
int(x^3*(a+b*log(c*x^n))^2/(e*x+d)^3,x)
```

output
```
(6*int(log(x**n*c)**2/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4)
,x)*b**2*d**6*n + 12*int(log(x**n*c)**2/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2
*x**3 + e**3*x**4),x)*b**2*d**5*e*n*x + 6*int(log(x**n*c)**2/(d**3*x + 3*d
**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*b**2*d**4*e**2*n*x**2 + 12*int(
log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*a*b*d*
*6*n + 24*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x
**4),x)*a*b*d**5*e*n*x + 12*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*
e**2*x**3 + e**3*x**4),x)*a*b*d**4*e**2*n*x**2 + 28*int(log(x**n*c)/(d**3*
x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*b**2*d**6*n**2 + 56*int(
log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*b**2*d
**5*e*n**2*x + 28*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3
+ e**3*x**4),x)*b**2*d**4*e**2*n**2*x**2 - 6*log(d + e*x)*a**2*d**3*n - 12
*log(d + e*x)*a**2*d**2*e*n*x - 6*log(d + e*x)*a**2*d*e**2*n*x**2 - 28*log
(d + e*x)*a*b*d**3*n**2 - 56*log(d + e*x)*a*b*d**2*e*n**2*x - 28*log(d + e
*x)*a*b*d*e**2*n**2*x**2 - 38*log(d + e*x)*b**2*d**3*n**3 - 76*log(d + e*x
)*b**2*d**2*e*n**3*x - 38*log(d + e*x)*b**2*d*e**2*n**3*x**2 - 2*log(x**n*
c)**3*b**2*d**3 - 4*log(x**n*c)**3*b**2*d**2*e*x - 2*log(x**n*c)**3*b**2*d
*e**2*x**2 - 6*log(x**n*c)**2*a*b*d**3 - 12*log(x**n*c)**2*a*b*d**2*e*x -
6*log(x**n*c)**2*a*b*d*e**2*x**2 - 14*log(x**n*c)**2*b**2*d**3*n - 10*log(
x**n*c)**2*b**2*d**2*e*n*x + 4*log(x**n*c)**2*b**2*d*e**2*n*x**2 + 2*lo...
```

3.108 $\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$

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Optimal result

Integrand size = 23, antiderivative size = 232

$$\begin{aligned}\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = & -\frac{bnx(a+b\log(cx^n))}{e^2(d+ex)}+\frac{(a+b\log(cx^n))^2}{2e^3} \\ & -\frac{d^2(a+b\log(cx^n))^2}{2e^3(d+ex)^2}-\frac{2x(a+b\log(cx^n))^2}{e^2(d+ex)} \\ & +\frac{b^2n^2\log(d+ex)}{e^3}+\frac{3bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^3} \\ & +\frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^3}+\frac{3b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3} \\ & +\frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3} \\ & -\frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^3}\end{aligned}$$

output
```
-b*n*x*(a+b*ln(c*x^n))/e^2/(e*x+d)+1/2*(a+b*ln(c*x^n))^2/e^3-1/2*d^2*(a+b*
ln(c*x^n))^2/e^3/(e*x+d)^2-2*x*(a+b*ln(c*x^n))^2/e^2/(e*x+d)+b^2*n^2*ln(e*
x+d)/e^3+3*b*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^3+(a+b*ln(c*x^n))^2*ln(1+e*x/
d)/e^3+3*b^2*n^2*polylog(2,-e*x/d)/e^3+2*b*n*(a+b*ln(c*x^n))*polylog(2,-e*
x/d)/e^3-2*b^2*n^2*polylog(3,-e*x/d)/e^3
```

Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 212, normalized size of antiderivative = 0.91

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$
$$= \frac{\frac{2bdn(a+b\log(cx^n))}{d+ex}-3(a+b\log(cx^n))^2-\frac{d^2(a+b\log(cx^n))^2}{(d+ex)^2}+\frac{4d(a+b\log(cx^n))^2}{d+ex}-2b^2n^2(\log(x)-\log(d+ex))+ \cdots}{}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

output
```
((2*b*d*n*(a + b*Log[c*x^n]))/(d + e*x) - 3*(a + b*Log[c*x^n])^2 - (d^2*(a
 + b*Log[c*x^n])^2)/(d + e*x)^2 + (4*d*(a + b*Log[c*x^n])^2)/(d + e*x) - 2
*b^2*n^2*(Log[x] - Log[d + e*x]) + 6*b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/
d] + 2*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 6*b^2*n^2*PolyLog[2, -((e*x
)/d)] + 4*b*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] - 4*b^2*n^2*PolyLo
g[3, -((e*x)/d)])/(2*e^3)
```

Rubi [A] (verified)

Time = 0.69 (sec) , antiderivative size = 262, normalized size of antiderivative = 1.13, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$
$$\Big\downarrow \text{2795}$$
$$\int \left(\frac{d^2(a+b\log(cx^n))^2}{e^2(d+ex)^3}+\frac{(a+b\log(cx^n))^2}{e^2(d+ex)}-\frac{2d(a+b\log(cx^n))^2}{e^2(d+ex)^2}\right)dx$$
$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))^2}{2e^3(d+ex)^2}+\frac{2bn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^3}-\frac{bn\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{e^3}+\frac{4bn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^3}+\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^3}-\frac{bnx(a+b\log(cx^n))}{e^2(d+ex)}-\frac{2x(a+b\log(cx^n))^2}{e^2(d+ex)}+\frac{b^2n^2\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{e^3}+\frac{4b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}-\frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^3}+\frac{b^2n^2\log(d+ex)}{e^3}$$

input
```
Int[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

output
```
-((b*n*x*(a + b*Log[c*x^n]))/(e^2*(d + e*x))) - (b*n*Log[1 + d/(e*x)]*(a +
 b*Log[c*x^n]))/e^3 - (d^2*(a + b*Log[c*x^n])^2)/(2*e^3*(d + e*x)^2) - (2*
x*(a + b*Log[c*x^n])^2)/(e^2*(d + e*x)) + (b^2*n^2*Log[d + e*x])/e^3 + (4*
b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/e^3 + ((a + b*Log[c*x^n])^2*Log[1
 + (e*x)/d])/e^3 + (b^2*n^2*PolyLog[2, -(d/(e*x))])/e^3 + (4*b^2*n^2*PolyL
og[2, -((e*x)/d)])/e^3 + (2*b*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)])
/e^3 - (2*b^2*n^2*PolyLog[3, -((e*x)/d)])/e^3
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.80 (sec) , antiderivative size = 738, normalized size of antiderivative = 3.18

method	result
risch	$\frac{2b^2 \ln(x^n)^2 d}{e^3(ex+d)} + \frac{b^2 \ln(x^n)^2 \ln(ex+d)}{e^3} - \frac{b^2 \ln(x^n)^2 d^2}{2e^3(ex+d)^2} + \frac{b^2 n \ln(x^n) d}{e^3(ex+d)} + \frac{3b^2 n \ln(x^n) \ln(ex+d)}{e^3} - \frac{3b^2 n \ln(x^n) \ln(x)}{e^3} + \frac{b^2 n^2 \ln}{}$

input
```
int(x^2*(a+b*ln(c*x^n))^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
2*b^2*ln(x^n)^2/e^3*d/(e*x+d)+b^2*ln(x^n)^2/e^3*ln(e*x+d)-1/2*b^2*ln(x^n)^
2/e^3*d^2/(e*x+d)^2+b^2*n*ln(x^n)/e^3*d/(e*x+d)+3*b^2*n*ln(x^n)/e^3*ln(e*x
+d)-3*b^2*n/e^3*ln(x^n)*ln(x)+b^2*n^2*ln(e*x+d)/e^3-b^2/e^3*n^2*ln(x)+3/2*
b^2/e^3*n^2*ln(x)^2-3*b^2/e^3*n^2*ln(e*x+d)*ln(-e*x/d)-3*b^2/e^3*n^2*dilog
(-e*x/d)+2*b^2/e^3*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2+2*b^2/e^3*ln(x)*dilog(-e
*x/d)*n^2-2*b^2*n/e^3*ln(x^n)*ln(e*x+d)*ln(-e*x/d)-2*b^2*n/e^3*ln(x^n)*dil
og(-e*x/d)-b^2/e^3*n^2*ln(e*x+d)*ln(x)^2+b^2/e^3*n^2*ln(x)^2*ln(1+e*x/d)+2
*b^2/e^3*n^2*ln(x)*polylog(2,-e*x/d)-2*b^2*n^2*polylog(3,-e*x/d)/e^3+(I*Pi
*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-
I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*(
2*ln(x^n)/e^3*d/(e*x+d)+ln(x^n)/e^3*ln(e*x+d)-1/2*ln(x^n)/e^3*d^2/(e*x+d)^
2-1/2*n*(-1/e^3*d/(e*x+d)-3/e^3*ln(e*x+d)+3/e^3*ln(e*x)+2/e^3*ln(e*x+d)*ln
(-e*x/d)+2/e^3*dilog(-e*x/d)))+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*P
i*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn
(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^2*(2/e^3*d/(e*x+d)+1/e^3*ln(e*x+d)-1/
2/e^3*d^2/(e*x+d)^2)
```

Fricas [F]

$$\int \frac{x^2(a + b\log{(cx^n)})^2}{(d+ex)^3}\,dx = \int \frac{(b\log{(cx^n)} + a)^2 x^2}{(ex+d)^3}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b^2*x^2*log(c*x^n)^2 + 2*a*b*x^2*log(c*x^n) + a^2*x^2)/(e^3*x^3
+ 3*d*e^2*x^2 + 3*d^2*e*x + d^3), x)
```

Sympy [F]

$$\int \frac{x^2(a+b\log{(cx^n)})^2}{(d+ex)^3}\,dx = \int \frac{x^2(a+b\log{(cx^n)})^2}{(d+ex)^3}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))**2/(e*x+d)**3,x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))**2/(d + e*x)**3, x)
```

Maxima [F]

$$\int \frac{x^2(a+b\log{(cx^n)})^2}{(d+ex)^3}\,dx = \int \frac{(b\log{(cx^n)}+a)^2x^2}{(ex+d)^3}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="maxima")
```

output
```
1/2*a^2*((4*d*e*x + 3*d^2)/(e^5*x^2 + 2*d*e^4*x + d^2*e^3) + 2*log(e*x + d
)/e^3) + integrate((b^2*x^2*log(x^n)^2 + 2*(b^2*log(c) + a*b)*x^2*log(x^n)
 + (b^2*log(c)^2 + 2*a*b*log(c))*x^2)/(e^3*x^3 + 3*d*e^2*x^2 + 3*d^2*e*x +
 d^3), x)
```

Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{(ex+d)^3}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x^2/(e*x + d)^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^3}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n))^2)/(d + e*x)^3,x)
```

output
```
int((x^2*(a + b*log(c*x^n))^2)/(d + e*x)^3, x)
```

Reduce [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \text{Too large to display}$$

input
```
int(x^2*(a+b*log(c*x^n))^2/(e*x+d)^3,x)
```

output
```
( - 6*int(log(x**n*c)**2/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x*
*4),x)*b**2*d**5*n - 12*int(log(x**n*c)**2/(d**3*x + 3*d**2*e*x**2 + 3*d*e
**2*x**3 + e**3*x**4),x)*b**2*d**4*e*n*x - 6*int(log(x**n*c)**2/(d**3*x +
3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*b**2*d**3*e**2*n*x**2 - 12*i
nt(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*a*b
*d**5*n - 24*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**
3*x**4),x)*a*b*d**4*e*n*x - 12*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3
*d*e**2*x**3 + e**3*x**4),x)*a*b*d**3*e**2*n*x**2 - 36*int(log(x**n*c)/(d*
*3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*b**2*d**5*n**2 - 72*i
nt(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*b**
2*d**4*e*n**2*x - 36*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x*
*3 + e**3*x**4),x)*b**2*d**3*e**2*n**2*x**2 + 6*log(d + e*x)*a**2*d**2*n +
 12*log(d + e*x)*a**2*d*e*n*x + 6*log(d + e*x)*a**2*e**2*n*x**2 + 36*log(d
 + e*x)*a*b*d**2*n**2 + 72*log(d + e*x)*a*b*d*e*n**2*x + 36*log(d + e*x)*a
*b*e**2*n**2*x**2 + 54*log(d + e*x)*b**2*d**2*n**3 + 108*log(d + e*x)*b**2
*d*e*n**3*x + 54*log(d + e*x)*b**2*e**2*n**3*x**2 + 2*log(x**n*c)**3*b**2*
d**2 + 4*log(x**n*c)**3*b**2*d*e*x + 2*log(x**n*c)**3*b**2*e**2*x**2 + 6*l
og(x**n*c)**2*a*b*d**2 + 12*log(x**n*c)**2*a*b*d*e*x + 6*log(x**n*c)**2*a*
b*e**2*x**2 + 18*log(x**n*c)**2*b**2*d**2*n + 18*log(x**n*c)**2*b**2*d*e*n
*x + 18*log(x**n*c)*a*b*d**2*n - 18*log(x**n*c)*a*b*e**2*n*x**2 + 36*lo...
```

3.109 $\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$

Optimal result 945
Mathematica [A] (verified) 945
Rubi [A] (verified) 946
Maple [C] (warning: unable to verify) 948
Fricas [F] 948
Sympy [F] 949
Maxima [F] 949
Giac [F] 949
Mupad [F(-1)] 950
Reduce [F] 950

Optimal result

Integrand size = 21, antiderivative size = 112

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \frac{bnx(a+b\log(cx^n))}{de(d+ex)} + \frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2} - \frac{bn(a+bn+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{de^2} - \frac{b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{de^2}$$

output
```
b*n*x*(a+b*ln(c*x^n))/d/e/(e*x+d)+1/2*x^2*(a+b*ln(c*x^n))^2/d/(e*x+d)^2-b*
n*(a+b*n+b*ln(c*x^n))*ln(1+e*x/d)/d/e^2-b^2*n^2*polylog(2,-e*x/d)/d/e^2
```

Mathematica [A] (verified)

Time = 0.26 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.38

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \frac{-\frac{2bn(a+b\log(cx^n))}{d+ex} + \frac{(a+b\log(cx^n))^2}{d} + \frac{d(a+b\log(cx^n))^2}{(d+ex)^2} - \frac{2(a+b\log(cx^n))^2}{d+ex} + \frac{2b^2n^2(\log(x)-\log(d+ex))}{d} - \frac{2bn(a+b\log(cx^n))\log}{d}}{2e^2}$$

input
```
Integrate[(x*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

output
```
((-2*b*n*(a + b*Log[c*x^n]))/(d + e*x) + (a + b*Log[c*x^n])^2/d + (d*(a +
b*Log[c*x^n])^2)/(d + e*x)^2 - (2*(a + b*Log[c*x^n])^2)/(d + e*x) + (2*b^2
*n^2*(Log[x] - Log[d + e*x]))/d - (2*b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/
d])/d - (2*b^2*n^2*PolyLog[2, -((e*x)/d)])/d)/(2*e^2)
```

Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 107, normalized size of antiderivative = 0.96, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2781, 2784, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}dx$$

$$\Big\downarrow \ 2781$$

$$\frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{bn\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}dx}{d}$$

$$\Big\downarrow \ 2784$$

$$\frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{bn\left(\frac{\int \frac{a+bn+b\log(cx^n)}{d+ex}dx}{e}-\frac{x(a+b\log(cx^n))}{e(d+ex)}\right)}{d}$$

$$\Big\downarrow \ 2754$$

$$\frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{bn\left(\frac{\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n)+bn)}{e}-\frac{bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}}{e}-\frac{x(a+b\log(cx^n))}{e(d+ex)}\right)}{d}$$

$$\Big\downarrow \ 2838$$

$$\frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{bn\left(\frac{\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n)+bn)}{e}+\frac{bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}}{e}-\frac{x(a+b\log(cx^n))}{e(d+ex)}\right)}{d}$$

input
```
Int[(x*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

output
```
(x^2*(a + b*Log[c*x^n])^2)/(2*d*(d + e*x)^2) - (b*n*(-((x*(a + b*Log[c*x^n
]))/(e*(d + e*x))) + (((a + b*n + b*Log[c*x^n])*Log[1 + (e*x)/d])/e + (b*n
*PolyLog[2, -((e*x)/d)])/e)/e))/d
```

Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2781
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_))^(q_), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x)^(q + 1)*((a
+ b*Log[c*x^n])^p/(d*f*(q + 1))), x] + Simp[b*n*(p/(d*(q + 1)))   Int[(f*x)
^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b, c,
d, e, f, m, n, q}, x] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.66 (sec) , antiderivative size = 484, normalized size of antiderivative = 4.32

method	result
risch	$-\frac{b^{2}\ln(x^{n})^{2}}{e^{2}(ex+d)}+\frac{b^{2}\ln(x^{n})^{2}d}{2e^{2}(ex+d)^{2}}-\frac{b^{2}n\ln(x^{n})}{e^{2}(ex+d)}-\frac{b^{2}n\ln(x^{n})\ln(ex+d)}{e^{2}d}+\frac{b^{2}n\ln(x^{n})\ln(x)}{e^{2}d}-\frac{b^{2}n^{2}\ln(x)^{2}}{2e^{2}d}-\frac{b^{2}n^{2}\ln(ex+d)}{e^{2}d}+$

input
```
int(x*(a+b*ln(c*x^n))^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-b^2*ln(x^n)^2/e^2/(e*x+d)+1/2*b^2*ln(x^n)^2/e^2*d/(e*x+d)^2-b^2*n*ln(x^n)
/e^2/(e*x+d)-b^2*n*ln(x^n)/e^2/d*ln(e*x+d)+b^2*n*ln(x^n)/e^2/d*ln(x)-1/2*b
^2*n^2/e^2/d*ln(x)^2-b^2*n^2/e^2/d*ln(e*x+d)+b^2*n^2/e^2/d*ln(x)+b^2*n^2/e
^2/d*ln(e*x+d)*ln(-e*x/d)+b^2*n^2/e^2/d*dilog(-e*x/d)+(I*Pi*b*csgn(I*x^n)*
csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c
*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*(-ln(x^n)/e^2/(e
*x+d)+1/2*ln(x^n)/e^2*d/(e*x+d)^2-1/2*n/e^2*(1/d*ln(e*x+d)+1/(e*x+d)-1/d*l
n(x)))+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c
*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*
b*ln(c)+2*a)^2*(-1/e^2/(e*x+d)+1/2/e^2*d/(e*x+d)^2)
```

Fricas [F]

$$\int \frac{x(a+b\log(cx^{n}))^{2}}{(d+ex)^{3}}\,dx=\int \frac{(b\log(cx^{n})+a)^{2}x}{(ex+d)^{3}}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b^2*x*log(c*x^n)^2 + 2*a*b*x*log(c*x^n) + a^2*x)/(e^3*x^3 + 3*d*
e^2*x^2 + 3*d^2*e*x + d^3), x)
```

Sympy [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$

input
```
integrate(x*(a+b*ln(c*x**n))**2/(e*x+d)**3,x)
```

output
```
Integral(x*(a + b*log(c*x**n))**2/(d + e*x)**3, x)
```

Maxima [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2x}{(ex+d)^3}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="maxima")
```

output
```
-a*b*n*(1/(e^3*x + d*e^2) + log(e*x + d)/(d*e^2) - log(x)/(d*e^2)) - 1/2*(
(2*e*x + d)*log(x^n)^2/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) - 2*integrate((e^2*
x^2*log(c)^2 + (3*d*e*n*x + d^2*n + 2*(e^2*n + e^2*log(c))*x^2)*log(x^n))/
(e^5*x^4 + 3*d*e^4*x^3 + 3*d^2*e^3*x^2 + d^3*e^2*x), x))*b^2 - (2*e*x + d)
*a*b*log(c*x^n)/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) - 1/2*(2*e*x + d)*a^2/(e^4
*x^2 + 2*d*e^3*x + d^2*e^2)
```

Giac [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2x}{(ex+d)^3}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x/(e*x + d)^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^3}\,dx$$

input
```
int((x*(a + b*log(c*x^n))^2)/(d + e*x)^3,x)
```

output
```
int((x*(a + b*log(c*x^n))^2)/(d + e*x)^3, x)
```

Reduce [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \frac{4\left(\int \frac{\log(x^n c)}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+d^3x}dx\right)b^2d^5n+8\left(\int \frac{\log(x^n c)}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+d^3x}dx\right)b^2d^4enx+4\left(\int \frac{\log(x^n c)}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+}\right.}{}$$

input
```
int(x*(a+b*log(c*x^n))^2/(e*x+d)^3,x)
```

output
```
(4*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)
*b**2*d**5*n + 8*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 +
 e**3*x**4),x)*b**2*d**4*e*n*x + 4*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2
 + 3*d*e**2*x**3 + e**3*x**4),x)*b**2*d**3*e**2*n*x**2 - 4*log(d + e*x)*a*
b*d**2*n - 8*log(d + e*x)*a*b*d*e*n*x - 4*log(d + e*x)*a*b*e**2*n*x**2 - 1
0*log(d + e*x)*b**2*d**2*n**2 - 20*log(d + e*x)*b**2*d*e*n**2*x - 10*log(d
 + e*x)*b**2*e**2*n**2*x**2 - 2*log(x**n*c)**2*b**2*d**2 - 4*log(x**n*c)**
2*b**2*d*e*x + 4*log(x**n*c)*a*b*e**2*x**2 - 6*log(x**n*c)*b**2*d**2*n + 4
*log(x**n*c)*b**2*e**2*n*x**2 + 6*log(x)*b**2*d**2*n**2 + 12*log(x)*b**2*d
*e*n**2*x + 6*log(x)*b**2*e**2*n**2*x**2 + 2*a**2*e**2*x**2 - 2*a*b*d**2*n
 + 2*a*b*e**2*n*x**2 + b**2*d**2*n**2 - b**2*e**2*n**2*x**2)/(4*d*e**2*(d*
*2 + 2*d*e*x + e**2*x**2))
```

3.110 $\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$

Optimal result 951
Mathematica [A] (verified) 951
Rubi [A] (verified) 952
Maple [C] (warning: unable to verify) 954
Fricas [F] 955
Sympy [F] 955
Maxima [F] 956
Giac [F] 956
Mupad [F(-1)] 956
Reduce [F] 957

Optimal result

Integrand size = 20, antiderivative size = 126

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = -\frac{bnx(a+b\log(cx^n))}{d^2(d+ex)} - \frac{bn\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^2e} - \frac{(a+b\log(cx^n))^2}{2e(d+ex)^2} + \frac{b^2n^2\log(d+ex)}{d^2e} + \frac{b^2n^2\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^2e}$$

output
```
-b*n*x*(a+b*ln(c*x^n))/d^2/(e*x+d)-b*n*ln(1+d/e/x)*(a+b*ln(c*x^n))/d^2/e-1
/2*(a+b*ln(c*x^n))^2/e/(e*x+d)^2+b^2*n^2*ln(e*x+d)/d^2/e+b^2*n^2*polylog(2
,-d/e/x)/d^2/e
```

Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 146, normalized size of antiderivative = 1.16

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = -\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2} + \frac{bn\left(\frac{a+b\log(cx^n)}{d(d+ex)} + \frac{(a+b\log(cx^n))^2}{2bd^2n} - \frac{bn\left(\frac{\log(x)}{d}-\frac{\log(d+ex)}{d}\right)}{d} - \frac{(a+b\log(cx^n))\log\left(\frac{d+ex}{d}\right)}{d^2} - \frac{bn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^2}\right)}{e}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(d + e*x)^3,x]
```

output
```
-1/2*(a + b*Log[c*x^n])^2/(e*(d + e*x)^2) + (b*n*((a + b*Log[c*x^n])/(d*(d
 + e*x)) + (a + b*Log[c*x^n])^2/(2*b*d^2*n) - (b*n*(Log[x]/d - Log[d + e*x
]/d))/d - ((a + b*Log[c*x^n])*Log[(d + e*x)/d])/d^2 - (b*n*PolyLog[2, -((e
*x)/d)])/d^2))/e
```

Rubi [A] (verified)

Time = 0.55 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.01, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.300, Rules used = {2756, 2789, 2751, 16, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}dx$$

$$\Big\downarrow \text{2756}$$

$$\frac{bn\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}$$

$$\Big\downarrow \text{2789}$$

$$\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}$$

$$\Big\downarrow \text{2751}$$

$$\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int \frac{1}{d+ex}dx}{d}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}$$

$$\Big\downarrow \text{16}$$

$$\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}$$

$$\Big\downarrow \text{2779}$$

$$\frac{bn\left(\frac{\frac{bn\int \frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}$$

$$\Big\downarrow \text{2838}$$

$$\frac{bn\left(\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}$$

input
```
Int[(a + b*Log[c*x^n])^2/(d + e*x)^3,x]
```

output
```
-1/2*(a + b*Log[c*x^n])^2/(e*(d + e*x)^2) + (b*n*(-((e*((x*(a + b*Log[c*x^
n]))/(d*(d + e*x)) - (b*n*Log[d + e*x])/(d*e)))/d) + (-((Log[1 + d/(e*x)]*
(a + b*Log[c*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x))])/d)/d))/e
```

Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.63 (sec) , antiderivative size = 435, normalized size of antiderivative = 3.45

method	result
risch	$-\frac{b^{2} \ln \left(x^{n}\right)^{2}}{2 e \left(e x+d\right)^{2}}-\frac{b^{2} n \ln \left(x^{n}\right) \ln \left(e x+d\right)}{e\, d^{2}}+\frac{b^{2} n \ln \left(x^{n}\right)}{e d \left(e x+d\right)}+\frac{b^{2} n \ln \left(x^{n}\right) \ln \left(x\right)}{e\, d^{2}}-\frac{b^{2} n^{2} \ln \left(x\right)^{2}}{2 e\, d^{2}}+\frac{b^{2} n^{2} \ln \left(e x+d\right)}{d^{2} e}-\frac{b^{2} n^{2} \ln \left(x\right)}{e\, d^{2}}+$

input
```
int((a+b*ln(c*x^n))^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-1/2*b^2*ln(x^n)^2/e/(e*x+d)^2-b^2/e*n*ln(x^n)/d^2*ln(e*x+d)+b^2*n*ln(x^n)
/e/d/(e*x+d)+b^2/e*n*ln(x^n)/d^2*ln(x)-1/2*b^2/e*n^2/d^2*ln(x)^2+b^2*n^2*l
n(e*x+d)/d^2/e-b^2/e*n^2/d^2*ln(x)+b^2/e*n^2/d^2*ln(e*x+d)*ln(-e*x/d)+b^2/
e*n^2/d^2*dilog(-e*x/d)+(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*
x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2
*csgn(I*c)+2*b*ln(c)+2*a)*b*(-1/2*ln(x^n)/e/(e*x+d)^2+1/2/e*n*(-1/d^2*ln(e
*x+d)+1/d/(e*x+d)+1/d^2*ln(x)))-1/8*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*
Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csg
n(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^2/(e*x+d)^2/e
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx=\int \frac{(b\log(cx^n)+a)^2}{(ex+d)^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^3*x^3 + 3*d*e^2*x^
2 + 3*d^2*e*x + d^3), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx=\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/(e*x+d)**3,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(d + e*x)**3, x)
```

Maxima [F]

$$\int \frac{(a+b\log{(cx^n)})^2}{(d+ex)^3}\,dx = \int \frac{(b\log{(cx^n)}+a)^2}{(ex+d)^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="maxima")
```

output
```
a*b*n*(1/(d*e^2*x + d^2*e) - log(e*x + d)/(d^2*e) + log(x)/(d^2*e)) - 1/2*
b^2*(log(x^n)^2/(e^3*x^2 + 2*d*e^2*x + d^2*e) - 2*integrate((e*x*log(c)^2
+ (d*n + (e*n + 2*e*log(c))*x)*log(x^n))/(e^4*x^4 + 3*d*e^3*x^3 + 3*d^2*e^
2*x^2 + d^3*e*x), x)) - a*b*log(c*x^n)/(e^3*x^2 + 2*d*e^2*x + d^2*e) - 1/2
*a^2/(e^3*x^2 + 2*d*e^2*x + d^2*e)
```

Giac [F]

$$\int \frac{(a+b\log{(cx^n)})^2}{(d+ex)^3}\,dx = \int \frac{(b\log{(cx^n)}+a)^2}{(ex+d)^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/(e*x + d)^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log{(cx^n)})^2}{(d+ex)^3}\,dx = \int \frac{(a+b\,\ln{(c\,x^n)})^2}{(d+e\,x)^3}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(d + e*x)^3,x)
```

output
```
int((a + b*log(c*x^n))^2/(d + e*x)^3, x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$

$$= \frac{4\left(\int \frac{\log(x^n c)}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+d^3x}dx\right)b^2d^5n+8\left(\int \frac{\log(x^n c)}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+d^3x}dx\right)b^2d^4enx+4\left(\int \frac{\log(x^n c)}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+}\right.}{}$$

input
```
int((a+b*log(c*x^n))^2/(e*x+d)^3,x)
```

output
```
(4*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)
*b**2*d**5*n + 8*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 +
 e**3*x**4),x)*b**2*d**4*e*n*x + 4*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2
 + 3*d*e**2*x**3 + e**3*x**4),x)*b**2*d**3*e**2*n*x**2 - 4*log(d + e*x)*a*
b*d**2*n - 8*log(d + e*x)*a*b*d*e*n*x - 4*log(d + e*x)*a*b*e**2*n*x**2 - 2
*log(d + e*x)*b**2*d**2*n**2 - 4*log(d + e*x)*b**2*d*e*n**2*x - 2*log(d +
e*x)*b**2*e**2*n**2*x**2 - 2*log(x**n*c)**2*b**2*d**2 + 8*log(x**n*c)*a*b*
d*e*x + 4*log(x**n*c)*a*b*e**2*x**2 + 4*log(x**n*c)*b**2*d*e*n*x + 2*log(x
**n*c)*b**2*e**2*n*x**2 - 2*a**2*d**2 + 2*a*b*d**2*n - 2*a*b*e**2*n*x**2 +
 b**2*d**2*n**2 - b**2*e**2*n**2*x**2)/(4*d**2*e*(d**2 + 2*d*e*x + e**2*x*
*2))
```

3.111 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx$

Optimal result 958
Mathematica [A] (verified) 959
Rubi [A] (verified) 959
Maple [C] (warning: unable to verify) 964
Fricas [F] 965
Sympy [F] 966
Maxima [F] 966
Giac [F] 966
Mupad [F(-1)] 967
Reduce [F] 967

Optimal result

Integrand size = 23, antiderivative size = 257

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx &= \frac{benx(a+b\log(cx^n))}{d^3(d+ex)} - \frac{(a+b\log(cx^n))^2}{2d^3} + \frac{(a+b\log(cx^n))^2}{2d(d+ex)^2} \\ &\quad - \frac{ex(a+b\log(cx^n))^2}{d^3(d+ex)} + \frac{(a+b\log(cx^n))^3}{3bd^3n} \\ &\quad - \frac{b^2n^2\log(d+ex)}{d^3} + \frac{3bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^3} \\ &\quad - \frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d^3} + \frac{3b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^3} \\ &\quad - \frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^3} \\ &\quad + \frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^3}\end{aligned}$$

output
```
b*e*n*x*(a+b*ln(c*x^n))/d^3/(e*x+d)-1/2*(a+b*ln(c*x^n))^2/d^3+1/2*(a+b*ln(
c*x^n))^2/d/(e*x+d)^2-e*x*(a+b*ln(c*x^n))^2/d^3/(e*x+d)+1/3*(a+b*ln(c*x^n)
)^3/b/d^3/n-b^2*n^2*ln(e*x+d)/d^3+3*b*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^3-(a
+b*ln(c*x^n))^2*ln(1+e*x/d)/d^3+3*b^2*n^2*polylog(2,-e*x/d)/d^3-2*b*n*(a+b
*ln(c*x^n))*polylog(2,-e*x/d)/d^3+2*b^2*n^2*polylog(3,-e*x/d)/d^3
```

Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 232, normalized size of antiderivative = 0.90

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx$$
$$= \frac{-\frac{6bdn(a+b\log(cx^n))}{d+ex} - 9(a+b\log(cx^n))^2 + \frac{3d^2(a+b\log(cx^n))^2}{(d+ex)^2} + \frac{6d(a+b\log(cx^n))^2}{d+ex} + \frac{2(a+b\log(cx^n))^3}{bn} + 6b^2n^2(\log(x)}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x)^3),x]
```

output
```
((-6*b*d*n*(a + b*Log[c*x^n]))/(d + e*x) - 9*(a + b*Log[c*x^n])^2 + (3*d^2
*(a + b*Log[c*x^n])^2)/(d + e*x)^2 + (6*d*(a + b*Log[c*x^n])^2)/(d + e*x)
+ (2*(a + b*Log[c*x^n])^3)/(b*n) + 6*b^2*n^2*(Log[x] - Log[d + e*x]) + 18*
b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 6*(a + b*Log[c*x^n])^2*Log[1 + (
e*x)/d] + 18*b^2*n^2*PolyLog[2, -((e*x)/d)] - 12*b*n*(a + b*Log[c*x^n])*Po
lyLog[2, -((e*x)/d)] + 12*b^2*n^2*PolyLog[3, -((e*x)/d)])/(6*d^3)
```

Rubi [A] (verified)

Time = 1.79 (sec) , antiderivative size = 293, normalized size of antiderivative = 1.14, number of steps used = 11, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}} = 0.478$, Rules used = {2789, 2756, 2789, 2751, 16, 2755, 2754, 2779, 2821, 2838, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx$$

$$\Big\downarrow \text{ 2789}$$

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}dx}{d} - \frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}dx}{d}$$

$$\Big\downarrow \text{ 2756}$$

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \text{ 2789}$$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \text{ 2751}$$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int \frac{1}{d+ex}dx}{d}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \text{ 16}$$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \text{ 2755}$$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\int \frac{a+b\log(cx^n)}{d+ex}dx}{d}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

$\Big\downarrow$ 2754

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-\frac{bn\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int\frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

$\Big\downarrow$ 2779

$$\frac{\frac{\frac{2bn\int\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-\frac{bn\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\frac{bn\int\frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

$\Big\downarrow$ 2821

$$\frac{\frac{\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}\cdots\right.}{d}\cdots\right.}{d}}{d}$$

$$-\frac{e\left(\frac{bn\left(\frac{\frac{bn\int\frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

$\downarrow$ 2838

$$\frac{\frac{\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}\cdots\right.}{d}\cdots\right.}{d}}{d}$$

$$\frac{e\left(\frac{bn\left(\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

$\downarrow$ 7143

$$\frac{\frac{\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))+bn\,\text{PolyLog}\left(3,-\frac{d}{ex}\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}+\frac{bn\,\text{P}\cdots}{}\right.}{d}\cdots\right.}{d}}{d}$$

$$\frac{e\left(\frac{bn\left(\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

input

```
Int[(a + b*Log[c*x^n])^2/(x*(d + e*x)^3),x]
```

output

```
-((e*(-1/2*(a + b*Log[c*x^n])^2/(e*(d + e*x)^2) + (b*n*(-((e*((x*(a + b*Lo
g[c*x^n]))/(d*(d + e*x)) - (b*n*Log[d + e*x])/(d*e)))/d) + (-((Log[1 + d/(
e*x)]*(a + b*Log[c*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x))])/d)/d))/e))/d)
 + (-((e*((x*(a + b*Log[c*x^n])^2)/(d*(d + e*x)) - (2*b*n*(((a + b*Log[c*x^
n])*Log[1 + (e*x)/d])/e + (b*n*PolyLog[2, -((e*x)/d)])/e))/d))/d) + (-((Lo
g[1 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d) + (2*b*n*((a + b*Log[c*x^n])*PolyL
og[2, -(d/(e*x))] + b*n*PolyLog[3, -(d/(e*x))]))/d)/d)/d
```

Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2755
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Simp[b*n*(p/d)
 Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e,
n, p}, x] && GtQ[p, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.94 (sec) , antiderivative size = 793, normalized size of antiderivative = 3.09

method	result	size
risch	Expression too large to display	793

input
```
int((a+b*ln(c*x^n))^2/x/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-b^2*ln(x^n)^2/d^3*ln(e*x+d)+b^2*ln(x^n)^2/d^2/(e*x+d)+1/2*b^2*ln(x^n)^2/d
/(e*x+d)^2+b^2*ln(x^n)^2/d^3*ln(x)-b^2*n*ln(x^n)/d^2/(e*x+d)+3*b^2*n*ln(x^
n)/d^3*ln(e*x+d)-3*b^2*n*ln(x^n)/d^3*ln(x)-b^2*n^2*ln(e*x+d)/d^3+b^2/d^3*n
^2*ln(x)+3/2*b^2/d^3*n^2*ln(x)^2-3*b^2/d^3*n^2*ln(e*x+d)*ln(-e*x/d)-3*b^2/
d^3*n^2*dilog(-e*x/d)-b^2*n/d^3*ln(x^n)*ln(x)^2+1/3*b^2/d^3*ln(x)^3*n^2-2*
b^2/d^3*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2-2*b^2/d^3*ln(x)*dilog(-e*x/d)*n^2+2
*b^2*n/d^3*ln(x^n)*ln(e*x+d)*ln(-e*x/d)+2*b^2*n/d^3*ln(x^n)*dilog(-e*x/d)+
b^2/d^3*n^2*ln(e*x+d)*ln(x)^2-b^2/d^3*n^2*ln(x)^2*ln(1+e*x/d)-2*b^2/d^3*n^
2*ln(x)*polylog(2,-e*x/d)+2*b^2*n^2*polylog(3,-e*x/d)/d^3+(I*Pi*b*csgn(I*x
^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn
(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*(-ln(x^n)/d^
3*ln(e*x+d)+ln(x^n)/d^2/(e*x+d)+1/2*ln(x^n)/d/(e*x+d)^2+ln(x^n)/d^3*ln(x)-
1/2*n*(1/d^2/(e*x+d)-3/d^3*ln(e*x+d)+3/d^3*ln(x)+1/d^3*ln(x)^2-2/d^3*ln(e*
x+d)*ln(-e*x/d)-2/d^3*dilog(-e*x/d)))+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n
)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi
*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^2*(-1/d^3*ln(e*x+d)+1/d^2/(e*x
+d)+1/2/d/(e*x+d)^2+1/d^3*ln(x))
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^3*x^4 + 3*d*e^2*x^
3 + 3*d^2*e*x^2 + d^3*x), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx = \int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x/(e*x+d)**3,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x*(d + e*x)**3), x)
```

Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d)^3,x, algorithm="maxima")
```

output
```
1/2*a^2*((2*e*x + 3*d)/(d^2*e^2*x^2 + 2*d^3*e*x + d^4) - 2*log(e*x + d)/d^
3 + 2*log(x)/d^3) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c
) + 2*(b^2*log(c) + a*b)*log(x^n))/(e^3*x^4 + 3*d*e^2*x^3 + 3*d^2*e*x^2 +
d^3*x), x)
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)^3*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x\,(d+e\,x)^3}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x*(d + e*x)^3),x)
```

output
```
int((a + b*log(c*x^n))^2/(x*(d + e*x)^3), x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx = \frac{2\left(\int \frac{\log(x^nc)^2}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+d^3x}dx\right)b^2d^5+4\left(\int \frac{\log(x^nc)^2}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+d^3x}dx\right)b^2d^4ex+2\left(\int \frac{\log(x^nc)^2}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+d^3x}\right.}{}$$

input
```
int((a+b*log(c*x^n))^2/x/(e*x+d)^3,x)
```

output
```
(2*int(log(x**n*c)**2/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4)
,x)*b**2*d**5 + 4*int(log(x**n*c)**2/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x*
*3 + e**3*x**4),x)*b**2*d**4*e*x + 2*int(log(x**n*c)**2/(d**3*x + 3*d**2*e
*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*b**2*d**3*e**2*x**2 + 4*int(log(x**n
*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*a*b*d**5 + 8*i
nt(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*a*b
*d**4*e*x + 4*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e*
*3*x**4),x)*a*b*d**3*e**2*x**2 - 2*log(d + e*x)*a**2*d**2 - 4*log(d + e*x)
*a**2*d*e*x - 2*log(d + e*x)*a**2*e**2*x**2 + 2*log(x)*a**2*d**2 + 4*log(x
)*a**2*d*e*x + 2*log(x)*a**2*e**2*x**2 + 2*a**2*d**2 - a**2*e**2*x**2)/(2*
d**3*(d**2 + 2*d*e*x + e**2*x**2))
```

3.112 $\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx$

Optimal result 968
Mathematica [A] (verified) 969
Rubi [A] (verified) 969
Maple [C] (warning: unable to verify) 971
Fricas [F] 972
Sympy [F] 973
Maxima [F] 973
Giac [F] 973
Mupad [F(-1)] 974
Reduce [F] 974

Optimal result

Integrand size = 23, antiderivative size = 322

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx = & -\frac{2b^2n^2}{d^3x}-\frac{2bn(a+b\log(cx^n))}{d^3x}-\frac{be^2nx(a+b\log(cx^n))}{d^4(d+ex)} \\ & +\frac{e(a+b\log(cx^n))^2}{2d^4}-\frac{(a+b\log(cx^n))^2}{d^3x}-\frac{e(a+b\log(cx^n))^2}{2d^2(d+ex)^2} \\ & +\frac{2e^2x(a+b\log(cx^n))^2}{d^4(d+ex)}-\frac{e(a+b\log(cx^n))^3}{bd^4n} \\ & +\frac{b^2en^2\log(d+ex)}{d^4}-\frac{5ben(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^4} \\ & +\frac{3e(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d^4}-\frac{5b^2en^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^4} \\ & +\frac{6ben(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^4} \\ & -\frac{6b^2en^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^4}\end{aligned}$$

output
```
-2*b^2*n^2/d^3/x-2*b*n*(a+b*ln(c*x^n))/d^3/x-b*e^2*n*x*(a+b*ln(c*x^n))/d^4
/(e*x+d)+1/2*e*(a+b*ln(c*x^n))^2/d^4-(a+b*ln(c*x^n))^2/d^3/x-1/2*e*(a+b*ln
(c*x^n))^2/d^2/(e*x+d)^2+2*e^2*x*(a+b*ln(c*x^n))^2/d^4/(e*x+d)-e*(a+b*ln(c
*x^n))^3/b/d^4/n+b^2*e*n^2*ln(e*x+d)/d^4-5*b*e*n*(a+b*ln(c*x^n))*ln(1+e*x/
d)/d^4+3*e*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/d^4-5*b^2*e*n^2*polylog(2,-e*x/d)
/d^4+6*b*e*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/d^4-6*b^2*e*n^2*polylog(3,-
e*x/d)/d^4
```

Mathematica [A] (verified)

Time = 0.49 (sec) , antiderivative size = 290, normalized size of antiderivative = 0.90

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx = -\frac{\frac{4b^2dn^2}{x} + \frac{4bdn(a+b\log(cx^n))}{x} - \frac{2bden(a+b\log(cx^n))}{d+ex} - 5e(a+b\log(cx^n))^2 + \frac{2d(a+b\log(cx^n))^2}{x} + \frac{d^2e(a+b\log(cx^n))^2}{(d+ex)^2} + \cdots}{\cdots}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)^3),x]
```

output
```
-1/2*((4*b^2*d*n^2)/x + (4*b*d*n*(a + b*Log[c*x^n]))/x - (2*b*d*e*n*(a + b
*Log[c*x^n]))/(d + e*x) - 5*e*(a + b*Log[c*x^n])^2 + (2*d*(a + b*Log[c*x^n
])^2)/x + (d^2*e*(a + b*Log[c*x^n])^2)/(d + e*x)^2 + (4*d*e*(a + b*Log[c*x
^n])^2)/(d + e*x) + (2*e*(a + b*Log[c*x^n])^3)/(b*n) + 2*b^2*e*n^2*(Log[x]
 - Log[d + e*x]) + 10*b*e*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 6*e*(a +
 b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 10*b^2*e*n^2*PolyLog[2, -((e*x)/d)] -
12*b*e*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + 12*b^2*e*n^2*PolyLog[
3, -((e*x)/d)])/d^4
```

Rubi [A] (verified)

Time = 0.84 (sec) , antiderivative size = 335, normalized size of antiderivative = 1.04, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx$$
$$\Big\downarrow \text{2795}$$
$$\int \left(\frac{2e^2(a+b\log(cx^n))^2}{d^3(d+ex)^2}-\frac{3e(a+b\log(cx^n))^2}{d^3x(d+ex)}+\frac{(a+b\log(cx^n))^2}{d^3x^2}+\frac{e^2(a+b\log(cx^n))^2}{d^2(d+ex)^3}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{2e^2x(a+b\log(cx^n))^2}{d^4(d+ex)}-\frac{be^2nx(a+b\log(cx^n))}{d^4(d+ex)}-\frac{6ben\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^4}+\frac{3e\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d^4}-\frac{ben\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^4}-\frac{4ben\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{d^4}-\frac{(a+b\log(cx^n))^2}{d^3x}-\frac{2bn(a+b\log(cx^n))}{d^3x}-\frac{e(a+b\log(cx^n))^2}{2d^2(d+ex)^2}+\frac{b^2en^2\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}-\frac{4b^2en^2\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^4}-\frac{6b^2en^2\,\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^4}+\frac{b^2en^2\log(d+ex)}{d^4}-\frac{2b^2n^2}{d^3x}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)^3),x]
```

output
```
(-2*b^2*n^2)/(d^3*x) - (2*b*n*(a + b*Log[c*x^n]))/(d^3*x) - (b*e^2*n*x*(a
+ b*Log[c*x^n]))/(d^4*(d + e*x)) - (b*e*n*Log[1 + d/(e*x)]*(a + b*Log[c*x^
n]))/d^4 - (a + b*Log[c*x^n])^2/(d^3*x) - (e*(a + b*Log[c*x^n])^2)/(2*d^2*
(d + e*x)^2) + (2*e^2*x*(a + b*Log[c*x^n])^2)/(d^4*(d + e*x)) + (3*e*Log[1
 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d^4 + (b^2*e*n^2*Log[d + e*x])/d^4 - (4*
b*e*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/d^4 + (b^2*e*n^2*PolyLog[2, -(d
/(e*x))])/d^4 - (6*b*e*n*(a + b*Log[c*x^n])*PolyLog[2, -(d/(e*x))])/d^4 -
(4*b^2*e*n^2*PolyLog[2, -((e*x)/d)])/d^4 - (6*b^2*e*n^2*PolyLog[3, -(d/(e*
x))])/d^4
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.13 (sec) , antiderivative size = 908, normalized size of antiderivative = 2.82

method	result	size
risch	Expression too large to display	908

input
```
int((a+b*ln(c*x^n))^2/x^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-2*b^2*n*ln(x^n)/d^3/x+b^2*n*ln(x^n)/d^3*e/(e*x+d)-b^2*ln(x^n)^2/d^3/x+5*b
^2/d^4*n^2*e*ln(e*x+d)*ln(-e*x/d)+3*b^2*n/d^4*e*ln(x^n)*ln(x)^2+6*b^2/d^4*
e*ln(x)*dilog(-e*x/d)*n^2-6*b^2*n/d^4*e*ln(x^n)*dilog(-e*x/d)-3*b^2/d^4*e*
n^2*ln(e*x+d)*ln(x)^2+3*b^2/d^4*e*n^2*ln(x)^2*ln(1+e*x/d)+6*b^2/d^4*e*n^2*
ln(x)*polylog(2,-e*x/d)-5*b^2*n*ln(x^n)/d^4*e*ln(e*x+d)+5*b^2*n*ln(x^n)/d^
4*e*ln(x)+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(
I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)
+2*b*ln(c)+2*a)^2*(-1/2/d^2/(e*x+d)^2*e+3/d^4*e*ln(e*x+d)-2/d^3*e/(e*x+d)-
1/d^3/x-3/d^4*e*ln(x))-5/2*b^2/d^4*n^2*e*ln(x)^2+5*b^2/d^4*n^2*e*dilog(-e*
x/d)-3*b^2*ln(x^n)^2/d^4*e*ln(x)-b^2/d^4*e*ln(x)^3*n^2-b^2/d^4*n^2*e*ln(x)
+3*b^2*ln(x^n)^2/d^4*e*ln(e*x+d)+(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*
b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I
*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*(-1/2*ln(x^n)/d^2/(e*x+d)^2*e+3*ln(x^
n)/d^4*e*ln(e*x+d)-2*ln(x^n)/d^3*e/(e*x+d)-ln(x^n)/d^3/x-3*ln(x^n)/d^4*e*l
n(x)-1/2*n*(-3/d^4*e*ln(x)^2+6/d^4*e*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))-
1/d^3*e/(e*x+d)+5/d^4*e*ln(e*x+d)+2/d^3/x-5/d^4*e*ln(x)))-6*b^2*n/d^4*e*ln
(x^n)*ln(e*x+d)*ln(-e*x/d)+6*b^2/d^4*e*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2-6*b^
2*e*n^2*polylog(3,-e*x/d)/d^4-2*b^2*ln(x^n)^2/d^3*e/(e*x+d)-1/2*b^2*ln(x^n
)^2/d^2/(e*x+d)^2*e+b^2*e*n^2*ln(e*x+d)/d^4-2*b^2*n^2/d^3/x
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^3x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^3*x^5 + 3*d*e^2*x^
4 + 3*d^2*e*x^3 + d^3*x^2), x)
```

Sympy [F]

$$\int \frac{(a + b\log(cx^n))^2}{x^2(d + ex)^3} dx = \int \frac{(a + b\log(cx^n))^2}{x^2 (d + ex)^3} dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x**2/(e*x+d)**3,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x**2*(d + e*x)**3), x)
```

Maxima [F]

$$\int \frac{(a + b\log(cx^n))^2}{x^2(d + ex)^3} dx = \int \frac{(b\log(cx^n) + a)^2}{(ex + d)^3 x^2} dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^3,x, algorithm="maxima")
```

output
```
-1/2*a^2*((6*e^2*x^2 + 9*d*e*x + 2*d^2)/(d^3*e^2*x^3 + 2*d^4*e*x^2 + d^5*x
) - 6*e*log(e*x + d)/d^4 + 6*e*log(x)/d^4) + integrate((b^2*log(c)^2 + b^2
*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e^3*x^5 + 3*d
*e^2*x^4 + 3*d^2*e*x^3 + d^3*x^2), x)
```

Giac [F]

$$\int \frac{(a + b\log(cx^n))^2}{x^2(d + ex)^3} dx = \int \frac{(b\log(cx^n) + a)^2}{(ex + d)^3 x^2} dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)^3*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x^2\,(d+e\,x)^3}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x^2*(d + e*x)^3),x)
```

output
```
int((a + b*log(c*x^n))^2/(x^2*(d + e*x)^3), x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx$$
$$= \frac{2\left(\int \frac{\log(x^n c)^2}{e^3x^5+3d\,e^2x^4+3d^2e\,x^3+d^3x^2}dx\right)b^2d^6x+4\left(\int \frac{\log(x^n c)^2}{e^3x^5+3d\,e^2x^4+3d^2e\,x^3+d^3x^2}dx\right)b^2d^5e\,x^2+2\left(\int \frac{\log(x^n c)^2}{e^3x^5+3d\,e^2x^4+3d^2e\,x^3}\right.}{}$$

input
```
int((a+b*log(c*x^n))^2/x^2/(e*x+d)^3,x)
```

output
```
(2*int(log(x**n*c)**2/(d**3*x**2 + 3*d**2*e*x**3 + 3*d*e**2*x**4 + e**3*x*
*5),x)*b**2*d**6*x + 4*int(log(x**n*c)**2/(d**3*x**2 + 3*d**2*e*x**3 + 3*d
*e**2*x**4 + e**3*x**5),x)*b**2*d**5*e*x**2 + 2*int(log(x**n*c)**2/(d**3*x
**2 + 3*d**2*e*x**3 + 3*d*e**2*x**4 + e**3*x**5),x)*b**2*d**4*e**2*x**3 +
4*int(log(x**n*c)/(d**3*x**2 + 3*d**2*e*x**3 + 3*d*e**2*x**4 + e**3*x**5),
x)*a*b*d**6*x + 8*int(log(x**n*c)/(d**3*x**2 + 3*d**2*e*x**3 + 3*d*e**2*x*
*4 + e**3*x**5),x)*a*b*d**5*e*x**2 + 4*int(log(x**n*c)/(d**3*x**2 + 3*d**2
*e*x**3 + 3*d*e**2*x**4 + e**3*x**5),x)*a*b*d**4*e**2*x**3 + 6*log(d + e*x
)*a**2*d**2*e*x + 12*log(d + e*x)*a**2*d*e**2*x**2 + 6*log(d + e*x)*a**2*e
**3*x**3 - 6*log(x)*a**2*d**2*e*x - 12*log(x)*a**2*d*e**2*x**2 - 6*log(x)*
a**2*e**3*x**3 - 2*a**2*d**3 - 6*a**2*d**2*e*x + 3*a**2*e**3*x**3)/(2*d**4
*x*(d**2 + 2*d*e*x + e**2*x**2))
```

3.113 $\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

Optimal result 975
Mathematica [A] (verified) 976
Rubi [A] (verified) 977
Maple [C] (warning: unable to verify) 978
Fricas [F] 979
Sympy [F] 980
Maxima [F] 980
Giac [F] 980
Mupad [F(-1)] 981
Reduce [F] 981

Optimal result

Integrand size = 23, antiderivative size = 398

$$\begin{aligned}\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = &-\frac{2abnx}{e^4}+\frac{2b^2n^2x}{e^4}-\frac{b^2d^2n^2}{3e^5(d+ex)}-\frac{b^2dn^2\log(x)}{3e^5}\\ &-\frac{2b^2nx\log(cx^n)}{e^4}+\frac{bd^3n(a+b\log(cx^n))}{3e^5(d+ex)^2}\\ &+\frac{10bdnx(a+b\log(cx^n))}{3e^4(d+ex)}-\frac{5d(a+b\log(cx^n))^2}{3e^5}\\ &+\frac{x(a+b\log(cx^n))^2}{e^4}-\frac{d^4(a+b\log(cx^n))^2}{3e^5(d+ex)^3}\\ &+\frac{2d^3(a+b\log(cx^n))^2}{e^5(d+ex)^2}+\frac{6dx(a+b\log(cx^n))^2}{e^4(d+ex)}\\ &-\frac{3b^2dn^2\log(d+ex)}{e^5}-\frac{26bdn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{3e^5}\\ &-\frac{4d(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^5}\\ &-\frac{26b^2dn^2\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{3e^5}\\ &-\frac{8bdn(a+b\log(cx^n))\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^5}\\ &+\frac{8b^2dn^2\,\mathrm{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^5}\end{aligned}$$

output
```
-2*a*b*n*x/e^4+2*b^2*n^2*x/e^4-1/3*b^2*d^2*n^2/e^5/(e*x+d)-1/3*b^2*d*n^2*l
n(x)/e^5-2*b^2*n*x*ln(c*x^n)/e^4+1/3*b*d^3*n*(a+b*ln(c*x^n))/e^5/(e*x+d)^2
+10/3*b*d*n*x*(a+b*ln(c*x^n))/e^4/(e*x+d)-5/3*d*(a+b*ln(c*x^n))^2/e^5+x*(a
+b*ln(c*x^n))^2/e^4-1/3*d^4*(a+b*ln(c*x^n))^2/e^5/(e*x+d)^3+2*d^3*(a+b*ln(
c*x^n))^2/e^5/(e*x+d)^2+6*d*x*(a+b*ln(c*x^n))^2/e^4/(e*x+d)-3*b^2*d*n^2*ln
(e*x+d)/e^5-26/3*b*d*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^5-4*d*(a+b*ln(c*x^n))
^2*ln(1+e*x/d)/e^5-26/3*b^2*d*n^2*polylog(2,-e*x/d)/e^5-8*b*d*n*(a+b*ln(c*
x^n))*polylog(2,-e*x/d)/e^5+8*b^2*d*n^2*polylog(3,-e*x/d)/e^5
```

Mathematica [A] (verified)

Time = 0.76 (sec) , antiderivative size = 344, normalized size of antiderivative = 0.86

$$\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx =$$

$$-\frac{-\frac{bd^3n(a+b\log(cx^n))}{(d+ex)^2}+\frac{10bd^2n(a+b\log(cx^n))}{d+ex}-13d(a+b\log(cx^n))^2-3ex(a+b\log(cx^n))^2+\frac{d^4(a+b\log(cx^n))^2}{(d+ex)^3}}{}$$

input
```
Integrate[(x^4*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

output
```
-1/3*(-((b*d^3*n*(a + b*Log[c*x^n]))/(d + e*x)^2) + (10*b*d^2*n*(a + b*Log
[c*x^n]))/(d + e*x) - 13*d*(a + b*Log[c*x^n])^2 - 3*e*x*(a + b*Log[c*x^n])
^2 + (d^4*(a + b*Log[c*x^n])^2)/(d + e*x)^3 - (6*d^3*(a + b*Log[c*x^n])^2)
/(d + e*x)^2 + (18*d^2*(a + b*Log[c*x^n])^2)/(d + e*x) + 6*b*e*n*x*(a - b*
n + b*Log[c*x^n]) - 10*b^2*d*n^2*(Log[x] - Log[d + e*x]) + (b^2*d*n^2*(d +
 (d + e*x)*Log[x] - (d + e*x)*Log[d + e*x]))/(d + e*x) + 26*b*d*n*(a + b*L
og[c*x^n])*Log[1 + (e*x)/d] + 12*d*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] +
 26*b^2*d*n^2*PolyLog[2, -((e*x)/d)] + 24*b*d*n*(a + b*Log[c*x^n])*PolyLog
[2, -((e*x)/d)] - 24*b^2*d*n^2*PolyLog[3, -((e*x)/d)])/e^5
```

Rubi [A] (verified)

Time = 1.09 (sec) , antiderivative size = 430, normalized size of antiderivative = 1.08, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$

$$\Big\downarrow \text{ 2795}$$

$$\int \left(\frac{d^4(a+b\log(cx^n))^2}{e^4(d+ex)^4}-\frac{4d^3(a+b\log(cx^n))^2}{e^4(d+ex)^3}+\frac{6d^2(a+b\log(cx^n))^2}{e^4(d+ex)^2}-\frac{4d(a+b\log(cx^n))^2}{e^4(d+ex)}+\frac{(a+b\log(cx^n))^2}{e^4}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^4(a+b\log(cx^n))^2}{3e^5(d+ex)^3}+\frac{2d^3(a+b\log(cx^n))^2}{e^5(d+ex)^2}+\frac{bd^3n(a+b\log(cx^n))}{3e^5(d+ex)^2}-\frac{8bdn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^5}+\frac{10bdn\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{3e^5}-\frac{4d\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^5}-\frac{12bdn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^5}+\frac{6dx(a+b\log(cx^n))^2}{e^4(d+ex)}+\frac{10bdnx(a+b\log(cx^n))}{3e^4(d+ex)}+\frac{x(a+b\log(cx^n))^2}{e^4}-\frac{2abnx}{e^4}-\frac{2b^2nx\log(cx^n)}{e^4}-\frac{b^2d^2n^2}{3e^5(d+ex)}-\frac{10b^2dn^2\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{3e^5}-\frac{12b^2dn^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^5}+\frac{8b^2dn^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^5}-\frac{b^2dn^2\log(x)}{3e^5}-\frac{3b^2dn^2\log(d+ex)}{e^5}+\frac{2b^2n^2x}{e^4}$$

input
```
Int[(x^4*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

output
```
(-2*a*b*n*x)/e^4 + (2*b^2*n^2*x)/e^4 - (b^2*d^2*n^2)/(3*e^5*(d + e*x)) - (
b^2*d*n^2*Log[x])/(3*e^5) - (2*b^2*n*x*Log[c*x^n])/e^4 + (b*d^3*n*(a + b*L
og[c*x^n]))/(3*e^5*(d + e*x)^2) + (10*b*d*n*x*(a + b*Log[c*x^n]))/(3*e^4*(
d + e*x)) + (10*b*d*n*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/(3*e^5) + (x*(a
 + b*Log[c*x^n])^2)/e^4 - (d^4*(a + b*Log[c*x^n])^2)/(3*e^5*(d + e*x)^3) +
 (2*d^3*(a + b*Log[c*x^n])^2)/(e^5*(d + e*x)^2) + (6*d*x*(a + b*Log[c*x^n]
)^2)/(e^4*(d + e*x)) - (3*b^2*d*n^2*Log[d + e*x])/e^5 - (12*b*d*n*(a + b*L
og[c*x^n])*Log[1 + (e*x)/d])/e^5 - (4*d*(a + b*Log[c*x^n])^2*Log[1 + (e*x)
/d])/e^5 - (10*b^2*d*n^2*PolyLog[2, -(d/(e*x))])/(3*e^5) - (12*b^2*d*n^2*P
olyLog[2, -((e*x)/d)])/e^5 - (8*b*d*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x
)/d)])/e^5 + (8*b^2*d*n^2*PolyLog[3, -((e*x)/d)])/e^5
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.14 (sec) , antiderivative size = 943, normalized size of antiderivative = 2.37

method	result	size
risch	Expression too large to display	943

input
```
int(x^4*(a+b*ln(c*x^n))^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
b^2*ln(x^n)^2*x/e^4-4*b^2*ln(x^n)^2/e^5*d*ln(e*x+d)-8*b^2/e^5*d*n^2*ln(x)*
polylog(2,-e*x/d)+1/3*b^2*n*ln(x^n)/e^5*d^3/(e*x+d)^2-13/3*b^2/e^5*n^2*d*l
n(x)^2+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c
*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*
b*ln(c)+2*a)^2*(x/e^4-6/e^5*d^2/(e*x+d)-4/e^5*d*ln(e*x+d)+2/e^5*d^3/(e*x+d
)^2-1/3/e^5*d^4/(e*x+d)^3)-26/3*b^2*n*ln(x^n)/e^5*d*ln(e*x+d)-10/3*b^2*n*l
n(x^n)/e^5*d^2/(e*x+d)+26/3*b^2*n/e^5*ln(x)*ln(x^n)*d+26/3*b^2/e^5*n^2*ln(
e*x+d)*ln(-e*x/d)*d-8*b^2/e^5*d*ln(x)*dilog(-e*x/d)*n^2+8*b^2*n/e^5*d*ln(x
^n)*dilog(-e*x/d)+4*b^2/e^5*d*n^2*ln(e*x+d)*ln(x)^2-4*b^2/e^5*d*n^2*ln(x)^
2*ln(1+e*x/d)+2*b^2*ln(x^n)^2/e^5*d^3/(e*x+d)^2-2*b^2*n*ln(x^n)*x/e^4-8*b^
2/e^5*d*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2+8*b^2*n/e^5*d*ln(x^n)*ln(e*x+d)*ln(
-e*x/d)-1/3*b^2*ln(x^n)^2*d^4/e^5/(e*x+d)^3+26/3*b^2/e^5*n^2*dilog(-e*x/d)
*d-6*b^2*ln(x^n)^2/e^5*d^2/(e*x+d)-1/3*b^2*d^2*n^2/e^5/(e*x+d)+3*b^2*d*n^2
*ln(x)/e^5-3*b^2*d*n^2*ln(e*x+d)/e^5+8*b^2*d*n^2*polylog(3,-e*x/d)/e^5+(I*
Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c
)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b
*(ln(x^n)*x/e^4-6*ln(x^n)/e^5*d^2/(e*x+d)-4*ln(x^n)/e^5*d*ln(e*x+d)+2*ln(x
^n)/e^5*d^3/(e*x+d)^2-1/3*ln(x^n)*d^4/e^5/(e*x+d)^3-1/3*n*(1/e^5*(3*e*x+3*
d-1/2*d^3/(e*x+d)^2+13*d*ln(e*x+d)+5*d^2/(e*x+d)-13*d*ln(e*x))-12/e^5*d*(d
ilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))))+2*b^2*n^2*x/e^4
```

Fricas [F]

$$\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2x^4}{(ex+d)^4}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b^2*x^4*log(c*x^n)^2 + 2*a*b*x^4*log(c*x^n) + a^2*x^4)/(e^4*x^4
+ 4*d*e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d^4), x)
```

Sympy [F]

$$\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$

input
```
integrate(x**4*(a+b*ln(c*x**n))**2/(e*x+d)**4,x)
```

output
```
Integral(x**4*(a + b*log(c*x**n))**2/(d + e*x)**4, x)
```

Maxima [F]

$$\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2x^4}{(ex+d)^4}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="maxima")
```

output
```
-1/3*a^2*((18*d^2*e^2*x^2 + 30*d^3*e*x + 13*d^4)/(e^8*x^3 + 3*d*e^7*x^2 +
3*d^2*e^6*x + d^3*e^5) - 3*x/e^4 + 12*d*log(e*x + d)/e^5) + integrate((b^2
*x^4*log(x^n)^2 + 2*(b^2*log(c) + a*b)*x^4*log(x^n) + (b^2*log(c)^2 + 2*a*
b*log(c))*x^4)/(e^4*x^4 + 4*d*e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d^4),
x)
```

Giac [F]

$$\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2x^4}{(ex+d)^4}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x^4/(e*x + d)^4, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{x^4\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^4}\,dx$$

input
```
int((x^4*(a + b*log(c*x^n))^2)/(d + e*x)^4,x)
```

output
```
int((x^4*(a + b*log(c*x^n))^2)/(d + e*x)^4, x)
```

Reduce [F]

$$\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \text{too large to display}$$

input
```
int(x^4*(a+b*log(c*x^n))^2/(e*x+d)^4,x)
```

output
```
(108*int(log(x**n*c)**2/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e
**3*x**4 + e**4*x**5),x)*b**2*d**8*n + 324*int(log(x**n*c)**2/(d**4*x + 4*
d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b**2*d**7*e
*n*x + 324*int(log(x**n*c)**2/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 +
 4*d*e**3*x**4 + e**4*x**5),x)*b**2*d**6*e**2*n*x**2 + 108*int(log(x**n*c)
**2/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5
),x)*b**2*d**5*e**3*n*x**3 + 216*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 +
 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*a*b*d**8*n + 648*int(log
(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4
*x**5),x)*a*b*d**7*e*n*x + 648*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6
*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*a*b*d**6*e**2*n*x**2 + 216
*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**
4 + e**4*x**5),x)*a*b*d**5*e**3*n*x**3 + 630*int(log(x**n*c)/(d**4*x + 4*d
**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b**2*d**8*n*
*2 + 1890*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d
*e**3*x**4 + e**4*x**5),x)*b**2*d**7*e*n**2*x + 1890*int(log(x**n*c)/(d**4
*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b**2
*d**6*e**2*n**2*x**2 + 630*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**
2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b**2*d**5*e**3*n**2*x**3 - 108
*log(d + e*x)*a**2*d**4*n - 324*log(d + e*x)*a**2*d**3*e*n*x - 324*log(...
```

3.114 $\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

Optimal result 983
Mathematica [A] (verified) 984
Rubi [A] (verified) 984
Maple [C] (warning: unable to verify) 986
Fricas [F] 987
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Maxima [F] 988
Giac [F] 988
Mupad [F(-1)] 989
Reduce [F] 989

Optimal result

Integrand size = 23, antiderivative size = 333

$$\begin{aligned}\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx &= \frac{b^2dn^2}{3e^4(d+ex)}+\frac{b^2n^2\log(x)}{3e^4}-\frac{bd^2n(a+b\log(cx^n))}{3e^4(d+ex)^2} \\ &\quad -\frac{7bnx(a+b\log(cx^n))}{3e^3(d+ex)}+\frac{7(a+b\log(cx^n))^2}{6e^4} \\ &\quad +\frac{d^3(a+b\log(cx^n))^2}{3e^4(d+ex)^3}-\frac{3d^2(a+b\log(cx^n))^2}{2e^4(d+ex)^2} \\ &\quad -\frac{3x(a+b\log(cx^n))^2}{e^3(d+ex)}+\frac{2b^2n^2\log(d+ex)}{e^4} \\ &\quad +\frac{11bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{3e^4} \\ &\quad +\frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^4}+\frac{11b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{3e^4} \\ &\quad +\frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4} \\ &\quad -\frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}\end{aligned}$$

output
```
1/3*b^2*d*n^2/e^4/(e*x+d)+1/3*b^2*n^2*ln(x)/e^4-1/3*b*d^2*n*(a+b*ln(c*x^n)
)/e^4/(e*x+d)^2-7/3*b*n*x*(a+b*ln(c*x^n))/e^3/(e*x+d)+7/6*(a+b*ln(c*x^n))^
2/e^4+1/3*d^3*(a+b*ln(c*x^n))^2/e^4/(e*x+d)^3-3/2*d^2*(a+b*ln(c*x^n))^2/e^
4/(e*x+d)^2-3*x*(a+b*ln(c*x^n))^2/e^3/(e*x+d)+2*b^2*n^2*ln(e*x+d)/e^4+11/3
*b*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^4+(a+b*ln(c*x^n))^2*ln(1+e*x/d)/e^4+11/
3*b^2*n^2*polylog(2,-e*x/d)/e^4+2*b*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/e^
4-2*b^2*n^2*polylog(3,-e*x/d)/e^4
```

Mathematica [A] (verified)

Time = 0.54 (sec) , antiderivative size = 298, normalized size of antiderivative = 0.89

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$
$$= \frac{-\frac{2bd^2n(a+b\log(cx^n))}{(d+ex)^2}+\frac{14bdn(a+b\log(cx^n))}{d+ex}-11(a+b\log(cx^n))^2+\frac{2d^3(a+b\log(cx^n))^2}{(d+ex)^3}-\frac{9d^2(a+b\log(cx^n))^2}{(d+ex)^2}+\frac{18d(a+b}{d-}}{}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

output
```
((-2*b*d^2*n*(a + b*Log[c*x^n]))/(d + e*x)^2 + (14*b*d*n*(a + b*Log[c*x^n]
))/(d + e*x) - 11*(a + b*Log[c*x^n])^2 + (2*d^3*(a + b*Log[c*x^n])^2)/(d +
 e*x)^3 - (9*d^2*(a + b*Log[c*x^n])^2)/(d + e*x)^2 + (18*d*(a + b*Log[c*x^
n])^2)/(d + e*x) - 14*b^2*n^2*(Log[x] - Log[d + e*x]) + (2*b^2*n^2*(d + (d
 + e*x)*Log[x] - (d + e*x)*Log[d + e*x]))/(d + e*x) + 22*b*n*(a + b*Log[c*
x^n])*Log[1 + (e*x)/d] + 6*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 22*b^2*
n^2*PolyLog[2, -((e*x)/d)] + 12*b*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/
d)] - 12*b^2*n^2*PolyLog[3, -((e*x)/d)])/(6*e^4)
```

Rubi [A] (verified)

Time = 1.00 (sec) , antiderivative size = 364, normalized size of antiderivative = 1.09, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$
$$\Big\downarrow \; 2795$$
$$\int \left(-\frac{d^3(a+b\log(cx^n))^2}{e^3(d+ex)^4}+\frac{3d^2(a+b\log(cx^n))^2}{e^3(d+ex)^3}-\frac{3d(a+b\log(cx^n))^2}{e^3(d+ex)^2}+\frac{(a+b\log(cx^n))^2}{e^3(d+ex)}\right)dx$$
$$\Big\downarrow \; 2009$$
$$\frac{d^3(a+b\log(cx^n))^2}{3e^4(d+ex)^3}-\frac{3d^2(a+b\log(cx^n))^2}{2e^4(d+ex)^2}-\frac{bd^2n(a+b\log(cx^n))}{3e^4(d+ex)^2}+\frac{2bn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^4}-\frac{7bn\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{3e^4}+\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^4}+\frac{6bn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^4}-\frac{3x(a+b\log(cx^n))^2}{e^3(d+ex)}-\frac{7bnx(a+b\log(cx^n))}{3e^3(d+ex)}+\frac{7b^2n^2\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{3e^4}+\frac{6b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}-\frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}+\frac{b^2dn^2}{3e^4(d+ex)}+\frac{2b^2n^2\log(d+ex)}{e^4}+\frac{b^2n^2\log(x)}{3e^4}$$

input
```
Int[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

output
```
(b^2*d*n^2)/(3*e^4*(d + e*x)) + (b^2*n^2*Log[x])/(3*e^4) - (b*d^2*n*(a + b
*Log[c*x^n]))/(3*e^4*(d + e*x)^2) - (7*b*n*x*(a + b*Log[c*x^n]))/(3*e^3*(d
 + e*x)) - (7*b*n*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/(3*e^4) + (d^3*(a +
 b*Log[c*x^n])^2)/(3*e^4*(d + e*x)^3) - (3*d^2*(a + b*Log[c*x^n])^2)/(2*e^
4*(d + e*x)^2) - (3*x*(a + b*Log[c*x^n])^2)/(e^3*(d + e*x)) + (2*b^2*n^2*L
og[d + e*x])/e^4 + (6*b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/e^4 + ((a +
 b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e^4 + (7*b^2*n^2*PolyLog[2, -(d/(e*x))]
)/(3*e^4) + (6*b^2*n^2*PolyLog[2, -((e*x)/d)])/e^4 + (2*b*n*(a + b*Log[c*x
^n])*PolyLog[2, -((e*x)/d)])/e^4 - (2*b^2*n^2*PolyLog[3, -((e*x)/d)])/e^4
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.09 (sec) , antiderivative size = 854, normalized size of antiderivative = 2.56

method	result	size
risch	Expression too large to display	854

input
```
int(x^3*(a+b*ln(c*x^n))^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
3*b^2*ln(x^n)^2/e^4*d/(e*x+d)+b^2*ln(x^n)^2/e^4*ln(e*x+d)-3/2*b^2*ln(x^n)^
2/e^4*d^2/(e*x+d)^2+1/3*b^2*ln(x^n)^2/e^4*d^3/(e*x+d)^3+7/3*b^2*n*ln(x^n)/
e^4*d/(e*x+d)-1/3*b^2*n*ln(x^n)/e^4*d^2/(e*x+d)^2+11/3*b^2*n*ln(x^n)/e^4*l
n(e*x+d)-11/3*b^2*n/e^4*ln(x^n)*ln(x)+11/6*b^2/e^4*n^2*ln(x)^2-11/3*b^2/e^
4*n^2*ln(e*x+d)*ln(-e*x/d)-11/3*b^2/e^4*n^2*dilog(-e*x/d)+1/3*b^2*d*n^2/e^
4/(e*x+d)+2*b^2*n^2*ln(e*x+d)/e^4-2*b^2*n^2*ln(x)/e^4+2*b^2/e^4*ln(x)*ln(e
*x+d)*ln(-e*x/d)*n^2+2*b^2/e^4*ln(x)*dilog(-e*x/d)*n^2-2*b^2*n/e^4*ln(x^n)
*ln(e*x+d)*ln(-e*x/d)-2*b^2*n/e^4*ln(x^n)*dilog(-e*x/d)-b^2/e^4*n^2*ln(e*x
+d)*ln(x)^2+b^2/e^4*n^2*ln(x)^2*ln(1+e*x/d)+2*b^2/e^4*n^2*ln(x)*polylog(2,
-e*x/d)-2*b^2*n^2*polylog(3,-e*x/d)/e^4+(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^
2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b
*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*(3*ln(x^n)/e^4*d/(e*x+d)+ln(x^
n)/e^4*ln(e*x+d)-3/2*ln(x^n)/e^4*d^2/(e*x+d)^2+1/3*ln(x^n)/e^4*d^3/(e*x+d)
^3-1/6*n*(-7/e^4*d/(e*x+d)-11/e^4*ln(e*x+d)+1/e^4*d^2/(e*x+d)^2+11/e^4*ln(
e*x)+6/e^4*ln(e*x+d)*ln(-e*x/d)+6/e^4*dilog(-e*x/d)))+1/4*(I*Pi*b*csgn(I*x
^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn
(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^2*(3/e^4*d/(e*
x+d)+1/e^4*ln(e*x+d)-3/2/e^4*d^2/(e*x+d)^2+1/3/e^4*d^3/(e*x+d)^3)
```

Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx=\int \frac{(b\log(cx^n)+a)^2x^3}{(ex+d)^4}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b^2*x^3*log(c*x^n)^2 + 2*a*b*x^3*log(c*x^n) + a^2*x^3)/(e^4*x^4
+ 4*d*e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d^4), x)
```

Sympy [F]

$$\int \frac{x^3(a+b\log{(cx^n)})^2}{(d+ex)^4}\,dx = \int \frac{x^3(a+b\log{(cx^n)})^2}{(d+ex)^4}\,dx$$

input
```
integrate(x**3*(a+b*ln(c*x**n))**2/(e*x+d)**4,x)
```

output
```
Integral(x**3*(a + b*log(c*x**n))**2/(d + e*x)**4, x)
```

Maxima [F]

$$\int \frac{x^3(a+b\log{(cx^n)})^2}{(d+ex)^4}\,dx = \int \frac{(b\log{(cx^n)}+a)^2x^3}{(ex+d)^4}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/6*a^2*((18*d*e^2*x^2 + 27*d^2*e*x + 11*d^3)/(e^7*x^3 + 3*d*e^6*x^2 + 3*d
^2*e^5*x + d^3*e^4) + 6*log(e*x + d)/e^4) + integrate((b^2*x^3*log(x^n)^2
+ 2*(b^2*log(c) + a*b)*x^3*log(x^n) + (b^2*log(c)^2 + 2*a*b*log(c))*x^3)/(
e^4*x^4 + 4*d*e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d^4), x)
```

Giac [F]

$$\int \frac{x^3(a+b\log{(cx^n)})^2}{(d+ex)^4}\,dx = \int \frac{(b\log{(cx^n)}+a)^2x^3}{(ex+d)^4}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x^3/(e*x + d)^4, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^4}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n))^2)/(d + e*x)^4,x)
```

output
```
int((x^3*(a + b*log(c*x^n))^2)/(d + e*x)^4, x)
```

Reduce [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \text{Too large to display}$$

input
```
int(x^3*(a+b*log(c*x^n))^2/(e*x+d)^4,x)
```

output

```
( - 54*int(log(x**n*c)**2/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d
*e**3*x**4 + e**4*x**5),x)*b**2*d**7*n - 162*int(log(x**n*c)**2/(d**4*x +
4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b**2*d**6
*e*n*x - 162*int(log(x**n*c)**2/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3
 + 4*d*e**3*x**4 + e**4*x**5),x)*b**2*d**5*e**2*n*x**2 - 54*int(log(x**n*c
)**2/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**
5),x)*b**2*d**4*e**3*n*x**3 - 108*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2
+ 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*a*b*d**7*n - 324*int(lo
g(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**
4*x**5),x)*a*b*d**6*e*n*x - 324*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 +
6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*a*b*d**5*e**2*n*x**2 - 10
8*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x*
*4 + e**4*x**5),x)*a*b*d**4*e**3*n*x**3 - 396*int(log(x**n*c)/(d**4*x + 4*
d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b**2*d**7*n
**2 - 1188*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*
d*e**3*x**4 + e**4*x**5),x)*b**2*d**6*e*n**2*x - 1188*int(log(x**n*c)/(d**
4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b**
2*d**5*e**2*n**2*x**2 - 396*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d*
*2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b**2*d**4*e**3*n**2*x**3 + 54
*log(d + e*x)*a**2*d**3*n + 162*log(d + e*x)*a**2*d**2*e*n*x + 162*log(...
```

3.115 $\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

Optimal result 991
Mathematica [B] (verified) 992
Rubi [A] (verified) 992
Maple [C] (warning: unable to verify) 994
Fricas [F] 995
Sympy [F] 995
Maxima [F] 996
Giac [F] 996
Mupad [F(-1)] 997
Reduce [F] 997

Optimal result

Integrand size = 23, antiderivative size = 161

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \frac{bnx^2(a+b\log(cx^n))}{3de(d+ex)^2}+\frac{x^3(a+b\log(cx^n))^2}{3d(d+ex)^3}+\frac{bnx(2a+bn+2b\log(cx^n))}{3de^2(d+ex)}-\frac{bn(2a+3bn+2b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{3de^3}-\frac{2b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{3de^3}$$

output
```
1/3*b*n*x^2*(a+b*ln(c*x^n))/d/e/(e*x+d)^2+1/3*x^3*(a+b*ln(c*x^n))^2/d/(e*x
+d)^3+1/3*b*n*x*(2*a+b*n+2*b*ln(c*x^n))/d/e^2/(e*x+d)-1/3*b*n*(2*a+3*b*n+2
*b*ln(c*x^n))*ln(1+e*x/d)/d/e^3-2/3*b^2*n^2*polylog(2,-e*x/d)/d/e^3
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 371 vs. $2(161) = 322$.

Time = 0.58 (sec) , antiderivative size = 371, normalized size of antiderivative = 2.30

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx =$$

$$-\frac{-\frac{a^2}{d}+\frac{a^2d^2}{(d+ex)^3}-\frac{3a^2d}{(d+ex)^2}-\frac{abdn}{(d+ex)^2}+\frac{3a^2}{d+ex}+\frac{4abn}{d+ex}+\frac{b^2n^2}{d+ex}-\frac{3b^2n^2\log(x)}{d}-\frac{2ab\log(cx^n)}{d}+\frac{2abd^2\log(cx^n)}{(d+ex)^3}-\frac{6abd\,\mathrm{l}}{(d\text{-}}}{}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

output
```
-1/3*(-(a^2/d) + (a^2*d^2)/(d + e*x)^3 - (3*a^2*d)/(d + e*x)^2 - (a*b*d*n)
/(d + e*x)^2 + (3*a^2)/(d + e*x) + (4*a*b*n)/(d + e*x) + (b^2*n^2)/(d + e*
x) - (3*b^2*n^2*Log[x])/d - (2*a*b*Log[c*x^n])/d + (2*a*b*d^2*Log[c*x^n])/
(d + e*x)^3 - (6*a*b*d*Log[c*x^n])/(d + e*x)^2 - (b^2*d*n*Log[c*x^n])/(d +
 e*x)^2 + (6*a*b*Log[c*x^n])/(d + e*x) + (4*b^2*n*Log[c*x^n])/(d + e*x) -
(b^2*Log[c*x^n]^2)/d + (b^2*d^2*Log[c*x^n]^2)/(d + e*x)^3 - (3*b^2*d*Log[c
*x^n]^2)/(d + e*x)^2 + (3*b^2*Log[c*x^n]^2)/(d + e*x) + (3*b^2*n^2*Log[d +
 e*x])/d + (2*a*b*n*Log[1 + (e*x)/d])/d + (2*b^2*n*Log[c*x^n]*Log[1 + (e*x
)/d])/d + (2*b^2*n^2*PolyLog[2, -((e*x)/d)])/d)/e^3
```

Rubi [A] (verified)

Time = 0.59 (sec) , antiderivative size = 155, normalized size of antiderivative = 0.96, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {2781, 2784, 2784, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$

$$\Big\downarrow \; 2781$$

$$\frac{x^3(a+b\log(cx^n))^2}{3d(d+ex)^3}-\frac{2bn\int\frac{x^2(a+b\log(cx^n))}{(d+ex)^3}dx}{3d}$$

$$\Big\downarrow \text{2784}$$

$$\frac{x^3(a+b\log(cx^n))^2}{3d(d+ex)^3}-\frac{2bn\left(\frac{\int\frac{x(2a+bn+2b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2}\right)}{3d}$$

$$\Big\downarrow \text{2784}$$

$$\frac{x^3(a+b\log(cx^n))^2}{3d(d+ex)^3}-\frac{2bn\left(\frac{\frac{\int\frac{2a+3bn+2b\log(cx^n)}{d+ex}dx}{e}-\frac{x(2a+2b\log(cx^n)+bn)}{e(d+ex)}}{2e}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2}\right)}{3d}$$

$$\Big\downarrow \text{2754}$$

$$\frac{x^3(a+b\log(cx^n))^2}{3d(d+ex)^3}-\frac{2bn\left(\frac{\frac{\frac{\log\left(\frac{ex}{d}+1\right)(2a+2b\log(cx^n)+3bn)}{e}-\frac{2bn\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}}{e}-\frac{x(2a+2b\log(cx^n)+bn)}{e(d+ex)}}{2e}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2}\right)}{3d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{x^3(a+b\log(cx^n))^2}{3d(d+ex)^3}-\frac{2bn\left(\frac{\frac{\frac{\log\left(\frac{ex}{d}+1\right)(2a+2b\log(cx^n)+3bn)}{e}+\frac{2bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}}{e}-\frac{x(2a+2b\log(cx^n)+bn)}{e(d+ex)}}{2e}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2}\right)}{3d}$$

input
```
Int[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

output
```
(x^3*(a + b*Log[c*x^n])^2)/(3*d*(d + e*x)^3) - (2*b*n*(-1/2*(x^2*(a + b*Lo
g[c*x^n]))/(e*(d + e*x)^2) + (-((x*(2*a + b*n + 2*b*Log[c*x^n]))/(e*(d + e
*x))) + (((2*a + 3*b*n + 2*b*Log[c*x^n])*Log[1 + (e*x)/d])/e + (2*b*n*Poly
Log[2, -((e*x)/d)])/e)/e)/(2*e)))/(3*d)
```

Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2781
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_))^(q_), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x)^(q + 1)*((a
+ b*Log[c*x^n])^p/(d*f*(q + 1))), x] + Simp[b*n*(p/(d*(q + 1)))   Int[(f*x)
^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b, c,
d, e, f, m, n, q}, x] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.97 (sec) , antiderivative size = 593, normalized size of antiderivative = 3.68

method	result
risch	$-\frac{b^2 \ln(x^n)^2}{e^3(ex+d)} + \frac{b^2 \ln(x^n)^2 d}{e^3(ex+d)^2} - \frac{b^2 \ln(x^n)^2 d^2}{3e^3(ex+d)^3} - \frac{4b^2 n \ln(x^n)}{3e^3(ex+d)} + \frac{b^2 n \ln(x^n) d}{3e^3(ex+d)^2} - \frac{2b^2 n \ln(x^n) \ln(ex+d)}{3e^3 d} + \frac{2b^2 n \ln(x^n) \ln(x)}{3e^3 d} -$

input
```
int(x^2*(a+b*ln(c*x^n))^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
-b^2*ln(x^n)^2/e^3/(e*x+d)+b^2*ln(x^n)^2/e^3*d/(e*x+d)^2-1/3*b^2*ln(x^n)^2
/e^3*d^2/(e*x+d)^3-4/3*b^2*n*ln(x^n)/e^3/(e*x+d)+1/3*b^2*n*ln(x^n)/e^3*d/(
e*x+d)^2-2/3*b^2*n*ln(x^n)/e^3/d*ln(e*x+d)+2/3*b^2*n*ln(x^n)/e^3/d*ln(x)-1
/3*b^2*n^2/e^3/d*ln(x)^2+2/3*b^2*n^2/e^3/d*ln(e*x+d)*ln(-e*x/d)+2/3*b^2*n^
2/e^3/d*dilog(-e*x/d)-1/3*b^2*n^2/e^3/(e*x+d)-b^2*n^2/e^3/d*ln(e*x+d)+b^2*
n^2/e^3/d*ln(x)+(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csg
n(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*
c)+2*b*ln(c)+2*a)*b*(-ln(x^n)/e^3/(e*x+d)+ln(x^n)/e^3*d/(e*x+d)^2-1/3*ln(x
^n)/e^3*d^2/(e*x+d)^3-1/3*n/e^3*(-1/2*d/(e*x+d)^2+1/d*ln(e*x+d)+2/(e*x+d)-
1/d*ln(x)))+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csg
n(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*
c)+2*b*ln(c)+2*a)^2*(-1/e^3/(e*x+d)+1/e^3*d/(e*x+d)^2-1/3/e^3*d^2/(e*x+d)^
3)
```

Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{(ex+d)^4}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b^2*x^2*log(c*x^n)^2 + 2*a*b*x^2*log(c*x^n) + a^2*x^2)/(e^4*x^4
+ 4*d*e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d^4), x)
```

Sympy [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))**2/(e*x+d)**4,x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))**2/(d + e*x)**4, x)
```

Maxima [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{(ex+d)^4}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="maxima")
```

output
```
-1/3*a*b*n*((4*e*x + 3*d)/(e^5*x^2 + 2*d*e^4*x + d^2*e^3) + 2*log(e*x + d)
/(d*e^3) - 2*log(x)/(d*e^3)) - 1/3*((3*e^2*x^2 + 3*d*e*x + d^2)*log(x^n)^2
/(e^6*x^3 + 3*d*e^5*x^2 + 3*d^2*e^4*x + d^3*e^3) - 3*integrate(1/3*(3*e^3*
x^3*log(c)^2 + 2*(6*d*e^2*n*x^2 + 4*d^2*e*n*x + d^3*n + 3*(e^3*n + e^3*log
(c))*x^3)*log(x^n))/(e^7*x^5 + 4*d*e^6*x^4 + 6*d^2*e^5*x^3 + 4*d^3*e^4*x^2
 + d^4*e^3*x), x))*b^2 - 2/3*(3*e^2*x^2 + 3*d*e*x + d^2)*a*b*log(c*x^n)/(e
^6*x^3 + 3*d*e^5*x^2 + 3*d^2*e^4*x + d^3*e^3) - 1/3*(3*e^2*x^2 + 3*d*e*x +
 d^2)*a^2/(e^6*x^3 + 3*d*e^5*x^2 + 3*d^2*e^4*x + d^3*e^3)
```

Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{(ex+d)^4}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x^2/(e*x + d)^4, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^4}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n))^2)/(d + e*x)^4,x)
```

output
```
int((x^2*(a + b*log(c*x^n))^2)/(d + e*x)^4, x)
```

Reduce [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \text{Too large to display}$$

input
```
int(x^2*(a+b*log(c*x^n))^2/(e*x+d)^4,x)
```

output
```
(18*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*
x**4 + e**4*x**5),x)*b**2*d**7*n + 54*int(log(x**n*c)/(d**4*x + 4*d**3*e*x
**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b**2*d**6*e*n*x + 5
4*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x*
*4 + e**4*x**5),x)*b**2*d**5*e**2*n*x**2 + 18*int(log(x**n*c)/(d**4*x + 4*
d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b**2*d**4*e
**3*n*x**3 - 18*log(d + e*x)*a*b*d**3*n - 54*log(d + e*x)*a*b*d**2*e*n*x -
 54*log(d + e*x)*a*b*d*e**2*n*x**2 - 18*log(d + e*x)*a*b*e**3*n*x**3 - 60*
log(d + e*x)*b**2*d**3*n**2 - 180*log(d + e*x)*b**2*d**2*e*n**2*x - 180*lo
g(d + e*x)*b**2*d*e**2*n**2*x**2 - 60*log(d + e*x)*b**2*e**3*n**2*x**3 - 9
*log(x**n*c)**2*b**2*d**3 - 27*log(x**n*c)**2*b**2*d**2*e*x - 27*log(x**n*
c)**2*b**2*d*e**2*x**2 + 18*log(x**n*c)*a*b*e**3*x**3 - 42*log(x**n*c)*b**
2*d**3*n - 54*log(x**n*c)*b**2*d**2*e*n*x + 18*log(x**n*c)*b**2*e**3*n*x**
3 + 42*log(x)*b**2*d**3*n**2 + 126*log(x)*b**2*d**2*e*n**2*x + 126*log(x)*
b**2*d*e**2*n**2*x**2 + 42*log(x)*b**2*e**3*n**2*x**3 + 9*a**2*e**3*x**3 -
 15*a*b*d**3*n - 27*a*b*d**2*e*n*x + 12*a*b*e**3*n*x**3 + 7*b**2*d**3*n**2
 + 9*b**2*d**2*e*n**2*x - 2*b**2*e**3*n**2*x**3)/(27*d*e**3*(d**3 + 3*d**2
*e*x + 3*d*e**2*x**2 + e**3*x**3))
```

3.116 $\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

Optimal result 998
Mathematica [A] (verified) 999
Rubi [A] (verified) 999
Maple [C] (warning: unable to verify) 1003
Fricas [F] 1003
Sympy [F] 1004
Maxima [F] 1004
Giac [F] 1004
Mupad [F(-1)] 1005
Reduce [F] 1005

Optimal result

Integrand size = 21, antiderivative size = 210

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \frac{b^2n^2}{3de^2(d+ex)} - \frac{bn(a+b\log(cx^n))}{3e^2(d+ex)^2} + \frac{bn(a+b\log(cx^n))}{3de^2(d+ex)} + \frac{(a+b\log(cx^n))^2}{6d^2e^2} + \frac{d(a+b\log(cx^n))^2}{3e^2(d+ex)^3} - \frac{(a+b\log(cx^n))^2}{2e^2(d+ex)^2} - \frac{bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{3d^2e^2} - \frac{b^2n^2\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{3d^2e^2}$$

output

```
1/3*b^2*n^2/d/e^2/(e*x+d)-1/3*b*n*(a+b*ln(c*x^n))/e^2/(e*x+d)^2+1/3*b*n*(a
+b*ln(c*x^n))/d/e^2/(e*x+d)+1/6*(a+b*ln(c*x^n))^2/d^2/e^2+1/3*d*(a+b*ln(c*
x^n))^2/e^2/(e*x+d)^3-1/2*(a+b*ln(c*x^n))^2/e^2/(e*x+d)^2-1/3*b*n*(a+b*ln(
c*x^n))*ln(1+e*x/d)/d^2/e^2-1/3*b^2*n^2*polylog(2,-e*x/d)/d^2/e^2
```

Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 281, normalized size of antiderivative = 1.34

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$
$$= \frac{2b^2d^3n^2+2abd^2enx+4b^2d^2en^2x+3a^2de^2x^2+2abde^2nx^2+2b^2de^2n^2x^2+a^2e^3x^3+b^2e^2x^2(3d+ex)\log}{}$$

input
```
Integrate[(x*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

output
```
(2*b^2*d^3*n^2 + 2*a*b*d^2*e*n*x + 4*b^2*d^2*e*n^2*x + 3*a^2*d*e^2*x^2 + 2
*a*b*d*e^2*n*x^2 + 2*b^2*d*e^2*n^2*x^2 + a^2*e^3*x^3 + b^2*e^2*x^2*(3*d +
e*x)*Log[c*x^n]^2 - 2*a*b*d^3*n*Log[1 + (e*x)/d] - 6*a*b*d^2*e*n*x*Log[1 +
 (e*x)/d] - 6*a*b*d*e^2*n*x^2*Log[1 + (e*x)/d] - 2*a*b*e^3*n*x^3*Log[1 + (
e*x)/d] - 2*b*Log[c*x^n]*(-(e*x*(b*d*n*(d + e*x) + a*e*x*(3*d + e*x))) + b
*n*(d + e*x)^3*Log[1 + (e*x)/d]) - 2*b^2*n^2*(d + e*x)^3*PolyLog[2, -((e*x
)/d)])/(6*d^2*e^2*(d + e*x)^3)
```

Rubi [A] (verified)

Time = 0.79 (sec) , antiderivative size = 213, normalized size of antiderivative = 1.01, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.381$, Rules used = {2783, 2773, 49, 2009, 2781, 2784, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}dx$$
$$\Big\downarrow \text{ 2783}$$
$$-\frac{2bn\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}dx}{3d}+\frac{\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}dx}{3d}+\frac{x^2(a+b\log(cx^n))^2}{3d(d+ex)^3}$$
$$\Big\downarrow \text{ 2773}$$

$$\frac{\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}dx}{3d}-\frac{2bn\left(\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\int \frac{x}{(d+ex)^2}dx}{2d}\right)}{3d}+\frac{x^2(a+b\log(cx^n))^2}{3d(d+ex)^3}$$

$\downarrow$ 49

$$\frac{\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}dx}{3d}-\frac{2bn\left(\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\int \left(\frac{1}{e(d+ex)}-\frac{d}{e(d+ex)^2}\right)dx}{2d}\right)}{3d}+\frac{x^2(a+b\log(cx^n))^2}{3d(d+ex)^3}$$

$\downarrow$ 2009

$$\frac{\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}dx}{3d}-\frac{2bn\left(\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\left(\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}\right)}{2d}\right)}{3d}+\frac{x^2(a+b\log(cx^n))^2}{3d(d+ex)^3}$$

$\downarrow$ 2781

$$\frac{\frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{bn\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}dx}{d}}{3d}-\frac{2bn\left(\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\left(\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}\right)}{2d}\right)}{3d}+\frac{x^2(a+b\log(cx^n))^2}{3d(d+ex)^3}$$

$\downarrow$ 2784

$$\frac{\frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{bn\left(\frac{\int \frac{a+bn+b\log(cx^n)}{d+ex}dx}{e}-\frac{x(a+b\log(cx^n))}{e(d+ex)}\right)}{d}}{3d}-\frac{2bn\left(\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\left(\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}\right)}{2d}\right)}{3d}+\frac{x^2(a+b\log(cx^n))^2}{3d(d+ex)^3}$$

$\downarrow$ 2754

$$\frac{\frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{bn\left(\frac{\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n)+bn)}{e}-\frac{bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}}{e}-\frac{x(a+b\log(cx^n))}{e(d+ex)}\right)}{d}}{3d}-\frac{2bn\left(\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\left(\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}\right)}{2d}\right)}{3d}+\frac{x^2(a+b\log(cx^n))^2}{3d(d+ex)^3}$$

$\downarrow$ 2838

$$-\frac{2bn\left(\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\left(\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}\right)}{2d}\right)}{3d}+\frac{\frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{bn\left(\frac{\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n)+bn)}{e}+\frac{bn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}}{e}-\frac{x(a+b\log(cx^n))}{e(d+ex)}\right)}{d}}{3d}+\frac{x^2(a+b\log(cx^n))^2}{3d(d+ex)^3}$$

input
```
Int[(x*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

output
```
(x^2*(a + b*Log[c*x^n])^2)/(3*d*(d + e*x)^3) - (2*b*n*((x^2*(a + b*Log[c*x
^n]))/(2*d*(d + e*x)^2) - (b*n*(d/(e^2*(d + e*x)) + Log[d + e*x]/e^2))/(2*
d)))/(3*d) + ((x^2*(a + b*Log[c*x^n])^2)/(2*d*(d + e*x)^2) - (b*n*(-((x*(a
 + b*Log[c*x^n]))/(e*(d + e*x))) + (((a + b*n + b*Log[c*x^n])*Log[1 + (e*x
)/d])/e + (b*n*PolyLog[2, -((e*x)/d)])/e)/e))/d)/(3*d)
```

Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

rule 2781
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_))^(q_), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x)^(q + 1)*((a
+ b*Log[c*x^n])^p/(d*f*(q + 1))), x] + Simp[b*n*(p/(d*(q + 1)))   Int[(f*x)
^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b, c,
d, e, f, m, n, q}, x] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

rule 2783
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_))^(q_), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x)^(q + 1)*((a
+ b*Log[c*x^n])^p/(d*f*(q + 1))), x] + (Simp[(m + q + 2)/(d*(q + 1))   Int[
(f*x)^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^p, x], x] + Simp[b*n*(p/(d*(q
+ 1)))   Int[(f*x)^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p - 1), x], x])
/; FreeQ[{a, b, c, d, e, f, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[p, 0] && L
tQ[q, -1] && GtQ[m, 0]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.98 (sec) , antiderivative size = 508, normalized size of antiderivative = 2.42

method	result
risch	$\frac{b^2 \ln(x^n)^2 d}{3e^2(ex+d)^3} - \frac{b^2 \ln(x^n)^2}{2e^2(ex+d)^2} - \frac{b^2 n \ln(x^n)}{3e^2(ex+d)^2} - \frac{b^2 n \ln(x^n) \ln(ex+d)}{3e^2 d^2} + \frac{b^2 n \ln(x^n)}{3e^2 d(ex+d)} + \frac{b^2 n \ln(x^n) \ln(x)}{3e^2 d^2} - \frac{b^2 n^2 \ln(x)^2}{6e^2 d^2} +$

input
```
int(x*(a+b*ln(c*x^n))^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
1/3*b^2*ln(x^n)^2/e^2*d/(e*x+d)^3-1/2*b^2*ln(x^n)^2/e^2/(e*x+d)^2-1/3*b^2*
n*ln(x^n)/e^2/(e*x+d)^2-1/3*b^2*n*ln(x^n)/e^2/d^2*ln(e*x+d)+1/3*b^2*n*ln(x
^n)/e^2/d/(e*x+d)+1/3*b^2*n*ln(x^n)/e^2/d^2*ln(x)-1/6*b^2*n^2/e^2/d^2*ln(x
)^2+1/3*b^2*n^2/d/e^2/(e*x+d)+1/3*b^2*n^2/e^2/d^2*ln(e*x+d)*ln(-e*x/d)+1/3
*b^2*n^2/e^2/d^2*dilog(-e*x/d)+(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*
csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c
*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*(1/3*ln(x^n)/e^2*d/(e*x+d)^3-1/2*ln(x^n
)/e^2/(e*x+d)^2-1/6*n/e^2*(1/d^2*ln(e*x+d)-1/d/(e*x+d)+1/(e*x+d)^2-1/d^2*l
n(x)))+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c
*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*
b*ln(c)+2*a)^2*(1/3/e^2*d/(e*x+d)^3-1/2/e^2/(e*x+d)^2)
```

Fricas [F]

$$\int \frac{x(a + b\log(cx^n))^2}{(d + ex)^4} dx = \int \frac{(b\log(cx^n) + a)^2 x}{(ex + d)^4} dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b^2*x*log(c*x^n)^2 + 2*a*b*x*log(c*x^n) + a^2*x)/(e^4*x^4 + 4*d*
e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d^4), x)
```

Sympy [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$

input
```
integrate(x*(a+b*ln(c*x**n))**2/(e*x+d)**4,x)
```

output
```
Integral(x*(a + b*log(c*x**n))**2/(d + e*x)**4, x)
```

Maxima [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2x}{(ex+d)^4}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/3*a*b*n*(x/(d*e^3*x^2 + 2*d^2*e^2*x + d^3*e) - log(e*x + d)/(d^2*e^2) +
log(x)/(d^2*e^2)) - 1/6*((3*e*x + d)*log(x^n)^2/(e^5*x^3 + 3*d*e^4*x^2 + 3
*d^2*e^3*x + d^3*e^2) - 6*integrate(1/3*(3*e^2*x^2*log(c)^2 + (4*d*e*n*x +
 d^2*n + 3*(e^2*n + 2*e^2*log(c))*x^2)*log(x^n))/(e^6*x^5 + 4*d*e^5*x^4 +
6*d^2*e^4*x^3 + 4*d^3*e^3*x^2 + d^4*e^2*x), x))*b^2 - 1/3*(3*e*x + d)*a*b*
log(c*x^n)/(e^5*x^3 + 3*d*e^4*x^2 + 3*d^2*e^3*x + d^3*e^2) - 1/6*(3*e*x +
d)*a^2/(e^5*x^3 + 3*d*e^4*x^2 + 3*d^2*e^3*x + d^3*e^2)
```

Giac [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2x}{(ex+d)^4}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x/(e*x + d)^4, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^4}\,dx$$

input
```
int((x*(a + b*log(c*x^n))^2)/(d + e*x)^4,x)
```

output
```
int((x*(a + b*log(c*x^n))^2)/(d + e*x)^4, x)
```

Reduce [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \text{Too large to display}$$

input
```
int(x*(a+b*log(c*x^n))^2/(e*x+d)^4,x)
```

output

```
(18*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*
x**4 + e**4*x**5),x)*b**2*d**7*n + 54*int(log(x**n*c)/(d**4*x + 4*d**3*e*x
**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b**2*d**6*e*n*x + 5
4*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x*
*4 + e**4*x**5),x)*b**2*d**5*e**2*n*x**2 + 18*int(log(x**n*c)/(d**4*x + 4*
d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b**2*d**4*e
**3*n*x**3 - 18*log(d + e*x)*a*b*d**3*n - 54*log(d + e*x)*a*b*d**2*e*n*x -
 54*log(d + e*x)*a*b*d*e**2*n*x**2 - 18*log(d + e*x)*a*b*e**3*n*x**3 - 33*
log(d + e*x)*b**2*d**3*n**2 - 99*log(d + e*x)*b**2*d**2*e*n**2*x - 99*log(
d + e*x)*b**2*d*e**2*n**2*x**2 - 33*log(d + e*x)*b**2*e**3*n**2*x**3 - 9*l
og(x**n*c)**2*b**2*d**3 - 27*log(x**n*c)**2*b**2*d**2*e*x + 54*log(x**n*c)
*a*b*d*e**2*x**2 + 18*log(x**n*c)*a*b*e**3*x**3 - 24*log(x**n*c)*b**2*d**3
*n + 27*log(x**n*c)*b**2*d*e**2*n*x**2 + 9*log(x**n*c)*b**2*e**3*n*x**3 +
24*log(x)*b**2*d**3*n**2 + 72*log(x)*b**2*d**2*e*n**2*x + 72*log(x)*b**2*d
*e**2*n**2*x**2 + 24*log(x)*b**2*e**3*n**2*x**3 - 9*a**2*d**3 - 27*a**2*d*
*2*e*x - 6*a*b*d**3*n - 6*a*b*e**3*n*x**3 + 25*b**2*d**3*n**2 + 36*b**2*d*
*2*e*n**2*x - 11*b**2*e**3*n**2*x**3)/(54*d**2*e**2*(d**3 + 3*d**2*e*x + 3
*d*e**2*x**2 + e**3*x**3))
```

3.117 $\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

Optimal result 1007
Mathematica [A] (verified) 1008
Rubi [A] (verified) 1008
Maple [C] (warning: unable to verify) 1012
Fricas [F] 1013
Sympy [F] 1013
Maxima [F] 1013
Giac [F] 1014
Mupad [F(-1)] 1014
Reduce [F] 1015

Optimal result

Integrand size = 20, antiderivative size = 203

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = &-\frac{b^2n^2}{3d^2e(d+ex)}-\frac{b^2n^2\log(x)}{3d^3e}\\ &+\frac{bn(a+b\log(cx^n))}{3de(d+ex)^2}-\frac{2bnx(a+b\log(cx^n))}{3d^3(d+ex)}\\ &-\frac{2bn\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{3d^3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\\ &+\frac{b^2n^2\log(d+ex)}{d^3e}+\frac{2b^2n^2\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{3d^3e}\end{aligned}$$

output
```
-1/3*b^2*n^2/d^2/e/(e*x+d)-1/3*b^2*n^2*ln(x)/d^3/e+1/3*b*n*(a+b*ln(c*x^n))
/d/e/(e*x+d)^2-2/3*b*n*x*(a+b*ln(c*x^n))/d^3/(e*x+d)-2/3*b*n*ln(1+d/e/x)*(
a+b*ln(c*x^n))/d^3/e-1/3*(a+b*ln(c*x^n))^2/e/(e*x+d)^3+b^2*n^2*ln(e*x+d)/d
^3/e+2/3*b^2*n^2*polylog(2,-d/e/x)/d^3/e
```

Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 211, normalized size of antiderivative = 1.04

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = -\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3} + \frac{2bn\left(\frac{a+b\log(cx^n)}{2d(d+ex)^2}+\frac{a+b\log(cx^n)}{d^2(d+ex)}+\frac{(a+b\log(cx^n))^2}{2bd^3n}-\frac{bn\left(\frac{1}{d(d+ex)}+\frac{\log(x)}{d^2}-\frac{\log(d+ex)}{d^2}\right)}{2d}-\frac{bn\left(\frac{\log(x)}{d}-\frac{\log(d+ex)}{d}\right)}{d^2}-\frac{(a+b\log(c\cdots}{}\right.}{3e}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(d + e*x)^4,x]
```

output
```
-1/3*(a + b*Log[c*x^n])^2/(e*(d + e*x)^3) + (2*b*n*((a + b*Log[c*x^n])/(2*
d*(d + e*x)^2) + (a + b*Log[c*x^n])/(d^2*(d + e*x)) + (a + b*Log[c*x^n])^2
/(2*b*d^3*n) - (b*n*(1/(d*(d + e*x)) + Log[x]/d^2 - Log[d + e*x]/d^2))/(2*
d) - (b*n*(Log[x]/d - Log[d + e*x]/d))/d^2 - ((a + b*Log[c*x^n])*Log[(d +
e*x)/d])/d^3 - (b*n*PolyLog[2, -((e*x)/d)])/d^3))/(3*e)
```

Rubi [A] (verified)

Time = 0.85 (sec) , antiderivative size = 204, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.500$, Rules used = {2756, 2789, 2756, 54, 2009, 2789, 2751, 16, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$

$$\Big\downarrow \text{ 2756}$$

$$\frac{2bn\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

$$\Big\downarrow \text{ 2789}$$

$$\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^3}dx}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

$\Big\downarrow$ 2756

$$\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(d+ex)^2}dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

$\Big\downarrow$ 54

$$\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \left(-\frac{e}{d^2(d+ex)}-\frac{e}{d(d+ex)^2}+\frac{1}{d^2x}\right)dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

$\Big\downarrow$ 2009

$$\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

$\Big\downarrow$ 2789

$$\frac{2bn\left(\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

$\Big\downarrow$ 2751

$$\frac{2bn\left(\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int \frac{1}{d+ex}dx}{d}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

$$\Big\downarrow \; 16$$

$$\frac{2bn\left(\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

$$\Big\downarrow \; 2779$$

$$\frac{2bn\left(\frac{\frac{\frac{bn\int \frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

$$\Big\downarrow \; 2838$$

$$\frac{2bn\left(\frac{\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

input

```
Int[(a + b*Log[c*x^n])^2/(d + e*x)^4,x]
```

output
```
-1/3*(a + b*Log[c*x^n])^2/(e*(d + e*x)^3) + (2*b*n*(-((e*(-1/2*(a + b*Log[
c*x^n])/(e*(d + e*x)^2) + (b*n*(1/(d*(d + e*x)) + Log[x]/d^2 - Log[d + e*x
]/d^2))/(2*e)))/d) + (-((e*((x*(a + b*Log[c*x^n]))/(d*(d + e*x)) - (b*n*Lo
g[d + e*x])/(d*e)))/d) + (-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d) + (b*
n*PolyLog[2, -(d/(e*x))])/d)/d)/d))/(3*e)
```

Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.99 (sec) , antiderivative size = 495, normalized size of antiderivative = 2.44

method	result
risch	$-\frac{b^2\ln(x^n)^2}{3e(ex+d)^3}-\frac{2b^2n\ln(x^n)\ln(ex+d)}{3e\,d^3}+\frac{2b^2n\ln(x^n)}{3e\,d^2(ex+d)}+\frac{b^2n\ln(x^n)}{3ed(ex+d)^2}+\frac{2b^2n\ln(x^n)\ln(x)}{3e\,d^3}-\frac{b^2n^2}{3d^2e(ex+d)}+\frac{b^2n^2\ln(ex+d}{d^3e}$

input
```
int((a+b*ln(c*x^n))^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
-1/3*b^2*ln(x^n)^2/e/(e*x+d)^3-2/3*b^2/e*n*ln(x^n)/d^3*ln(e*x+d)+2/3*b^2*n
*ln(x^n)/e/d^2/(e*x+d)+1/3*b^2*n*ln(x^n)/e/d/(e*x+d)^2+2/3*b^2/e*n*ln(x^n)
/d^3*ln(x)-1/3*b^2*n^2/d^2/e/(e*x+d)+b^2*n^2*ln(e*x+d)/d^3/e-b^2*n^2*ln(x)
/d^3/e-1/3*b^2/e*n^2/d^3*ln(x)^2+2/3*b^2/e*n^2/d^3*ln(e*x+d)*ln(-e*x/d)+2/
3*b^2/e*n^2/d^3*dilog(-e*x/d)+(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*c
sgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*
x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*(-1/3*ln(x^n)/e/(e*x+d)^3+1/3/e*n*(-1/d^
3*ln(e*x+d)+1/d^2/(e*x+d)+1/2/d/(e*x+d)^2+1/d^3*ln(x)))-1/12*(I*Pi*b*csgn(
I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*c
sgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^2/(e*x+d)^3
/e
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^4*x^4 + 4*d*e^3*x^
3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d^4), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/(e*x+d)**4,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(d + e*x)**4, x)
```

Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/3*a*b*n*((2*e*x + 3*d)/(d^2*e^3*x^2 + 2*d^3*e^2*x + d^4*e) - 2*log(e*x +
 d)/(d^3*e) + 2*log(x)/(d^3*e)) - 1/3*b^2*(log(x^n)^2/(e^4*x^3 + 3*d*e^3*x
^2 + 3*d^2*e^2*x + d^3*e) - 3*integrate(1/3*(3*e*x*log(c)^2 + 2*(d*n + (e*
n + 3*e*log(c))*x)*log(x^n))/(e^5*x^5 + 4*d*e^4*x^4 + 6*d^2*e^3*x^3 + 4*d^
3*e^2*x^2 + d^4*e*x), x)) - 2/3*a*b*log(c*x^n)/(e^4*x^3 + 3*d*e^3*x^2 + 3*
d^2*e^2*x + d^3*e) - 1/3*a^2/(e^4*x^3 + 3*d*e^3*x^2 + 3*d^2*e^2*x + d^3*e)
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/(e*x + d)^4, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^4}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(d + e*x)^4,x)
```

output
```
int((a + b*log(c*x^n))^2/(d + e*x)^4, x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$
$$= \frac{18\left(\int \frac{\log(x^n c)}{e^4x^5+4d\,e^3x^4+6d^2e^2x^3+4d^3e\,x^2+d^4x}dx\right)b^2d^7n - 6\log(ex+d)\,b^2d^3n^2 + 21ab\,d^3n - 2b^2e^3n^2x^3 + 54\log(x^n}{}$$

input
```
int((a+b*log(c*x^n))^2/(e*x+d)^4,x)
```

output
```
(18*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*
x**4 + e**4*x**5),x)*b**2*d**7*n + 54*int(log(x**n*c)/(d**4*x + 4*d**3*e*x
**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b**2*d**6*e*n*x + 5
4*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x*
*4 + e**4*x**5),x)*b**2*d**5*e**2*n*x**2 + 18*int(log(x**n*c)/(d**4*x + 4*
d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b**2*d**4*e
**3*n*x**3 - 18*log(d + e*x)*a*b*d**3*n - 54*log(d + e*x)*a*b*d**2*e*n*x -
 54*log(d + e*x)*a*b*d*e**2*n*x**2 - 18*log(d + e*x)*a*b*e**3*n*x**3 - 6*l
og(d + e*x)*b**2*d**3*n**2 - 18*log(d + e*x)*b**2*d**2*e*n**2*x - 18*log(d
 + e*x)*b**2*d*e**2*n**2*x**2 - 6*log(d + e*x)*b**2*e**3*n**2*x**3 - 9*log
(x**n*c)**2*b**2*d**3 + 54*log(x**n*c)*a*b*d**2*e*x + 54*log(x**n*c)*a*b*d
*e**2*x**2 + 18*log(x**n*c)*a*b*e**3*x**3 + 18*log(x**n*c)*b**2*d**2*e*n*x
 + 18*log(x**n*c)*b**2*d*e**2*n*x**2 + 6*log(x**n*c)*b**2*e**3*n*x**3 - 9*
a**2*d**3 + 21*a*b*d**3*n + 27*a*b*d**2*e*n*x - 6*a*b*e**3*n*x**3 + 7*b**2
*d**3*n**2 + 9*b**2*d**2*e*n**2*x - 2*b**2*e**3*n**2*x**3)/(27*d**3*e*(d**
3 + 3*d**2*e*x + 3*d*e**2*x**2 + e**3*x**3))
```

3.118 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx$

Optimal result 1016
Mathematica [A] (verified) 1017
Rubi [A] (verified) 1018
Maple [C] (warning: unable to verify) 1026
Fricas [F] 1027
Sympy [F] 1028
Maxima [F] 1028
Giac [F] 1028
Mupad [F(-1)] 1029
Reduce [F] 1029

Optimal result

Integrand size = 23, antiderivative size = 351

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx = {} & \frac{b^2n^2}{3d^3(d+ex)} + \frac{b^2n^2\log(x)}{3d^4} - \frac{bn(a+b\log(cx^n))}{3d^2(d+ex)^2} \\ & + \frac{5benx(a+b\log(cx^n))}{3d^4(d+ex)} - \frac{5(a+b\log(cx^n))^2}{6d^4} \\ & + \frac{(a+b\log(cx^n))^2}{3d(d+ex)^3} + \frac{(a+b\log(cx^n))^2}{2d^2(d+ex)^2} \\ & - \frac{ex(a+b\log(cx^n))^2}{d^4(d+ex)} + \frac{(a+b\log(cx^n))^3}{3bd^4n} \\ & - \frac{2b^2n^2\log(d+ex)}{d^4} + \frac{11bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{3d^4} \\ & - \frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d^4} + \frac{11b^2n^2\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{3d^4} \\ & - \frac{2bn(a+b\log(cx^n))\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^4} \\ & + \frac{2b^2n^2\,\mathrm{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^4}\end{aligned}$$

output
```
1/3*b^2*n^2/d^3/(e*x+d)+1/3*b^2*n^2*ln(x)/d^4-1/3*b*n*(a+b*ln(c*x^n))/d^2/
(e*x+d)^2+5/3*b*e*n*x*(a+b*ln(c*x^n))/d^4/(e*x+d)-5/6*(a+b*ln(c*x^n))^2/d^
4+1/3*(a+b*ln(c*x^n))^2/d/(e*x+d)^3+1/2*(a+b*ln(c*x^n))^2/d^2/(e*x+d)^2-e*
x*(a+b*ln(c*x^n))^2/d^4/(e*x+d)+1/3*(a+b*ln(c*x^n))^3/b/d^4/n-2*b^2*n^2*ln
(e*x+d)/d^4+11/3*b*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^4-(a+b*ln(c*x^n))^2*ln(
1+e*x/d)/d^4+11/3*b^2*n^2*polylog(2,-e*x/d)/d^4-2*b*n*(a+b*ln(c*x^n))*poly
log(2,-e*x/d)/d^4+2*b^2*n^2*polylog(3,-e*x/d)/d^4
```

Mathematica [A] (verified)

Time = 0.50 (sec) , antiderivative size = 318, normalized size of antiderivative = 0.91

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx = \frac{-\frac{2bd^2n(a+b\log(cx^n))}{(d+ex)^2}-\frac{10bdn(a+b\log(cx^n))}{d+ex}-11(a+b\log(cx^n))^2+\frac{2d^3(a+b\log(cx^n))^2}{(d+ex)^3}+\frac{3d^2(a+b\log(cx^n))^2}{(d+ex)^2}+\frac{6d(a+b\log(cx^n))^2}{d+ex}}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x)^4),x]
```

output
```
((-2*b*d^2*n*(a + b*Log[c*x^n]))/(d + e*x)^2 - (10*b*d*n*(a + b*Log[c*x^n]
))/(d + e*x) - 11*(a + b*Log[c*x^n])^2 + (2*d^3*(a + b*Log[c*x^n])^2)/(d +
 e*x)^3 + (3*d^2*(a + b*Log[c*x^n])^2)/(d + e*x)^2 + (6*d*(a + b*Log[c*x^n
])^2)/(d + e*x) + (2*(a + b*Log[c*x^n])^3)/(b*n) + 10*b^2*n^2*(Log[x] - Lo
g[d + e*x]) + (2*b^2*n^2*(d + (d + e*x)*Log[x] - (d + e*x)*Log[d + e*x]))/
(d + e*x) + 22*b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 6*(a + b*Log[c*x^
n])^2*Log[1 + (e*x)/d] + 22*b^2*n^2*PolyLog[2, -((e*x)/d)] - 12*b*n*(a + b
*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + 12*b^2*n^2*PolyLog[3, -((e*x)/d)])/(
6*d^4)
```

Rubi [A] (verified)

Time = 3.04 (sec) , antiderivative size = 508, normalized size of antiderivative = 1.45, number of steps used = 15, number of rules used = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.652, Rules used = {2789, 2756, 2789, 2756, 54, 2009, 2789, 2751, 16, 2755, 2754, 2779, 2821, 2838, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4} \, dx$$

$$\Big\downarrow \text{2789}$$

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}dx}{d}$$

$$\Big\downarrow \text{2756}$$

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}dx}{d}-\frac{e\left(\frac{2bn\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \text{2789}$$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}dx}{d}}{d}-\frac{e\left(\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^3}dx}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \text{2756}$$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(d+ex)^2}dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$\Big\downarrow$ 54

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \left(-\frac{e}{d^2(d+ex)}-\frac{e}{d(d+ex)^2}+\frac{1}{d^2x}\right)dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$\Big\downarrow$ 2009

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$\Big\downarrow$ 2789

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{2bn\left(\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$\downarrow$ 2751

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int \frac{1}{d+ex}dx}{d}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{2bn\left(\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int \frac{1}{d+ex}dx}{d}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$\downarrow$ 16

$$\frac{\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{2bn\left(\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \; 2755$$

$$\frac{\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\int \frac{a+b\log(cx^n)}{d+ex}dx}{d}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{2bn\left(\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \; 2754$$

$$\frac{\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d} - \frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)} - \frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e} - \frac{bn\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}}{d} - \frac{e\left(\frac{bn\left(\frac{\int\frac{a+b\log(cx^n)}{x(d+ex)}dx}{d} - \frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)} \cdots\right)}{d}\right)}{e} \cdots\right)}{d}}{d}$$

$$\frac{e\left(\frac{2bn\left(\frac{\frac{\int\frac{a+b\log(cx^n)}{x(d+ex)}dx}{d} - \frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)} - \frac{bn\log(d+ex)}{de}\right)}{d}}{d} - \frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e} - \frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e} - \frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \text{ 2779}$$

$$\frac{\frac{\frac{\frac{2bn\int\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{x}dx}{d} - \frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d} - \frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)} - \frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e} - \frac{bn\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}}{d} - \frac{e\left(\cdots\right)}{\cdots}}{d}$$

$$\frac{e\left(\frac{2bn\left(\frac{\frac{\frac{bn\int\frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d} - \frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d} - \frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)} - \frac{bn\log(d+ex)}{de}\right)}{d}}{d} - \frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e} - \frac{a+b\log(cx^n)}{2e(d+ex)^2} \cdots\right)}{d}\cdots\right)}{3e}\cdots\right)}{d}$$

$$\Big\downarrow \text{ 2821}$$

$$\frac{\frac{\frac{2bn\left(\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-\right.}{d}\right.}{d}}{d}$$

$$d$$

$$\frac{e\left(\frac{2bn\left(\frac{\frac{bn\int\frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right.}{d}\right.}{3e}\right.}{d}$$

$$\downarrow 2838$$

$$\frac{\frac{\frac{2bn\left(\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}+\right.}{d}\right.}{d}}{d}$$

$$d$$

$$\frac{e\left(\frac{2bn\left(\frac{\frac{bn\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right.}{d}\right.}{3e}\right.}{d}$$

$$\downarrow 7143$$

$$\frac{\frac{\frac{\frac{2bn\left(\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))+bn\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}+\frac{bn\operatorname{Poly}}{}\right.}{d}\right.}{d}}{d}}{d}$$

$$\frac{e\left(\frac{2bn\left(\frac{\frac{\frac{bn\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right.}{d}\right.}{3e}\right.}{d}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x*(d + e*x)^4),x]
```

output
```
-((e*(-1/3*(a + b*Log[c*x^n])^2/(e*(d + e*x)^3) + (2*b*n*(-((e*(-1/2*(a + 
b*Log[c*x^n])/(e*(d + e*x)^2) + (b*n*(1/(d*(d + e*x)) + Log[x]/d^2 - Log[d
 + e*x]/d^2))/(2*e)))/d) + (-((e*((x*(a + b*Log[c*x^n]))/(d*(d + e*x)) - (
b*n*Log[d + e*x])/(d*e)))/d) + (-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d)
 + (b*n*PolyLog[2, -(d/(e*x))])/d)/d)/d))/(3*e)))/d) + (-((e*(-1/2*(a + b*
Log[c*x^n])^2/(e*(d + e*x)^2) + (b*n*(-((e*((x*(a + b*Log[c*x^n]))/(d*(d +
 e*x)) - (b*n*Log[d + e*x])/(d*e)))/d) + (-((Log[1 + d/(e*x)]*(a + b*Log[c
*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x))])/d)/d))/e))/d) + (-((e*((x*(a + b
*Log[c*x^n])^2)/(d*(d + e*x)) - (2*b*n*(((a + b*Log[c*x^n])*Log[1 + (e*x)/
d])/e + (b*n*PolyLog[2, -((e*x)/d)])/e))/d))/d) + (-((Log[1 + d/(e*x)]*(a
+ b*Log[c*x^n])^2)/d) + (2*b*n*((a + b*Log[c*x^n])*PolyLog[2, -(d/(e*x))]
+ b*n*PolyLog[3, -(d/(e*x))]))/d)/d)/d)/d
```

Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2755
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Simp[b*n*(p/d)
 Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e,
n, p}, x] && GtQ[p, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.26 (sec) , antiderivative size = 894, normalized size of antiderivative = 2.55

method	result	size
risch	Expression too large to display	894

input
```
int((a+b*ln(c*x^n))^2/x/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
-2*b^2/d^4*ln(e*x+d)*ln(-e*x/d)*ln(x)*n^2+2*b^2*n/d^4*ln(x^n)*ln(e*x+d)*ln
(-e*x/d)-b^2*n/d^4*ln(x^n)*ln(x)^2-2*b^2/d^4*dilog(-e*x/d)*ln(x)*n^2+2*b^2
*n/d^4*ln(x^n)*dilog(-e*x/d)+b^2/d^4*n^2*ln(e*x+d)*ln(x)^2-b^2/d^4*n^2*ln(
x)^2*ln(1+e*x/d)-2*b^2/d^4*n^2*ln(x)*polylog(2,-e*x/d)+11/3*b^2*n*ln(x^n)/
d^4*ln(e*x+d)-11/3*b^2*n*ln(x^n)/d^4*ln(x)-11/3*b^2/d^4*n^2*ln(e*x+d)*ln(-
e*x/d)+1/4*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c
*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*
b*ln(c)+2*a)^2*(-1/d^4*ln(e*x+d)+1/d^3/(e*x+d)+1/2/d^2/(e*x+d)^2+1/3/d/(e*
x+d)^3+1/d^4*ln(x))-b^2*ln(x^n)^2/d^4*ln(e*x+d)+b^2*ln(x^n)^2/d^3/(e*x+d)+
1/2*b^2*ln(x^n)^2/d^2/(e*x+d)^2+1/3*b^2*ln(x^n)^2/d/(e*x+d)^3+b^2*ln(x^n)^
2/d^4*ln(x)+11/6*b^2/d^4*n^2*ln(x)^2-11/3*b^2/d^4*n^2*dilog(-e*x/d)+1/3*b^
2/d^4*ln(x)^3*n^2-5/3*b^2*n*ln(x^n)/d^3/(e*x+d)-1/3*b^2*n*ln(x^n)/d^2/(e*x
+d)^2+(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)
*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(
c)+2*a)*b*(-ln(x^n)/d^4*ln(e*x+d)+ln(x^n)/d^3/(e*x+d)+1/2*ln(x^n)/d^2/(e*x
+d)^2+1/3*ln(x^n)/d/(e*x+d)^3+ln(x^n)/d^4*ln(x)-1/6*n*(5/d^3/(e*x+d)+1/d^2
/(e*x+d)^2-11/d^4*ln(e*x+d)+11/d^4*ln(x)+3/d^4*ln(x)^2-6/d^4*ln(e*x+d)*ln(
-e*x/d)-6/d^4*dilog(-e*x/d)))+1/3*b^2*n^2/d^3/(e*x+d)+2*b^2*n^2*ln(x)/d^4-
2*b^2*n^2*ln(e*x+d)/d^4+2*b^2*n^2*polylog(3,-e*x/d)/d^4
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^4x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^4*x^5 + 4*d*e^3*x^
4 + 6*d^2*e^2*x^3 + 4*d^3*e*x^2 + d^4*x), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx = \int \frac{(a+b\log(cx^n))^2}{x\,(d+ex)^4}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x/(e*x+d)**4,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x*(d + e*x)**4), x)
```

Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^4x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/6*a^2*((6*e^2*x^2 + 15*d*e*x + 11*d^2)/(d^3*e^3*x^3 + 3*d^4*e^2*x^2 + 3*
d^5*e*x + d^6) - 6*log(e*x + d)/d^4 + 6*log(x)/d^4) + integrate((b^2*log(c
)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e^4*
x^5 + 4*d*e^3*x^4 + 6*d^2*e^2*x^3 + 4*d^3*e*x^2 + d^4*x), x)
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^4x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)^4*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x\,(d+e\,x)^4}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x*(d + e*x)^4),x)
```

output
```
int((a + b*log(c*x^n))^2/(x*(d + e*x)^4), x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx = \frac{6\left(\int \frac{\log(x^nc)^2}{e^4x^5+4d\,e^3x^4+6d^2e^2x^3+4d^3e\,x^2+d^4x}dx\right)b^2d^7+18\left(\int \frac{\log(x^nc)^2}{e^4x^5+4d\,e^3x^4+6d^2e^2x^3+4d^3e\,x^2+d^4x}dx\right)b^2d^6ex+18\left(\int \frac{}{e^4x^5+}\right.}{}$$

input
```
int((a+b*log(c*x^n))^2/x/(e*x+d)^4,x)
```

output

```
(6*int(log(x**n*c)**2/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**
3*x**4 + e**4*x**5),x)*b**2*d**7 + 18*int(log(x**n*c)**2/(d**4*x + 4*d**3*
e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b**2*d**6*e*x +
18*int(log(x**n*c)**2/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**
3*x**4 + e**4*x**5),x)*b**2*d**5*e**2*x**2 + 6*int(log(x**n*c)**2/(d**4*x
+ 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*b**2*d*
*4*e**3*x**3 + 12*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x*
*3 + 4*d*e**3*x**4 + e**4*x**5),x)*a*b*d**7 + 36*int(log(x**n*c)/(d**4*x +
 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*a*b*d**6
*e*x + 36*int(log(x**n*c)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d
*e**3*x**4 + e**4*x**5),x)*a*b*d**5*e**2*x**2 + 12*int(log(x**n*c)/(d**4*x
 + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*a*b*d*
*4*e**3*x**3 - 6*log(d + e*x)*a**2*d**3 - 18*log(d + e*x)*a**2*d**2*e*x -
18*log(d + e*x)*a**2*d*e**2*x**2 - 6*log(d + e*x)*a**2*e**3*x**3 + 6*log(x
)*a**2*d**3 + 18*log(x)*a**2*d**2*e*x + 18*log(x)*a**2*d*e**2*x**2 + 6*log
(x)*a**2*e**3*x**3 + 9*a**2*d**3 + 9*a**2*d**2*e*x - 2*a**2*e**3*x**3)/(6*
d**4*(d**3 + 3*d**2*e*x + 3*d*e**2*x**2 + e**3*x**3))
```

3.119 $\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx$

Optimal result 1031
Mathematica [A] (verified) 1032
Rubi [A] (verified) 1033
Maple [C] (warning: unable to verify) 1034
Fricas [F] 1035
Sympy [F] 1036
Maxima [F] 1036
Giac [F] 1036
Mupad [F(-1)] 1037
Reduce [F] 1037

Optimal result

Integrand size = 23, antiderivative size = 420

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx = &-\frac{2b^2n^2}{d^4x}-\frac{b^2en^2}{3d^4(d+ex)}-\frac{b^2en^2\log(x)}{3d^5}-\frac{2bn(a+b\log(cx^n))}{d^4x}\\&+\frac{ben(a+b\log(cx^n))}{3d^3(d+ex)^2}-\frac{8be^2nx(a+b\log(cx^n))}{3d^5(d+ex)}\\&+\frac{4e(a+b\log(cx^n))^2}{3d^5}-\frac{(a+b\log(cx^n))^2}{d^4x}\\&-\frac{e(a+b\log(cx^n))^2}{3d^2(d+ex)^3}-\frac{e(a+b\log(cx^n))^2}{d^3(d+ex)^2}\\&+\frac{3e^2x(a+b\log(cx^n))^2}{d^5(d+ex)}-\frac{4e(a+b\log(cx^n))^3}{3bd^5n}\\&+\frac{3b^2en^2\log(d+ex)}{d^5}-\frac{26ben(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{3d^5}\\&+\frac{4e(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d^5}\\&-\frac{26b^2en^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{3d^5}\\&+\frac{8ben(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^5}\\&-\frac{8b^2en^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^5}\end{aligned}$$

output
```
-2*b^2*n^2/d^4/x-1/3*b^2*e*n^2/d^4/(e*x+d)-1/3*b^2*e*n^2*ln(x)/d^5-2*b*n*(
a+b*ln(c*x^n))/d^4/x+1/3*b*e*n*(a+b*ln(c*x^n))/d^3/(e*x+d)^2-8/3*b*e^2*n*x
*(a+b*ln(c*x^n))/d^5/(e*x+d)+4/3*e*(a+b*ln(c*x^n))^2/d^5-(a+b*ln(c*x^n))^2
/d^4/x-1/3*e*(a+b*ln(c*x^n))^2/d^2/(e*x+d)^3-e*(a+b*ln(c*x^n))^2/d^3/(e*x+
d)^2+3*e^2*x*(a+b*ln(c*x^n))^2/d^5/(e*x+d)-4/3*e*(a+b*ln(c*x^n))^3/b/d^5/n
+3*b^2*e*n^2*ln(e*x+d)/d^5-26/3*b*e*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^5+4*e*
(a+b*ln(c*x^n))^2*ln(1+e*x/d)/d^5-26/3*b^2*e*n^2*polylog(2,-e*x/d)/d^5+8*b
*e*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/d^5-8*b^2*e*n^2*polylog(3,-e*x/d)/d
^5
```

Mathematica [A] (verified)

Time = 0.77 (sec) , antiderivative size = 378, normalized size of antiderivative = 0.90

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx =$$

$$-\frac{\frac{6b^2dn^2}{x} + \frac{6bdn(a+b\log(cx^n))}{x} - \frac{bd^2en(a+b\log(cx^n))}{(d+ex)^2} - \frac{8bden(a+b\log(cx^n))}{d+ex} - 13e(a+b\log(cx^n))^2 + \frac{3d(a+b\log(cx^n))^2}{x}}{\ }$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)^4),x]
```

output
```
-1/3*((6*b^2*d*n^2)/x + (6*b*d*n*(a + b*Log[c*x^n]))/x - (b*d^2*e*n*(a + b
*Log[c*x^n]))/(d + e*x)^2 - (8*b*d*e*n*(a + b*Log[c*x^n]))/(d + e*x) - 13*
e*(a + b*Log[c*x^n])^2 + (3*d*(a + b*Log[c*x^n])^2)/x + (d^3*e*(a + b*Log[
c*x^n])^2)/(d + e*x)^3 + (3*d^2*e*(a + b*Log[c*x^n])^2)/(d + e*x)^2 + (9*d
*e*(a + b*Log[c*x^n])^2)/(d + e*x) + (4*e*(a + b*Log[c*x^n])^3)/(b*n) + 8*
b^2*e*n^2*(Log[x] - Log[d + e*x]) + (b^2*e*n^2*(d + (d + e*x)*Log[x] - (d
+ e*x)*Log[d + e*x]))/(d + e*x) + 26*b*e*n*(a + b*Log[c*x^n])*Log[1 + (e*x
)/d] - 12*e*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 26*b^2*e*n^2*PolyLog[2
, -((e*x)/d)] - 24*b*e*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + 24*b^
2*e*n^2*PolyLog[3, -((e*x)/d)])/d^5
```

Rubi [A] (verified)

Time = 1.20 (sec) , antiderivative size = 432, normalized size of antiderivative = 1.03, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(\frac{3e^2(a+b\log(cx^n))^2}{d^4(d+ex)^2}-\frac{4e(a+b\log(cx^n))^2}{d^4x(d+ex)}+\frac{(a+b\log(cx^n))^2}{d^4x^2}+\frac{2e^2(a+b\log(cx^n))^2}{d^3(d+ex)^3}+\frac{e^2(a+b\log(cx^n$$

$$\Big\downarrow \text{2009}$$

$$\frac{3e^2x(a+b\log(cx^n))^2}{d^5(d+ex)}-\frac{8be^2nx(a+b\log(cx^n))}{3d^5(d+ex)}-\frac{8ben\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^5}+\frac{4e\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d^5}-\frac{8ben\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{3d^5}-\frac{6ben\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{d^5}-\frac{(a+b\log(cx^n))^2}{d^4x}-\frac{2bn(a+b\log(cx^n))}{d^4x}-\frac{e(a+b\log(cx^n))^2}{d^3(d+ex)^2}+\frac{ben(a+b\log(cx^n))}{3d^3(d+ex)^2}-\frac{e(a+b\log(cx^n))^2}{3d^2(d+ex)^3}+\frac{8b^2en^2\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{3d^5}-\frac{6b^2en^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^5}-\frac{8b^2en^2\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^5}-\frac{b^2en^2\log(x)}{3d^5}+\frac{3b^2en^2\log(d+ex)}{d^5}-\frac{b^2en^2}{3d^4(d+ex)}-\frac{2b^2n^2}{d^4x}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)^4),x]
```

output
```
(-2*b^2*n^2)/(d^4*x) - (b^2*e*n^2)/(3*d^4*(d + e*x)) - (b^2*e*n^2*Log[x])/
(3*d^5) - (2*b*n*(a + b*Log[c*x^n]))/(d^4*x) + (b*e*n*(a + b*Log[c*x^n]))/
(3*d^3*(d + e*x)^2) - (8*b*e^2*n*x*(a + b*Log[c*x^n]))/(3*d^5*(d + e*x)) -
 (8*b*e*n*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/(3*d^5) - (a + b*Log[c*x^n]
)^2/(d^4*x) - (e*(a + b*Log[c*x^n])^2)/(3*d^2*(d + e*x)^3) - (e*(a + b*Log
[c*x^n])^2)/(d^3*(d + e*x)^2) + (3*e^2*x*(a + b*Log[c*x^n])^2)/(d^5*(d + e
*x)) + (4*e*Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d^5 + (3*b^2*e*n^2*Log[
d + e*x])/d^5 - (6*b*e*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/d^5 + (8*b^2
*e*n^2*PolyLog[2, -(d/(e*x))])/(3*d^5) - (8*b*e*n*(a + b*Log[c*x^n])*PolyL
og[2, -(d/(e*x))])/d^5 - (6*b^2*e*n^2*PolyLog[2, -((e*x)/d)])/d^5 - (8*b^2
*e*n^2*PolyLog[3, -(d/(e*x))])/d^5
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.78 (sec) , antiderivative size = 1015, normalized size of antiderivative = 2.42

method	result	size
risch	Expression too large to display	1015

input
```
int((a+b*ln(c*x^n))^2/x^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
4*b^2*ln(x^n)^2/d^5*e*ln(e*x+d)-2*b^2*n*ln(x^n)/d^4/x+1/4*(I*Pi*b*csgn(I*x
^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn
(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^2*(-1/3/d^2/(e
*x+d)^3*e+4/d^5*e*ln(e*x+d)-3/d^4*e/(e*x+d)-1/d^3/(e*x+d)^2*e-1/d^4/x-4/d^
5*e*ln(x))-b^2*ln(x^n)^2/d^4/x+8*b^2/d^5*e*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2-
8*b^2*n/d^5*e*ln(x^n)*ln(e*x+d)*ln(-e*x/d)-26/3*b^2*n*ln(x^n)/d^5*e*ln(e*x
+d)+4*b^2*n/d^5*e*ln(x^n)*ln(x)^2+8*b^2/d^5*e*ln(x)*dilog(-e*x/d)*n^2-8*b^
2*n/d^5*e*ln(x^n)*dilog(-e*x/d)-4*b^2/d^5*e*n^2*ln(e*x+d)*ln(x)^2+4*b^2/d^
5*e*n^2*ln(x)^2*ln(1+e*x/d)+8*b^2/d^5*e*n^2*ln(x)*polylog(2,-e*x/d)+26/3*b
^2*n*ln(x^n)/d^5*e*ln(x)+26/3*b^2/d^5*n^2*e*ln(e*x+d)*ln(-e*x/d)-4*b^2*ln(
x^n)^2/d^5*e*ln(x)-4/3*b^2/d^5*e*ln(x)^3*n^2-13/3*b^2/d^5*n^2*e*ln(x)^2+26
/3*b^2/d^5*n^2*e*dilog(-e*x/d)+8/3*b^2*n*ln(x^n)/d^4*e/(e*x+d)+1/3*b^2*n*l
n(x^n)/d^3/(e*x+d)^2*e-1/3*b^2*e*n^2/d^4/(e*x+d)+(I*Pi*b*csgn(I*x^n)*csgn(
I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)
^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*(-1/3*ln(x^n)/d^2/(e*
x+d)^3*e+4*ln(x^n)/d^5*e*ln(e*x+d)-3*ln(x^n)/d^4*e/(e*x+d)-ln(x^n)/d^3/(e*
x+d)^2*e-ln(x^n)/d^4/x-4*ln(x^n)/d^5*e*ln(x)-1/3*n*(-6/d^5*e*ln(x)^2+12/d^
5*e*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))-4/d^4*e/(e*x+d)+13/d^5*e*ln(e*x+d
)-1/2/d^3/(e*x+d)^2*e+3/d^4/x-13/d^5*e*ln(x)))-1/3*b^2*ln(x^n)^2/d^2/(e*x+
d)^3*e-3*b^2*e*n^2*ln(x)/d^5+3*b^2*e*n^2*ln(e*x+d)/d^5-8*b^2*e*n^2*poly...
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^4x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^4*x^6 + 4*d*e^3*x^
5 + 6*d^2*e^2*x^4 + 4*d^3*e*x^3 + d^4*x^2), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx = \int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x**2/(e*x+d)**4,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x**2*(d + e*x)**4), x)
```

Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^4x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^4,x, algorithm="maxima")
```

output
```
-1/3*a^2*((12*e^3*x^3 + 30*d*e^2*x^2 + 22*d^2*e*x + 3*d^3)/(d^4*e^3*x^4 +
3*d^5*e^2*x^3 + 3*d^6*e*x^2 + d^7*x) - 12*e*log(e*x + d)/d^5 + 12*e*log(x)
/d^5) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*l
og(c) + a*b)*log(x^n))/(e^4*x^6 + 4*d*e^3*x^5 + 6*d^2*e^2*x^4 + 4*d^3*e*x^
3 + d^4*x^2), x)
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^4x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)^4*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x^2\,(d+e\,x)^4}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x^2*(d + e*x)^4),x)
```

output
```
int((a + b*log(c*x^n))^2/(x^2*(d + e*x)^4), x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx = \frac{3\left(\int \frac{\log(x^n c)^2}{e^4x^6+4d\,e^3x^5+6d^2e^2x^4+4d^3e\,x^3+d^4x^2}dx\right)b^2d^8x+9\left(\int \frac{\log(x^n c)^2}{e^4x^6+4d\,e^3x^5+6d^2e^2x^4+4d^3e\,x^3+d^4x^2}dx\right)b^2d^7e\,x^2+9\left(\int \frac{}{e^4x}\right.}{}$$

input
```
int((a+b*log(c*x^n))^2/x^2/(e*x+d)^4,x)
```

output
```
(3*int(log(x**n*c)**2/(d**4*x**2 + 4*d**3*e*x**3 + 6*d**2*e**2*x**4 + 4*d*
e**3*x**5 + e**4*x**6),x)*b**2*d**8*x + 9*int(log(x**n*c)**2/(d**4*x**2 +
4*d**3*e*x**3 + 6*d**2*e**2*x**4 + 4*d*e**3*x**5 + e**4*x**6),x)*b**2*d**7
*e*x**2 + 9*int(log(x**n*c)**2/(d**4*x**2 + 4*d**3*e*x**3 + 6*d**2*e**2*x*
*4 + 4*d*e**3*x**5 + e**4*x**6),x)*b**2*d**6*e**2*x**3 + 3*int(log(x**n*c)
**2/(d**4*x**2 + 4*d**3*e*x**3 + 6*d**2*e**2*x**4 + 4*d*e**3*x**5 + e**4*x
**6),x)*b**2*d**5*e**3*x**4 + 6*int(log(x**n*c)/(d**4*x**2 + 4*d**3*e*x**3
 + 6*d**2*e**2*x**4 + 4*d*e**3*x**5 + e**4*x**6),x)*a*b*d**8*x + 18*int(lo
g(x**n*c)/(d**4*x**2 + 4*d**3*e*x**3 + 6*d**2*e**2*x**4 + 4*d*e**3*x**5 +
e**4*x**6),x)*a*b*d**7*e*x**2 + 18*int(log(x**n*c)/(d**4*x**2 + 4*d**3*e*x
**3 + 6*d**2*e**2*x**4 + 4*d*e**3*x**5 + e**4*x**6),x)*a*b*d**6*e**2*x**3
+ 6*int(log(x**n*c)/(d**4*x**2 + 4*d**3*e*x**3 + 6*d**2*e**2*x**4 + 4*d*e*
*3*x**5 + e**4*x**6),x)*a*b*d**5*e**3*x**4 + 12*log(d + e*x)*a**2*d**3*e*x
 + 36*log(d + e*x)*a**2*d**2*e**2*x**2 + 36*log(d + e*x)*a**2*d*e**3*x**3
+ 12*log(d + e*x)*a**2*e**4*x**4 - 12*log(x)*a**2*d**3*e*x - 36*log(x)*a**
2*d**2*e**2*x**2 - 36*log(x)*a**2*d*e**3*x**3 - 12*log(x)*a**2*e**4*x**4 -
 3*a**2*d**4 - 18*a**2*d**3*e*x - 18*a**2*d**2*e**2*x**2 + 4*a**2*e**4*x**
4)/(3*d**5*x*(d**3 + 3*d**2*e*x + 3*d*e**2*x**2 + e**3*x**3))
```

3.120 $\int \frac{x\log^2(x)}{(d+ex)^4}\,dx$

Optimal result 1039
Mathematica [A] (verified) 1039
Rubi [A] (verified) 1040
Maple [A] (verified) 1043
Fricas [F] 1043
Sympy [A] (verification not implemented) 1044
Maxima [A] (verification not implemented) 1044
Giac [F] 1045
Mupad [F(-1)] 1045
Reduce [F] 1046

Optimal result

Integrand size = 13, antiderivative size = 107

$$\int \frac{x\log^2(x)}{(d+ex)^4}\,dx = -\frac{x}{3d^2e(d+ex)}+\frac{x\log(x)}{3de(d+ex)^2}+\frac{x^2(3d+ex)\log^2(x)}{6d^2(d+ex)^3} - \frac{\log(x)\log\left(1+\frac{ex}{d}\right)}{3d^2e^2}-\frac{\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{3d^2e^2}$$

output
```
-1/3*x/d^2/e/(e*x+d)+1/3*x*ln(x)/d/e/(e*x+d)^2+1/6*x^2*(e*x+3*d)*ln(x)^2/d
^2/(e*x+d)^3-1/3*ln(x)*ln(1+e*x/d)/d^2/e^2-1/3*polylog(2,-e*x/d)/d^2/e^2
```

Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 96, normalized size of antiderivative = 0.90

$$\int \frac{x\log^2(x)}{(d+ex)^4}\,dx = \frac{2d(d+ex)^2+e^2x^2(3d+ex)\log^2(x)-2(d+ex)\log(x)\left(-dex+(d+ex)^2\log\left(1+\frac{ex}{d}\right)\right)-2(d+ex)^3\,\text{P}}{6d^2e^2(d+ex)^3}$$

input
```
Integrate[(x*Log[x]^2)/(d + e*x)^4,x]
```

output
```
(2*d*(d + e*x)^2 + e^2*x^2*(3*d + e*x)*Log[x]^2 - 2*(d + e*x)*Log[x]*(-(d*
e*x) + (d + e*x)^2*Log[1 + (e*x)/d]) - 2*(d + e*x)^3*PolyLog[2, -((e*x)/d)
])/(6*d^2*e^2*(d + e*x)^3)
```

Rubi [A] (verified)

Time = 0.63 (sec) , antiderivative size = 164, normalized size of antiderivative = 1.53, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.615$, Rules used = {2783, 2773, 49, 2009, 2781, 2784, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x\log^2(x)}{(d+ex)^4}\,dx$$

$$\Big\downarrow \text{2783}$$

$$\frac{\int \frac{x\log^2(x)}{(d+ex)^3}dx}{3d}-\frac{2\int \frac{x\log(x)}{(d+ex)^3}dx}{3d}+\frac{x^2\log^2(x)}{3d(d+ex)^3}$$

$$\Big\downarrow \text{2773}$$

$$-\frac{2\left(\frac{x^2\log(x)}{2d(d+ex)^2}-\frac{\int \frac{x}{(d+ex)^2}dx}{2d}\right)}{3d}+\frac{\int \frac{x\log^2(x)}{(d+ex)^3}dx}{3d}+\frac{x^2\log^2(x)}{3d(d+ex)^3}$$

$$\Big\downarrow \text{49}$$

$$-\frac{2\left(\frac{x^2\log(x)}{2d(d+ex)^2}-\frac{\int \left(\frac{1}{e(d+ex)}-\frac{d}{e(d+ex)^2}\right)dx}{2d}\right)}{3d}+\frac{\int \frac{x\log^2(x)}{(d+ex)^3}dx}{3d}+\frac{x^2\log^2(x)}{3d(d+ex)^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{\int \frac{x\log^2(x)}{(d+ex)^3}dx}{3d}-\frac{2\left(\frac{x^2\log(x)}{2d(d+ex)^2}-\frac{\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}}{2d}\right)}{3d}+\frac{x^2\log^2(x)}{3d(d+ex)^3}$$

$$\Big\downarrow \text{2781}$$

$$\frac{\frac{x^2\log^2(x)}{2d(d+ex)^2}-\frac{\int\frac{x\log(x)}{(d+ex)^2}dx}{d}}{3d}-\frac{2\left(\frac{x^2\log(x)}{2d(d+ex)^2}-\frac{\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}}{2d}\right)}{3d}+\frac{x^2\log^2(x)}{3d(d+ex)^3}$$

$\downarrow$ 2784

$$\frac{\frac{x^2\log^2(x)}{2d(d+ex)^2}-\frac{\frac{\int\frac{\log(x)+1}{d+ex}dx}{e}-\frac{x\log(x)}{e(d+ex)}}{d}}{3d}-\frac{2\left(\frac{x^2\log(x)}{2d(d+ex)^2}-\frac{\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}}{2d}\right)}{3d}+\frac{x^2\log^2(x)}{3d(d+ex)^3}$$

$\downarrow$ 2754

$$\frac{\frac{x^2\log^2(x)}{2d(d+ex)^2}-\frac{\frac{\frac{(\log(x)+1)\log\left(\frac{ex}{d}+1\right)}{e}-\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}-\frac{x\log(x)}{e(d+ex)}}{d}}{3d}-\frac{2\left(\frac{x^2\log(x)}{2d(d+ex)^2}-\frac{\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}}{2d}\right)}{3d}+\frac{x^2\log^2(x)}{3d(d+ex)^3}$$

$\downarrow$ 2838

$$-\frac{2\left(\frac{x^2\log(x)}{2d(d+ex)^2}-\frac{\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}}{2d}\right)}{3d}+\frac{\frac{x^2\log^2(x)}{2d(d+ex)^2}-\frac{\frac{\frac{\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}+\frac{(\log(x)+1)\log\left(\frac{ex}{d}+1\right)}{e}}{e}-\frac{x\log(x)}{e(d+ex)}}{d}}{3d}+\frac{x^2\log^2(x)}{3d(d+ex)^3}$$

input
```
Int[(x*Log[x]^2)/(d + e*x)^4,x]
```

output
```
(x^2*Log[x]^2)/(3*d*(d + e*x)^3) - (2*((x^2*Log[x])/(2*d*(d + e*x)^2) - (d
/(e^2*(d + e*x)) + Log[d + e*x]/e^2)/(2*d)))/(3*d) + ((x^2*Log[x]^2)/(2*d*
(d + e*x)^2) - (-((x*Log[x])/(e*(d + e*x))) + (((1 + Log[x])*Log[1 + (e*x)
/d])/e + PolyLog[2, -((e*x)/d)]/e)/e)/d)/(3*d)
```

Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

rule 2781
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_))^(q_), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x)^(q + 1)*((a
+ b*Log[c*x^n])^p/(d*f*(q + 1))), x] + Simp[b*n*(p/(d*(q + 1)))   Int[(f*x)
^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b, c,
d, e, f, m, n, q}, x] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

rule 2783
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_))^(q_), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x)^(q + 1)*((a
+ b*Log[c*x^n])^p/(d*f*(q + 1))), x] + (Simp[(m + q + 2)/(d*(q + 1))   Int[
(f*x)^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^p, x], x] + Simp[b*n*(p/(d*(q
+ 1)))   Int[(f*x)^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p - 1), x], x])
/; FreeQ[{a, b, c, d, e, f, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[p, 0] && L
tQ[q, -1] && GtQ[m, 0]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [A] (verified)

Time = 0.44 (sec) , antiderivative size = 180, normalized size of antiderivative = 1.68

method	result
parts	$\frac{\ln\left(x\right)^{2} d}{3 e^{2} \left(e x +d \right)^{3}}-\frac{\ln\left(x\right)^{2}}{2 e^{2} \left(e x +d \right)^{2}}-\frac{-\frac{\ln\left(e x +d \right)}{d e}+\frac{\ln\left(x\right) x}{d \left(e x +d \right)}}{3 e d}-\frac{\frac{\operatorname{dilog}\left(\frac{e x +d}{d}\right)}{e}+\frac{\ln\left(x\right) \ln\left(\frac{e x +d}{d}\right)}{e}}{3 e \,d^{2}}+\frac{\frac{1}{3 d e \left(e x +d \right)}-\frac{\ln\left(e x +d \right)}{3 d^{2} e}+\frac{\ln\left(x\right) x \left(e x +2 d \right)}{3 d^{2} \left(e x +d \right)^{2}}}{e}$

input
```
int(x*ln(x)^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
1/3*ln(x)^2/e^2*d/(e*x+d)^3-1/2*ln(x)^2/e^2/(e*x+d)^2-1/3*(-1/d*ln(e*x+d)/
e+ln(x)*x/d/(e*x+d))/e/d-1/3*(dilog((e*x+d)/d)/e+ln(x)*ln((e*x+d)/d)/e)/e/
d^2+2/3*(1/2/d/e/(e*x+d)-1/2/d^2*ln(e*x+d)/e+1/2*ln(x)*x*(e*x+2*d)/d^2/(e*
x+d)^2)/e+1/6*ln(x)^2/d^2/e^2
```

Fricas [F]

$$\int \frac{x \log^2(x)}{(d+ex)^4} \, dx = \int \frac{x \log \left(x\right)^{2}}{{\left(e x + d\right)}^{4}} \, dx$$

input
```
integrate(x*log(x)^2/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral(x*log(x)^2/(e^4*x^4 + 4*d*e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d
^4), x)
```

Sympy [A] (verification not implemented)

Time = 21.26 (sec) , antiderivative size = 374, normalized size of antiderivative = 3.50

$$\int \frac{x\log^2(x)}{(d+ex)^4}\,dx = \text{Too large to display}$$

input
```
integrate(x*ln(x)**2/(e*x+d)**4,x)
```

output
```
(-d - 3*e*x)*log(x)**2/(6*d**3*e**2 + 18*d**2*e**3*x + 18*d*e**4*x**2 + 6*
e**5*x**3) + Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))*
log(x)/e - Piecewise((x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log
(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e), True))/e + Piecewise((-1/(e**3*x
), Eq(d, 0)), (-1/(2*d*e**2 + 2*e**3*x) - log(d + e*x)/(2*d*e**2), True))/
(3*d) - Piecewise((1/(e**3*x), Eq(d, 0)), (-1/(2*d*(d/x + e)**2), True))*l
og(x)/(3*d) - 2*Piecewise((-1/(e**2*x), Eq(d, 0)), (-log(d**2 + d*e*x)/(d*
e), True))/(3*d*e) + 2*Piecewise((1/(e**2*x), Eq(d, 0)), (-1/(d**2/x + d*e
), True))*log(x)/(3*d*e) + Piecewise((-1/(e*x), Eq(d, 0)), (Piecewise((pol
ylog(2, d*exp_polar(I*pi)/(e*x)), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*
log(x) + polylog(2, d*exp_polar(I*pi)/(e*x)), Abs(x) < 1), (-log(e)*log(1/
x) + polylog(2, d*exp_polar(I*pi)/(e*x)), 1/Abs(x) < 1), (-meijerg(((), (1
, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1), ()), ((), (0, 0)), x)*lo
g(e) + polylog(2, d*exp_polar(I*pi)/(e*x)), True))/d, True))/(3*d*e**2) -
Piecewise((1/(e*x), Eq(d, 0)), (log(d/x + e)/d, True))*log(x)/(3*d*e**2)
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 132, normalized size of antiderivative = 1.23

$$\begin{aligned}\int \frac{x\log^2(x)}{(d+ex)^4}\,dx &= -\frac{d^2\log(x)^2 - 2\,(e^2\log(x)+e^2)x^2 - 2\,d^2 + \left(3\,de\log(x)^2 - 2\,de\log(x) - 4\,de\right)x}{6\,(de^5x^3 + 3\,d^2e^4x^2 + 3\,d^3e^3x + d^4e^2)} \\ &\quad + \frac{\log(x)^2}{6\,d^2e^2} - \frac{\log\left(\frac{ex}{d}+1\right)\log(x) + \mathrm{Li}_2\left(-\frac{ex}{d}\right)}{3\,d^2e^2}\end{aligned}$$

input
```
integrate(x*log(x)^2/(e*x+d)^4,x, algorithm="maxima")
```

output
```
-1/6*(d^2*log(x)^2 - 2*(e^2*log(x) + e^2)*x^2 - 2*d^2 + (3*d*e*log(x)^2 -
2*d*e*log(x) - 4*d*e)*x)/(d*e^5*x^3 + 3*d^2*e^4*x^2 + 3*d^3*e^3*x + d^4*e^
2) + 1/6*log(x)^2/(d^2*e^2) - 1/3*(log(e*x/d + 1)*log(x) + dilog(-e*x/d))/
(d^2*e^2)
```

Giac [F]

$$\int \frac{x \log^2(x)}{(d+ex)^4} \, dx = \int \frac{x \log(x)^2}{(ex+d)^4} \, dx$$

input
```
integrate(x*log(x)^2/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate(x*log(x)^2/(e*x + d)^4, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x \log^2(x)}{(d+ex)^4} \, dx = \int \frac{x \ln(x)^2}{(d+e\,x)^4} \, dx$$

input
```
int((x*log(x)^2)/(d + e*x)^4,x)
```

output
```
int((x*log(x)^2)/(d + e*x)^4, x)
```

Reduce [F]

$$\int \frac{x \log^2(x)}{(d+ex)^4}\,dx$$
$$= \frac{18\left(\int \frac{\log(x)}{e^4x^5+4d\,e^3x^4+6d^2e^2x^3+4d^3e\,x^2+d^4x}dx\right)d^7+54\left(\int \frac{\log(x)}{e^4x^5+4d\,e^3x^4+6d^2e^2x^3+4d^3e\,x^2+d^4x}dx\right)d^6ex+54\left(\int \frac{}{e^4x^5+4d}\right.}{}$$

input
```
int(x*log(x)^2/(e*x+d)^4,x)
```

output
```
(18*int(log(x)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4
+ e**4*x**5),x)*d**7 + 54*int(log(x)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2
*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*d**6*e*x + 54*int(log(x)/(d**4*x + 4
*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3*x**4 + e**4*x**5),x)*d**5*e**2*
x**2 + 18*int(log(x)/(d**4*x + 4*d**3*e*x**2 + 6*d**2*e**2*x**3 + 4*d*e**3
*x**4 + e**4*x**5),x)*d**4*e**3*x**3 - 33*log(d + e*x)*d**3 - 99*log(d + e
*x)*d**2*e*x - 99*log(d + e*x)*d*e**2*x**2 - 33*log(d + e*x)*e**3*x**3 - 9
*log(x)**2*d**3 - 27*log(x)**2*d**2*e*x + 72*log(x)*d**2*e*x + 99*log(x)*d
*e**2*x**2 + 33*log(x)*e**3*x**3 + 25*d**3 + 36*d**2*e*x - 11*e**3*x**3)/(
54*d**2*e**2*(d**3 + 3*d**2*e*x + 3*d*e**2*x**2 + e**3*x**3))
```

3.121 $\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx$

Optimal result 1047
Mathematica [B] (verified) 1048
Rubi [A] (verified) 1048
Maple [C] (warning: unable to verify) 1050
Fricas [F] 1051
Sympy [F] 1052
Maxima [F] 1052
Giac [F] 1052
Mupad [F(-1)] 1053
Reduce [F] 1053

Optimal result

Integrand size = 23, antiderivative size = 113

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx = -\frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^3}{d} + \frac{3bn(a+b\log(cx^n))^2\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d} + \frac{6b^2n^2(a+b\log(cx^n))\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d} + \frac{6b^3n^3\operatorname{PolyLog}\left(4,-\frac{d}{ex}\right)}{d}$$

output

```
-ln(1+d/e/x)*(a+b*ln(c*x^n))^3/d+3*b*n*(a+b*ln(c*x^n))^2*polylog(2,-d/e/x)
/d+6*b^2*n^2*(a+b*ln(c*x^n))*polylog(3,-d/e/x)/d+6*b^3*n^3*polylog(4,-d/e/
x)/d
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 243 vs. $2(113) = 226$.

Time = 0.24 (sec) , antiderivative size = 243, normalized size of antiderivative = 2.15

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx$$
$$= \frac{4\log(x)\left(a-bn\log(x)+b\log(cx^n)\right)^3-4(a-bn\log(x)+b\log(cx^n))^3\log(d+ex)+6bn(a-bn\log(x)}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^3/(x*(d + e*x)),x]
```

output
```
(4*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n])^3 - 4*(a - b*n*Log[x] + b*Log[c*
x^n])^3*Log[d + e*x] + 6*b*n*(a - b*n*Log[x] + b*Log[c*x^n])^2*(Log[x]^2 -
 2*(Log[x]*Log[1 + (e*x)/d] + PolyLog[2, -((e*x)/d)])) - 4*b^2*n^2*(-a + b
*n*Log[x] - b*Log[c*x^n])*(Log[x]^2*(Log[x] - 3*Log[1 + (e*x)/d]) - 6*Log[
x]*PolyLog[2, -((e*x)/d)] + 6*PolyLog[3, -((e*x)/d)]) + b^3*n^3*(Log[x]^4
- 4*Log[x]^3*Log[1 + (e*x)/d] - 12*Log[x]^2*PolyLog[2, -((e*x)/d)] + 24*Lo
g[x]*PolyLog[3, -((e*x)/d)] - 24*PolyLog[4, -((e*x)/d)]))/(4*d)
```

Rubi [A] (verified)

Time = 0.50 (sec) , antiderivative size = 104, normalized size of antiderivative = 0.92, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2779, 2821, 2830, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx$$
$$\Big\downarrow \; 2779$$
$$\frac{3bn\int \frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}$$
$$\Big\downarrow \; 2821$$

$$\frac{3bn\left(\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\int\frac{(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}$$

$\Big\downarrow$ 2830

$$\frac{3bn\left(\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\left(bn\int\frac{\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{x}dx-\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)(a+b\log(cx^n))\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}$$

$\Big\downarrow$ 7143

$$\frac{3bn\left(\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\left(-\left(\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)(a+b\log(cx^n))\right)-bn\operatorname{PolyLog}\left(4,-\frac{d}{ex}\right)\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}$$

input
```
Int[(a + b*Log[c*x^n])^3/(x*(d + e*x)),x]
```

output
```
-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^3)/d) + (3*b*n*((a + b*Log[c*x^n])^
2*PolyLog[2, -(d/(e*x))] - 2*b*n*(-((a + b*Log[c*x^n])*PolyLog[3, -(d/(e*x
))]) - b*n*PolyLog[4, -(d/(e*x))])))/d
```

Defintions of rubi rules used

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 2830
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*PolyLog[k_, (e_.)*(x_)^(q_
.)])/(x_), x_Symbol] :> Simp[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^p/q)
, x] - Simp[b*n*(p/q)   Int[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, e, k, n, q}, x] && GtQ[p, 0]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.98 (sec) , antiderivative size = 967, normalized size of antiderivative = 8.56

method	result	size
risch	Expression too large to display	967

input
```
int((a+b*ln(c*x^n))^3/x/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
-b^3*ln(x^n)^3/d*ln(e*x+d)+b^3*ln(x^n)^3/d*ln(x)-3/2*b^3*n/d*ln(x^n)^2*ln(
x)^2+b^3/d*n^2*ln(x^n)*ln(x)^3-1/4*b^3/d*ln(x)^4*n^3+3*b^3/d*ln(x)^2*ln(e*
x+d)*ln(-e*x/d)*n^3+3*b^3/d*ln(x)^2*dilog(-e*x/d)*n^3-6*b^3/d*ln(x)*ln(x^n
)*ln(e*x+d)*ln(-e*x/d)*n^2-6*b^3/d*ln(x)*ln(x^n)*dilog(-e*x/d)*n^2+3*b^3*n
/d*ln(x^n)^2*ln(e*x+d)*ln(-e*x/d)+3*b^3*n/d*ln(x^n)^2*dilog(-e*x/d)-2*b^3/
d*n^3*ln(e*x+d)*ln(x)^3+2*b^3/d*n^3*ln(x)^3*ln(1+e*x/d)+3*b^3/d*n^3*ln(x)^
2*polylog(2,-e*x/d)-6*b^3/d*n^3*polylog(4,-e*x/d)+3*b^3/d*n^2*ln(x)^2*ln(x
^n)*ln(e*x+d)-3*b^3/d*n^2*ln(x)^2*ln(x^n)*ln(1+e*x/d)-6*b^3/d*n^2*ln(x)*ln
(x^n)*polylog(2,-e*x/d)+6*b^3/d*n^2*ln(x^n)*polylog(3,-e*x/d)+1/8*(I*Pi*b*
csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*P
i*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^3*(-1/
d*ln(e*x+d)+1/d*ln(x))+3/2*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn
(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n
)^2*csgn(I*c)+2*b*ln(c)+2*a)*b^2*(-ln(x^n)^2/d*ln(e*x+d)+ln(x^n)^2/d*ln(x)
-2*n*(1/2/d*ln(x^n)*ln(x)^2-1/6/d*ln(x)^3*n-1/d*((ln(x^n)-n*ln(x))*(dilog(
-e*x/d)+ln(e*x+d)*ln(-e*x/d))+n*(1/2*ln(e*x+d)*ln(x)^2-1/2*ln(x)^2*ln(1+e*
x/d)-ln(x)*polylog(2,-e*x/d)+polylog(3,-e*x/d)))))+3/4*(I*Pi*b*csgn(I*x^n)
*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*
c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^2*b*(-ln(x^n)/d*l
n(e*x+d)+ln(x^n)/d*ln(x)-n*(1/2/d*ln(x)^2-1/d*ln(e*x+d)*ln(-e*x/d)-1/d*...
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/x/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b^3*log(c*x^n)^3 + 3*a*b^2*log(c*x^n)^2 + 3*a^2*b*log(c*x^n) + a
^3)/(e*x^2 + d*x), x)
```

Sympy [F]

$$\int \frac{(a+b\log{(cx^n)})^3}{x(d+ex)}\,dx = \int \frac{(a+b\log{(cx^n)})^3}{x\,(d+ex)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**3/x/(e*x+d),x)
```

output
```
Integral((a + b*log(c*x**n))**3/(x*(d + e*x)), x)
```

Maxima [F]

$$\int \frac{(a+b\log{(cx^n)})^3}{x(d+ex)}\,dx = \int \frac{(b\log{(cx^n)}+a)^3}{(ex+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/x/(e*x+d),x, algorithm="maxima")
```

output
```
-a^3*(log(e*x + d)/d - log(x)/d) + integrate((b^3*log(c)^3 + b^3*log(x^n)^
3 + 3*a*b^2*log(c)^2 + 3*a^2*b*log(c) + 3*(b^3*log(c) + a*b^2)*log(x^n)^2
+ 3*(b^3*log(c)^2 + 2*a*b^2*log(c) + a^2*b)*log(x^n))/(e*x^2 + d*x), x)
```

Giac [F]

$$\int \frac{(a+b\log{(cx^n)})^3}{x(d+ex)}\,dx = \int \frac{(b\log{(cx^n)}+a)^3}{(ex+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/x/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^3/((e*x + d)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a + b\log(cx^n))^3}{x(d + ex)}\,dx = \int \frac{(a + b\,\ln(c\,x^n))^3}{x\,(d + e\,x)}\,dx$$

input
```
int((a + b*log(c*x^n))^3/(x*(d + e*x)),x)
```

output
```
int((a + b*log(c*x^n))^3/(x*(d + e*x)), x)
```

Reduce [F]

$$\int \frac{(a + b\log(cx^n))^3}{x(d + ex)}\,dx = \frac{\left(\int \frac{\log(x^n c)^3}{e\,x^2+dx}dx\right) b^3 d + 3\left(\int \frac{\log(x^n c)^2}{e\,x^2+dx}dx\right) a\,b^2 d + 3\left(\int \frac{\log(x^n c)}{e\,x^2+dx}dx\right) a^2 b d - \log(ex + d)\,a^3 + \log(x)\,a^3}{d}$$

input
```
int((a+b*log(c*x^n))^3/x/(e*x+d),x)
```

output
```
(int(log(x**n*c)**3/(d*x + e*x**2),x)*b**3*d + 3*int(log(x**n*c)**2/(d*x +
 e*x**2),x)*a*b**2*d + 3*int(log(x**n*c)/(d*x + e*x**2),x)*a**2*b*d - log(
d + e*x)*a**3 + log(x)*a**3)/d
```

3.122 $\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx$

Optimal result . . . 1054
Mathematica [A] (verified) . . . 1055
Rubi [A] (verified) . . . 1055
Maple [C] (warning: unable to verify) . . . 1059
Fricas [F] . . . 1060
Sympy [F] . . . 1060
Maxima [F] . . . 1060
Giac [F] . . . 1061
Mupad [F(-1)] . . . 1061
Reduce [F] . . . 1061

Optimal result

Integrand size = 23, antiderivative size = 217

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx =& -\frac{ex(a+b\log(cx^n))^3}{d^2(d+ex)} - \frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^3}{d^2} \\ &+ \frac{3bn(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d^2} \\ &+ \frac{3bn(a+b\log(cx^n))^2\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^2} \\ &+ \frac{6b^2n^2(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^2} \\ &+ \frac{6b^2n^2(a+b\log(cx^n))\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^2} \\ &- \frac{6b^3n^3\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^2} + \frac{6b^3n^3\operatorname{PolyLog}\left(4,-\frac{d}{ex}\right)}{d^2}\end{aligned}$$

output

```
-e*x*(a+b*ln(c*x^n))^3/d^2/(e*x+d)-ln(1+d/e/x)*(a+b*ln(c*x^n))^3/d^2+3*b*n
*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/d^2+3*b*n*(a+b*ln(c*x^n))^2*polylog(2,-d/e/
x)/d^2+6*b^2*n^2*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/d^2+6*b^2*n^2*(a+b*ln(c
*x^n))*polylog(3,-d/e/x)/d^2-6*b^3*n^3*polylog(3,-e*x/d)/d^2+6*b^3*n^3*pol
ylog(4,-d/e/x)/d^2
```

Mathematica [A] (verified)

Time = 0.63 (sec) , antiderivative size = 432, normalized size of antiderivative = 1.99

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx$$
$$= \frac{4d(a-bn\log(x)+b\log(cx^n))^3+4(d+ex)\log(x)\,(a-bn\log(x)+b\log(cx^n))^3-4(d+ex)\,(a-bn\log$$

input
```
Integrate[(a + b*Log[c*x^n])^3/(x*(d + e*x)^2),x]
```

output
```
(4*d*(a - b*n*Log[x] + b*Log[c*x^n])^3 + 4*(d + e*x)*Log[x]*(a - b*n*Log[x
] + b*Log[c*x^n])^3 - 4*(d + e*x)*(a - b*n*Log[x] + b*Log[c*x^n])^3*Log[d
+ e*x] + 6*b*n*(a - b*n*Log[x] + b*Log[c*x^n])^2*(-2*e*x*Log[x] + (d + e*x
)*Log[x]^2 + 2*(d + e*x)*Log[d + e*x] - 2*(d + e*x)*(Log[x]*Log[1 + (e*x)/
d] + PolyLog[2, -((e*x)/d)])) + 4*b^2*n^2*(a - b*n*Log[x] + b*Log[c*x^n])*
(Log[x]*((d + e*x)*Log[x]^2 + 6*(d + e*x)*Log[1 + (e*x)/d] - 3*Log[x]*(e*x
 + (d + e*x)*Log[1 + (e*x)/d])) - 6*(d + e*x)*(-1 + Log[x])*PolyLog[2, -((
e*x)/d)] + 6*(d + e*x)*PolyLog[3, -((e*x)/d)]) + b^3*n^3*((d + e*x)*Log[x]
^4 - 4*(Log[x]^2*(e*x*Log[x] - 3*(d + e*x)*Log[1 + (e*x)/d]) - 6*(d + e*x)
*Log[x]*PolyLog[2, -((e*x)/d)] + 6*(d + e*x)*PolyLog[3, -((e*x)/d)]) - 4*(
d + e*x)*(Log[x]^3*Log[1 + (e*x)/d] + 3*Log[x]^2*PolyLog[2, -((e*x)/d)] -
6*Log[x]*PolyLog[3, -((e*x)/d)] + 6*PolyLog[4, -((e*x)/d)])))/(4*d^2*(d +
e*x))
```

Rubi [A] (verified)

Time = 1.12 (sec) , antiderivative size = 214, normalized size of antiderivative = 0.99, number of steps used = 7, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {2789, 2755, 2754, 2779, 2821, 2830, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx$$

$$\Big\downarrow \; 2789$$

$$\frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^3}{(d+ex)^2}dx}{d}$$

$$\Big\downarrow \text{2755}$$

$$\frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\int \frac{(a+b\log(cx^n))^2}{d+ex}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2754}$$

$$\frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\int \frac{(a+b\log(cx^n))\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{\frac{3bn\int \frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\int \frac{(a+b\log(cx^n))\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{2821}$$

$$\frac{\frac{3bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\int \frac{(a+b\log(cx^n))\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\left(bn\int \frac{\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{x}dx-\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))\right)}{e}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{2830}$$

$$\frac{\frac{3bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\left(bn\int\frac{\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{x}dx-\text{PolyLog}\left(3,-\frac{d}{ex}\right)(a+b\log(cx^n))\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\left(bn\int\frac{\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{x}dx-\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))\right)}{e}\right)}{d}\right)}{d}$$

$$\Big\downarrow \; 7143$$

$$\frac{\frac{3bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\left(-\left(\text{PolyLog}\left(3,-\frac{d}{ex}\right)(a+b\log(cx^n))\right)-bn\,\text{PolyLog}\left(4,-\frac{d}{ex}\right)\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\left(bn\,\text{PolyLog}\left(3,-\frac{ex}{d}\right)-\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))\right)}{e}\right)}{d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])^3/(x*(d + e*x)^2),x]
```

output
```
-((e*((x*(a + b*Log[c*x^n])^3)/(d*(d + e*x)) - (3*b*n*(((a + b*Log[c*x^n])
^2*Log[1 + (e*x)/d])/e - (2*b*n*(-((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d
)]) + b*n*PolyLog[3, -((e*x)/d)]))/e))/d))/d) + (-((Log[1 + d/(e*x)]*(a +
b*Log[c*x^n])^3)/d) + (3*b*n*((a + b*Log[c*x^n])^2*PolyLog[2, -(d/(e*x))]
- 2*b*n*(-((a + b*Log[c*x^n])*PolyLog[3, -(d/(e*x))]) - b*n*PolyLog[4, -(d
/(e*x))])))/d)/d
```

Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2755
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Simp[b*n*(p/d)
 Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e,
n, p}, x] && GtQ[p, 0]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 2830
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*PolyLog[k_, (e_.)*(x_)^(q_
.)])/(x_), x_Symbol] :> Simp[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^p/q)
, x] - Simp[b*n*(p/q)   Int[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, e, k, n, q}, x] && GtQ[p, 0]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.06 (sec) , antiderivative size = 1373, normalized size of antiderivative = 6.33

method	result	size
risch	Expression too large to display	1373

input
```
int((a+b*ln(c*x^n))^3/x/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/8*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*c
sgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)
+2*a)^3*(-1/d^2*ln(e*x+d)+1/d/(e*x+d)+1/d^2*ln(x))-1/4*b^3/d^2*ln(x)^4*n^3
-6*b^3/d^2*n^3*polylog(4,-e*x/d)-b^3/d^2*ln(x)^3*n^3-b^3*ln(x^n)^3/d^2*ln(
e*x+d)+b^3*ln(x^n)^3/d/(e*x+d)+b^3*ln(x^n)^3/d^2*ln(x)+3/4*(I*Pi*b*csgn(I*
x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csg
n(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^2*b*(-ln(x^n)
/d^2*ln(e*x+d)+ln(x^n)/d/(e*x+d)+ln(x^n)/d^2*ln(x)-n*(1/2/d^2*ln(x)^2-1/d^
2*ln(e*x+d)+1/d^2*ln(x)-1/d^2*ln(e*x+d)*ln(-e*x/d)-1/d^2*dilog(-e*x/d)))+3
/2*(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*cs
gn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+
2*a)*b^2*(-ln(x^n)^2/d^2*ln(e*x+d)+ln(x^n)^2/d/(e*x+d)+ln(x^n)^2/d^2*ln(x)
-2*n*(1/2/d^2*ln(x^n)*ln(x)^2-1/6/d^2*ln(x)^3*n-ln(x^n)/d^2*ln(e*x+d)+ln(x
^n)/d^2*ln(x)-1/2/d^2*n*ln(x)^2+1/d^2*n*ln(e*x+d)*ln(-e*x/d)+1/d^2*n*dilog
(-e*x/d)-1/d^2*((ln(x^n)-n*ln(x))*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))+n*(
1/2*ln(e*x+d)*ln(x)^2-1/2*ln(x)^2*ln(1+e*x/d)-ln(x)*polylog(2,-e*x/d)+poly
log(3,-e*x/d)))))+6*b^3/d^2*n^3*ln(x)*polylog(2,-e*x/d)+3*b^3/d^2*ln(x)^2*
dilog(-e*x/d)*n^3+3*b^3*n*ln(x^n)^2/d^2*ln(e*x+d)-3*b^3*n*ln(x^n)^2/d^2*ln
(x)-3/2*b^3*n/d^2*ln(x^n)^2*ln(x)^2+3*b^3*n/d^2*ln(x^n)^2*dilog(-e*x/d)+3*
b^3*n/d^2*ln(x^n)^2*ln(e*x+d)*ln(-e*x/d)+3*b^3/d^2*n^2*ln(x)^2*ln(x^n)*...
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/x/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b^3*log(c*x^n)^3 + 3*a*b^2*log(c*x^n)^2 + 3*a^2*b*log(c*x^n) + a
^3)/(e^2*x^3 + 2*d*e*x^2 + d^2*x), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx = \int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**3/x/(e*x+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))**3/(x*(d + e*x)**2), x)
```

Maxima [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/x/(e*x+d)^2,x, algorithm="maxima")
```

output
```
a^3*(1/(d*e*x + d^2) - log(e*x + d)/d^2 + log(x)/d^2) + integrate((b^3*log
(c)^3 + b^3*log(x^n)^3 + 3*a*b^2*log(c)^2 + 3*a^2*b*log(c) + 3*(b^3*log(c)
 + a*b^2)*log(x^n)^2 + 3*(b^3*log(c)^2 + 2*a*b^2*log(c) + a^2*b)*log(x^n))
/(e^2*x^3 + 2*d*e*x^2 + d^2*x), x)
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/x/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^3/((e*x + d)^2*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx = \int \frac{(a+b\ln(c\,x^n))^3}{x\,(d+e\,x)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^3/(x*(d + e*x)^2),x)
```

output
```
int((a + b*log(c*x^n))^3/(x*(d + e*x)^2), x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx$$
$$= \frac{\left(\int \frac{\log(x^n c)^3}{e^2x^3+2de\,x^2+d^2x}dx\right)b^3d^3+\left(\int \frac{\log(x^n c)^3}{e^2x^3+2de\,x^2+d^2x}dx\right)b^3d^2ex+3\left(\int \frac{\log(x^n c)^2}{e^2x^3+2de\,x^2+d^2x}dx\right)a\,b^2d^3+3\left(\int \frac{\log(x}{e^2x^3+2de}\right.}{}$$

input
```
int((a+b*log(c*x^n))^3/x/(e*x+d)^2,x)
```

output
```
(int(log(x**n*c)**3/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b**3*d**3 + int(l
og(x**n*c)**3/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b**3*d**2*e*x + 3*int(l
og(x**n*c)**2/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*a*b**2*d**3 + 3*int(log
(x**n*c)**2/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*a*b**2*d**2*e*x + 3*int(l
og(x**n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*a**2*b*d**3 + 3*int(log(x*
*n*c)/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*a**2*b*d**2*e*x - log(d + e*x)*
a**3*d - log(d + e*x)*a**3*e*x + log(x)*a**3*d + log(x)*a**3*e*x - a**3*e*
x)/(d**2*(d + e*x))
```

3.123 $\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx$

Optimal result 1063
Mathematica [A] (verified) 1064
Rubi [A] (verified) 1065
Maple [C] (warning: unable to verify) 1073
Fricas [F] 1074
Sympy [F] 1074
Maxima [F] 1074
Giac [F] 1075
Mupad [F(-1)] 1075
Reduce [F] 1075

Optimal result

Integrand size = 23, antiderivative size = 361

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx &= \frac{3benx(a+b\log(cx^n))^2}{2d^3(d+ex)} - \frac{(a+b\log(cx^n))^3}{2d^3} \\
&+ \frac{(a+b\log(cx^n))^3}{2d(d+ex)^2} - \frac{ex(a+b\log(cx^n))^3}{d^3(d+ex)} \\
&+ \frac{(a+b\log(cx^n))^4}{4bd^3n} - \frac{3b^2n^2(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^3} \\
&+ \frac{9bn(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{2d^3} \\
&- \frac{(a+b\log(cx^n))^3\log\left(1+\frac{ex}{d}\right)}{d^3} - \frac{3b^3n^3\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^3} \\
&+ \frac{9b^2n^2(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^3} \\
&- \frac{3bn(a+b\log(cx^n))^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^3} \\
&- \frac{9b^3n^3\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^3} \\
&+ \frac{6b^2n^2(a+b\log(cx^n))\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^3} \\
&- \frac{6b^3n^3\operatorname{PolyLog}\left(4,-\frac{ex}{d}\right)}{d^3}\end{aligned}$$

output
```
3/2*b*e*n*x*(a+b*ln(c*x^n))^2/d^3/(e*x+d)-1/2*(a+b*ln(c*x^n))^3/d^3+1/2*(a
+b*ln(c*x^n))^3/d/(e*x+d)^2-e*x*(a+b*ln(c*x^n))^3/d^3/(e*x+d)+1/4*(a+b*ln(
c*x^n))^4/b/d^3/n-3*b^2*n^2*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^3+9/2*b*n*(a+b*l
n(c*x^n))^2*ln(1+e*x/d)/d^3-(a+b*ln(c*x^n))^3*ln(1+e*x/d)/d^3-3*b^3*n^3*po
lylog(2,-e*x/d)/d^3+9*b^2*n^2*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/d^3-3*b*n*
(a+b*ln(c*x^n))^2*polylog(2,-e*x/d)/d^3-9*b^3*n^3*polylog(3,-e*x/d)/d^3+6*
b^2*n^2*(a+b*ln(c*x^n))*polylog(3,-e*x/d)/d^3-6*b^3*n^3*polylog(4,-e*x/d)/
d^3
```

Mathematica [A] (verified)

Time = 1.11 (sec) , antiderivative size = 706, normalized size of antiderivative = 1.96

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx = \text{Too large to display}$$

input
```
Integrate[(a + b*Log[c*x^n])^3/(x*(d + e*x)^3),x]
```

output
```
(2*d^2*(a - b*n*Log[x] + b*Log[c*x^n])^3 + 4*d*(d + e*x)*(a - b*n*Log[x] +
 b*Log[c*x^n])^3 + 4*(d + e*x)^2*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n])^3
- 4*(d + e*x)^2*(a - b*n*Log[x] + b*Log[c*x^n])^3*Log[d + e*x] + 6*b*n*(a
- b*n*Log[x] + b*Log[c*x^n])^2*((d + e*x)^2*Log[x]^2 + (d + e*x)*(-d + 3*(
d + e*x)*Log[d + e*x]) - Log[x]*(e*x*(4*d + 3*e*x) + 2*(d + e*x)^2*Log[1 +
 (e*x)/d]) - 2*(d + e*x)^2*PolyLog[2, -((e*x)/d)]) + 2*b^2*n^2*(a - b*n*Lo
g[x] + b*Log[c*x^n])*(-3*e*x*(2*d + e*x)*Log[x]^2 + 2*(d + e*x)^2*Log[x]^3
 - 6*(d + e*x)^2*Log[d + e*x] + 6*(d + e*x)*Log[x]*(e*x + (d + e*x)*Log[1
+ (e*x)/d]) + 6*(d + e*x)^2*PolyLog[2, -((e*x)/d)] - 6*(d + e*x)*(Log[x]*(
e*x*Log[x] - 2*(d + e*x)*Log[1 + (e*x)/d]) - 2*(d + e*x)*PolyLog[2, -((e*x
)/d)]) - 6*(d + e*x)^2*(Log[x]^2*Log[1 + (e*x)/d] + 2*Log[x]*PolyLog[2, -(
(e*x)/d)] - 2*PolyLog[3, -((e*x)/d)])) + b^3*n^3*((d + e*x)^2*Log[x]^4 - 4
*(d + e*x)*(Log[x]^2*(e*x*Log[x] - 3*(d + e*x)*Log[1 + (e*x)/d]) - 6*(d +
e*x)*Log[x]*PolyLog[2, -((e*x)/d)] + 6*(d + e*x)*PolyLog[3, -((e*x)/d)]) -
 2*(Log[x]*(e*x*(2*d + e*x)*Log[x]^2 + 6*(d + e*x)^2*Log[1 + (e*x)/d] - 3*
(d + e*x)*Log[x]*(e*x + (d + e*x)*Log[1 + (e*x)/d])) - 6*(d + e*x)^2*(-1 +
 Log[x])*PolyLog[2, -((e*x)/d)] + 6*(d + e*x)^2*PolyLog[3, -((e*x)/d)]) -
4*(d + e*x)^2*(Log[x]^3*Log[1 + (e*x)/d] + 3*Log[x]^2*PolyLog[2, -((e*x)/d
)] - 6*Log[x]*PolyLog[3, -((e*x)/d)] + 6*PolyLog[4, -((e*x)/d)])))/(4*d^3*
(d + e*x)^2)
```

Rubi [A] (verified)

Time = 2.16 (sec) , antiderivative size = 416, normalized size of antiderivative = 1.15, number of steps used = 10, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.435, Rules used = {2789, 2756, 2789, 2755, 2754, 2779, 2821, 2830, 2838, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx$$

$$\Big\downarrow \text{2789}$$

$$\frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^3}{(d+ex)^3}dx}{d}$$

$$\Big\downarrow \text{2756}$$

$$\frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{3bn\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}dx}{2e}-\frac{(a+b\log(cx^n))^3}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \text{2789}$$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^3}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{3bn\left(\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}dx}{d}\right)}{2e}-\frac{(a+b\log(cx^n))^3}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \text{2755}$$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\int \frac{(a+b\log(cx^n))^2}{d+ex}dx}{d}\right)}{d}}{d}-\frac{e\left(\frac{3bn\left(\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\int \frac{a+b\log(cx^n)}{d+ex}dx}{d}\right)}{d}\right)}{2e}-\frac{(a+b\log(cx^n))^3}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \; 2754$$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\int \frac{(a+b\log(cx^n))\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}}{d}-\frac{e\left(\frac{3bn\left(\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-\frac{bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}\right)}{2e}-\frac{(a+b\log(cx^n))^3}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \; 2779$$

$$\frac{\frac{\frac{3bn\int\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\int\frac{(a+b\log(cx^n))\log\left(\cdots\right.}{x}}{e}\right.}{d}\right.}{d}}{d}$$

$$\frac{e\left(\frac{3bn\left(\frac{\frac{2bn\int\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-\frac{bn\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right.}{d}\right.}{2e}\right.}{d}$$

$\downarrow$ 2821

$$\frac{\frac{3bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\int\frac{(a+b\log(cx^n))\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\left(\frac{\log\left(\frac{ex}{d}+\cdots\right.}{\cdots}\right.}{\cdots}\right.}{d}$$

$$\frac{e\left(\frac{3bn\left(\frac{\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log\cdots}{e}\right.}{\cdots}\right.}{d}\right.}{2e}\right.}{d}$$

↓ 2830

$$\frac{\frac{3bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\left(bn\int\frac{\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{x}dx-\text{PolyLog}\left(3,-\frac{d}{ex}\right)(a+b\log(cx^n))\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}}{d}-\frac{e\left(\frac{x(a+b\log(\ldots}{d(d+\ldots}\right.}{d}$$

$$\frac{e\left(\frac{3bn\left(\frac{\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log\ldots}{e}\right.}{\ldots}\right.}{d}\right.}{2e}\right.}{d}$$

$\downarrow$ 2838

$$\frac{\frac{3bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\left(bn\int\frac{\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{x}dx-\text{PolyLog}\left(3,-\frac{d}{ex}\right)(a+b\log(cx^n))\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}}{d}-\frac{e\left(\frac{x(a+b\log(\cdots}{d(d+\cdots}\cdots\right.}{d}$$

$$\frac{e\left(\frac{3bn\left(\frac{\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log\cdots}{e}\cdots\right.}{\cdots}\right.}{d}\cdots\right.}{2e}\cdots\right.}{d}$$

$\downarrow$ 7143

$$\frac{\frac{3bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\left(-\left(\text{PolyLog}\left(3,-\frac{d}{ex}\right)(a+b\log(cx^n))\right)-bn\,\text{PolyLog}\left(4,-\frac{d}{ex}\right)\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx\cdots}{d(d+ex)}\cdots\right.}{d}$$

$$\frac{e\left(\frac{3bn\left(\frac{\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))+bn\,\text{PolyLog}\left(3,-\frac{d}{ex}\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n\cdots}{e}\cdots\right.}{d}\right.}{d}\cdots\right.}{2e}\cdots\right.}{d}$$

input
```
Int[(a + b*Log[c*x^n])^3/(x*(d + e*x)^3),x]
```

output
```
-((e*(-1/2*(a + b*Log[c*x^n])^3/(e*(d + e*x)^2) + (3*b*n*(-((e*((x*(a + b*
Log[c*x^n])^2)/(d*(d + e*x)) - (2*b*n*(((a + b*Log[c*x^n])*Log[1 + (e*x)/d
])/e + (b*n*PolyLog[2, -((e*x)/d)])/e))/d))/d) + (-((Log[1 + d/(e*x)]*(a +
 b*Log[c*x^n])^2)/d) + (2*b*n*((a + b*Log[c*x^n])*PolyLog[2, -(d/(e*x))] +
 b*n*PolyLog[3, -(d/(e*x))]))/d)/d))/(2*e)))/d) + (-((e*((x*(a + b*Log[c*x
^n])^3)/(d*(d + e*x)) - (3*b*n*(((a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e
- (2*b*n*(-((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)]) + b*n*PolyLog[3, -(
(e*x)/d)]))/e))/d))/d) + (-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^3)/d) + (
3*b*n*((a + b*Log[c*x^n])^2*PolyLog[2, -(d/(e*x))] - 2*b*n*(-((a + b*Log[c
*x^n])*PolyLog[3, -(d/(e*x))]) - b*n*PolyLog[4, -(d/(e*x))])))/d)/d)/d
```

Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2755
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Simp[b*n*(p/d)
 Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e,
n, p}, x] && GtQ[p, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 2830
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*PolyLog[k_, (e_.)*(x_)^(q_
.)])/(x_), x_Symbol] :> Simp[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^p/q)
, x] - Simp[b*n*(p/q)   Int[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, e, k, n, q}, x] && GtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.18 (sec) , antiderivative size = 1607, normalized size of antiderivative = 4.45

method	result	size
risch	Expression too large to display	1607

input
```
int((a+b*ln(c*x^n))^3/x/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-6*b^3/d^3*ln(x)*ln(x^n)*ln(e*x+d)*ln(-e*x/d)*n^2+9*b^3/d^3*n^3*ln(x)*poly
log(2,-e*x/d)+9/2*b^3/d^3*n^2*ln(x^n)*ln(x)^2+3*b^3/d^3*n^3*ln(x)^2*polylo
g(2,-e*x/d)+6*b^3/d^3*n^2*ln(x^n)*polylog(3,-e*x/d)-3/2*b^3*n/d^3*ln(x^n)^
2*ln(x)^2+b^3/d^3*n^2*ln(x^n)*ln(x)^3-3*b^3/d^3*n^2*ln(x^n)*ln(e*x+d)+3*b^
3/d^3*ln(x)^2*dilog(-e*x/d)*n^3+3*b^3/d^3*n^2*ln(x^n)*ln(x)-3/2*b^3*n*ln(x
^n)^2/d^2/(e*x+d)-9*b^3/d^3*n^2*ln(x^n)*dilog(-e*x/d)+3*b^3/d^3*n^3*ln(e*x
+d)*ln(-e*x/d)+9*b^3/d^3*ln(x)*dilog(-e*x/d)*n^3-9/2*b^3*n*ln(x^n)^2/d^3*l
n(x)+3*b^3*n/d^3*ln(x^n)^2*dilog(-e*x/d)-2*b^3/d^3*n^3*ln(e*x+d)*ln(x)^3+2
*b^3/d^3*n^3*ln(x)^3*ln(1+e*x/d)+9/2*b^3*n*ln(x^n)^2/d^3*ln(e*x+d)-9/2*b^3
/d^3*n^3*ln(e*x+d)*ln(x)^2+9/2*b^3/d^3*n^3*ln(x)^2*ln(1+e*x/d)+1/8*(I*Pi*b
*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*
Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^3*(-1
/d^3*ln(e*x+d)+1/d^2/(e*x+d)+1/2/d/(e*x+d)^2+1/d^3*ln(x))+b^3*ln(x^n)^3/d^
2/(e*x+d)+1/2*b^3*ln(x^n)^3/d/(e*x+d)^2+b^3*ln(x^n)^3/d^3*ln(x)-1/4*b^3/d^
3*ln(x)^4*n^3-3/2*b^3/d^3*n^3*ln(x)^2+3*b^3/d^3*n^3*dilog(-e*x/d)-b^3*ln(x
^n)^3/d^3*ln(e*x+d)-3/2*b^3/d^3*ln(x)^3*n^3-9*b^3/d^3*n^2*ln(x^n)*ln(e*x+d
)*ln(-e*x/d)+3*b^3/d^3*ln(x)^2*ln(e*x+d)*ln(-e*x/d)*n^3-6*b^3/d^3*ln(x)*ln
(x^n)*dilog(-e*x/d)*n^2+3*b^3*n/d^3*ln(x^n)^2*ln(e*x+d)*ln(-e*x/d)+3*b^3/d
^3*n^2*ln(x)^2*ln(x^n)*ln(e*x+d)-3*b^3/d^3*n^2*ln(x)^2*ln(x^n)*ln(1+e*x/d)
-6*b^3/d^3*n^2*ln(x)*ln(x^n)*polylog(2,-e*x/d)+9*b^3/d^3*ln(x)*ln(e*x+d...
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/x/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b^3*log(c*x^n)^3 + 3*a*b^2*log(c*x^n)^2 + 3*a^2*b*log(c*x^n) + a
^3)/(e^3*x^4 + 3*d*e^2*x^3 + 3*d^2*e*x^2 + d^3*x), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx = \int \frac{(a+b\log(cx^n))^3}{x\,(d+ex)^3}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**3/x/(e*x+d)**3,x)
```

output
```
Integral((a + b*log(c*x**n))**3/(x*(d + e*x)**3), x)
```

Maxima [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/x/(e*x+d)^3,x, algorithm="maxima")
```

output
```
1/2*a^3*((2*e*x + 3*d)/(d^2*e^2*x^2 + 2*d^3*e*x + d^4) - 2*log(e*x + d)/d^
3 + 2*log(x)/d^3) + integrate((b^3*log(c)^3 + b^3*log(x^n)^3 + 3*a*b^2*log
(c)^2 + 3*a^2*b*log(c) + 3*(b^3*log(c) + a*b^2)*log(x^n)^2 + 3*(b^3*log(c)
^2 + 2*a*b^2*log(c) + a^2*b)*log(x^n))/(e^3*x^4 + 3*d*e^2*x^3 + 3*d^2*e*x^
2 + d^3*x), x)
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/x/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^3/((e*x + d)^3*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx = \int \frac{(a+b\ln(c\,x^n))^3}{x\,(d+e\,x)^3}\,dx$$

input
```
int((a + b*log(c*x^n))^3/(x*(d + e*x)^3),x)
```

output
```
int((a + b*log(c*x^n))^3/(x*(d + e*x)^3), x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx = \frac{2\left(\int \frac{\log(x^nc)^3}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+d^3x}dx\right)b^3d^5+4\left(\int \frac{\log(x^nc)^3}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+d^3x}dx\right)b^3d^4ex+2\left(\int \frac{\log(x^nc)^3}{e^3x^4+3d\,e^2x^3+3d^2e\,x^2+d^3x}\right.}{}$$

input
```
int((a+b*log(c*x^n))^3/x/(e*x+d)^3,x)
```

output
```
(2*int(log(x**n*c)**3/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4)
,x)*b**3*d**5 + 4*int(log(x**n*c)**3/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x*
*3 + e**3*x**4),x)*b**3*d**4*e*x + 2*int(log(x**n*c)**3/(d**3*x + 3*d**2*e
*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*b**3*d**3*e**2*x**2 + 6*int(log(x**n
*c)**2/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*a*b**2*d**5
 + 12*int(log(x**n*c)**2/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x*
*4),x)*a*b**2*d**4*e*x + 6*int(log(x**n*c)**2/(d**3*x + 3*d**2*e*x**2 + 3*
d*e**2*x**3 + e**3*x**4),x)*a*b**2*d**3*e**2*x**2 + 6*int(log(x**n*c)/(d**
3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*a**2*b*d**5 + 12*int(l
og(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*a**2*b*
d**4*e*x + 6*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**
3*x**4),x)*a**2*b*d**3*e**2*x**2 - 2*log(d + e*x)*a**3*d**2 - 4*log(d + e*
x)*a**3*d*e*x - 2*log(d + e*x)*a**3*e**2*x**2 + 2*log(x)*a**3*d**2 + 4*log
(x)*a**3*d*e*x + 2*log(x)*a**3*e**2*x**2 + 2*a**3*d**2 - a**3*e**2*x**2)/(
2*d**3*(d**2 + 2*d*e*x + e**2*x**2))
```

3.124 $\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx$

Optimal result 1077
Mathematica [A] (verified) 1078
Rubi [A] (verified) 1078
Maple [F] 1079
Fricas [F(-2)] 1080
Sympy [F] 1080
Maxima [F] 1080
Giac [F] 1081
Mupad [F(-1)] 1081
Reduce [F] 1081

Optimal result

Integrand size = 20, antiderivative size = 189

$$
\begin{aligned}
\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx
&= -\frac{1}{2}\sqrt{b}de^{-\frac{a}{bn}}\sqrt{n}\sqrt{\pi}x(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right) \\
&\quad -\frac{1}{4}\sqrt{b}ee^{-\frac{2a}{bn}}\sqrt{n}\sqrt{\frac{\pi}{2}}x^2(cx^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right) \\
&\quad + dx\sqrt{a+b\log(cx^n)}+\frac{1}{2}ex^2\sqrt{a+b\log(cx^n)}
\end{aligned}
$$

output
```
-1/2*b^(1/2)*d*n^(1/2)*Pi^(1/2)*x*erfi((a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(1/
2))/exp(a/b/n)/((c*x^n)^(1/n))-1/8*b^(1/2)*e*n^(1/2)*2^(1/2)*Pi^(1/2)*x^2*
erfi(2^(1/2)*(a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(1/2))/exp(2*a/b/n)/((c*x^n)^
(2/n))+d*x*(a+b*ln(c*x^n))^(1/2)+1/2*e*x^2*(a+b*ln(c*x^n))^(1/2)
```

Mathematica [A] (verified)

Time = 0.35 (sec) , antiderivative size = 169, normalized size of antiderivative = 0.89

$$\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx$$
$$=\frac{1}{8}x\left(-4\sqrt{b}de^{-\frac{a}{bn}}\sqrt{n}\sqrt{\pi}(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)\right.$$
$$\left.-\sqrt{b}ee^{-\frac{2a}{bn}}\sqrt{n}\sqrt{2\pi}x(cx^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+4(2d+ex)\sqrt{a+b\log(cx^n)}\right)$$

input
```
Integrate[(d + e*x)*Sqrt[a + b*Log[c*x^n]],x]
```

output
```
(x*((-4*Sqrt[b]*d*Sqrt[n]*Sqrt[Pi]*Erfi[Sqrt[a + b*Log[c*x^n]]/(Sqrt[b]*Sq
rt[n])])/(E^(a/(b*n))*(c*x^n)^n^(-1)) - (Sqrt[b]*e*Sqrt[n]*Sqrt[2*Pi]*x*Er
fi[(Sqrt[2]*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(E^((2*a)/(b*n))*(
c*x^n)^(2/n)) + 4*(2*d + e*x)*Sqrt[a + b*Log[c*x^n]]))/8
```

Rubi [A] (verified)

Time = 0.55 (sec) , antiderivative size = 189, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx$$
$$\Big\downarrow \text{ 2767}$$
$$\int \left(d\sqrt{a+b\log(cx^n)}+ex\sqrt{a+b\log(cx^n)}\right)dx$$
$$\Big\downarrow \text{ 2009}$$

$$-\frac{1}{2}\sqrt{\pi}\sqrt{b}d\sqrt{n}xe^{-\frac{a}{bn}}(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+dx\sqrt{a+b\log(cx^n)}-\frac{1}{4}\sqrt{\frac{\pi}{2}}\sqrt{b}e\sqrt{n}x^2e^{-\frac{2a}{bn}}(cx^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+\frac{1}{2}ex^2\sqrt{a+b\log(cx^n)}$$

input
```
Int[(d + e*x)*Sqrt[a + b*Log[c*x^n]],x]
```

output
```
-1/2*(Sqrt[b]*d*Sqrt[n]*Sqrt[Pi]*x*Erfi[Sqrt[a + b*Log[c*x^n]]/(Sqrt[b]*Sq
rt[n])])/(E^(a/(b*n))*(c*x^n)^n^(-1)) - (Sqrt[b]*e*Sqrt[n]*Sqrt[Pi/2]*x^2*
Erfi[(Sqrt[2]*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(4*E^((2*a)/(b*n
))*(c*x^n)^(2/n)) + d*x*Sqrt[a + b*Log[c*x^n]] + (e*x^2*Sqrt[a + b*Log[c*x
^n]])/2
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Maple [F]

$$\int (ex+d)\sqrt{a+b\ln(c\,x^n)}dx$$

input
```
int((e*x+d)*(a+b*ln(c*x^n))^(1/2),x)
```

output
```
int((e*x+d)*(a+b*ln(c*x^n))^(1/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx = \int \sqrt{a+b\log(cx^n)}(d+ex)\,dx$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))**(1/2),x)
```

output
```
Integral(sqrt(a + b*log(c*x**n))*(d + e*x), x)
```

Maxima [F]

$$\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx = \int (ex+d)\sqrt{b\log(cx^n)+a}\,dx$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")
```

output
```
integrate((e*x + d)*sqrt(b*log(c*x^n) + a), x)
```

Giac [F]

$$\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx = \int (ex+d)\sqrt{b\log(cx^n)+a}\,dx$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

output
```
integrate((e*x + d)*sqrt(b*log(c*x^n) + a), x)
```

Mupad [F(-1)]

Timed out.

$$\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx = \int \sqrt{a+b\,\ln(c\,x^n)}\,(d+e\,x)\,dx$$

input
```
int((a + b*log(c*x^n))^(1/2)*(d + e*x),x)
```

output
```
int((a + b*log(c*x^n))^(1/2)*(d + e*x), x)
```

Reduce [F]

$$\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx = \text{Too large to display}$$

input
```
int((e*x+d)*(a+b*log(c*x^n))^(1/2),x)
```

output

```
(8*sqrt(log(x**n*c)*b + a)*a**2*d*x + 4*sqrt(log(x**n*c)*b + a)*a**2*e*x**
2 + 2*sqrt(log(x**n*c)*b + a)*a*b*d*n*x + 2*sqrt(log(x**n*c)*b + a)*a*b*e*
n*x**2 + 16*int((sqrt(log(x**n*c)*b + a)*log(x**n*c)*x)/(8*log(x**n*c)*a**
2*b + 6*log(x**n*c)*a*b**2*n + log(x**n*c)*b**3*n**2 + 8*a**3 + 6*a**2*b*n
 + a*b**2*n**2),x)*a**3*b**2*e*n + 20*int((sqrt(log(x**n*c)*b + a)*log(x**
n*c)*x)/(8*log(x**n*c)*a**2*b + 6*log(x**n*c)*a*b**2*n + log(x**n*c)*b**3*
n**2 + 8*a**3 + 6*a**2*b*n + a*b**2*n**2),x)*a**2*b**3*e*n**2 + 8*int((sqr
t(log(x**n*c)*b + a)*log(x**n*c)*x)/(8*log(x**n*c)*a**2*b + 6*log(x**n*c)*
a*b**2*n + log(x**n*c)*b**3*n**2 + 8*a**3 + 6*a**2*b*n + a*b**2*n**2),x)*a
*b**4*e*n**3 + int((sqrt(log(x**n*c)*b + a)*log(x**n*c)*x)/(8*log(x**n*c)*
a**2*b + 6*log(x**n*c)*a*b**2*n + log(x**n*c)*b**3*n**2 + 8*a**3 + 6*a**2*
b*n + a*b**2*n**2),x)*b**5*e*n**4 + 32*int((sqrt(log(x**n*c)*b + a)*log(x*
*n*c))/(8*log(x**n*c)*a**2*b + 6*log(x**n*c)*a*b**2*n + log(x**n*c)*b**3*n
**2 + 8*a**3 + 6*a**2*b*n + a*b**2*n**2),x)*a**3*b**2*d*n + 32*int((sqrt(l
og(x**n*c)*b + a)*log(x**n*c))/(8*log(x**n*c)*a**2*b + 6*log(x**n*c)*a*b**
2*n + log(x**n*c)*b**3*n**2 + 8*a**3 + 6*a**2*b*n + a*b**2*n**2),x)*a**2*b
**3*d*n**2 + 10*int((sqrt(log(x**n*c)*b + a)*log(x**n*c))/(8*log(x**n*c)*a
**2*b + 6*log(x**n*c)*a*b**2*n + log(x**n*c)*b**3*n**2 + 8*a**3 + 6*a**2*b
*n + a*b**2*n**2),x)*a*b**4*d*n**3 + int((sqrt(log(x**n*c)*b + a)*log(x**n
*c))/(8*log(x**n*c)*a**2*b + 6*log(x**n*c)*a*b**2*n + log(x**n*c)*b**3*...
```

3.125 $\int (d+ex)^2 \sqrt{a+b\log(cx^n)}\,dx$

Optimal result 1083
Mathematica [A] (verified) 1084
Rubi [A] (verified) 1084
Maple [F] 1086
Fricas [F(-2)] 1086
Sympy [F] 1086
Maxima [F] 1087
Giac [F] 1087
Mupad [F(-1)] 1087
Reduce [F] 1088

Optimal result

Integrand size = 22, antiderivative size = 298

$$\int (d+ex)^2\sqrt{a+b\log(cx^n)}\,dx$$
$$= -\frac{1}{2}\sqrt{b}d^2e^{-\frac{a}{bn}}\sqrt{n}\sqrt{\pi}x(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)$$
$$-\frac{1}{2}\sqrt{b}dee^{-\frac{2a}{bn}}\sqrt{n}\sqrt{\frac{\pi}{2}}x^2(cx^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)$$
$$-\frac{1}{6}\sqrt{b}e^2e^{-\frac{3a}{bn}}\sqrt{n}\sqrt{\frac{\pi}{3}}x^3(cx^n)^{-3/n}\operatorname{erfi}\left(\frac{\sqrt{3}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+d^2x\sqrt{a+b\log(cx^n)}+dex^2\sqrt{a+b\log(c}$$

output
```
-1/2*b^(1/2)*d^2*n^(1/2)*Pi^(1/2)*x*erfi((a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(
1/2))/exp(a/b/n)/((c*x^n)^(1/n))-1/4*b^(1/2)*d*e*n^(1/2)*2^(1/2)*Pi^(1/2)*
x^2*erfi(2^(1/2)*(a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(1/2))/exp(2*a/b/n)/((c*x
^n)^(2/n))-1/18*b^(1/2)*e^2*n^(1/2)*3^(1/2)*Pi^(1/2)*x^3*erfi(3^(1/2)*(a+b
*ln(c*x^n))^(1/2)/b^(1/2)/n^(1/2))/exp(3*a/b/n)/((c*x^n)^(3/n))+d^2*x*(a+b
*ln(c*x^n))^(1/2)+d*e*x^2*(a+b*ln(c*x^n))^(1/2)+1/3*e^2*x^3*(a+b*ln(c*x^n)
)^(1/2)
```

Mathematica [A] (verified)

Time = 0.45 (sec) , antiderivative size = 287, normalized size of antiderivative = 0.96

$$\int (d+ex)^2\sqrt{a+b\log(cx^n)}\,dx$$
$$=\frac{1}{36}x\left(-18\sqrt{b}d^2e^{-\frac{a}{bn}}\sqrt{n}\sqrt{\pi}(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)\right.$$
$$-9\sqrt{b}dee^{-\frac{2a}{bn}}\sqrt{n}\sqrt{2\pi}x(cx^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)-2\sqrt{b}e^2e^{-\frac{3a}{bn}}\sqrt{n}\sqrt{3\pi}x^2(cx^n)^{-3/n}\operatorname{erfi}\left(\frac{\sqrt{3}\sqrt{}}{}\right.$$

input
```
Integrate[(d + e*x)^2*Sqrt[a + b*Log[c*x^n]],x]
```

output
```
(x*((-18*Sqrt[b]*d^2*Sqrt[n]*Sqrt[Pi]*Erfi[Sqrt[a + b*Log[c*x^n]]/(Sqrt[b]
*Sqrt[n])])/(E^(a/(b*n))*(c*x^n)^n^(-1)) - (9*Sqrt[b]*d*e*Sqrt[n]*Sqrt[2*P
i]*x*Erfi[(Sqrt[2]*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(E^((2*a)/(
b*n))*(c*x^n)^(2/n)) - (2*Sqrt[b]*e^2*Sqrt[n]*Sqrt[3*Pi]*x^2*Erfi[(Sqrt[3]
*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(E^((3*a)/(b*n))*(c*x^n)^(3/n
)) + 36*d^2*Sqrt[a + b*Log[c*x^n]] + 36*d*e*x*Sqrt[a + b*Log[c*x^n]] + 12*
e^2*x^2*Sqrt[a + b*Log[c*x^n]]))/36
```

Rubi [A] (verified)

Time = 0.84 (sec) , antiderivative size = 298, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)^2\sqrt{a+b\log(cx^n)}\,dx$$
$$\Big\downarrow \text{2767}$$
$$\int \left(d^2\sqrt{a+b\log(cx^n)}+2dex\sqrt{a+b\log(cx^n)}+e^2x^2\sqrt{a+b\log(cx^n)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{1}{2}\sqrt{\pi}\sqrt{b}d^2\sqrt{n}xe^{-\frac{a}{bn}}(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+d^2x\sqrt{a+b\log(cx^n)}-\frac{1}{2}\sqrt{\frac{\pi}{2}}\sqrt{b}de\sqrt{n}x^2e^{-\frac{2a}{bn}}(cx^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+dex^2\sqrt{a+b\log(cx^n)}-\frac{1}{6}\sqrt{\frac{\pi}{3}}\sqrt{b}e^2\sqrt{n}x^3e^{-\frac{3a}{bn}}(cx^n)^{-3/n}\operatorname{erfi}\left(\frac{\sqrt{3}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+\frac{1}{3}e^2x^3\sqrt{a+b\log(cx^n)}$$

input
```
Int[(d + e*x)^2*Sqrt[a + b*Log[c*x^n]],x]
```

output
```
-1/2*(Sqrt[b]*d^2*Sqrt[n]*Sqrt[Pi]*x*Erfi[Sqrt[a + b*Log[c*x^n]]/(Sqrt[b]*
Sqrt[n])])/(E^(a/(b*n))*(c*x^n)^n^(-1)) - (Sqrt[b]*d*e*Sqrt[n]*Sqrt[Pi/2]*
x^2*Erfi[(Sqrt[2]*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(2*E^((2*a)/
(b*n))*(c*x^n)^(2/n)) - (Sqrt[b]*e^2*Sqrt[n]*Sqrt[Pi/3]*x^3*Erfi[(Sqrt[3]*
Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(6*E^((3*a)/(b*n))*(c*x^n)^(3/
n)) + d^2*x*Sqrt[a + b*Log[c*x^n]] + d*e*x^2*Sqrt[a + b*Log[c*x^n]] + (e^2
*x^3*Sqrt[a + b*Log[c*x^n]])/3
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Maple [F]

$$\int (ex+d)^2 \sqrt{a+b\ln (c\,x^n)}dx$$

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))^(1/2),x)
```

output
```
int((e*x+d)^2*(a+b*ln(c*x^n))^(1/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int (d+ex)^2\sqrt{a+b\log(cx^n)}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int (d+ex)^2\sqrt{a+b\log(cx^n)}\,dx = \int \sqrt{a+b\log(cx^n)}(d+ex)^2\,dx$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))**(1/2),x)
```

output
```
Integral(sqrt(a + b*log(c*x**n))*(d + e*x)**2, x)
```

Maxima [F]

$$\int (d+ex)^2\sqrt{a+b\log(cx^n)}\,dx = \int (ex+d)^2\sqrt{b\log(cx^n)+a}\,dx$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")
```

output
```
integrate((e*x + d)^2*sqrt(b*log(c*x^n) + a), x)
```

Giac [F]

$$\int (d+ex)^2\sqrt{a+b\log(cx^n)}\,dx = \int (ex+d)^2\sqrt{b\log(cx^n)+a}\,dx$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

output
```
integrate((e*x + d)^2*sqrt(b*log(c*x^n) + a), x)
```

Mupad [F(-1)]

Timed out.

$$\int (d+ex)^2\sqrt{a+b\log(cx^n)}\,dx = \int \sqrt{a+b\,\ln(c\,x^n)}\,(d+e\,x)^2\,dx$$

input
```
int((a + b*log(c*x^n))^(1/2)*(d + e*x)^2,x)
```

output
```
int((a + b*log(c*x^n))^(1/2)*(d + e*x)^2, x)
```

Reduce [F]

$$\int (d+ex)^2\sqrt{a+b\log\left(cx^n\right)}\,dx = \text{too large to display}$$

input
```
int((e*x+d)^2*(a+b*log(c*x^n))^(1/2),x)
```

output
```
(48*sqrt(log(x**n*c)*b + a)*a**3*d**2*x + 48*sqrt(log(x**n*c)*b + a)*a**3*
d*e*x**2 + 16*sqrt(log(x**n*c)*b + a)*a**3*e**2*x**3 + 20*sqrt(log(x**n*c)
*b + a)*a**2*b*d**2*n*x + 32*sqrt(log(x**n*c)*b + a)*a**2*b*d*e*n*x**2 + 1
2*sqrt(log(x**n*c)*b + a)*a**2*b*e**2*n*x**3 + 2*sqrt(log(x**n*c)*b + a)*a
*b**2*d**2*n**2*x + 4*sqrt(log(x**n*c)*b + a)*a*b**2*d*e*n**2*x**2 + 2*sqr
t(log(x**n*c)*b + a)*a*b**2*e**2*n**2*x**3 + 384*int((sqrt(log(x**n*c)*b +
 a)*log(x**n*c)*x**2)/(48*log(x**n*c)*a**3*b + 44*log(x**n*c)*a**2*b**2*n
+ 12*log(x**n*c)*a*b**3*n**2 + log(x**n*c)*b**4*n**3 + 48*a**4 + 44*a**3*b
*n + 12*a**2*b**2*n**2 + a*b**3*n**3),x)*a**5*b**2*e**2*n + 640*int((sqrt(
log(x**n*c)*b + a)*log(x**n*c)*x**2)/(48*log(x**n*c)*a**3*b + 44*log(x**n*
c)*a**2*b**2*n + 12*log(x**n*c)*a*b**3*n**2 + log(x**n*c)*b**4*n**3 + 48*a
**4 + 44*a**3*b*n + 12*a**2*b**2*n**2 + a*b**3*n**3),x)*a**4*b**3*e**2*n**
2 + 408*int((sqrt(log(x**n*c)*b + a)*log(x**n*c)*x**2)/(48*log(x**n*c)*a**
3*b + 44*log(x**n*c)*a**2*b**2*n + 12*log(x**n*c)*a*b**3*n**2 + log(x**n*c
)*b**4*n**3 + 48*a**4 + 44*a**3*b*n + 12*a**2*b**2*n**2 + a*b**3*n**3),x)*
a**3*b**4*e**2*n**3 + 124*int((sqrt(log(x**n*c)*b + a)*log(x**n*c)*x**2)/(
48*log(x**n*c)*a**3*b + 44*log(x**n*c)*a**2*b**2*n + 12*log(x**n*c)*a*b**3
*n**2 + log(x**n*c)*b**4*n**3 + 48*a**4 + 44*a**3*b*n + 12*a**2*b**2*n**2
+ a*b**3*n**3),x)*a**2*b**5*e**2*n**4 + 18*int((sqrt(log(x**n*c)*b + a)*lo
g(x**n*c)*x**2)/(48*log(x**n*c)*a**3*b + 44*log(x**n*c)*a**2*b**2*n + 1...
```

3.126 $\int (d+ex)^3 \sqrt{a+b\log(cx^n)}\,dx$

Optimal result 1089
Mathematica [A] (verified) 1090
Rubi [A] (verified) 1090
Maple [F] 1092
Fricas [F(-2)] 1092
Sympy [F] 1092
Maxima [F] 1093
Giac [F] 1093
Mupad [F(-1)] 1093
Reduce [F] 1094

Optimal result

Integrand size = 22, antiderivative size = 402

$$\int (d+ex)^3 \sqrt{a+b\log(cx^n)}\,dx$$
$$= -\frac{1}{2}\sqrt{b}d^3e^{-\frac{a}{bn}}\sqrt{n}\sqrt{\pi}x(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)$$
$$-\frac{1}{16}\sqrt{b}e^3e^{-\frac{4a}{bn}}\sqrt{n}\sqrt{\pi}x^4(cx^n)^{-4/n}\operatorname{erfi}\left(\frac{2\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)$$
$$-\frac{3}{4}\sqrt{b}d^2ee^{-\frac{2a}{bn}}\sqrt{n}\sqrt{\frac{\pi}{2}}x^2(cx^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)-\frac{1}{2}\sqrt{b}de^2e^{-\frac{3a}{bn}}\sqrt{n}\sqrt{\frac{\pi}{3}}x^3(cx^n)^{-3/n}\operatorname{erfi}\Bigg(\frac{\sqrt{}}{}$$

output
```
-1/2*b^(1/2)*d^3*n^(1/2)*Pi^(1/2)*x*erfi((a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(
1/2))/exp(a/b/n)/((c*x^n)^(1/n))-1/16*b^(1/2)*e^3*n^(1/2)*Pi^(1/2)*x^4*erf
i(2*(a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(1/2))/exp(4*a/b/n)/((c*x^n)^(4/n))-3/
8*b^(1/2)*d^2*e*n^(1/2)*2^(1/2)*Pi^(1/2)*x^2*erfi(2^(1/2)*(a+b*ln(c*x^n))^
(1/2)/b^(1/2)/n^(1/2))/exp(2*a/b/n)/((c*x^n)^(2/n))-1/6*b^(1/2)*d*e^2*n^(1
/2)*3^(1/2)*Pi^(1/2)*x^3*erfi(3^(1/2)*(a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(1/2
))/exp(3*a/b/n)/((c*x^n)^(3/n))+d^3*x*(a+b*ln(c*x^n))^(1/2)+3/2*d^2*e*x^2*
(a+b*ln(c*x^n))^(1/2)+d*e^2*x^3*(a+b*ln(c*x^n))^(1/2)+1/4*e^3*x^4*(a+b*ln(
c*x^n))^(1/2)
```

Mathematica [A] (verified)

Time = 0.74 (sec) , antiderivative size = 366, normalized size of antiderivative = 0.91

$$\int (d+ex)^3\sqrt{a+b\log(cx^n)}\,dx$$
$$=\frac{1}{48}e^{-\frac{4a}{bn}}x(cx^n)^{-4/n}\left(-24\sqrt{b}d^3e^{\frac{3a}{bn}}\sqrt{n}\sqrt{\pi}(cx^n)^{3/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)-3\sqrt{b}e^3\sqrt{n}\sqrt{\pi}x^3\operatorname{erfi}\left(\frac{2\sqrt{a+}}{\sqrt{}}\right.\right.$$

input
```
Integrate[(d + e*x)^3*Sqrt[a + b*Log[c*x^n]],x]
```

output
```
(x*(-24*Sqrt[b]*d^3*E^((3*a)/(b*n))*Sqrt[n]*Sqrt[Pi]*(c*x^n)^(3/n)*Erfi[Sq
rt[a + b*Log[c*x^n]]/(Sqrt[b]*Sqrt[n])] - 3*Sqrt[b]*e^3*Sqrt[n]*Sqrt[Pi]*x
^3*Erfi[(2*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])] + 2*E^(a/(b*n))*(c*x
^n)^n^(-1)*(-9*Sqrt[b]*d^2*e*E^(a/(b*n))*Sqrt[n]*Sqrt[2*Pi]*x*(c*x^n)^n^(-
1)*Erfi[(Sqrt[2]*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])] - 4*Sqrt[b]*d*
e^2*Sqrt[n]*Sqrt[3*Pi]*x^2*Erfi[(Sqrt[3]*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*
Sqrt[n])] + 6*E^((3*a)/(b*n))*(c*x^n)^(3/n)*(4*d^3 + 6*d^2*e*x + 4*d*e^2*x
^2 + e^3*x^3)*Sqrt[a + b*Log[c*x^n]])))/(48*E^((4*a)/(b*n))*(c*x^n)^(4/n))
```

Rubi [A] (verified)

Time = 1.07 (sec) , antiderivative size = 402, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)^3\sqrt{a+b\log(cx^n)}\,dx$$

$$\Big\downarrow \text{2767}$$

$$\int \left(d^3\sqrt{a+b\log(cx^n)}+3d^2ex\sqrt{a+b\log(cx^n)}+3de^2x^2\sqrt{a+b\log(cx^n)}+e^3x^3\sqrt{a+b\log(cx^n)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{1}{2}\sqrt{\pi}\sqrt{b}d^3\sqrt{n}xe^{-\frac{a}{bn}}(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+d^3x\sqrt{a+b\log(cx^n)}-\frac{3}{4}\sqrt{\frac{\pi}{2}}\sqrt{b}d^2e\sqrt{n}x^2e^{-\frac{2a}{bn}}(cx^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+\frac{3}{2}d^2ex^2\sqrt{a+b\log(cx^n)}-\frac{1}{2}\sqrt{\frac{\pi}{3}}\sqrt{b}de^2\sqrt{n}x^3e^{-\frac{3a}{bn}}(cx^n)^{-3/n}\operatorname{erfi}\left(\frac{\sqrt{3}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+de^2x^3\sqrt{a+b\log(cx^n)}-\frac{1}{16}\sqrt{\pi}\sqrt{b}e^3\sqrt{n}x^4e^{-\frac{4a}{bn}}(cx^n)^{-4/n}\operatorname{erfi}\left(\frac{2\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+\frac{1}{4}e^3x^4\sqrt{a+b\log(cx^n)}$$

input
```
Int[(d + e*x)^3*Sqrt[a + b*Log[c*x^n]],x]
```

output
```
-1/2*(Sqrt[b]*d^3*Sqrt[n]*Sqrt[Pi]*x*Erfi[Sqrt[a + b*Log[c*x^n]]/(Sqrt[b]*
Sqrt[n])])/(E^(a/(b*n))*(c*x^n)^n^(-1)) - (Sqrt[b]*e^3*Sqrt[n]*Sqrt[Pi]*x^
4*Erfi[(2*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(16*E^((4*a)/(b*n))*
(c*x^n)^(4/n)) - (3*Sqrt[b]*d^2*e*Sqrt[n]*Sqrt[Pi/2]*x^2*Erfi[(Sqrt[2]*Sqr
t[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(4*E^((2*a)/(b*n))*(c*x^n)^(2/n))
 - (Sqrt[b]*d*e^2*Sqrt[n]*Sqrt[Pi/3]*x^3*Erfi[(Sqrt[3]*Sqrt[a + b*Log[c*x^
n]])/(Sqrt[b]*Sqrt[n])])/(2*E^((3*a)/(b*n))*(c*x^n)^(3/n)) + d^3*x*Sqrt[a
+ b*Log[c*x^n]] + (3*d^2*e*x^2*Sqrt[a + b*Log[c*x^n]])/2 + d*e^2*x^3*Sqrt[
a + b*Log[c*x^n]] + (e^3*x^4*Sqrt[a + b*Log[c*x^n]])/4
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Maple [F]

$$\int (ex+d)^3 \sqrt{a+b\ln(c\,x^n)}dx$$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n))^(1/2),x)
```

output
```
int((e*x+d)^3*(a+b*ln(c*x^n))^(1/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int (d+ex)^3\sqrt{a+b\log(cx^n)}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int (d+ex)^3\sqrt{a+b\log(cx^n)}\,dx = \int \sqrt{a+b\log(cx^n)}(d+ex)^3\,dx$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n))**(1/2),x)
```

output
```
Integral(sqrt(a + b*log(c*x**n))*(d + e*x)**3, x)
```

Maxima [F]

$$\int (d+ex)^3\sqrt{a+b\log(cx^n)}\,dx = \int (ex+d)^3\sqrt{b\log(cx^n)+a}\,dx$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")
```

output
```
integrate((e*x + d)^3*sqrt(b*log(c*x^n) + a), x)
```

Giac [F]

$$\int (d+ex)^3\sqrt{a+b\log(cx^n)}\,dx = \int (ex+d)^3\sqrt{b\log(cx^n)+a}\,dx$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

output
```
integrate((e*x + d)^3*sqrt(b*log(c*x^n) + a), x)
```

Mupad [F(-1)]

Timed out.

$$\int (d+ex)^3\sqrt{a+b\log(cx^n)}\,dx = \int \sqrt{a+b\,\ln(c\,x^n)}\,(d+e\,x)^3\,dx$$

input
```
int((a + b*log(c*x^n))^(1/2)*(d + e*x)^3,x)
```

output
```
int((a + b*log(c*x^n))^(1/2)*(d + e*x)^3, x)
```

Reduce [F]

$$\int (d+ex)^3\sqrt{a+b\log(cx^n)}\,dx = \text{too large to display}$$

input
```
int((e*x+d)^3*(a+b*log(c*x^n))^(1/2),x)
```

output
```
(384*sqrt(log(x**n*c)*b + a)*a**4*d**3*x + 576*sqrt(log(x**n*c)*b + a)*a**
4*d**2*e*x**2 + 384*sqrt(log(x**n*c)*b + a)*a**4*d*e**2*x**3 + 96*sqrt(log
(x**n*c)*b + a)*a**4*e**3*x**4 + 208*sqrt(log(x**n*c)*b + a)*a**3*b*d**3*n
*x + 456*sqrt(log(x**n*c)*b + a)*a**3*b*d**2*e*n*x**2 + 336*sqrt(log(x**n*
c)*b + a)*a**3*b*d*e**2*n*x**3 + 88*sqrt(log(x**n*c)*b + a)*a**3*b*e**3*n*
x**4 + 36*sqrt(log(x**n*c)*b + a)*a**2*b**2*d**3*n**2*x + 96*sqrt(log(x**n
*c)*b + a)*a**2*b**2*d**2*e*n**2*x**2 + 84*sqrt(log(x**n*c)*b + a)*a**2*b*
*2*d*e**2*n**2*x**3 + 24*sqrt(log(x**n*c)*b + a)*a**2*b**2*e**3*n**2*x**4
 + 2*sqrt(log(x**n*c)*b + a)*a*b**3*d**3*n**3*x + 6*sqrt(log(x**n*c)*b + a)
*a*b**3*d**2*e*n**3*x**2 + 6*sqrt(log(x**n*c)*b + a)*a*b**3*d*e**2*n**3*x*
*3 + 2*sqrt(log(x**n*c)*b + a)*a*b**3*e**3*n**3*x**4 + 18432*int((sqrt(log
(x**n*c)*b + a)*log(x**n*c)*x**3)/(384*log(x**n*c)*a**4*b + 400*log(x**n*c
)*a**3*b**2*n + 140*log(x**n*c)*a**2*b**3*n**2 + 20*log(x**n*c)*a*b**4*n**
3 + log(x**n*c)*b**5*n**4 + 384*a**5 + 400*a**4*b*n + 140*a**3*b**2*n**2 +
 20*a**2*b**3*n**3 + a*b**4*n**4),x)*a**7*b**2*e**3*n + 36096*int((sqrt(lo
g(x**n*c)*b + a)*log(x**n*c)*x**3)/(384*log(x**n*c)*a**4*b + 400*log(x**n*
c)*a**3*b**2*n + 140*log(x**n*c)*a**2*b**3*n**2 + 20*log(x**n*c)*a*b**4*n*
*3 + log(x**n*c)*b**5*n**4 + 384*a**5 + 400*a**4*b*n + 140*a**3*b**2*n**2
+ 20*a**2*b**3*n**3 + a*b**4*n**4),x)*a**6*b**3*e**3*n**2 + 28928*int((sqr
t(log(x**n*c)*b + a)*log(x**n*c)*x**3)/(384*log(x**n*c)*a**4*b + 400*lo...
```

3.127 $\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx$

Optimal result 1095
Mathematica [N/A] 1095
Rubi [N/A] 1096
Maple [N/A] 1096
Fricas [F(-2)] 1097
Sympy [N/A] 1097
Maxima [N/A] 1098
Giac [N/A] 1098
Mupad [N/A] 1098
Reduce [N/A] 1099

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx = \text{Int}\left(\frac{\sqrt{a+b\log(cx^n)}}{d+ex},x\right)$$

output
```
Defer(Int)((a+b*ln(c*x^n))^(1/2)/(e*x+d),x)
```

Mathematica [N/A]

Not integrable

Time = 12.41 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx = \int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx$$

input
```
Integrate[Sqrt[a + b*Log[c*x^n]]/(d + e*x),x]
```

output
```
Integrate[Sqrt[a + b*Log[c*x^n]]/(d + e*x), x]
```

Rubi [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = $\{2768\}$

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex} \, dx$$

$$\Big\downarrow \text{ 2768}$$

$$\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex} dx$$

input
```
Int[Sqrt[a + b*Log[c*x^n]]/(d + e*x),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2768
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> Unintegrable[(d + e*x^r)^q*(a + b*Log[c*x^n])^p, x] /; F
reeQ[{a, b, c, d, e, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{\sqrt{a+b\ln(c\,x^n)}}{ex+d} dx$$

input
```
int((a+b*ln(c*x^n))^(1/2)/(e*x+d),x)
```

output
```
int((a+b*ln(c*x^n))^(1/2)/(e*x+d),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{a+b\log\left(cx^{n}\right)}}{d+ex}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*log(c*x^n))^(1/2)/(e*x+d),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 0.38 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{\sqrt{a+b\log\left(cx^{n}\right)}}{d+ex}\,dx = \int \frac{\sqrt{a+b\log\left(cx^{n}\right)}}{d+ex}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**(1/2)/(e*x+d),x)
```

output
```
Integral(sqrt(a + b*log(c*x**n))/(d + e*x), x)
```

Maxima [N/A]

Not integrable

Time = 0.10 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx = \int \frac{\sqrt{b\log(cx^n)+a}}{ex+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))^(1/2)/(e*x+d),x, algorithm="maxima")
```

output
```
integrate(sqrt(b*log(c*x^n) + a)/(e*x + d), x)
```

Giac [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx = \int \frac{\sqrt{b\log(cx^n)+a}}{ex+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))^(1/2)/(e*x+d),x, algorithm="giac")
```

output
```
integrate(sqrt(b*log(c*x^n) + a)/(e*x + d), x)
```

Mupad [N/A]

Not integrable

Time = 25.85 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx = \int \frac{\sqrt{a+b\,\ln(c\,x^n)}}{d+e\,x}\,dx$$

input
```
int((a + b*log(c*x^n))^(1/2)/(d + e*x),x)
```

output
```
int((a + b*log(c*x^n))^(1/2)/(d + e*x), x)
```

Reduce [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 76, normalized size of antiderivative = 3.45

$$\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx = \frac{2\sqrt{\log(x^n c)\,b+a}\,\log(x^n c)\,b+2\sqrt{\log(x^n c)\,b+a}\,a-3\left(\int \frac{\sqrt{\log(x^n c)b+a}}{e\,x^2+dx}dx\right)bdn}{3ben}$$

input
```
int((a+b*log(c*x^n))^(1/2)/(e*x+d),x)
```

output
```
(2*sqrt(log(x**n*c)*b + a)*log(x**n*c)*b + 2*sqrt(log(x**n*c)*b + a)*a - 3
*int(sqrt(log(x**n*c)*b + a)/(d*x + e*x**2),x)*b*d*n)/(3*b*e*n)
```

3.128 $\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx$

Optimal result 1100
Mathematica [N/A] 1100
Rubi [N/A] 1101
Maple [N/A] 1102
Fricas [F(-2)] 1102
Sympy [N/A] 1102
Maxima [N/A] 1103
Giac [N/A] 1103
Mupad [N/A] 1104
Reduce [N/A] 1104

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx=\frac{x\sqrt{a+b\log(cx^n)}}{d(d+ex)}-\frac{bn\text{Int}\left(\frac{1}{(d+ex)\sqrt{a+b\log(cx^n)}},x\right)}{2d}$$

output
```
x*(a+b*ln(c*x^n))^(1/2)/d/(e*x+d)-1/2*b*n*Defer(Int)(1/(e*x+d)/(a+b*ln(c*x
^n))^(1/2),x)/d
```

Mathematica [N/A]

Not integrable

Time = 9.40 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx=\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx$$

input
```
Integrate[Sqrt[a + b*Log[c*x^n]]/(d + e*x)^2,x]
```

output
```
Integrate[Sqrt[a + b*Log[c*x^n]]/(d + e*x)^2, x]
```

Rubi [N/A]

Not integrable

Time = 0.31 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2755, 2768}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx$$

$$\Big\downarrow \text{ 2755}$$

$$\frac{x\sqrt{a+b\log(cx^n)}}{d(d+ex)}-\frac{bn\int \frac{1}{(d+ex)\sqrt{a+b\log(cx^n)}}dx}{2d}$$

$$\Big\downarrow \text{ 2768}$$

$$\frac{x\sqrt{a+b\log(cx^n)}}{d(d+ex)}-\frac{bn\int \frac{1}{(d+ex)\sqrt{a+b\log(cx^n)}}dx}{2d}$$

input
```
Int[Sqrt[a + b*Log[c*x^n]]/(d + e*x)^2,x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2755
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Simp[b*n*(p/d)
 Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e,
n, p}, x] && GtQ[p, 0]
```

rule 2768
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> Unintegrable[(d + e*x^r)^q*(a + b*Log[c*x^n])^p, x] /; F
reeQ[{a, b, c, d, e, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{\sqrt{a+b\ln\left(c\,x^{n}\right)}}{\left(ex+d\right)^{2}}dx$$

input
```
int((a+b*ln(c*x^n))^(1/2)/(e*x+d)^2,x)
```

output
```
int((a+b*ln(c*x^n))^(1/2)/(e*x+d)^2,x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{a+b\log\left(cx^{n}\right)}}{(d+ex)^{2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*log(c*x^n))^(1/2)/(e*x+d)^2,x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 0.89 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{\sqrt{a+b\log\left(cx^{n}\right)}}{(d+ex)^{2}}\,dx = \int \frac{\sqrt{a+b\log\left(cx^{n}\right)}}{\left(d+ex\right)^{2}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**(1/2)/(e*x+d)**2,x)
```

output
```
Integral(sqrt(a + b*log(c*x**n))/(d + e*x)**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.11 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx=\int \frac{\sqrt{b\log(cx^n)+a}}{(ex+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^(1/2)/(e*x+d)^2,x, algorithm="maxima")
```

output
```
integrate(sqrt(b*log(c*x^n) + a)/(e*x + d)^2, x)
```

Giac [N/A]

Not integrable

Time = 0.13 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx=\int \frac{\sqrt{b\log(cx^n)+a}}{(ex+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^(1/2)/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate(sqrt(b*log(c*x^n) + a)/(e*x + d)^2, x)
```

Mupad [N/A]

Not integrable

Time = 26.74 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx = \int \frac{\sqrt{a+b\,\ln(c\,x^n)}}{(d+e\,x)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^(1/2)/(d + e*x)^2,x)
```

output
```
int((a + b*log(c*x^n))^(1/2)/(d + e*x)^2, x)
```

Reduce [N/A]

Not integrable

Time = 0.19 (sec) , antiderivative size = 124, normalized size of antiderivative = 5.64

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx = \frac{2\sqrt{\log(x^n c)\,b+a}\,x-\left(\int \frac{\sqrt{\log(x^n c)b+a}}{\log(x^n c)bd+\log(x^n c)bex+ad+aex}dx\right)bdn-\left(\int \frac{\sqrt{\log(x^n c)b+a}}{\log(x^n c)bd+\log(x^n c)bex+ad+aex}dx\right)benx}{2d\,(ex+d)}$$

input
```
int((a+b*log(c*x^n))^(1/2)/(e*x+d)^2,x)
```

output
```
(2*sqrt(log(x**n*c)*b + a)*x - int(sqrt(log(x**n*c)*b + a)/(log(x**n*c)*b*
d + log(x**n*c)*b*e*x + a*d + a*e*x),x)*b*d*n - int(sqrt(log(x**n*c)*b + a
)/(log(x**n*c)*b*d + log(x**n*c)*b*e*x + a*d + a*e*x),x)*b*e*n*x)/(2*d*(d
+ e*x))
```

3.129 $\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx$

Optimal result 1105
Mathematica [N/A] 1105
Rubi [N/A] 1106
Maple [N/A] 1107
Fricas [F(-2)] 1107
Sympy [N/A] 1108
Maxima [N/A] 1108
Giac [N/A] 1108
Mupad [N/A] 1109
Reduce [N/A] 1109

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx = -\frac{\sqrt{a+b\log(cx^n)}}{2e(d+ex)^2} + \frac{bn\text{Int}\left(\frac{1}{x(d+ex)^2\sqrt{a+b\log(cx^n)}},x\right)}{4e}$$

output
```
-1/2*(a+b*ln(c*x^n))^(1/2)/e/(e*x+d)^2+1/4*b*n*Defer(Int)(1/x/(e*x+d)^2/(a
+b*ln(c*x^n))^(1/2),x)/e
```

Mathematica [N/A]

Not integrable

Time = 20.17 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx = \int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx$$

input
```
Integrate[Sqrt[a + b*Log[c*x^n]]/(d + e*x)^3,x]
```

output
```
Integrate[Sqrt[a + b*Log[c*x^n]]/(d + e*x)^3, x]
```

Rubi [N/A]

Not integrable

Time = 0.40 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2756, 2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}dx$$

$$\Big\downarrow \text{ 2756}$$

$$\frac{bn\int \frac{1}{x(d+ex)^2\sqrt{a+b\log(cx^n)}}dx}{4e}-\frac{\sqrt{a+b\log(cx^n)}}{2e(d+ex)^2}$$

$$\Big\downarrow \text{ 2796}$$

$$\frac{bn\int \frac{1}{x(d+ex)^2\sqrt{a+b\log(cx^n)}}dx}{4e}-\frac{\sqrt{a+b\log(cx^n)}}{2e(d+ex)^2}$$

input
```
Int[Sqrt[a + b*Log[c*x^n]]/(d + e*x)^3,x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{\sqrt{a+b\ln\left(c\,x^{n}\right)}}{\left(ex+d\right)^{3}}dx$$

input
```
int((a+b*ln(c*x^n))^(1/2)/(e*x+d)^3,x)
```

output
```
int((a+b*ln(c*x^n))^(1/2)/(e*x+d)^3,x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{a+b\log\left(cx^{n}\right)}}{(d+ex)^{3}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*log(c*x^n))^(1/2)/(e*x+d)^3,x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 1.96 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx = \int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**(1/2)/(e*x+d)**3,x)
```

output
```
Integral(sqrt(a + b*log(c*x**n))/(d + e*x)**3, x)
```

Maxima [N/A]

Not integrable

Time = 0.10 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx = \int \frac{\sqrt{b\log(cx^n)+a}}{(ex+d)^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^(1/2)/(e*x+d)^3,x, algorithm="maxima")
```

output
```
integrate(sqrt(b*log(c*x^n) + a)/(e*x + d)^3, x)
```

Giac [N/A]

Not integrable

Time = 0.13 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx = \int \frac{\sqrt{b\log(cx^n)+a}}{(ex+d)^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^(1/2)/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate(sqrt(b*log(c*x^n) + a)/(e*x + d)^3, x)
```

Mupad [N/A]

Not integrable

Time = 26.32 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx = \int \frac{\sqrt{a+b\,\ln\left(c\,x^n\right)}}{{\left(d+e\,x\right)}^3}\,dx$$

input
```
int((a + b*log(c*x^n))^(1/2)/(d + e*x)^3,x)
```

output
```
int((a + b*log(c*x^n))^(1/2)/(d + e*x)^3, x)
```

Reduce [N/A]

Not integrable

Time = 0.19 (sec) , antiderivative size = 551, normalized size of antiderivative = 25.05

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx$$
$$= \frac{4\sqrt{\log(x^n c)\,b+a}\,dx+2\sqrt{\log(x^n c)\,b+a}\,e\,x^2-2\left(\int \frac{\sqrt{\log(x^n c)b+a}}{\log(x^n c)b\,d^2+2\log(x^n c)bdex+\log(x^n c)b\,e^2x^2+a\,d^2+2adex+a\,e^2x^2} c\right.}{}$$

input
```
int((a+b*log(c*x^n))^(1/2)/(e*x+d)^3,x)
```

output
```
(4*sqrt(log(x**n*c)*b + a)*d*x + 2*sqrt(log(x**n*c)*b + a)*e*x**2 - 2*int(
sqrt(log(x**n*c)*b + a)/(log(x**n*c)*b*d**2 + 2*log(x**n*c)*b*d*e*x + log(
x**n*c)*b*e**2*x**2 + a*d**2 + 2*a*d*e*x + a*e**2*x**2),x)*b*d**3*n - 4*in
t(sqrt(log(x**n*c)*b + a)/(log(x**n*c)*b*d**2 + 2*log(x**n*c)*b*d*e*x + lo
g(x**n*c)*b*e**2*x**2 + a*d**2 + 2*a*d*e*x + a*e**2*x**2),x)*b*d**2*e*n*x
 - 2*int(sqrt(log(x**n*c)*b + a)/(log(x**n*c)*b*d**2 + 2*log(x**n*c)*b*d*e*
x + log(x**n*c)*b*e**2*x**2 + a*d**2 + 2*a*d*e*x + a*e**2*x**2),x)*b*d*e**
2*n*x**2 - int((sqrt(log(x**n*c)*b + a)*x)/(log(x**n*c)*b*d**2 + 2*log(x**
n*c)*b*d*e*x + log(x**n*c)*b*e**2*x**2 + a*d**2 + 2*a*d*e*x + a*e**2*x**2)
,x)*b*d**2*e*n - 2*int((sqrt(log(x**n*c)*b + a)*x)/(log(x**n*c)*b*d**2 + 2
*log(x**n*c)*b*d*e*x + log(x**n*c)*b*e**2*x**2 + a*d**2 + 2*a*d*e*x + a*e*
*2*x**2),x)*b*d*e**2*n*x - int((sqrt(log(x**n*c)*b + a)*x)/(log(x**n*c)*b*
d**2 + 2*log(x**n*c)*b*d*e*x + log(x**n*c)*b*e**2*x**2 + a*d**2 + 2*a*d*e*
x + a*e**2*x**2),x)*b*e**3*n*x**2)/(4*d**2*(d**2 + 2*d*e*x + e**2*x**2))
```

3.130 $\int x^3\sqrt{d+ex}(a+b\log(cx^n))\,dx$

Optimal result . . . 1111
Mathematica [A] (verified) . . . 1112
Rubi [A] (verified) . . . 1112
Maple [F] . . . 1114
Fricas [A] (verification not implemented) . . . 1115
Sympy [A] (verification not implemented) . . . 1116
Maxima [A] (verification not implemented) . . . 1117
Giac [F] . . . 1117
Mupad [F(-1)] . . . 1118
Reduce [B] (verification not implemented) . . . 1118

Optimal result

Integrand size = 23, antiderivative size = 242

$$\int x^3\sqrt{d+ex}(a+b\log(cx^n))\,dx = \frac{64bd^4n\sqrt{d+ex}}{315e^4}+\frac{64bd^3n(d+ex)^{3/2}}{945e^4}-\frac{356bd^2n(d+ex)^{5/2}}{1575e^4}+\frac{80bdn(d+ex)^{7/2}}{441e^4}-\frac{4bn(d+ex)^{9/2}}{81e^4}-\frac{64bd^{9/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{315e^4}-\frac{2d^3(d+ex)^{3/2}(a+b\log(cx^n))}{3e^4}+\frac{6d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}-\frac{6d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^4}$$

output
```
64/315*b*d^4*n*(e*x+d)^(1/2)/e^4+64/945*b*d^3*n*(e*x+d)^(3/2)/e^4-356/1575
*b*d^2*n*(e*x+d)^(5/2)/e^4+80/441*b*d*n*(e*x+d)^(7/2)/e^4-4/81*b*n*(e*x+d)
^(9/2)/e^4-64/315*b*d^(9/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e^4-2/3*d^3*(
e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^4+6/5*d^2*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^4
-6/7*d*(e*x+d)^(7/2)*(a+b*ln(c*x^n))/e^4+2/9*(e*x+d)^(9/2)*(a+b*ln(c*x^n))
/e^4
```

Mathematica [A] (verified)

Time = 0.31 (sec) , antiderivative size = 183, normalized size of antiderivative = 0.76

$$\int x^3\sqrt{d+ex}(a+b\log(cx^n))\,dx =$$

$$-\frac{2\left(10080bd^{9/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+\sqrt{d+ex}(315a(16d^4-8d^3ex+6d^2e^2x^2-5de^3x^3-35e^4x^4)+2bn(\right.}{}$$

input
```
Integrate[x^3*Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

output
```
(-2*(10080*b*d^(9/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + Sqrt[d + e*x]*(315
*a*(16*d^4 - 8*d^3*e*x + 6*d^2*e^2*x^2 - 5*d*e^3*x^3 - 35*e^4*x^4) + 2*b*n
*(-4388*d^4 + 934*d^3*e*x - 543*d^2*e^2*x^2 + 400*d*e^3*x^3 + 1225*e^4*x^4
) + 315*b*(16*d^4 - 8*d^3*e*x + 6*d^2*e^2*x^2 - 5*d*e^3*x^3 - 35*e^4*x^4)*
Log[c*x^n])))/(99225*e^4)
```

Rubi [A] (verified)

Time = 0.57 (sec) , antiderivative size = 218, normalized size of antiderivative = 0.90, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2792, 27, 2123, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3\sqrt{d+ex}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{ 2792}$$

$$-bn\int -\frac{2(d+ex)^{3/2}\left(16d^3-24exd^2+30e^2x^2d-35e^3x^3\right)}{315e^4x}dx-\frac{2d^3(d+ex)^{3/2}\left(a+b\log(cx^n)\right)}{3e^4}+\frac{6d^2(d+ex)^{5/2}\left(a+b\log(cx^n)\right)}{5e^4}+\frac{2(d+ex)^{9/2}\left(a+b\log(cx^n)\right)}{9e^4}-\frac{6d(d+ex)^{7/2}\left(a+b\log(cx^n)\right)}{7e^4}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{2bn\int \frac{(d+ex)^{3/2}(16d^3-24exd^2+30e^2x^2d-35e^3x^3)}{x}dx}{315e^4}-\frac{2d^3(d+ex)^{3/2}(a+b\log(cx^n))}{3e^4}+\frac{6d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^4}-\frac{6d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}$$

$$\Big\downarrow \text{2123}$$

$$\frac{2bn\int \left(-35e(d+ex)^{7/2}+100de(d+ex)^{5/2}-89d^2e(d+ex)^{3/2}+\frac{16d^3(d+ex)^{3/2}}{x}\right)dx}{315e^4}-\frac{2d^3(d+ex)^{3/2}(a+b\log(cx^n))}{3e^4}+\frac{6d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^4}-\frac{6d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{2d^3(d+ex)^{3/2}(a+b\log(cx^n))}{3e^4}+\frac{6d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^4}-\frac{6d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}+\frac{2bn\left(-32d^{9/2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+32d^4\sqrt{d+ex}+\frac{32}{3}d^3(d+ex)^{3/2}-\frac{178}{5}d^2(d+ex)^{5/2}+\frac{200}{7}d(d+ex)^{7/2}-\frac{70}{9}(d+\right.}{315e^4}$$

input
```
Int[x^3*Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

output
```
(2*b*n*(32*d^4*Sqrt[d + e*x] + (32*d^3*(d + e*x)^(3/2))/3 - (178*d^2*(d +
e*x)^(5/2))/5 + (200*d*(d + e*x)^(7/2))/7 - (70*(d + e*x)^(9/2))/9 - 32*d^
(9/2)*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))/(315*e^4) - (2*d^3*(d + e*x)^(3/2)*
(a + b*Log[c*x^n]))/(3*e^4) + (6*d^2*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/(
5*e^4) - (6*d*(d + e*x)^(7/2)*(a + b*Log[c*x^n]))/(7*e^4) + (2*(d + e*x)^(
9/2)*(a + b*Log[c*x^n]))/(9*e^4)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2123
```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int x^3\sqrt{ex+d}\,(a+b\ln(c\,x^n))\,dx$$

input
```
int(x^3*(e*x+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x^3*(e*x+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 492, normalized size of antiderivative = 2.03

$$\int x^3\sqrt{d+ex}(a+b\log(cx^n))\,dx$$
$$= \left[\frac{2\left(5040\,bd^{\frac{9}{2}}n\log\left(\frac{ex-2\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)+(8776\,bd^4n-5040\,ad^4-1225\,(2\,be^4n-9\,ae^4)x^4-25\,(32\,bde^3n\right.}{}\right.$$

input
```
integrate(x^3*(e*x+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[2/99225*(5040*b*d^(9/2)*n*log((e*x - 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) +
(8776*b*d^4*n - 5040*a*d^4 - 1225*(2*b*e^4*n - 9*a*e^4)*x^4 - 25*(32*b*d*e
^3*n - 63*a*d*e^3)*x^3 + 6*(181*b*d^2*e^2*n - 315*a*d^2*e^2)*x^2 - 4*(467*
b*d^3*e*n - 630*a*d^3*e)*x + 315*(35*b*e^4*x^4 + 5*b*d*e^3*x^3 - 6*b*d^2*e
^2*x^2 + 8*b*d^3*e*x - 16*b*d^4)*log(c) + 315*(35*b*e^4*n*x^4 + 5*b*d*e^3*
n*x^3 - 6*b*d^2*e^2*n*x^2 + 8*b*d^3*e*n*x - 16*b*d^4*n)*log(x))*sqrt(e*x +
 d))/e^4, 2/99225*(10080*b*sqrt(-d)*d^4*n*arctan(sqrt(-d)/sqrt(e*x + d)) +
 (8776*b*d^4*n - 5040*a*d^4 - 1225*(2*b*e^4*n - 9*a*e^4)*x^4 - 25*(32*b*d*
e^3*n - 63*a*d*e^3)*x^3 + 6*(181*b*d^2*e^2*n - 315*a*d^2*e^2)*x^2 - 4*(467
*b*d^3*e*n - 630*a*d^3*e)*x + 315*(35*b*e^4*x^4 + 5*b*d*e^3*x^3 - 6*b*d^2*
e^2*x^2 + 8*b*d^3*e*x - 16*b*d^4)*log(c) + 315*(35*b*e^4*n*x^4 + 5*b*d*e^3
*n*x^3 - 6*b*d^2*e^2*n*x^2 + 8*b*d^3*e*n*x - 16*b*d^4*n)*log(x))*sqrt(e*x
+ d))/e^4]
```

Sympy [A] (verification not implemented)

Time = 72.24 (sec) , antiderivative size = 347, normalized size of antiderivative = 1.43

$$\int x^3\sqrt{d+ex}(a+b\log(cx^n))\,dx$$
$$= a\left(\begin{cases} -\frac{2d^3(d+ex)^{\frac{3}{2}}}{3e^4}+\frac{6d^2(d+ex)^{\frac{5}{2}}}{5e^4}-\frac{6d(d+ex)^{\frac{7}{2}}}{7e^4}+\frac{2(d+ex)^{\frac{9}{2}}}{9e^4} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^4}{4} & \text{otherwise}\end{cases}\right)$$
$$-bn\left(\begin{cases} -\frac{17552d^{\frac{9}{2}}\sqrt{1+\frac{ex}{d}}}{99225e^4}-\frac{32d^{\frac{9}{2}}\log\left(\frac{ex}{d}\right)}{315e^4}+\frac{64d^{\frac{9}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{315e^4}+\frac{3736d^{\frac{7}{2}}x\sqrt{1+\frac{ex}{d}}}{99225e^3}-\frac{724d^{\frac{5}{2}}x^2\sqrt{1+\frac{ex}{d}}}{33075e^2}+\frac{64d^{\frac{3}{2}}x^3\sqrt{1+\frac{ex}{d}}}{3969e} \\ \frac{\sqrt{d}x^4}{16} \end{cases}\right.$$
$$+b\left(\begin{cases} -\frac{2d^3(d+ex)^{\frac{3}{2}}}{3e^4}+\frac{6d^2(d+ex)^{\frac{5}{2}}}{5e^4}-\frac{6d(d+ex)^{\frac{7}{2}}}{7e^4}+\frac{2(d+ex)^{\frac{9}{2}}}{9e^4} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^4}{4} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**3*(e*x+d)**(1/2)*(a+b*ln(c*x**n)),x)
```

output
```
a*Piecewise((-2*d**3*(d + e*x)**(3/2)/(3*e**4) + 6*d**2*(d + e*x)**(5/2)/(
5*e**4) - 6*d*(d + e*x)**(7/2)/(7*e**4) + 2*(d + e*x)**(9/2)/(9*e**4), Ne(
e, 0)), (sqrt(d)*x**4/4, True)) - b*n*Piecewise((-17552*d**(9/2)*sqrt(1 +
e*x/d)/(99225*e**4) - 32*d**(9/2)*log(e*x/d)/(315*e**4) + 64*d**(9/2)*log(
sqrt(1 + e*x/d) + 1)/(315*e**4) + 3736*d**(7/2)*x*sqrt(1 + e*x/d)/(99225*e
**3) - 724*d**(5/2)*x**2*sqrt(1 + e*x/d)/(33075*e**2) + 64*d**(3/2)*x**3*s
qrt(1 + e*x/d)/(3969*e) + 4*sqrt(d)*x**4*sqrt(1 + e*x/d)/81, (e > -oo) & (
e < oo) & Ne(e, 0)), (sqrt(d)*x**4/16, True)) + b*Piecewise((-2*d**3*(d +
e*x)**(3/2)/(3*e**4) + 6*d**2*(d + e*x)**(5/2)/(5*e**4) - 6*d*(d + e*x)**(
7/2)/(7*e**4) + 2*(d + e*x)**(9/2)/(9*e**4), Ne(e, 0)), (sqrt(d)*x**4/4, T
rue))*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 227, normalized size of antiderivative = 0.94

$$\int x^3\sqrt{d+ex}(a+b\log(cx^n))\,dx$$
$$= \frac{4}{99225}\Bigg(\frac{2520\,d^{\frac{9}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^4} - \frac{1225\,(ex+d)^{\frac{9}{2}} - 4500\,(ex+d)^{\frac{7}{2}}d + 5607\,(ex+d)^{\frac{5}{2}}d^2 - 1680\,(ex+}{e^4}$$
$$+ \frac{2}{315}b\left(\frac{35\,(ex+d)^{\frac{9}{2}}}{e^4} - \frac{135\,(ex+d)^{\frac{7}{2}}d}{e^4} + \frac{189\,(ex+d)^{\frac{5}{2}}d^2}{e^4} - \frac{105\,(ex+d)^{\frac{3}{2}}d^3}{e^4}\right)\log(cx^n)$$
$$+ \frac{2}{315}a\left(\frac{35\,(ex+d)^{\frac{9}{2}}}{e^4} - \frac{135\,(ex+d)^{\frac{7}{2}}d}{e^4} + \frac{189\,(ex+d)^{\frac{5}{2}}d^2}{e^4} - \frac{105\,(ex+d)^{\frac{3}{2}}d^3}{e^4}\right)$$

input
```
integrate(x^3*(e*x+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
4/99225*(2520*d^(9/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(
d)))/e^4 - (1225*(e*x + d)^(9/2) - 4500*(e*x + d)^(7/2)*d + 5607*(e*x + d)
^(5/2)*d^2 - 1680*(e*x + d)^(3/2)*d^3 - 5040*sqrt(e*x + d)*d^4)/e^4)*b*n +
 2/315*b*(35*(e*x + d)^(9/2)/e^4 - 135*(e*x + d)^(7/2)*d/e^4 + 189*(e*x +
d)^(5/2)*d^2/e^4 - 105*(e*x + d)^(3/2)*d^3/e^4)*log(c*x^n) + 2/315*a*(35*(
e*x + d)^(9/2)/e^4 - 135*(e*x + d)^(7/2)*d/e^4 + 189*(e*x + d)^(5/2)*d^2/e
^4 - 105*(e*x + d)^(3/2)*d^3/e^4)
```

Giac [F]

$$\int x^3\sqrt{d+ex}(a+b\log(cx^n))\,dx = \int \sqrt{ex+d}(b\log(cx^n)+a)x^3\,dx$$

input
```
integrate(x^3*(e*x+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(sqrt(e*x + d)*(b*log(c*x^n) + a)*x^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int x^3\sqrt{d+ex}(a+b\log(cx^n))\,dx=\int x^3\,(a+b\,\ln(c\,x^n))\,\sqrt{d+e\,x}\,dx$$

input
```
int(x^3*(a + b*log(c*x^n))*(d + e*x)^(1/2),x)
```

output
```
int(x^3*(a + b*log(c*x^n))*(d + e*x)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 301, normalized size of antiderivative = 1.24

$$\int x^3\sqrt{d+ex}(a+b\log(cx^n))\,dx$$
$$=\frac{-\frac{32\sqrt{ex+d}\log(x^nc)b\,d^4}{315}+\frac{16\sqrt{ex+d}\log(x^nc)b\,d^3ex}{315}-\frac{4\sqrt{ex+d}\log(x^nc)b\,d^2e^2x^2}{105}+\frac{2\sqrt{ex+d}\log(x^nc)bd\,e^3x^3}{63}+\frac{2\sqrt{ex+d}\log(x^nc)b\,e^4x}{9}}{}$$

input
```
int(x^3*(e*x+d)^(1/2)*(a+b*log(c*x^n)),x)
```

output
```
(2*( - 5040*sqrt(d + e*x)*log(x**n*c)*b*d**4 + 2520*sqrt(d + e*x)*log(x**n
*c)*b*d**3*e*x - 1890*sqrt(d + e*x)*log(x**n*c)*b*d**2*e**2*x**2 + 1575*sq
rt(d + e*x)*log(x**n*c)*b*d*e**3*x**3 + 11025*sqrt(d + e*x)*log(x**n*c)*b*
e**4*x**4 - 5040*sqrt(d + e*x)*a*d**4 + 2520*sqrt(d + e*x)*a*d**3*e*x - 18
90*sqrt(d + e*x)*a*d**2*e**2*x**2 + 1575*sqrt(d + e*x)*a*d*e**3*x**3 + 110
25*sqrt(d + e*x)*a*e**4*x**4 + 8776*sqrt(d + e*x)*b*d**4*n - 1868*sqrt(d +
 e*x)*b*d**3*e*n*x + 1086*sqrt(d + e*x)*b*d**2*e**2*n*x**2 - 800*sqrt(d +
e*x)*b*d*e**3*n*x**3 - 2450*sqrt(d + e*x)*b*e**4*n*x**4 + 10080*sqrt(d)*lo
g(sqrt(d + e*x) - sqrt(d))*b*d**4*n - 5040*sqrt(d)*log(x**n*c)*b*d**4))/(9
9225*e**4)
```

3.131 $\int x^2\sqrt{d+ex}(a+b\log(cx^n))\,dx$

Optimal result 1119
Mathematica [A] (verified) 1120
Rubi [A] (verified) 1120
Maple [F] 1123
Fricas [A] (verification not implemented) 1123
Sympy [A] (verification not implemented) 1124
Maxima [A] (verification not implemented) 1125
Giac [F] 1125
Mupad [F(-1)] 1126
Reduce [B] (verification not implemented) 1126

Optimal result

Integrand size = 23, antiderivative size = 192

$$\int x^2\sqrt{d+ex}(a+b\log(cx^n))\,dx = -\frac{32bd^3n\sqrt{d+ex}}{105e^3}-\frac{32bd^2n(d+ex)^{3/2}}{315e^3}+\frac{36bdn(d+ex)^{5/2}}{175e^3}-\frac{4bn(d+ex)^{7/2}}{49e^3}+\frac{32bd^{7/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{105e^3}+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}-\frac{4d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}$$

output
```
-32/105*b*d^3*n*(e*x+d)^(1/2)/e^3-32/315*b*d^2*n*(e*x+d)^(3/2)/e^3+36/175*
b*d*n*(e*x+d)^(5/2)/e^3-4/49*b*n*(e*x+d)^(7/2)/e^3+32/105*b*d^(7/2)*n*arct
anh((e*x+d)^(1/2)/d^(1/2))/e^3+2/3*d^2*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^3-4
/5*d*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^3+2/7*(e*x+d)^(7/2)*(a+b*ln(c*x^n))/e
^3
```

Mathematica [A] (verified)

Time = 0.24 (sec) , antiderivative size = 151, normalized size of antiderivative = 0.79

$$\int x^2\sqrt{d+ex}(a+b\log(cx^n))\,dx$$
$$=\frac{3360bd^{7/2}n\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2\sqrt{d+ex}(105a(8d^3-4d^2ex+3de^2x^2+15e^3x^3)-2bn(778d^3-179d^2ex}{11025e^3}$$

input
```
Integrate[x^2*Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

output
```
(3360*b*d^(7/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 2*Sqrt[d + e*x]*(105*a*
(8*d^3 - 4*d^2*e*x + 3*d*e^2*x^2 + 15*e^3*x^3) - 2*b*n*(778*d^3 - 179*d^2*
e*x + 108*d*e^2*x^2 + 225*e^3*x^3) + 105*b*(8*d^3 - 4*d^2*e*x + 3*d*e^2*x^
2 + 15*e^3*x^3)*Log[c*x^n]))/(11025*e^3)
```

Rubi [A] (verified)

Time = 0.47 (sec) , antiderivative size = 188, normalized size of antiderivative = 0.98, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.261, Rules used = {2792, 27, 1192, 25, 1584, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2\sqrt{d+ex}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int \frac{2(d+ex)^{3/2}(8d^2-12exd+15e^2x^2)}{105e^3x}dx+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{4d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \text{27}$$

$$-\frac{2bn\int \frac{(d+ex)^{3/2}(8d^2-12exd+15e^2x^2)}{x}dx}{105e^3}+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{4d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \text{1192}$$

$$-\frac{4bn\int \frac{(d+ex)^2(35d^2e^2+15(d+ex)^2e^2-42d(d+ex)e^2)}{ex}d\sqrt{d+ex}}{105e^5}+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{4d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \text{25}$$

$$\frac{4bn\int -\frac{(d+ex)^2(35d^2e^2+15(d+ex)^2e^2-42d(d+ex)e^2)}{ex}d\sqrt{d+ex}}{105e^5}+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{4d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \text{1584}$$

$$\frac{4bn\int \left(-\frac{8ed^4}{x}-8e^2d^3-8e^2(d+ex)d^2+27e^2(d+ex)^2d-15e^2(d+ex)^3\right)d\sqrt{d+ex}}{105e^5}+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{4d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{4d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{4bn\left(-8d^{7/2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+8d^3e^2\sqrt{d+ex}+\frac{8}{3}d^2e^2(d+ex)^{3/2}-\frac{27}{5}de^2(d+ex)^{5/2}+\frac{15}{7}e^2(d+ex)^{7/2}\right)}{105e^5}$$

input
```
Int[x^2*Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

output
```
(-4*b*n*(8*d^3*e^2*Sqrt[d + e*x] + (8*d^2*e^2*(d + e*x)^(3/2))/3 - (27*d*e
^2*(d + e*x)^(5/2))/5 + (15*e^2*(d + e*x)^(7/2))/7 - 8*d^(7/2)*e^2*ArcTanh
[Sqrt[d + e*x]/Sqrt[d]]))/(105*e^5) + (2*d^2*(d + e*x)^(3/2)*(a + b*Log[c*
x^n]))/(3*e^3) - (4*d*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/(5*e^3) + (2*(d
+ e*x)^(7/2)*(a + b*Log[c*x^n]))/(7*e^3)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1192
```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[2/e^(n + 2*p + 1)   Subst[Int[x^(
2*m + 1)*(e*f - d*g + g*x^2)^n*(c*d^2 - b*d*e + a*e^2 - (2*c*d - b*e)*x^2 +
 c*x^4)^p, x], x, Sqrt[d + e*x]], x] /; FreeQ[{a, b, c, d, e, f, g}, x] &&
IGtQ[p, 0] && ILtQ[n, 0] && IntegerQ[m + 1/2]
```

rule 1584
```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int x^2\sqrt{ex+d}\,(a+b\ln(c\,x^n))\,dx$$

input
```
int(x^2*(e*x+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x^2*(e*x+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 393, normalized size of antiderivative = 2.05

$$\int x^2\sqrt{d+ex}(a+b\log(cx^n))\ dx$$
$$= \left[\frac{2\left(840\,bd^{\frac{7}{2}}n\log\left(\frac{ex+2\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)-(1556\,bd^3n-840\,ad^3+225\,(2\,be^3n-7\,ae^3)x^3+9\,(24\,bde^2n-35\right.}{}\right.$$
$$-\frac{2\left(1680\,b\sqrt{-d}d^3n\arctan\left(\frac{\sqrt{-d}}{\sqrt{ex+d}}\right)+(1556\,bd^3n-840\,ad^3+225\,(2\,be^3n-7\,ae^3)x^3+9\,(24\,bde^2n-3\right.}{}$$

input
```
integrate(x^2*(e*x+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[2/11025*(840*b*d^(7/2)*n*log((e*x + 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) - (
1556*b*d^3*n - 840*a*d^3 + 225*(2*b*e^3*n - 7*a*e^3)*x^3 + 9*(24*b*d*e^2*n
 - 35*a*d*e^2)*x^2 - 2*(179*b*d^2*e*n - 210*a*d^2*e)*x - 105*(15*b*e^3*x^3
 + 3*b*d*e^2*x^2 - 4*b*d^2*e*x + 8*b*d^3)*log(c) - 105*(15*b*e^3*n*x^3 + 3
*b*d*e^2*n*x^2 - 4*b*d^2*e*n*x + 8*b*d^3*n)*log(x))*sqrt(e*x + d))/e^3, -2
/11025*(1680*b*sqrt(-d)*d^3*n*arctan(sqrt(-d)/sqrt(e*x + d)) + (1556*b*d^3
*n - 840*a*d^3 + 225*(2*b*e^3*n - 7*a*e^3)*x^3 + 9*(24*b*d*e^2*n - 35*a*d*
e^2)*x^2 - 2*(179*b*d^2*e*n - 210*a*d^2*e)*x - 105*(15*b*e^3*x^3 + 3*b*d*e
^2*x^2 - 4*b*d^2*e*x + 8*b*d^3)*log(c) - 105*(15*b*e^3*n*x^3 + 3*b*d*e^2*n
*x^2 - 4*b*d^2*e*n*x + 8*b*d^3*n)*log(x))*sqrt(e*x + d))/e^3]
```

Sympy [A] (verification not implemented)

Time = 51.14 (sec) , antiderivative size = 284, normalized size of antiderivative = 1.48

$$\int x^2\sqrt{d+ex}(a+b\log(cx^n))\,dx = a\left(\begin{cases}\frac{2d^2(d+ex)^{\frac{3}{2}}}{3e^3}-\frac{4d(d+ex)^{\frac{5}{2}}}{5e^3}+\frac{2(d+ex)^{\frac{7}{2}}}{7e^3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^3}{3} & \text{otherwise}\end{cases}\right)$$

$$-bn\left(\begin{cases}\frac{3112d^{\frac{7}{2}}\sqrt{1+\frac{ex}{d}}}{11025e^3}+\frac{16d^{\frac{7}{2}}\log\left(\frac{ex}{d}\right)}{105e^3}-\frac{32d^{\frac{7}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{105e^3}-\frac{716d^{\frac{5}{2}}x\sqrt{1+\frac{ex}{d}}}{11025e^2}+\frac{48d^{\frac{3}{2}}x^2\sqrt{1+\frac{ex}{d}}}{1225e}+\frac{4\sqrt{d}x^3\sqrt{1+\frac{ex}{d}}}{49} & \text{fo}\\ \frac{\sqrt{d}x^3}{9} & \text{ot}\end{cases}\right.$$

$$+b\left(\begin{cases}\frac{2d^2(d+ex)^{\frac{3}{2}}}{3e^3}-\frac{4d(d+ex)^{\frac{5}{2}}}{5e^3}+\frac{2(d+ex)^{\frac{7}{2}}}{7e^3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^3}{3} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input

```
integrate(x**2*(e*x+d)**(1/2)*(a+b*ln(c*x**n)),x)
```

output

```
a*Piecewise((2*d**2*(d + e*x)**(3/2)/(3*e**3) - 4*d*(d + e*x)**(5/2)/(5*e*
*3) + 2*(d + e*x)**(7/2)/(7*e**3), Ne(e, 0)), (sqrt(d)*x**3/3, True)) - b*
n*Piecewise((3112*d**(7/2)*sqrt(1 + e*x/d)/(11025*e**3) + 16*d**(7/2)*log(
e*x/d)/(105*e**3) - 32*d**(7/2)*log(sqrt(1 + e*x/d) + 1)/(105*e**3) - 716*
d**(5/2)*x*sqrt(1 + e*x/d)/(11025*e**2) + 48*d**(3/2)*x**2*sqrt(1 + e*x/d)
/(1225*e) + 4*sqrt(d)*x**3*sqrt(1 + e*x/d)/49, (e > -oo) & (e < oo) & Ne(e
, 0)), (sqrt(d)*x**3/9, True)) + b*Piecewise((2*d**2*(d + e*x)**(3/2)/(3*e
**3) - 4*d*(d + e*x)**(5/2)/(5*e**3) + 2*(d + e*x)**(7/2)/(7*e**3), Ne(e,
0)), (sqrt(d)*x**3/3, True))*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 184, normalized size of antiderivative = 0.96

$$\int x^2\sqrt{d+ex}(a+b\log(cx^n))\,dx = -\frac{4}{11025}\left(\frac{420\,d^{\frac{7}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^3}+\frac{225\,(ex+d)^{\frac{7}{2}}-567\,(ex+d)^{\frac{5}{2}}d+280\,(ex+d)^{\frac{3}{2}}d^2+840\,\sqrt{ex+d}\,d^3}{e^3}\right)bn + \frac{2}{105}b\left(\frac{15\,(ex+d)^{\frac{7}{2}}}{e^3}-\frac{42\,(ex+d)^{\frac{5}{2}}d}{e^3}+\frac{35\,(ex+d)^{\frac{3}{2}}d^2}{e^3}\right)\log(cx^n) + \frac{2}{105}a\left(\frac{15\,(ex+d)^{\frac{7}{2}}}{e^3}-\frac{42\,(ex+d)^{\frac{5}{2}}d}{e^3}+\frac{35\,(ex+d)^{\frac{3}{2}}d^2}{e^3}\right)$$

input
```
integrate(x^2*(e*x+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-4/11025*(420*d^(7/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(
d)))/e^3 + (225*(e*x + d)^(7/2) - 567*(e*x + d)^(5/2)*d + 280*(e*x + d)^(3
/2)*d^2 + 840*sqrt(e*x + d)*d^3)/e^3)*b*n + 2/105*b*(15*(e*x + d)^(7/2)/e^
3 - 42*(e*x + d)^(5/2)*d/e^3 + 35*(e*x + d)^(3/2)*d^2/e^3)*log(c*x^n) + 2/
105*a*(15*(e*x + d)^(7/2)/e^3 - 42*(e*x + d)^(5/2)*d/e^3 + 35*(e*x + d)^(3
/2)*d^2/e^3)
```

Giac [F]

$$\int x^2\sqrt{d+ex}(a+b\log(cx^n))\,dx = \int \sqrt{ex+d}(b\log(cx^n)+a)x^2\,dx$$

input
```
integrate(x^2*(e*x+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(sqrt(e*x + d)*(b*log(c*x^n) + a)*x^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int x^2\sqrt{d+ex}(a+b\log(cx^n))\,dx=\int x^2\,(a+b\,\ln(c\,x^n))\,\sqrt{d+e\,x}\,dx$$

input
```
int(x^2*(a + b*log(c*x^n))*(d + e*x)^(1/2),x)
```

output
```
int(x^2*(a + b*log(c*x^n))*(d + e*x)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 240, normalized size of antiderivative = 1.25

$$\int x^2\sqrt{d+ex}(a+b\log(cx^n))\,dx$$

$$=\frac{\frac{16\sqrt{ex+d}\log(x^n c)b\,d^3}{105}-\frac{8\sqrt{ex+d}\log(x^n c)b\,d^2ex}{105}+\frac{2\sqrt{ex+d}\log(x^n c)bd\,e^2x^2}{35}+\frac{2\sqrt{ex+d}\log(x^n c)b\,e^3x^3}{7}+\frac{16\sqrt{ex+d}\,a\,d^3}{105}-\frac{8\sqrt{ex+d}\,a}{105}}{}$$

input
```
int(x^2*(e*x+d)^(1/2)*(a+b*log(c*x^n)),x)
```

output
```
(2*(840*sqrt(d + e*x)*log(x**n*c)*b*d**3 - 420*sqrt(d + e*x)*log(x**n*c)*b
*d**2*e*x + 315*sqrt(d + e*x)*log(x**n*c)*b*d*e**2*x**2 + 1575*sqrt(d + e*
x)*log(x**n*c)*b*e**3*x**3 + 840*sqrt(d + e*x)*a*d**3 - 420*sqrt(d + e*x)*
a*d**2*e*x + 315*sqrt(d + e*x)*a*d*e**2*x**2 + 1575*sqrt(d + e*x)*a*e**3*x
**3 - 1556*sqrt(d + e*x)*b*d**3*n + 358*sqrt(d + e*x)*b*d**2*e*n*x - 216*s
qrt(d + e*x)*b*d*e**2*n*x**2 - 450*sqrt(d + e*x)*b*e**3*n*x**3 - 1680*sqrt
(d)*log(sqrt(d + e*x) - sqrt(d))*b*d**3*n + 840*sqrt(d)*log(x**n*c)*b*d**3
))/(11025*e**3)
```

3.132 $\int x\sqrt{d+ex}(a+b\log(cx^n))\,dx$

Optimal result 1127
Mathematica [A] (verified) 1128
Rubi [A] (verified) 1128
Maple [F] 1131
Fricas [A] (verification not implemented) 1131
Sympy [A] (verification not implemented) 1132
Maxima [A] (verification not implemented) 1132
Giac [F] 1133
Mupad [F(-1)] 1133
Reduce [B] (verification not implemented) 1134

Optimal result

Integrand size = 21, antiderivative size = 142

$$\int x\sqrt{d+ex}(a+b\log(cx^n))\,dx = \frac{8bd^2n\sqrt{d+ex}}{15e^2}+\frac{8bdn(d+ex)^{3/2}}{45e^2} - \frac{4bn(d+ex)^{5/2}}{25e^2}-\frac{8bd^{5/2}n\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{15e^2} - \frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2} + \frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}$$

output
```
8/15*b*d^2*n*(e*x+d)^(1/2)/e^2+8/45*b*d*n*(e*x+d)^(3/2)/e^2-4/25*b*n*(e*x+
d)^(5/2)/e^2-8/15*b*d^(5/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e^2-2/3*d*(e*
x+d)^(3/2)*(a+b*ln(c*x^n))/e^2+2/5*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^2
```

Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 116, normalized size of antiderivative = 0.82

$$\int x\sqrt{d+ex}(a+b\log(cx^n))\,dx = \frac{-120bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2\sqrt{d+ex}(2bn(31d^2-8dex-9e^2x^2)+15a(-2d^2+dex+3e^2x^2)+15b(\cdots}{225e^2}$$

input
```
Integrate[x*Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

output
```
(-120*b*d^(5/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 2*Sqrt[d + e*x]*(2*b*n*
(31*d^2 - 8*d*e*x - 9*e^2*x^2) + 15*a*(-2*d^2 + d*e*x + 3*e^2*x^2) + 15*b*
(-2*d^2 + d*e*x + 3*e^2*x^2)*Log[c*x^n]))/(225*e^2)
```

Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 131, normalized size of antiderivative = 0.92, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {2792, 27, 90, 60, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x\sqrt{d+ex}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{2(2d-3ex)(d+ex)^{3/2}}{15e^2x}dx+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{2bn\int\frac{(2d-3ex)(d+ex)^{3/2}}{x}dx}{15e^2}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}$$

$$\Big\downarrow \text{90}$$

$$\frac{2bn\left(2d\int \frac{(d+ex)^{3/2}}{x}dx-\frac{6}{5}(d+ex)^{5/2}\right)}{15e^2}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}$$

$$\Big\downarrow \; 60$$

$$\frac{2bn\left(2d\left(d\int \frac{\sqrt{d+ex}}{x}dx+\frac{2}{3}(d+ex)^{3/2}\right)-\frac{6}{5}(d+ex)^{5/2}\right)}{15e^2}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}$$

$$\Big\downarrow \; 60$$

$$\frac{2bn\left(2d\left(d\left(d\int \frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)-\frac{6}{5}(d+ex)^{5/2}\right)}{15e^2}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}$$

$$\Big\downarrow \; 73$$

$$\frac{2bn\left(2d\left(d\left(\frac{2d\int \frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)-\frac{6}{5}(d+ex)^{5/2}\right)}{15e^2}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}$$

$$\Big\downarrow \; 221$$

$$\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}+\frac{2bn\left(2d\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)-\frac{6}{5}(d+ex)^{5/2}\right)}{15e^2}$$

input
```
Int[x*Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

output
```
(2*b*n*((-6*(d + e*x)^(5/2))/5 + 2*d*((2*(d + e*x)^(3/2))/3 + d*(2*Sqrt[d
+ e*x] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))))/(15*e^2) - (2*d*(d +
 e*x)^(3/2)*(a + b*Log[c*x^n]))/(3*e^2) + (2*(d + e*x)^(5/2)*(a + b*Log[c*
x^n]))/(5*e^2)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int x\sqrt{ex+d}\,(a+b\ln(c\,x^n))\,dx$$

input
```
int(x*(e*x+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x*(e*x+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 288, normalized size of antiderivative = 2.03

$$\int x\sqrt{d+ex}(a+b\log(cx^n))\,dx = \left[\frac{2\left(30\,bd^{\frac{5}{2}}n\log\left(\frac{ex-2\,\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)+(62\,bd^2n-30\,ad^2-9\,(2\,be^2n-5\,ae^2)x^2-(16\,bden-15\,ade)x+\right.}{225\,e^2}\right.$$

input
```
integrate(x*(e*x+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[2/225*(30*b*d^(5/2)*n*log((e*x - 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) + (62*
b*d^2*n - 30*a*d^2 - 9*(2*b*e^2*n - 5*a*e^2)*x^2 - (16*b*d*e*n - 15*a*d*e)
*x + 15*(3*b*e^2*x^2 + b*d*e*x - 2*b*d^2)*log(c) + 15*(3*b*e^2*n*x^2 + b*d
*e*n*x - 2*b*d^2*n)*log(x))*sqrt(e*x + d))/e^2, 2/225*(60*b*sqrt(-d)*d^2*n
*arctan(sqrt(-d)/sqrt(e*x + d)) + (62*b*d^2*n - 30*a*d^2 - 9*(2*b*e^2*n -
5*a*e^2)*x^2 - (16*b*d*e*n - 15*a*d*e)*x + 15*(3*b*e^2*x^2 + b*d*e*x - 2*b
*d^2)*log(c) + 15*(3*b*e^2*n*x^2 + b*d*e*n*x - 2*b*d^2*n)*log(x))*sqrt(e*x
 + d))/e^2]
```

Sympy [A] (verification not implemented)

Time = 57.49 (sec) , antiderivative size = 221, normalized size of antiderivative = 1.56

$$\int x\sqrt{d+ex}(a+b\log(cx^n))\,dx = a\left(\begin{cases}-\frac{2d(d+ex)^{\frac{3}{2}}}{3e^2}+\frac{2(d+ex)^{\frac{5}{2}}}{5e^2} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}\right)$$
$$-bn\left(\begin{cases}-\frac{124d^{\frac{5}{2}}\sqrt{1+\frac{ex}{d}}}{225e^2}-\frac{4d^{\frac{5}{2}}\log\left(\frac{ex}{d}\right)}{15e^2}+\frac{8d^{\frac{5}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{15e^2}+\frac{32d^{\frac{3}{2}}x\sqrt{1+\frac{ex}{d}}}{225e}+\frac{4\sqrt{d}x^2\sqrt{1+\frac{ex}{d}}}{25} & \text{for } e>-\infty\wedge e<\\ \frac{\sqrt{d}x^2}{4} & \text{otherwise}\end{cases}\right)$$
$$+b\left(\begin{cases}-\frac{2d(d+ex)^{\frac{3}{2}}}{3e^2}+\frac{2(d+ex)^{\frac{5}{2}}}{5e^2} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x*(e*x+d)**(1/2)*(a+b*ln(c*x**n)),x)
```

output
```
a*Piecewise((-2*d*(d + e*x)**(3/2)/(3*e**2) + 2*(d + e*x)**(5/2)/(5*e**2),
 Ne(e, 0)), (sqrt(d)*x**2/2, True)) - b*n*Piecewise((-124*d**(5/2)*sqrt(1
+ e*x/d)/(225*e**2) - 4*d**(5/2)*log(e*x/d)/(15*e**2) + 8*d**(5/2)*log(sqr
t(1 + e*x/d) + 1)/(15*e**2) + 32*d**(3/2)*x*sqrt(1 + e*x/d)/(225*e) + 4*sq
rt(d)*x**2*sqrt(1 + e*x/d)/25, (e > -oo) & (e < oo) & Ne(e, 0)), (sqrt(d)*
x**2/4, True)) + b*Piecewise((-2*d*(d + e*x)**(3/2)/(3*e**2) + 2*(d + e*x)
**(5/2)/(5*e**2), Ne(e, 0)), (sqrt(d)*x**2/2, True))*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.01

$$\int x\sqrt{d+ex}(a+b\log(cx^n))\,dx$$
$$=\frac{4}{225}\left(\frac{15\,d^{\frac{5}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^2}-\frac{9\,(ex+d)^{\frac{5}{2}}-10\,(ex+d)^{\frac{3}{2}}d-30\,\sqrt{ex+d}d^2}{e^2}\right)bn$$
$$+\frac{2}{15}\,b\left(\frac{3\,(ex+d)^{\frac{5}{2}}}{e^2}-\frac{5\,(ex+d)^{\frac{3}{2}}d}{e^2}\right)\log(cx^n)$$
$$+\frac{2}{15}\,a\left(\frac{3\,(ex+d)^{\frac{5}{2}}}{e^2}-\frac{5\,(ex+d)^{\frac{3}{2}}d}{e^2}\right)$$

input
```
integrate(x*(e*x+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
4/225*(15*d^(5/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))
/e^2 - (9*(e*x + d)^(5/2) - 10*(e*x + d)^(3/2)*d - 30*sqrt(e*x + d)*d^2)/e
^2)*b*n + 2/15*b*(3*(e*x + d)^(5/2)/e^2 - 5*(e*x + d)^(3/2)*d/e^2)*log(c*x
^n) + 2/15*a*(3*(e*x + d)^(5/2)/e^2 - 5*(e*x + d)^(3/2)*d/e^2)
```

Giac [F]

$$\int x\sqrt{d+ex}(a+b\log(cx^n))\,dx = \int \sqrt{ex+d}(b\log(cx^n)+a)x\,dx$$

input
```
integrate(x*(e*x+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(sqrt(e*x + d)*(b*log(c*x^n) + a)*x, x)
```

Mupad [F(-1)]

Timed out.

$$\int x\sqrt{d+ex}(a+b\log(cx^n))\,dx = \int x\,(a+b\,\ln(c\,x^n))\,\sqrt{d+e\,x}\,dx$$

input
```
int(x*(a + b*log(c*x^n))*(d + e*x)^(1/2),x)
```

output
```
int(x*(a + b*log(c*x^n))*(d + e*x)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 179, normalized size of antiderivative = 1.26

$$\int x\sqrt{d+ex}(a+b\log(cx^n))\,dx$$

$$= \frac{-\frac{4\sqrt{ex+d}\log(x^nc)b\,d^2}{15}+\frac{2\sqrt{ex+d}\log(x^nc)bdex}{15}+\frac{2\sqrt{ex+d}\log(x^nc)b\,e^2x^2}{5}-\frac{4\sqrt{ex+d}\,a\,d^2}{15}+\frac{2\sqrt{ex+d}\,adex}{15}+\frac{2\sqrt{ex+d}\,a\,e^2x^2}{5}+12}{e^2}$$

input
```
int(x*(e*x+d)^(1/2)*(a+b*log(c*x^n)),x)
```

output
```
(2*( - 30*sqrt(d + e*x)*log(x**n*c)*b*d**2 + 15*sqrt(d + e*x)*log(x**n*c)*
b*d*e*x + 45*sqrt(d + e*x)*log(x**n*c)*b*e**2*x**2 - 30*sqrt(d + e*x)*a*d*
*2 + 15*sqrt(d + e*x)*a*d*e*x + 45*sqrt(d + e*x)*a*e**2*x**2 + 62*sqrt(d +
 e*x)*b*d**2*n - 16*sqrt(d + e*x)*b*d*e*n*x - 18*sqrt(d + e*x)*b*e**2*n*x*
*2 + 60*sqrt(d)*log(sqrt(d + e*x) - sqrt(d))*b*d**2*n - 30*sqrt(d)*log(x**
n*c)*b*d**2))/(225*e**2)
```

3.133 $\int \sqrt{d+ex}(a+b\log(cx^n))\,dx$

Optimal result 1135
Mathematica [A] (verified) 1135
Rubi [A] (verified) 1136
Maple [F] 1138
Fricas [A] (verification not implemented) 1138
Sympy [A] (verification not implemented) 1139
Maxima [A] (verification not implemented) 1139
Giac [F] 1140
Mupad [F(-1)] 1140
Reduce [B] (verification not implemented) 1140

Optimal result

Integrand size = 20, antiderivative size = 94

$$\int \sqrt{d+ex}(a+b\log(cx^n))\,dx = -\frac{4bdn\sqrt{d+ex}}{3e} - \frac{4bn(d+ex)^{3/2}}{9e} + \frac{4bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{3e} + \frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}$$

output
```
-4/3*b*d*n*(e*x+d)^(1/2)/e-4/9*b*n*(e*x+d)^(3/2)/e+4/3*b*d^(3/2)*n*arctanh
((e*x+d)^(1/2)/d^(1/2))/e+2/3*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e
```

Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 77, normalized size of antiderivative = 0.82

$$\int \sqrt{d+ex}(a+b\log(cx^n))\,dx = \frac{2\left(6bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) + \sqrt{d+ex}(3a(d+ex) - 2bn(4d+ex) + 3b(d+ex)\log(cx^n))\right)}{9e}$$

input
```
Integrate[Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

output
```
(2*(6*b*d^(3/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + Sqrt[d + e*x]*(3*a*(d +
 e*x) - 2*b*n*(4*d + e*x) + 3*b*(d + e*x)*Log[c*x^n])))/(9*e)
```

Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 87, normalized size of antiderivative = 0.93, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {2756, 60, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \sqrt{d+ex}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2756}$$

$$\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\int\frac{(d+ex)^{3/2}}{x}dx}{3e}$$

$$\Big\downarrow \text{60}$$

$$\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\int\frac{\sqrt{d+ex}}{x}dx+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}$$

$$\Big\downarrow \text{60}$$

$$\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(d\int\frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}$$

$$\Big\downarrow \text{73}$$

$$\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(\frac{2d\int\frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}$$

$$\Big\downarrow \text{221}$$

$$\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}$$

input
```
Int[Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

output
```
(-2*b*n*((2*(d + e*x)^(3/2))/3 + d*(2*Sqrt[d + e*x] - 2*Sqrt[d]*ArcTanh[Sq
rt[d + e*x]/Sqrt[d]])))/(3*e) + (2*(d + e*x)^(3/2)*(a + b*Log[c*x^n]))/(3*
e)
```

Defintions of rubi rules used

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

Maple [F]

$$\int \sqrt{ex+d}\,(a+b\ln(c\,x^n))\,dx$$

input
```
int((e*x+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

output
```
int((e*x+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 181, normalized size of antiderivative = 1.93

$$\int \sqrt{d+ex}(a+b\log(cx^n))\,dx = \left[\frac{2\left(3\,bd^{\frac{3}{2}}n\log\left(\frac{ex+2\,\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)-(8\,bdn-3\,ad+(2\,ben-3\,ae)x-3\,(bex+bd)\log(c)-3\,(benx+b\right.}{9\,e}\right. - \frac{2\left(6\,b\sqrt{-d}dn\arctan\left(\frac{\sqrt{-d}}{\sqrt{ex+d}}\right)+(8\,bdn-3\,ad+(2\,ben-3\,ae)x-3\,(bex+bd)\log(c)-3\,(benx+bd\right.}{9\,e}$$

input
```
integrate((e*x+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[2/9*(3*b*d^(3/2)*n*log((e*x + 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) - (8*b*d*
n - 3*a*d + (2*b*e*n - 3*a*e)*x - 3*(b*e*x + b*d)*log(c) - 3*(b*e*n*x + b*
d*n)*log(x))*sqrt(e*x + d))/e, -2/9*(6*b*sqrt(-d)*d*n*arctan(sqrt(-d)/sqrt
(e*x + d)) + (8*b*d*n - 3*a*d + (2*b*e*n - 3*a*e)*x - 3*(b*e*x + b*d)*log(
c) - 3*(b*e*n*x + b*d*n)*log(x))*sqrt(e*x + d))/e]
```

Sympy [A] (verification not implemented)

Time = 30.37 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.53

$$\int \sqrt{d+ex}(a+b\log(cx^n))\,dx = a\left(\begin{cases}\frac{2(d+ex)^{\frac{3}{2}}}{3e} & \text{for } e\neq 0\\ \sqrt{d}x & \text{otherwise}\end{cases}\right) - bn\left(\begin{cases}\frac{16d^{\frac{3}{2}}\sqrt{1+\frac{ex}{d}}}{9e}+\frac{2d^{\frac{3}{2}}\log\left(\frac{ex}{d}\right)}{3e}-\frac{4d^{\frac{3}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{3e}+\frac{4\sqrt{d}x\sqrt{1+\frac{ex}{d}}}{9} & \text{for } e>-\infty\wedge e<\infty\wedge e\neq 0\\ \sqrt{d}x & \text{otherwise}\end{cases}\right) + b\left(\begin{cases}\frac{2(d+ex)^{\frac{3}{2}}}{3e} & \text{for } e\neq 0\\ \sqrt{d}x & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((e*x+d)**(1/2)*(a+b*ln(c*x**n)),x)
```

output
```
a*Piecewise((2*(d + e*x)**(3/2)/(3*e), Ne(e, 0)), (sqrt(d)*x, True)) - b*n
*Piecewise((16*d**(3/2)*sqrt(1 + e*x/d)/(9*e) + 2*d**(3/2)*log(e*x/d)/(3*e
) - 4*d**(3/2)*log(sqrt(1 + e*x/d) + 1)/(3*e) + 4*sqrt(d)*x*sqrt(1 + e*x/d
)/9, (e > -oo) & (e < oo) & Ne(e, 0)), (sqrt(d)*x, True)) + b*Piecewise((2
*(d + e*x)**(3/2)/(3*e), Ne(e, 0)), (sqrt(d)*x, True))*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 93, normalized size of antiderivative = 0.99

$$\int \sqrt{d+ex}(a+b\log(cx^n))\,dx = \frac{2\,(ex+d)^{\frac{3}{2}}b\log(cx^n)}{3\,e} - \frac{2\left(3\,d^{\frac{3}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)+2\,(ex+d)^{\frac{3}{2}}+6\,\sqrt{ex+d}d\right)bn}{9\,e} + \frac{2\,(ex+d)^{\frac{3}{2}}a}{3\,e}$$

input
```
integrate((e*x+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
2/3*(e*x + d)^(3/2)*b*log(c*x^n)/e - 2/9*(3*d^(3/2)*log((sqrt(e*x + d) - s
qrt(d))/(sqrt(e*x + d) + sqrt(d))) + 2*(e*x + d)^(3/2) + 6*sqrt(e*x + d)*d
)*b*n/e + 2/3*(e*x + d)^(3/2)*a/e
```

Giac [F]

$$\int \sqrt{d+ex}(a+b\log(cx^n))\,dx = \int \sqrt{ex+d}(b\log(cx^n)+a)\,dx$$

input
```
integrate((e*x+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(sqrt(e*x + d)*(b*log(c*x^n) + a), x)
```

Mupad [F(-1)]

Timed out.

$$\int \sqrt{d+ex}(a+b\log(cx^n))\,dx = \int (a+b\,\ln(c\,x^n))\,\sqrt{d+e\,x}\,dx$$

input
```
int((a + b*log(c*x^n))*(d + e*x)^(1/2),x)
```

output
```
int((a + b*log(c*x^n))*(d + e*x)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.21

$$\int \sqrt{d+ex}(a+b\log(cx^n))\,dx$$
$$= \frac{\frac{2\sqrt{ex+d}\log(x^n c)bd}{3}+\frac{2\sqrt{ex+d}\log(x^n c)bex}{3}+\frac{2\sqrt{ex+d}\,ad}{3}+\frac{2\sqrt{ex+d}\,aex}{3}-\frac{16\sqrt{ex+d}\,bdn}{9}-\frac{4\sqrt{ex+d}\,benx}{9}-\frac{4\sqrt{d}\log\left(\sqrt{ex+d}-\sqrt{d}\right.}{3}}{e}$$

input
```
int((e*x+d)^(1/2)*(a+b*log(c*x^n)),x)
```

output
```
(2*(3*sqrt(d + e*x)*log(x**n*c)*b*d + 3*sqrt(d + e*x)*log(x**n*c)*b*e*x +
3*sqrt(d + e*x)*a*d + 3*sqrt(d + e*x)*a*e*x - 8*sqrt(d + e*x)*b*d*n - 2*sq
rt(d + e*x)*b*e*n*x - 6*sqrt(d)*log(sqrt(d + e*x) - sqrt(d))*b*d*n + 3*sqr
t(d)*log(x**n*c)*b*d))/(9*e)
```

3.134 $\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}\,dx$

Optimal result . . . 1142
Mathematica [A] (verified) . . . 1143
Rubi [A] (verified) . . . 1144
Maple [F] . . . 1149
Fricas [F] . . . 1150
Sympy [F] . . . 1150
Maxima [F] . . . 1150
Giac [F] . . . 1151
Mupad [F(-1)] . . . 1151
Reduce [F] . . . 1151

Optimal result

Integrand size = 23, antiderivative size = 211

$$\begin{aligned}\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}\,dx =& -4bn\sqrt{d+ex}+4b\sqrt{d}n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\\ &+2b\sqrt{d}n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2\\ &+2\sqrt{d+ex}(a+b\log(cx^n))\\ &-2\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))\\ &-4b\sqrt{d}n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\\ &-2b\sqrt{d}n\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\end{aligned}$$

output
```
-4*b*n*(e*x+d)^(1/2)+4*b*d^(1/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))+2*b*d^(1
/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))^2+2*(e*x+d)^(1/2)*(a+b*ln(c*x^n))-2*d
^(1/2)*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))-4*b*d^(1/2)*n*arctan
h((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))-2*b*d^(1/2)
*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))
```

Mathematica [A] (verified)

Time = 0.27 (sec) , antiderivative size = 332, normalized size of antiderivative = 1.57

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}\,dx = 2a\sqrt{d+ex} - 4bn\sqrt{d+ex} + 4b\sqrt{d}n\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) + 2b\sqrt{d+ex}\log(cx^n) + \sqrt{d}(a+b\log(cx^n))\log\left(\sqrt{d}-\sqrt{d+ex}\right) - \sqrt{d}(a+b\log(cx^n))\log\left(\sqrt{d}+\sqrt{d+ex}\right) - \frac{1}{2}b\sqrt{d}n\left(\log\left(\sqrt{d}-\sqrt{d+ex}\right)\left(\log\left(\sqrt{d}-\sqrt{d+ex}\right) + 2\log\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)\right) + 2\,\text{PolyLog}\left(2,\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)\right) + \frac{1}{2}b\sqrt{d}n\left(\log\left(\sqrt{d}+\sqrt{d+ex}\right)\left(\log\left(\sqrt{d}+\sqrt{d+ex}\right) + 2\log\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)\right) + 2\,\text{PolyLog}\left(2,\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)\right)$$

input

```
Integrate[(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x,x]
```

output

```
2*a*Sqrt[d + e*x] - 4*b*n*Sqrt[d + e*x] + 4*b*Sqrt[d]*n*ArcTanh[Sqrt[d + e
*x]/Sqrt[d]] + 2*b*Sqrt[d + e*x]*Log[c*x^n] + Sqrt[d]*(a + b*Log[c*x^n])*L
og[Sqrt[d] - Sqrt[d + e*x]] - Sqrt[d]*(a + b*Log[c*x^n])*Log[Sqrt[d] + Sqr
t[d + e*x]] - (b*Sqrt[d]*n*(Log[Sqrt[d] - Sqrt[d + e*x]]*(Log[Sqrt[d] - Sq
rt[d + e*x]] + 2*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2]) + 2*PolyLog[2, 1/2 -
Sqrt[d + e*x]/(2*Sqrt[d])]))/2 + (b*Sqrt[d]*n*(Log[Sqrt[d] + Sqrt[d + e*x]
]*(Log[Sqrt[d] + Sqrt[d + e*x]] + 2*Log[1/2 - Sqrt[d + e*x]/(2*Sqrt[d])])
+ 2*PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2]))/2
```

Rubi [A] (verified)

Time = 1.13 (sec) , antiderivative size = 217, normalized size of antiderivative = 1.03, number of steps used = 16, number of rules used = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.652, Rules used = {2788, 2756, 60, 73, 221, 2790, 27, 7267, 25, 6546, 27, 6470, 27, 2849, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \text{2788}$$

$$e\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}dx+d\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{2756}$$

$$e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\int \frac{\sqrt{d+ex}}{x}dx}{e}\right)+d\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{60}$$

$$e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(d\int \frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)}{e}\right)+d\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{73}$$

$$e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(\frac{2d\int \frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)}{e}\right)+ d\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{221}$$

$$d\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx+ e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{2790}$$

$$d\left(-bn\int -\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}x}dx-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{27}$$

$$d\left(\frac{2bn\int\frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{7267}$$

$$d\left(\frac{4bn\int\frac{\sqrt{d+ex}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{25}$$

$$d\left(-\frac{4bn\int-\frac{\sqrt{d+ex}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{6546}$$

$$d\left(\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\frac{\int\frac{\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{d+ex}}d\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{27}$$

$$d\left(\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\int\frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{d+ex}}d\sqrt{d+ex}\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+ e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{6470}$$

$$d\left(\frac{4bn\left(\frac{\int-\frac{d\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d-}}{\sqrt{}}\right.}{}\right. e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{27}$$

$$d\left(\frac{4bn\left(\sqrt{d}\int-\frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{ex}d\sqrt{d+ex}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanl}}{}\right. e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{2849}$$

$$d\left(\frac{4bn\left(-\sqrt{d}\int \frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}}d\frac{1}{\sqrt{d}-\sqrt{d+ex}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arcta}}{}\right.$$

$$e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{2752}$$

$$d\left(\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)-\frac{1}{2}\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}}{}\right.$$

$$e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

input
```
Int[(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x,x]
```

output
```
e*((-2*b*n*(2*Sqrt[d + e*x] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))/e
 + (2*Sqrt[d + e*x]*(a + b*Log[c*x^n]))/e) + d*((-2*ArcTanh[Sqrt[d + e*x]/
Sqrt[d]]*(a + b*Log[c*x^n]))/Sqrt[d] + (4*b*n*(ArcTanh[Sqrt[d + e*x]/Sqrt[
d]]^2/2 - ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d
 + e*x])] - PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])]/2))/Sqrt
[d])
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2788
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.))
/(x_), x_Symbol] :> Simp[d   Int[(d + e*x)^(q - 1)*((a + b*Log[c*x^n])^p/x)
, x], x] + Simp[e   Int[(d + e*x)^(q - 1)*(a + b*Log[c*x^n])^p, x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && GtQ[q, 0] && IntegerQ[2*q]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

rule 2849
```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Simp
[-e/g   Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[
{c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

rule 6470
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Simp[b*c
*(p/e)   Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^
2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2
, 0]
```

rule 6546
```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Simp[1/
(c*d)   Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

rule 7267
```
Int[u_, x_Symbol] :> With[{lst = SubstForFractionalPowerOfLinear[u, x]}, Si
mp[lst[[2]]*lst[[4]]   Subst[Int[lst[[1]], x], x, lst[[3]]^(1/lst[[2]])], x
] /;  !FalseQ[lst] && SubstForFractionalPowerQ[u, lst[[3]], x]]
```

Maple [F]

$$\int \frac{\sqrt{ex+d}\,(a+b\ln(c\,x^n))}{x}dx$$

input
```
int((e*x+d)^(1/2)*(a+b*ln(c*x^n))/x,x)
```

output
```
int((e*x+d)^(1/2)*(a+b*ln(c*x^n))/x,x)
```

Fricas [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}\,dx = \int \frac{\sqrt{ex+d}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((e*x+d)^(1/2)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
integral((sqrt(e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*a)/x, x)
```

Sympy [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}\,dx = \int \frac{(a+b\log(cx^n))\sqrt{d+ex}}{x}\,dx$$

input
```
integrate((e*x+d)**(1/2)*(a+b*ln(c*x**n))/x,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x)/x, x)
```

Maxima [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}\,dx = \int \frac{\sqrt{ex+d}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((e*x+d)^(1/2)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
(sqrt(d)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d))) + 2*sqrt
(e*x + d))*a + b*integrate(sqrt(e*x + d)*(log(c) + log(x^n))/x, x)
```

Giac [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}\,dx = \int \frac{\sqrt{ex+d}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((e*x+d)^(1/2)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x + d)*(b*log(c*x^n) + a)/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}\,dx = \int \frac{(a+b\ln(c\,x^n))\,\sqrt{d+e\,x}}{x}\,dx$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^(1/2))/x,x)
```

output
```
int(((a + b*log(c*x^n))*(d + e*x)^(1/2))/x, x)
```

Reduce [F]

$$\begin{aligned}\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}\,dx &= 2\sqrt{ex+d}\,\log(x^n c)\,b + 2\sqrt{ex+d}\,a \\ &\quad - 4\sqrt{ex+d}\,bn + \sqrt{d}\log\left(\sqrt{ex+d}-\sqrt{d}\right)a \\ &\quad - 2\sqrt{d}\log\left(\sqrt{ex+d}-\sqrt{d}\right)bn \\ &\quad - \sqrt{d}\log\left(\sqrt{ex+d}+\sqrt{d}\right)a \\ &\quad + 2\sqrt{d}\log\left(\sqrt{ex+d}+\sqrt{d}\right)bn \\ &\quad + \left(\int \frac{\sqrt{ex+d}\,\log(x^n c)}{e\,x^2+dx}dx\right)bd\end{aligned}$$

input
```
int((e*x+d)^(1/2)*(a+b*log(c*x^n))/x,x)
```

output
```
2*sqrt(d + e*x)*log(x**n*c)*b + 2*sqrt(d + e*x)*a - 4*sqrt(d + e*x)*b*n +
sqrt(d)*log(sqrt(d + e*x) - sqrt(d))*a - 2*sqrt(d)*log(sqrt(d + e*x) - sqr
t(d))*b*n - sqrt(d)*log(sqrt(d + e*x) + sqrt(d))*a + 2*sqrt(d)*log(sqrt(d
+ e*x) + sqrt(d))*b*n + int((sqrt(d + e*x)*log(x**n*c))/(d*x + e*x**2),x)*
b*d
```

3.135 $\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^2}\,dx$

Optimal result 1153
Mathematica [A] (verified) 1154
Rubi [A] (verified) 1154
Maple [F] 1156
Fricas [F] 1157
Sympy [F] 1157
Maxima [F] 1157
Giac [F] 1158
Mupad [F(-1)] 1158
Reduce [F] 1158

Optimal result

Integrand size = 23, antiderivative size = 221

$$\begin{aligned}\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^2}\,dx &= -\frac{bn\sqrt{d+ex}}{x}-\frac{ben\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}\\ &\quad+\frac{ben\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}\\ &\quad-\frac{e\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\\ &\quad-\frac{2ben\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{\sqrt{d}}\\ &\quad-\frac{ben\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{\sqrt{d}}\end{aligned}$$

output
```
-b*n*(e*x+d)^(1/2)/x-b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))/d^(1/2)+b*e*n*ar
ctanh((e*x+d)^(1/2)/d^(1/2))^2/d^(1/2)-(e*x+d)^(1/2)*(a+b*ln(c*x^n))/x-e*a
rctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(1/2)-2*b*e*n*arctanh((e*x
+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(1/2)-b*e*n*pol
ylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(1/2)
```

Mathematica [A] (verified)

Time = 0.37 (sec) , antiderivative size = 392, normalized size of antiderivative = 1.77

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^2}\,dx =$$
$$-\frac{4a\sqrt{d}\sqrt{d+ex}+4b\sqrt{d}n\sqrt{d+ex}+4benx\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+4b\sqrt{d}\sqrt{d+ex}\log(cx^n)-2aex\log\left(\sqrt{d}\right.}{}$$

input
```
Integrate[(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-1/4*(4*a*Sqrt[d]*Sqrt[d + e*x] + 4*b*Sqrt[d]*n*Sqrt[d + e*x] + 4*b*e*n*x*
ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 4*b*Sqrt[d]*Sqrt[d + e*x]*Log[c*x^n] - 2*
a*e*x*Log[Sqrt[d] - Sqrt[d + e*x]] - 2*b*e*x*Log[c*x^n]*Log[Sqrt[d] - Sqrt
[d + e*x]] + b*e*n*x*Log[Sqrt[d] - Sqrt[d + e*x]]^2 + 2*a*e*x*Log[Sqrt[d]
+ Sqrt[d + e*x]] + 2*b*e*x*Log[c*x^n]*Log[Sqrt[d] + Sqrt[d + e*x]] - b*e*n
*x*Log[Sqrt[d] + Sqrt[d + e*x]]^2 - 2*b*e*n*x*Log[Sqrt[d] + Sqrt[d + e*x]]
*Log[1/2 - Sqrt[d + e*x]/(2*Sqrt[d])] + 2*b*e*n*x*Log[Sqrt[d] - Sqrt[d + e
*x]]*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2] + 2*b*e*n*x*PolyLog[2, 1/2 - Sqrt[
d + e*x]/(2*Sqrt[d])] - 2*b*e*n*x*PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2
])/(Sqrt[d]*x)
```

Rubi [A] (verified)

Time = 0.62 (sec) , antiderivative size = 215, normalized size of antiderivative = 0.97, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2792, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^2}\,dx$$
$$\Big\downarrow \; 2792$$

$$-bn\int -\frac{\frac{e x \text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}+\sqrt{d+ex}}{x^2}dx-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{25}$$

$$bn\int \frac{\frac{e x \text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}+\sqrt{d+ex}}{x^2}dx-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{2010}$$

$$bn\int \left(\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}x}+\frac{\sqrt{d+ex}}{x^2}\right)dx-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}+bn\left(\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}}-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}-\frac{2e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{\sqrt{d}}-\frac{e\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{\sqrt{d}}\right.$$

input
```
Int[(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-((Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x) - (e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]
]*(a + b*Log[c*x^n]))/Sqrt[d] + b*n*(-(Sqrt[d + e*x]/x) - (e*ArcTanh[Sqrt[
d + e*x]/Sqrt[d]])/Sqrt[d] + (e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]^2)/Sqrt[d]
- (2*e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d +
e*x])])/Sqrt[d] - (e*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])]
)/Sqrt[d])
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{\sqrt{ex+d}\,(a+b\ln(c\,x^n))}{x^2}dx$$

input
```
int((e*x+d)^(1/2)*(a+b*ln(c*x^n))/x^2,x)
```

output
```
int((e*x+d)^(1/2)*(a+b*ln(c*x^n))/x^2,x)
```

Fricas [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{\sqrt{ex+d}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((e*x+d)^(1/2)*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
integral((sqrt(e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*a)/x^2, x)
```

Sympy [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{(a+b\log(cx^n))\sqrt{d+ex}}{x^2}\,dx$$

input
```
integrate((e*x+d)**(1/2)*(a+b*ln(c*x**n))/x**2,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x)/x**2, x)
```

Maxima [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{\sqrt{ex+d}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((e*x+d)^(1/2)*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
1/2*(e*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))/sqrt(d) -
2*sqrt(e*x + d)/x)*a + b*integrate(sqrt(e*x + d)*(log(c) + log(x^n))/x^2,
x)
```

Giac [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{\sqrt{ex+d}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((e*x+d)^(1/2)*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x + d)*(b*log(c*x^n) + a)/x^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{(a+b\ln(c\,x^n))\,\sqrt{d+e\,x}}{x^2}\,dx$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^(1/2))/x^2,x)
```

output
```
int(((a + b*log(c*x^n))*(d + e*x)^(1/2))/x^2, x)
```

Reduce [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^2}\,dx$$

$$= \frac{-4\sqrt{ex+d}\log(x^nc)\,bd - 2\sqrt{ex+d}\,ad - 4\sqrt{ex+d}\,bdn + \sqrt{d}\log\left(\sqrt{ex+d}-\sqrt{d}\right)aex + 2\sqrt{d}\log\left(\sqrt{ex\right.}}{}$$

input
```
int((e*x+d)^(1/2)*(a+b*log(c*x^n))/x^2,x)
```

output
```
( - 4*sqrt(d + e*x)*log(x**n*c)*b*d - 2*sqrt(d + e*x)*a*d - 4*sqrt(d + e*x
)*b*d*n + sqrt(d)*log(sqrt(d + e*x) - sqrt(d))*a*e*x + 2*sqrt(d)*log(sqrt(
d + e*x) - sqrt(d))*b*e*n*x - sqrt(d)*log(sqrt(d + e*x) + sqrt(d))*a*e*x -
 2*sqrt(d)*log(sqrt(d + e*x) + sqrt(d))*b*e*n*x - 2*int((sqrt(d + e*x)*log
(x**n*c))/(d*x**2 + e*x**3),x)*b*d**2*x)/(2*d*x)
```

3.136 $\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3}\,dx$

Optimal result 1160
Mathematica [A] (verified) 1161
Rubi [A] (verified) 1162
Maple [F] 1163
Fricas [F] 1164
Sympy [F] 1164
Maxima [F] 1164
Giac [F] 1165
Mupad [F(-1)] 1165
Reduce [F] 1165

Optimal result

Integrand size = 23, antiderivative size = 298

$$\begin{aligned}\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3}\,dx = & -\frac{bn\sqrt{d+ex}}{4x^2}-\frac{3ben\sqrt{d+ex}}{8dx}-\frac{be^2n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{8d^{3/2}} \\ & -\frac{be^2n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{4d^{3/2}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2x^2} \\ & -\frac{e\sqrt{d+ex}(a+b\log(cx^n))}{4dx} \\ & +\frac{e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{3/2}} \\ & +\frac{be^2n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{2d^{3/2}} \\ & +\frac{be^2n\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{4d^{3/2}}\end{aligned}$$

output
```
-1/4*b*n*(e*x+d)^(1/2)/x^2-3/8*b*e*n*(e*x+d)^(1/2)/d/x-1/8*b*e^2*n*arctanh
((e*x+d)^(1/2)/d^(1/2))/d^(3/2)-1/4*b*e^2*n*arctanh((e*x+d)^(1/2)/d^(1/2))
^2/d^(3/2)-1/2*(e*x+d)^(1/2)*(a+b*ln(c*x^n))/x^2-1/4*e*(e*x+d)^(1/2)*(a+b*
ln(c*x^n))/d/x+1/4*e^2*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(3
/2)+1/2*b*e^2*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+
d)^(1/2)))/d^(3/2)+1/4*b*e^2*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2
)))/d^(3/2)
```

Mathematica [A] (verified)

Time = 0.65 (sec) , antiderivative size = 500, normalized size of antiderivative = 1.68

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3}\,dx = -\frac{8ad^{3/2}\sqrt{d+ex}+4bd^{3/2}n\sqrt{d+ex}+4a\sqrt{d}ex\sqrt{d+ex}+6b\sqrt{d}enx\sqrt{d+ex}+2be^2nx^2\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{}$$

input
```
Integrate[(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-1/16*(8*a*d^(3/2)*Sqrt[d + e*x] + 4*b*d^(3/2)*n*Sqrt[d + e*x] + 4*a*Sqrt[
d]*e*x*Sqrt[d + e*x] + 6*b*Sqrt[d]*e*n*x*Sqrt[d + e*x] + 2*b*e^2*n*x^2*Arc
Tanh[Sqrt[d + e*x]/Sqrt[d]] + 8*b*d^(3/2)*Sqrt[d + e*x]*Log[c*x^n] + 4*b*S
qrt[d]*e*x*Sqrt[d + e*x]*Log[c*x^n] + 2*a*e^2*x^2*Log[Sqrt[d] - Sqrt[d + e
*x]] + 2*b*e^2*x^2*Log[c*x^n]*Log[Sqrt[d] - Sqrt[d + e*x]] - b*e^2*n*x^2*L
og[Sqrt[d] - Sqrt[d + e*x]]^2 - 2*a*e^2*x^2*Log[Sqrt[d] + Sqrt[d + e*x]] -
 2*b*e^2*x^2*Log[c*x^n]*Log[Sqrt[d] + Sqrt[d + e*x]] + b*e^2*n*x^2*Log[Sqr
t[d] + Sqrt[d + e*x]]^2 + 2*b*e^2*n*x^2*Log[Sqrt[d] + Sqrt[d + e*x]]*Log[1
/2 - Sqrt[d + e*x]/(2*Sqrt[d])] - 2*b*e^2*n*x^2*Log[Sqrt[d] - Sqrt[d + e*x
]]*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2] - 2*b*e^2*n*x^2*PolyLog[2, 1/2 - Sqr
t[d + e*x]/(2*Sqrt[d])] + 2*b*e^2*n*x^2*PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt
[d])/2])/(d^(3/2)*x^2)
```

Rubi [A] (verified)

Time = 0.69 (sec) , antiderivative size = 276, normalized size of antiderivative = 0.93, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3}dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{\sqrt{d}\sqrt{d+ex}(2d+ex)-e^2x^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{4d^{3/2}x^3}dx+\frac{e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{3/2}}-\frac{e\sqrt{d+ex}(a+b\log(cx^n))}{4dx}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{\sqrt{d}\sqrt{d+ex}(2d+ex)-e^2x^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x^3}dx}{4d^{3/2}}+\frac{e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{3/2}}-\frac{e\sqrt{d+ex}(a+b\log(cx^n))}{4dx}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{2010}$$

$$\frac{bn\int \left(-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)e^2}{x}+\frac{\sqrt{d}\sqrt{d+ex}e}{x^2}+\frac{2d^{3/2}\sqrt{d+ex}}{x^3}\right)dx}{4d^{3/2}}+\frac{e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{3/2}}-\frac{e\sqrt{d+ex}(a+b\log(cx^n))}{4dx}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{2009}$$

$$\frac{e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{3/2}}-\frac{e\sqrt{d+ex}(a+b\log(cx^n))}{4dx}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2x^2}+\frac{bn\left(e^2\left(-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2\right)-\frac{1}{2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)-\frac{d^{3/2}\sqrt{d+ex}}{x^2}+e^2\text{P}}{4d^{3/2}}$$

input
```
Int[(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-1/2*(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x^2 - (e*Sqrt[d + e*x]*(a + b*Log[
c*x^n]))/(4*d*x) + (e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^n]))
/(4*d^(3/2)) + (b*n*(-((d^(3/2)*Sqrt[d + e*x])/x^2) - (3*Sqrt[d]*e*Sqrt[d
+ e*x])/(2*x) - (e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/2 - e^2*ArcTanh[Sqrt[
d + e*x]/Sqrt[d]]^2 + 2*e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])
/(Sqrt[d] - Sqrt[d + e*x])] + e^2*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sq
rt[d + e*x])]))/(4*d^(3/2))
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{\sqrt{ex+d}\,(a+b\ln(c\,x^n))}{x^3}dx$$

input
```
int((e*x+d)^(1/2)*(a+b*ln(c*x^n))/x^3,x)
```

output
```
int((e*x+d)^(1/2)*(a+b*ln(c*x^n))/x^3,x)
```

Fricas [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{\sqrt{ex+d}(b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((e*x+d)^(1/2)*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
integral((sqrt(e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*a)/x^3, x)
```

Sympy [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(a+b\log(cx^n))\sqrt{d+ex}}{x^3}\,dx$$

input
```
integrate((e*x+d)**(1/2)*(a+b*ln(c*x**n))/x**3,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x)/x**3, x)
```

Maxima [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{\sqrt{ex+d}(b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((e*x+d)^(1/2)*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
-1/8*(e^2*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))/d^(3/2)
 + 2*((e*x + d)^(3/2)*e^2 + sqrt(e*x + d)*d*e^2)/((e*x + d)^2*d - 2*(e*x +
 d)*d^2 + d^3))*a + b*integrate(sqrt(e*x + d)*(log(c) + log(x^n))/x^3, x)
```

Giac [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{\sqrt{ex+d}(b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((e*x+d)^(1/2)*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x + d)*(b*log(c*x^n) + a)/x^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(a+b\ln(c\,x^n))\,\sqrt{d+e\,x}}{x^3}\,dx$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^(1/2))/x^3,x)
```

output
```
int(((a + b*log(c*x^n))*(d + e*x)^(1/2))/x^3, x)
```

Reduce [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3}\,dx$$
$$= \frac{-16\sqrt{ex+d}\log(x^n c)\,b\,d^2 - 12\sqrt{ex+d}\,a\,d^2 - 6\sqrt{ex+d}\,adex - 8\sqrt{ex+d}\,b\,d^2 n - 4\sqrt{ex+d}\,bdenx - 3}{}$$

input
```
int((e*x+d)^(1/2)*(a+b*log(c*x^n))/x^3,x)
```

output
```
( - 16*sqrt(d + e*x)*log(x**n*c)*b*d**2 - 12*sqrt(d + e*x)*a*d**2 - 6*sqrt
(d + e*x)*a*d*e*x - 8*sqrt(d + e*x)*b*d**2*n - 4*sqrt(d + e*x)*b*d*e*n*x -
 3*sqrt(d)*log(sqrt(d + e*x) - sqrt(d))*a*e**2*x**2 - 2*sqrt(d)*log(sqrt(d
 + e*x) - sqrt(d))*b*e**2*n*x**2 + 3*sqrt(d)*log(sqrt(d + e*x) + sqrt(d))*
a*e**2*x**2 + 2*sqrt(d)*log(sqrt(d + e*x) + sqrt(d))*b*e**2*n*x**2 - 8*int
((sqrt(d + e*x)*log(x**n*c))/(d*x**3 + e*x**4),x)*b*d**3*x**2)/(24*d**2*x*
*2)
```

3.137 $\int x^3(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal result 1167
Mathematica [A] (verified) 1168
Rubi [A] (verified) 1168
Maple [F] 1170
Fricas [A] (verification not implemented) 1171
Sympy [F(-1)] 1171
Maxima [A] (verification not implemented) 1172
Giac [F] 1172
Mupad [F(-1)] 1173
Reduce [B] (verification not implemented) 1173

Optimal result

Integrand size = 23, antiderivative size = 263

$$\begin{aligned}\int x^3(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx &= \frac{64bd^5n\sqrt{d+ex}}{1155e^4} \\ &+ \frac{64bd^4n(d+ex)^{3/2}}{3465e^4}+\frac{64bd^3n(d+ex)^{5/2}}{5775e^4}-\frac{172bd^2n(d+ex)^{7/2}}{1617e^4} \\ &+ \frac{32bdn(d+ex)^{9/2}}{297e^4}-\frac{4bn(d+ex)^{11/2}}{121e^4}-\frac{64bd^{11/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{1155e^4} \\ &- \frac{2d^3(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^4}+\frac{6d^2(d+ex)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^4} \\ &- \frac{2d(d+ex)^{9/2}\left(a+b\log\left(cx^n\right)\right)}{3e^4}+\frac{2(d+ex)^{11/2}\left(a+b\log\left(cx^n\right)\right)}{11e^4}\end{aligned}$$

output
```
64/1155*b*d^5*n*(e*x+d)^(1/2)/e^4+64/3465*b*d^4*n*(e*x+d)^(3/2)/e^4+64/577
5*b*d^3*n*(e*x+d)^(5/2)/e^4-172/1617*b*d^2*n*(e*x+d)^(7/2)/e^4+32/297*b*d*
n*(e*x+d)^(9/2)/e^4-4/121*b*n*(e*x+d)^(11/2)/e^4-64/1155*b*d^(11/2)*n*arct
anh((e*x+d)^(1/2)/d^(1/2))/e^4-2/5*d^3*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^4+6
/7*d^2*(e*x+d)^(7/2)*(a+b*ln(c*x^n))/e^4-2/3*d*(e*x+d)^(9/2)*(a+b*ln(c*x^n
))/e^4+2/11*(e*x+d)^(11/2)*(a+b*ln(c*x^n))/e^4
```

Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 187, normalized size of antiderivative = 0.71

$$\int x^3(d+ex)^{3/2}(a+b\log(cx^n))\,dx=\frac{-221760bd^{11/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2\sqrt{d+ex}(-3465a(d+ex)^2(16d^3-40d^2ex+70de^2$$

input
```
Integrate[x^3*(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(-221760*b*d^(11/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 2*Sqrt[d + e*x]*(-3
465*a*(d + e*x)^2*(16*d^3 - 40*d^2*e*x + 70*d*e^2*x^2 - 105*e^3*x^3) + 2*b
*n*(53308*d^5 - 12794*d^4*e*x + 7863*d^3*e^2*x^2 - 5975*d^2*e^3*x^3 - 5757
5*d*e^4*x^4 - 33075*e^5*x^5) - 3465*b*(d + e*x)^2*(16*d^3 - 40*d^2*e*x + 7
0*d*e^2*x^2 - 105*e^3*x^3)*Log[c*x^n]))/(4002075*e^4)
```

Rubi [A] (verified)

Time = 0.58 (sec) , antiderivative size = 234, normalized size of antiderivative = 0.89, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}=0.174$, Rules used = {2792, 27, 2123, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3(d+ex)^{3/2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{2(d+ex)^{5/2}(16d^3-40exd^2+70e^2x^2d-105e^3x^3)}{1155e^4x}dx-\frac{2d^3(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}+\frac{6d^2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}+\frac{2(d+ex)^{11/2}(a+b\log(cx^n))}{11e^4}-\frac{2d(d+ex)^{9/2}(a+b\log(cx^n))}{3e^4}$$

$$\Big\downarrow \text{27}$$

$$\frac{2bn\int \frac{(d+ex)^{5/2}(16d^3-40exd^2+70e^2x^2d-105e^3x^3)}{x}dx}{1155e^4} - \frac{2d^3(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4} + \frac{6d^2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4} + \frac{2(d+ex)^{11/2}(a+b\log(cx^n))}{11e^4} - \frac{2d(d+ex)^{9/2}(a+b\log(cx^n))}{3e^4}$$

$$\Big\downarrow \; 2123$$

$$\frac{2bn\int \left(-105e(d+ex)^{9/2}+280de(d+ex)^{7/2}-215d^2e(d+ex)^{5/2}+\frac{16d^3(d+ex)^{5/2}}{x}\right)dx}{1155e^4} - \frac{2d^3(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4} + \frac{6d^2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4} + \frac{2(d+ex)^{11/2}(a+b\log(cx^n))}{11e^4} - \frac{2d(d+ex)^{9/2}(a+b\log(cx^n))}{3e^4}$$

$$\Big\downarrow \; 2009$$

$$-\frac{2d^3(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4} + \frac{6d^2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4} + \frac{2(d+ex)^{11/2}(a+b\log(cx^n))}{11e^4} - \frac{2d(d+ex)^{9/2}(a+b\log(cx^n))}{3e^4} + \frac{2bn\left(-32d^{11/2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+32d^5\sqrt{d+ex}+\frac{32}{3}d^4(d+ex)^{3/2}+\frac{32}{5}d^3(d+ex)^{5/2}-\frac{430}{7}d^2(d+ex)^{7/2}+\frac{560}{9}d(\right.}{1155e^4}$$

input
```
Int[x^3*(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(2*b*n*(32*d^5*Sqrt[d + e*x] + (32*d^4*(d + e*x)^(3/2))/3 + (32*d^3*(d + e
*x)^(5/2))/5 - (430*d^2*(d + e*x)^(7/2))/7 + (560*d*(d + e*x)^(9/2))/9 - (
210*(d + e*x)^(11/2))/11 - 32*d^(11/2)*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))/(1
155*e^4) - (2*d^3*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/(5*e^4) + (6*d^2*(d
+ e*x)^(7/2)*(a + b*Log[c*x^n]))/(7*e^4) - (2*d*(d + e*x)^(9/2)*(a + b*Log
[c*x^n]))/(3*e^4) + (2*(d + e*x)^(11/2)*(a + b*Log[c*x^n]))/(11*e^4)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2123
```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int x^3(ex+d)^{\frac{3}{2}}\left(a+b\ln\left(c\,x^n\right)\right)dx$$

input
```
int(x^3*(e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x^3*(e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

Fricas [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 592, normalized size of antiderivative = 2.25

$$\int x^3(d+ex)^{3/2}(a+b\log(cx^n))\,dx = \left[\frac{2\left(55440\,bd^{\frac{11}{2}}n\log\left(\frac{ex-2\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)+(106616\,bd^5n-55440\,ad^5-33075\,(2\,be^5n-\right.}{}\right.$$

input
```
integrate(x^3*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[2/4002075*(55440*b*d^(11/2)*n*log((e*x - 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x
) + (106616*b*d^5*n - 55440*a*d^5 - 33075*(2*b*e^5*n - 11*a*e^5)*x^5 - 245
0*(47*b*d*e^4*n - 198*a*d*e^4)*x^4 - 25*(478*b*d^2*e^3*n - 693*a*d^2*e^3)*
x^3 + 6*(2621*b*d^3*e^2*n - 3465*a*d^3*e^2)*x^2 - 4*(6397*b*d^4*e*n - 6930
*a*d^4*e)*x + 3465*(105*b*e^5*x^5 + 140*b*d*e^4*x^4 + 5*b*d^2*e^3*x^3 - 6*
b*d^3*e^2*x^2 + 8*b*d^4*e*x - 16*b*d^5)*log(c) + 3465*(105*b*e^5*n*x^5 + 1
40*b*d*e^4*n*x^4 + 5*b*d^2*e^3*n*x^3 - 6*b*d^3*e^2*n*x^2 + 8*b*d^4*e*n*x -
 16*b*d^5*n)*log(x))*sqrt(e*x + d))/e^4, 2/4002075*(110880*b*sqrt(-d)*d^5*
n*arctan(sqrt(-d)/sqrt(e*x + d)) + (106616*b*d^5*n - 55440*a*d^5 - 33075*(
2*b*e^5*n - 11*a*e^5)*x^5 - 2450*(47*b*d*e^4*n - 198*a*d*e^4)*x^4 - 25*(47
8*b*d^2*e^3*n - 693*a*d^2*e^3)*x^3 + 6*(2621*b*d^3*e^2*n - 3465*a*d^3*e^2)
*x^2 - 4*(6397*b*d^4*e*n - 6930*a*d^4*e)*x + 3465*(105*b*e^5*x^5 + 140*b*d
*e^4*x^4 + 5*b*d^2*e^3*x^3 - 6*b*d^3*e^2*x^2 + 8*b*d^4*e*x - 16*b*d^5)*log
(c) + 3465*(105*b*e^5*n*x^5 + 140*b*d*e^4*n*x^4 + 5*b*d^2*e^3*n*x^3 - 6*b*
d^3*e^2*n*x^2 + 8*b*d^4*e*n*x - 16*b*d^5*n)*log(x))*sqrt(e*x + d))/e^4]
```

Sympy [F(-1)]

Timed out.

$$\int x^3(d+ex)^{3/2}(a+b\log(cx^n))\,dx = \text{Timed out}$$

input
```
integrate(x**3*(e*x+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

Maxima [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 239, normalized size of antiderivative = 0.91

$$\int x^3(d+ex)^{3/2}(a+b\log(cx^n))\,dx = \frac{4}{4002075}\left(\frac{27720\,d^{\frac{11}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^4} - \frac{33075\,(ex+d)^{\frac{11}{2}} - 107800\,(ex+d)^{\frac{9}{2}}d + 10642\cdots}{\cdots}\right.$$
$$+\frac{2}{1155}\left(\frac{105\,(ex+d)^{\frac{11}{2}}}{e^4} - \frac{385\,(ex+d)^{\frac{9}{2}}d}{e^4} + \frac{495\,(ex+d)^{\frac{7}{2}}d^2}{e^4} - \frac{231\,(ex+d)^{\frac{5}{2}}d^3}{e^4}\right)b\log(cx^n)$$
$$+\frac{2}{1155}\left(\frac{105\,(ex+d)^{\frac{11}{2}}}{e^4} - \frac{385\,(ex+d)^{\frac{9}{2}}d}{e^4} + \frac{495\,(ex+d)^{\frac{7}{2}}d^2}{e^4} - \frac{231\,(ex+d)^{\frac{5}{2}}d^3}{e^4}\right)a$$

input
```
integrate(x^3*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
4/4002075*(27720*d^(11/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + s
qrt(d)))/e^4 - (33075*(e*x + d)^(11/2) - 107800*(e*x + d)^(9/2)*d + 106425
*(e*x + d)^(7/2)*d^2 - 11088*(e*x + d)^(5/2)*d^3 - 18480*(e*x + d)^(3/2)*d
^4 - 55440*sqrt(e*x + d)*d^5)/e^4)*b*n + 2/1155*(105*(e*x + d)^(11/2)/e^4
- 385*(e*x + d)^(9/2)*d/e^4 + 495*(e*x + d)^(7/2)*d^2/e^4 - 231*(e*x + d)^
(5/2)*d^3/e^4)*b*log(c*x^n) + 2/1155*(105*(e*x + d)^(11/2)/e^4 - 385*(e*x
+ d)^(9/2)*d/e^4 + 495*(e*x + d)^(7/2)*d^2/e^4 - 231*(e*x + d)^(5/2)*d^3/e
^4)*a
```

Giac [F]

$$\int x^3(d+ex)^{3/2}(a+b\log(cx^n))\,dx = \int (ex+d)^{\frac{3}{2}}(b\log(cx^n)+a)x^3\,dx$$

input
```
integrate(x^3*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((e*x + d)^(3/2)*(b*log(c*x^n) + a)*x^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int x^3(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx=\int x^3\left(a+b\,\ln\left(c\,x^n\right)\right)\,\left(d+e\,x\right)^{3/2}\,dx$$

input
```
int(x^3*(a + b*log(c*x^n))*(d + e*x)^(3/2),x)
```

output
```
int(x^3*(a + b*log(c*x^n))*(d + e*x)^(3/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 362, normalized size of antiderivative = 1.38

$$\int x^3(d+ex)^{3/2}(a+b\log\left(cx^n\right))\,dx=\frac{-\frac{32\sqrt{ex+d}\log(x^nc)b\,d^5}{1155}+\frac{16\sqrt{ex+d}\log(x^nc)b\,d^4ex}{1155}-\frac{4\sqrt{ex+d}\log(x^nc)b\,d^3e^2x^2}{385}+\frac{2\sqrt{ex+d}\log(x^nc)b\,d^2e^3x^3}{231}+$$

input
```
int(x^3*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x)
```

output
```
(2*( - 55440*sqrt(d + e*x)*log(x**n*c)*b*d**5 + 27720*sqrt(d + e*x)*log(x*
*n*c)*b*d**4*e*x - 20790*sqrt(d + e*x)*log(x**n*c)*b*d**3*e**2*x**2 + 1732
5*sqrt(d + e*x)*log(x**n*c)*b*d**2*e**3*x**3 + 485100*sqrt(d + e*x)*log(x*
*n*c)*b*d*e**4*x**4 + 363825*sqrt(d + e*x)*log(x**n*c)*b*e**5*x**5 - 55440
*sqrt(d + e*x)*a*d**5 + 27720*sqrt(d + e*x)*a*d**4*e*x - 20790*sqrt(d + e*
x)*a*d**3*e**2*x**2 + 17325*sqrt(d + e*x)*a*d**2*e**3*x**3 + 485100*sqrt(d
 + e*x)*a*d*e**4*x**4 + 363825*sqrt(d + e*x)*a*e**5*x**5 + 106616*sqrt(d +
 e*x)*b*d**5*n - 25588*sqrt(d + e*x)*b*d**4*e*n*x + 15726*sqrt(d + e*x)*b*
d**3*e**2*n*x**2 - 11950*sqrt(d + e*x)*b*d**2*e**3*n*x**3 - 115150*sqrt(d
+ e*x)*b*d*e**4*n*x**4 - 66150*sqrt(d + e*x)*b*e**5*n*x**5 + 110880*sqrt(d
)*log(sqrt(d + e*x) - sqrt(d))*b*d**5*n - 55440*sqrt(d)*log(x**n*c)*b*d**5
))/(4002075*e**4)
```

3.138 $\int x^2(d+ex)^{3/2}(a+b\log(cx^n))\,dx$

Optimal result . . . 1174
Mathematica [A] (verified) . . . 1175
Rubi [A] (verified) . . . 1175
Maple [F] . . . 1178
Fricas [A] (verification not implemented) . . . 1178
Sympy [A] (verification not implemented) . . . 1179
Maxima [A] (verification not implemented) . . . 1180
Giac [F] . . . 1180
Mupad [F(-1)] . . . 1181
Reduce [B] (verification not implemented) . . . 1181

Optimal result

Integrand size = 23, antiderivative size = 213

$$\int x^2(d+ex)^{3/2}(a+b\log(cx^n))\,dx=-\frac{32bd^4n\sqrt{d+ex}}{315e^3}-\frac{32bd^3n(d+ex)^{3/2}}{945e^3}-\frac{32bd^2n(d+ex)^{5/2}}{1575e^3}+\frac{44bdn(d+ex)^{7/2}}{441e^3}-\frac{4bn(d+ex)^{9/2}}{81e^3}+\frac{32bd^{9/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{315e^3}+\frac{2d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{4d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^3}$$

output

```
-32/315*b*d^4*n*(e*x+d)^(1/2)/e^3-32/945*b*d^3*n*(e*x+d)^(3/2)/e^3-32/1575
*b*d^2*n*(e*x+d)^(5/2)/e^3+44/441*b*d*n*(e*x+d)^(7/2)/e^3-4/81*b*n*(e*x+d)
^(9/2)/e^3+32/315*b*d^(9/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e^3+2/5*d^2*(
e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^3-4/7*d*(e*x+d)^(7/2)*(a+b*ln(c*x^n))/e^3+2
/9*(e*x+d)^(9/2)*(a+b*ln(c*x^n))/e^3
```

Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 153, normalized size of antiderivative = 0.72

$$\int x^2(d+ex)^{3/2}(a+b\log(cx^n))\,dx = \frac{2\left(5040bd^{9/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+\sqrt{d+ex}(315a(d+ex)^2(8d^2-20dex+35e^2x^2)-2bn$$

input
```
Integrate[x^2*(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(2*(5040*b*d^(9/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + Sqrt[d + e*x]*(315*a
*(d + e*x)^2*(8*d^2 - 20*d*e*x + 35*e^2*x^2) - 2*b*n*(2614*d^4 - 677*d^3*e
*x + 429*d^2*e^2*x^2 + 2425*d*e^3*x^3 + 1225*e^4*x^4) + 315*b*(d + e*x)^2*
(8*d^2 - 20*d*e*x + 35*e^2*x^2)*Log[c*x^n])))/(99225*e^3)
```

Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 207, normalized size of antiderivative = 0.97, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2792, 27, 1192, 25, 1584, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2(d+ex)^{3/2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int \frac{2(d+ex)^{5/2}(8d^2-20exd+35e^2x^2)}{315e^3x}dx+\frac{2d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{4d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$$\Big\downarrow \text{27}$$

$$-\frac{2bn\int \frac{(d+ex)^{5/2}(8d^2-20exd+35e^2x^2)}{x}dx}{315e^3}+\frac{2d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{4d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$\Big\downarrow$ 1192

$$-\frac{4bn\int \frac{(d+ex)^3(63d^2e^2+35(d+ex)^2e^2-90d(d+ex)e^2)}{ex}d\sqrt{d+ex}}{315e^5}+\frac{2d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{4d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$\Big\downarrow$ 25

$$\frac{4bn\int -\frac{(d+ex)^3(63d^2e^2+35(d+ex)^2e^2-90d(d+ex)e^2)}{ex}d\sqrt{d+ex}}{315e^5}+\frac{2d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{4d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$\Big\downarrow$ 1584

$$\frac{4bn\int \left(-\frac{8ed^5}{x}-8e^2d^4-8e^2(d+ex)d^3-8e^2(d+ex)^2d^2+55e^2(d+ex)^3d-35e^2(d+ex)^4\right)d\sqrt{d+ex}}{315e^5}+\frac{2d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{4d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$\Big\downarrow$ 2009

$$\frac{2d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{4d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{4bn\left(-8d^{9/2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+8d^4e^2\sqrt{d+ex}+\frac{8}{3}d^3e^2(d+ex)^{3/2}+\frac{8}{5}d^2e^2(d+ex)^{5/2}-\frac{55}{7}de^2(d+ex)^{7/2}+\frac{3}{9}\right.}{315e^5}$$

input
```
Int[x^2*(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(-4*b*n*(8*d^4*e^2*Sqrt[d + e*x] + (8*d^3*e^2*(d + e*x)^(3/2))/3 + (8*d^2*
e^2*(d + e*x)^(5/2))/5 - (55*d*e^2*(d + e*x)^(7/2))/7 + (35*e^2*(d + e*x)^
(9/2))/9 - 8*d^(9/2)*e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))/(315*e^5) + (2*d
^2*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/(5*e^3) - (4*d*(d + e*x)^(7/2)*(a +
 b*Log[c*x^n]))/(7*e^3) + (2*(d + e*x)^(9/2)*(a + b*Log[c*x^n]))/(9*e^3)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1192
```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[2/e^(n + 2*p + 1)   Subst[Int[x^(
2*m + 1)*(e*f - d*g + g*x^2)^n*(c*d^2 - b*d*e + a*e^2 - (2*c*d - b*e)*x^2 +
 c*x^4)^p, x], x, Sqrt[d + e*x]], x] /; FreeQ[{a, b, c, d, e, f, g}, x] &&
IGtQ[p, 0] && ILtQ[n, 0] && IntegerQ[m + 1/2]
```

rule 1584
```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int x^2(ex+d)^{\frac{3}{2}}\left(a+b\ln\left(c\,x^n\right)\right)dx$$

input
```
int(x^2*(e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x^2*(e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 493, normalized size of antiderivative = 2.31

$$\int x^2(d+ex)^{3/2}(a+b\log(cx^n))\ dx = \left[\frac{2\left(2520\,bd^{\frac{9}{2}}n\log\left(\frac{ex+2\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)-(5228\,bd^4n-2520\,ad^4+1225\,(2\,be^4n-9\,ae^4)x\right.}{}\right.$$
$$-\frac{2\left(5040\,b\sqrt{-d}d^4n\arctan\left(\frac{\sqrt{-d}}{\sqrt{ex+d}}\right)+(5228\,bd^4n-2520\,ad^4+1225\,(2\,be^4n-9\,ae^4)x^4+50\,(97\,bde^3n-3\right.}{}$$

input
```
integrate(x^2*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[2/99225*(2520*b*d^(9/2)*n*log((e*x + 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) -
(5228*b*d^4*n - 2520*a*d^4 + 1225*(2*b*e^4*n - 9*a*e^4)*x^4 + 50*(97*b*d*e
^3*n - 315*a*d*e^3)*x^3 + 3*(286*b*d^2*e^2*n - 315*a*d^2*e^2)*x^2 - 2*(677
*b*d^3*e*n - 630*a*d^3*e)*x - 315*(35*b*e^4*x^4 + 50*b*d*e^3*x^3 + 3*b*d^2
*e^2*x^2 - 4*b*d^3*e*x + 8*b*d^4)*log(c) - 315*(35*b*e^4*n*x^4 + 50*b*d*e^
3*n*x^3 + 3*b*d^2*e^2*n*x^2 - 4*b*d^3*e*n*x + 8*b*d^4*n)*log(x))*sqrt(e*x
+ d))/e^3, -2/99225*(5040*b*sqrt(-d)*d^4*n*arctan(sqrt(-d)/sqrt(e*x + d))
+ (5228*b*d^4*n - 2520*a*d^4 + 1225*(2*b*e^4*n - 9*a*e^4)*x^4 + 50*(97*b*d
*e^3*n - 315*a*d*e^3)*x^3 + 3*(286*b*d^2*e^2*n - 315*a*d^2*e^2)*x^2 - 2*(6
77*b*d^3*e*n - 630*a*d^3*e)*x - 315*(35*b*e^4*x^4 + 50*b*d*e^3*x^3 + 3*b*d
^2*e^2*x^2 - 4*b*d^3*e*x + 8*b*d^4)*log(c) - 315*(35*b*e^4*n*x^4 + 50*b*d*
e^3*n*x^3 + 3*b*d^2*e^2*n*x^2 - 4*b*d^3*e*n*x + 8*b*d^4*n)*log(x))*sqrt(e*
x + d))/e^3]
```

Sympy [A] (verification not implemented)

Time = 132.70 (sec) , antiderivative size = 643, normalized size of antiderivative = 3.02

$$\int x^2(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx=\text{Too large to display}$$

input
```
integrate(x**2*(e*x+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*Piecewise((2*d**2*(d + e*x)**(3/2)/(3*e**3) - 4*d*(d + e*x)**(5/2)/(5*
e**3) + 2*(d + e*x)**(7/2)/(7*e**3), Ne(e, 0)), (sqrt(d)*x**3/3, True)) +
a*e*Piecewise((-2*d**3*(d + e*x)**(3/2)/(3*e**4) + 6*d**2*(d + e*x)**(5/2)
/(5*e**4) - 6*d*(d + e*x)**(7/2)/(7*e**4) + 2*(d + e*x)**(9/2)/(9*e**4), N
e(e, 0)), (sqrt(d)*x**4/4, True)) - b*d*n*Piecewise((3112*d**(7/2)*sqrt(1
+ e*x/d)/(11025*e**3) + 16*d**(7/2)*log(e*x/d)/(105*e**3) - 32*d**(7/2)*lo
g(sqrt(1 + e*x/d) + 1)/(105*e**3) - 716*d**(5/2)*x*sqrt(1 + e*x/d)/(11025*
e**2) + 48*d**(3/2)*x**2*sqrt(1 + e*x/d)/(1225*e) + 4*sqrt(d)*x**3*sqrt(1
+ e*x/d)/49, (e > -oo) & (e < oo) & Ne(e, 0)), (sqrt(d)*x**3/9, True)) + b
*d*Piecewise((2*d**2*(d + e*x)**(3/2)/(3*e**3) - 4*d*(d + e*x)**(5/2)/(5*e
**3) + 2*(d + e*x)**(7/2)/(7*e**3), Ne(e, 0)), (sqrt(d)*x**3/3, True))*log
(c*x**n) - b*e*n*Piecewise((-17552*d**(9/2)*sqrt(1 + e*x/d)/(99225*e**4) -
 32*d**(9/2)*log(e*x/d)/(315*e**4) + 64*d**(9/2)*log(sqrt(1 + e*x/d) + 1)/
(315*e**4) + 3736*d**(7/2)*x*sqrt(1 + e*x/d)/(99225*e**3) - 724*d**(5/2)*x
**2*sqrt(1 + e*x/d)/(33075*e**2) + 64*d**(3/2)*x**3*sqrt(1 + e*x/d)/(3969*
e) + 4*sqrt(d)*x**4*sqrt(1 + e*x/d)/81, (e > -oo) & (e < oo) & Ne(e, 0)),
(sqrt(d)*x**4/16, True)) + b*e*Piecewise((-2*d**3*(d + e*x)**(3/2)/(3*e**4
) + 6*d**2*(d + e*x)**(5/2)/(5*e**4) - 6*d*(d + e*x)**(7/2)/(7*e**4) + 2*(
d + e*x)**(9/2)/(9*e**4), Ne(e, 0)), (sqrt(d)*x**4/4, True))*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 196, normalized size of antiderivative = 0.92

$$\int x^2(d+ex)^{3/2}\,(a+b\log{(cx^n)})\;dx =$$
$$-\frac{4}{99225}\left(\frac{1260\,d^{\frac{9}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^3}+\frac{1225\,(ex+d)^{\frac{9}{2}}-2475\,(ex+d)^{\frac{7}{2}}d+504\,(ex+d)^{\frac{5}{2}}d^2+840\,(ex+d)\right.$$
$$+\frac{2}{315}\left(\frac{35\,(ex+d)^{\frac{9}{2}}}{e^3}-\frac{90\,(ex+d)^{\frac{7}{2}}d}{e^3}+\frac{63\,(ex+d)^{\frac{5}{2}}d^2}{e^3}\right)b\log{(cx^n)}$$
$$+\frac{2}{315}\left(\frac{35\,(ex+d)^{\frac{9}{2}}}{e^3}-\frac{90\,(ex+d)^{\frac{7}{2}}d}{e^3}+\frac{63\,(ex+d)^{\frac{5}{2}}d^2}{e^3}\right)a$$

input
```
integrate(x^2*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-4/99225*(1260*d^(9/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt
(d)))/e^3 + (1225*(e*x + d)^(9/2) - 2475*(e*x + d)^(7/2)*d + 504*(e*x + d)
^(5/2)*d^2 + 840*(e*x + d)^(3/2)*d^3 + 2520*sqrt(e*x + d)*d^4)/e^3)*b*n +
2/315*(35*(e*x + d)^(9/2)/e^3 - 90*(e*x + d)^(7/2)*d/e^3 + 63*(e*x + d)^(5
/2)*d^2/e^3)*b*log(c*x^n) + 2/315*(35*(e*x + d)^(9/2)/e^3 - 90*(e*x + d)^(
7/2)*d/e^3 + 63*(e*x + d)^(5/2)*d^2/e^3)*a
```

Giac [F]

$$\int x^2(d+ex)^{3/2}\,(a+b\log{(cx^n)})\;dx=\int(ex+d)^{\frac{3}{2}}(b\log{(cx^n)}+a)x^2\,dx$$

input
```
integrate(x^2*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((e*x + d)^(3/2)*(b*log(c*x^n) + a)*x^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int x^2(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx=\int x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,{\left(d+e\,x\right)}^{3/2}\,dx$$

input
```
int(x^2*(a + b*log(c*x^n))*(d + e*x)^(3/2),x)
```

output
```
int(x^2*(a + b*log(c*x^n))*(d + e*x)^(3/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 301, normalized size of antiderivative = 1.41

$$\int x^2(d+ex)^{3/2}(a+b\log(cx^n))\,dx=\frac{\frac{16\sqrt{ex+d}\,\log(x^nc)b\,d^4}{315}-\frac{8\sqrt{ex+d}\,\log(x^nc)b\,d^3ex}{315}+\frac{2\sqrt{ex+d}\,\log(x^nc)b\,d^2e^2x^2}{105}+\frac{20\sqrt{ex+d}\,\log(x^nc)bd\,e^3x^3}{63}+2\sqrt{}}{}$$

input
```
int(x^2*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x)
```

output
```
(2*(2520*sqrt(d + e*x)*log(x**n*c)*b*d**4 - 1260*sqrt(d + e*x)*log(x**n*c)
*b*d**3*e*x + 945*sqrt(d + e*x)*log(x**n*c)*b*d**2*e**2*x**2 + 15750*sqrt(
d + e*x)*log(x**n*c)*b*d*e**3*x**3 + 11025*sqrt(d + e*x)*log(x**n*c)*b*e**
4*x**4 + 2520*sqrt(d + e*x)*a*d**4 - 1260*sqrt(d + e*x)*a*d**3*e*x + 945*s
qrt(d + e*x)*a*d**2*e**2*x**2 + 15750*sqrt(d + e*x)*a*d*e**3*x**3 + 11025*
sqrt(d + e*x)*a*e**4*x**4 - 5228*sqrt(d + e*x)*b*d**4*n + 1354*sqrt(d + e*
x)*b*d**3*e*n*x - 858*sqrt(d + e*x)*b*d**2*e**2*n*x**2 - 4850*sqrt(d + e*x
)*b*d*e**3*n*x**3 - 2450*sqrt(d + e*x)*b*e**4*n*x**4 - 5040*sqrt(d)*log(sq
rt(d + e*x) - sqrt(d))*b*d**4*n + 2520*sqrt(d)*log(x**n*c)*b*d**4))/(99225
*e**3)
```

3.139 $\int x(d+ex)^{3/2} (a+b\log (cx^n)) \, dx$

Optimal result . . . 1182
Mathematica [A] (verified) . . . 1183
Rubi [A] (verified) . . . 1183
Maple [F] . . . 1186
Fricas [A] (verification not implemented) . . . 1186
Sympy [A] (verification not implemented) . . . 1187
Maxima [A] (verification not implemented) . . . 1188
Giac [F] . . . 1188
Mupad [F(-1)] . . . 1189
Reduce [B] (verification not implemented) . . . 1189

Optimal result

Integrand size = 21, antiderivative size = 163

$$\int x(d+ex)^{3/2} (a+b\log (cx^n)) \, dx = \frac{8bd^3n\sqrt{d+ex}}{35e^2}+\frac{8bd^2n(d+ex)^{3/2}}{105e^2} + \frac{8bdn(d+ex)^{5/2}}{175e^2}-\frac{4bn(d+ex)^{7/2}}{49e^2}-\frac{8bd^{7/2}n\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{35e^2} - \frac{2d(d+ex)^{5/2} (a+b\log (cx^n))}{5e^2}+\frac{2(d+ex)^{7/2} (a+b\log (cx^n))}{7e^2}$$

output
```
8/35*b*d^3*n*(e*x+d)^(1/2)/e^2+8/105*b*d^2*n*(e*x+d)^(3/2)/e^2+8/175*b*d*n
*(e*x+d)^(5/2)/e^2-4/49*b*n*(e*x+d)^(7/2)/e^2-8/35*b*d^(7/2)*n*arctanh((e*
x+d)^(1/2)/d^(1/2))/e^2-2/5*d*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^2+2/7*(e*x+d
)^(7/2)*(a+b*ln(c*x^n))/e^2
```

Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 120, normalized size of antiderivative = 0.74

$$\int x(d+ex)^{3/2}(a+b\log(cx^n))\,dx = -\frac{2\left(420bd^{7/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+\sqrt{d+ex}(105a(2d-5ex)(d+ex)^2+2bn(-247d^3+71d^2ex+183de^2x^2\right.}{3675e^2}$$

input
```
Integrate[x*(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(-2*(420*b*d^(7/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + Sqrt[d + e*x]*(105*a
*(2*d - 5*e*x)*(d + e*x)^2 + 2*b*n*(-247*d^3 + 71*d^2*e*x + 183*d*e^2*x^2
+ 75*e^3*x^3) + 105*b*(2*d - 5*e*x)*(d + e*x)^2*Log[c*x^n])))/(3675*e^2)
```

Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 147, normalized size of antiderivative = 0.90, number of steps used = 9, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.381$, Rules used = {2792, 27, 90, 60, 60, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex)^{3/2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{2(2d-5ex)(d+ex)^{5/2}}{35e^2x}dx+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{2d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{2bn\int\frac{(2d-5ex)(d+ex)^{5/2}}{x}dx}{35e^2}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{2d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \text{90}$$

$$\frac{2bn\left(2d\int \frac{(d+ex)^{5/2}}{x}dx-\frac{10}{7}(d+ex)^{7/2}\right)}{35e^2}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{2d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \; 60$$

$$\frac{2bn\left(2d\left(d\int \frac{(d+ex)^{3/2}}{x}dx+\frac{2}{5}(d+ex)^{5/2}\right)-\frac{10}{7}(d+ex)^{7/2}\right)}{35e^2}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{2d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \; 60$$

$$\frac{2bn\left(2d\left(d\left(d\int \frac{\sqrt{d+ex}}{x}dx+\frac{2}{3}(d+ex)^{3/2}\right)+\frac{2}{5}(d+ex)^{5/2}\right)-\frac{10}{7}(d+ex)^{7/2}\right)}{35e^2}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{2d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \; 60$$

$$\frac{2bn\left(2d\left(d\left(d\left(d\int \frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)+\frac{2}{5}(d+ex)^{5/2}\right)-\frac{10}{7}(d+ex)^{7/2}\right)}{35e^2}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{2d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \; 73$$

$$\frac{2bn\left(2d\left(d\left(d\left(\frac{2d\int \frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)+\frac{2}{5}(d+ex)^{5/2}\right)-\frac{10}{7}(d+ex)^{7/2}\right)}{35e^2}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{2d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \; 221$$

$$\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{2d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}+\frac{2bn\left(2d\left(d\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)+\frac{2}{5}(d+ex)^{5/2}\right)-\frac{10}{7}(d+ex)^{7/2}\right)}{35e^2}$$

input
```
Int[x*(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(2*b*n*((-10*(d + e*x)^(7/2))/7 + 2*d*((2*(d + e*x)^(5/2))/5 + d*((2*(d +
e*x)^(3/2))/3 + d*(2*Sqrt[d + e*x] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x]/Sqrt[
d]])))))/(35*e^2) - (2*d*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/(5*e^2) + (2*
(d + e*x)^(7/2)*(a + b*Log[c*x^n]))/(7*e^2)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int x(ex+d)^{\frac{3}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)dx$$

input
```
int(x*(e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x*(e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

Fricas [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 388, normalized size of antiderivative = 2.38

$$\int x(d+ex)^{3/2}(a+b\log(cx^n))\,dx = \left[\frac{2\left(210\,bd^{\frac{7}{2}}n\log\left(\frac{ex-2\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)+(494\,bd^3n-210\,ad^3-75\,(2\,be^3n-7\,ae^3)x^3-6\,(\right.}{}\right.$$

input
```
integrate(x*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[2/3675*(210*b*d^(7/2)*n*log((e*x - 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) + (4
94*b*d^3*n - 210*a*d^3 - 75*(2*b*e^3*n - 7*a*e^3)*x^3 - 6*(61*b*d*e^2*n -
140*a*d*e^2)*x^2 - (142*b*d^2*e*n - 105*a*d^2*e)*x + 105*(5*b*e^3*x^3 + 8*
b*d*e^2*x^2 + b*d^2*e*x - 2*b*d^3)*log(c) + 105*(5*b*e^3*n*x^3 + 8*b*d*e^2
*n*x^2 + b*d^2*e*n*x - 2*b*d^3*n)*log(x))*sqrt(e*x + d))/e^2, 2/3675*(420*
b*sqrt(-d)*d^3*n*arctan(sqrt(-d)/sqrt(e*x + d)) + (494*b*d^3*n - 210*a*d^3
 - 75*(2*b*e^3*n - 7*a*e^3)*x^3 - 6*(61*b*d*e^2*n - 140*a*d*e^2)*x^2 - (14
2*b*d^2*e*n - 105*a*d^2*e)*x + 105*(5*b*e^3*x^3 + 8*b*d*e^2*x^2 + b*d^2*e*
x - 2*b*d^3)*log(c) + 105*(5*b*e^3*n*x^3 + 8*b*d*e^2*n*x^2 + b*d^2*e*n*x -
 2*b*d^3*n)*log(x))*sqrt(e*x + d))/e^2]
```

Sympy [A] (verification not implemented)

Time = 114.18 (sec) , antiderivative size = 517, normalized size of antiderivative = 3.17

$$\int x(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx = \text{Too large to display}$$

input
```
integrate(x*(e*x+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*Piecewise((-2*d*(d + e*x)**(3/2)/(3*e**2) + 2*(d + e*x)**(5/2)/(5*e**2
), Ne(e, 0)), (sqrt(d)*x**2/2, True)) + a*e*Piecewise((2*d**2*(d + e*x)**(
3/2)/(3*e**3) - 4*d*(d + e*x)**(5/2)/(5*e**3) + 2*(d + e*x)**(7/2)/(7*e**3
), Ne(e, 0)), (sqrt(d)*x**3/3, True)) - b*d*n*Piecewise((-124*d**(5/2)*sqr
t(1 + e*x/d)/(225*e**2) - 4*d**(5/2)*log(e*x/d)/(15*e**2) + 8*d**(5/2)*log
(sqrt(1 + e*x/d) + 1)/(15*e**2) + 32*d**(3/2)*x*sqrt(1 + e*x/d)/(225*e) +
4*sqrt(d)*x**2*sqrt(1 + e*x/d)/25, (e > -oo) & (e < oo) & Ne(e, 0)), (sqrt
(d)*x**2/4, True)) + b*d*Piecewise((-2*d*(d + e*x)**(3/2)/(3*e**2) + 2*(d
+ e*x)**(5/2)/(5*e**2), Ne(e, 0)), (sqrt(d)*x**2/2, True))*log(c*x**n) - b
*e*n*Piecewise((3112*d**(7/2)*sqrt(1 + e*x/d)/(11025*e**3) + 16*d**(7/2)*l
og(e*x/d)/(105*e**3) - 32*d**(7/2)*log(sqrt(1 + e*x/d) + 1)/(105*e**3) - 7
16*d**(5/2)*x*sqrt(1 + e*x/d)/(11025*e**2) + 48*d**(3/2)*x**2*sqrt(1 + e*x
/d)/(1225*e) + 4*sqrt(d)*x**3*sqrt(1 + e*x/d)/49, (e > -oo) & (e < oo) & N
e(e, 0)), (sqrt(d)*x**3/9, True)) + b*e*Piecewise((2*d**2*(d + e*x)**(3/2)
/(3*e**3) - 4*d*(d + e*x)**(5/2)/(5*e**3) + 2*(d + e*x)**(7/2)/(7*e**3), N
e(e, 0)), (sqrt(d)*x**3/3, True))*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 155, normalized size of antiderivative = 0.95

$$\int x(d+ex)^{3/2}(a+b\log(cx^n))\,dx=\frac{4}{3675}\left(\frac{105\,d^{\frac{7}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^2}-\frac{75\,(ex+d)^{\frac{7}{2}}-42\,(ex+d)^{\frac{5}{2}}d-70\,(ex+d)^{\frac{3}{2}}d^2-210\right.$$
$$+\frac{2}{35}\left(\frac{5\,(ex+d)^{\frac{7}{2}}}{e^2}-\frac{7\,(ex+d)^{\frac{5}{2}}d}{e^2}\right)b\log(cx^n)+\frac{2}{35}\left(\frac{5\,(ex+d)^{\frac{7}{2}}}{e^2}-\frac{7\,(ex+d)^{\frac{5}{2}}d}{e^2}\right)a$$

input
```
integrate(x*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
4/3675*(105*d^(7/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)
))/e^2 - (75*(e*x + d)^(7/2) - 42*(e*x + d)^(5/2)*d - 70*(e*x + d)^(3/2)*d
^2 - 210*sqrt(e*x + d)*d^3)/e^2)*b*n + 2/35*(5*(e*x + d)^(7/2)/e^2 - 7*(e*
x + d)^(5/2)*d/e^2)*b*log(c*x^n) + 2/35*(5*(e*x + d)^(7/2)/e^2 - 7*(e*x +
d)^(5/2)*d/e^2)*a
```

Giac [F]

$$\int x(d+ex)^{3/2}(a+b\log(cx^n))\,dx=\int(ex+d)^{\frac{3}{2}}(b\log(cx^n)+a)x\,dx$$

input
```
integrate(x*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((e*x + d)^(3/2)*(b*log(c*x^n) + a)*x, x)
```

Mupad [F(-1)]

Timed out.

$$\int x(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx=\int x\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,{\left(d+e\,x\right)}^{3/2}\,dx$$

input
```
int(x*(a + b*log(c*x^n))*(d + e*x)^(3/2),x)
```

output
```
int(x*(a + b*log(c*x^n))*(d + e*x)^(3/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 240, normalized size of antiderivative = 1.47

$$\int x(d+ex)^{3/2}(a+b\log\left(cx^n\right))\,dx=\frac{-\frac{4\sqrt{ex+d}\,\log(x^n c)b\,d^3}{35}+\frac{2\sqrt{ex+d}\,\log(x^n c)b\,d^2ex}{35}+\frac{16\sqrt{ex+d}\,\log(x^n c)bd\,e^2x^2}{35}+\frac{2\sqrt{ex+d}\,\log(x^n c)b\,e^3x^3}{7}-4\sqrt{\ldots}}{\ldots}$$

input
```
int(x*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x)
```

output
```
(2*( - 210*sqrt(d + e*x)*log(x**n*c)*b*d**3 + 105*sqrt(d + e*x)*log(x**n*c
)*b*d**2*e*x + 840*sqrt(d + e*x)*log(x**n*c)*b*d*e**2*x**2 + 525*sqrt(d +
e*x)*log(x**n*c)*b*e**3*x**3 - 210*sqrt(d + e*x)*a*d**3 + 105*sqrt(d + e*x
)*a*d**2*e*x + 840*sqrt(d + e*x)*a*d*e**2*x**2 + 525*sqrt(d + e*x)*a*e**3*
x**3 + 494*sqrt(d + e*x)*b*d**3*n - 142*sqrt(d + e*x)*b*d**2*e*n*x - 366*s
qrt(d + e*x)*b*d*e**2*n*x**2 - 150*sqrt(d + e*x)*b*e**3*n*x**3 + 420*sqrt(
d)*log(sqrt(d + e*x) - sqrt(d))*b*d**3*n - 210*sqrt(d)*log(x**n*c)*b*d**3)
)/(3675*e**2)
```

3.140 $\int (d+ex)^{3/2} (a+b\log(cx^n))\,dx$

Optimal result 1190
Mathematica [A] (verified) 1190
Rubi [A] (verified) 1191
Maple [F] 1193
Fricas [A] (verification not implemented) 1193
Sympy [A] (verification not implemented) 1194
Maxima [A] (verification not implemented) 1195
Giac [F] 1195
Mupad [F(-1)] 1196
Reduce [B] (verification not implemented) 1196

Optimal result

Integrand size = 20, antiderivative size = 115

$$\int (d+ex)^{3/2} (a+b\log(cx^n))\,dx = -\frac{4bd^2n\sqrt{d+ex}}{5e} - \frac{4bdn(d+ex)^{3/2}}{15e} - \frac{4bn(d+ex)^{5/2}}{25e} + \frac{4bd^{5/2}n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{5e} + \frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e}$$

output
```
-4/5*b*d^2*n*(e*x+d)^(1/2)/e-4/15*b*d*n*(e*x+d)^(3/2)/e-4/25*b*n*(e*x+d)^(
5/2)/e+4/5*b*d^(5/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e+2/5*(e*x+d)^(5/2)*
(a+b*ln(c*x^n))/e
```

Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 87, normalized size of antiderivative = 0.76

$$\int (d+ex)^{3/2} (a+b\log(cx^n))\,dx = \frac{2\left(-\frac{2}{15}bn\sqrt{d+ex}(23d^2+11dex+3e^2x^2)+2bd^{5/2}n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+(d+ex)^{5/2}(a+\right.}{5e}$$

input
```
Integrate[(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(2*((-2*b*n*Sqrt[d + e*x]*(23*d^2 + 11*d*e*x + 3*e^2*x^2))/15 + 2*b*d^(5/2
)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + (d + e*x)^(5/2)*(a + b*Log[c*x^n])))/
(5*e)
```

Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 103, normalized size of antiderivative = 0.90, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.300, Rules used = {2756, 60, 60, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)^{3/2} \left(a+b\log \left(cx^n\right)\right) \, dx$$

$$\Big\downarrow \text{2756}$$

$$\frac{2(d+ex)^{5/2} \left(a+b\log \left(cx^n\right)\right)}{5e}-\frac{2bn\int \frac{(d+ex)^{5/2}}{x}dx}{5e}$$

$$\Big\downarrow \text{60}$$

$$\frac{2(d+ex)^{5/2} \left(a+b\log \left(cx^n\right)\right)}{5e}-\frac{2bn\left(d\int \frac{(d+ex)^{3/2}}{x}dx+\frac{2}{5}(d+ex)^{5/2}\right)}{5e}$$

$$\Big\downarrow \text{60}$$

$$\frac{2(d+ex)^{5/2} \left(a+b\log \left(cx^n\right)\right)}{5e}-\frac{2bn\left(d\left(d\int \frac{\sqrt{d+ex}}{x}dx+\frac{2}{3}(d+ex)^{3/2}\right)+\frac{2}{5}(d+ex)^{5/2}\right)}{5e}$$

$$\Big\downarrow \text{60}$$

$$\frac{2(d+ex)^{5/2} \left(a+b\log \left(cx^n\right)\right)}{5e}-\frac{2bn\left(d\left(d\left(d\int \frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)+\frac{2}{5}(d+ex)^{5/2}\right)}{5e}$$

$$\Big\downarrow \text{73}$$

$$\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e} - \frac{2bn\left(d\left(d\left(\frac{2d\int\frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)+\frac{2}{5}(d+ex)^{5/2}\right)}{5e}$$

$$\Big\downarrow \text{ 221}$$

$$\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e} - \frac{2bn\left(d\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)+\frac{2}{5}(d+ex)^{5/2}\right)}{5e}$$

input
```
Int[(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(-2*b*n*((2*(d + e*x)^(5/2))/5 + d*((2*(d + e*x)^(3/2))/3 + d*(2*Sqrt[d +
e*x] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))))/(5*e) + (2*(d + e*x)^(
5/2)*(a + b*Log[c*x^n]))/(5*e)
```

Defintions of rubi rules used

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

Maple [F]

$$\int (ex+d)^{\frac{3}{2}} (a+b\ln (c\,x^{n}))\,dx$$

input
```
int((e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

output
```
int((e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 285, normalized size of antiderivative = 2.48

$$\int (d+ex)^{3/2} (a+b\log (cx^n))\ dx = \left[\frac{2\left(15\,bd^{\frac{5}{2}}n\log\left(\frac{ex+2\,\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)-(46\,bd^2n-15\,ad^2+3\,(2\,be^2n-5\,ae^2)x^2+2\,(11\,b\right.}{} \right.$$

$$-\frac{2\left(30\,b\sqrt{-d}d^2n\arctan\left(\frac{\sqrt{-d}}{\sqrt{ex+d}}\right)+(46\,bd^2n-15\,ad^2+3\,(2\,be^2n-5\,ae^2)x^2+2\,(11\,bden-15\,ade)x-15\right.}{75\,e}$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[2/75*(15*b*d^(5/2)*n*log((e*x + 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) - (46*b
*d^2*n - 15*a*d^2 + 3*(2*b*e^2*n - 5*a*e^2)*x^2 + 2*(11*b*d*e*n - 15*a*d*e
)*x - 15*(b*e^2*x^2 + 2*b*d*e*x + b*d^2)*log(c) - 15*(b*e^2*n*x^2 + 2*b*d*
e*n*x + b*d^2*n)*log(x))*sqrt(e*x + d))/e, -2/75*(30*b*sqrt(-d)*d^2*n*arct
an(sqrt(-d)/sqrt(e*x + d)) + (46*b*d^2*n - 15*a*d^2 + 3*(2*b*e^2*n - 5*a*e
^2)*x^2 + 2*(11*b*d*e*n - 15*a*d*e)*x - 15*(b*e^2*x^2 + 2*b*d*e*x + b*d^2)
*log(c) - 15*(b*e^2*n*x^2 + 2*b*d*e*n*x + b*d^2*n)*log(x))*sqrt(e*x + d))/
e]
```

Sympy [A] (verification not implemented)

Time = 90.46 (sec) , antiderivative size = 377, normalized size of antiderivative = 3.28

$$\int (d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx = ad\left(\begin{cases}\frac{2(d+ex)^{\frac{3}{2}}}{3e} & \text{for}\ e\neq 0\\ \sqrt{d}x & \text{otherwise}\end{cases}\right)$$
$$+ae\left(\begin{cases}-\frac{2d(d+ex)^{\frac{3}{2}}}{3e^2}+\frac{2(d+ex)^{\frac{5}{2}}}{5e^2} & \text{for}\ e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}\right)$$
$$-bdn\left(\begin{cases}\frac{16d^{\frac{3}{2}}\sqrt{1+\frac{ex}{d}}}{9e}+\frac{2d^{\frac{3}{2}}\log\left(\frac{ex}{d}\right)}{3e}-\frac{4d^{\frac{3}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{3e}+\frac{4\sqrt{d}x\sqrt{1+\frac{ex}{d}}}{9} & \text{for}\ e>-\infty\wedge e<\infty\wedge e\neq 0\\ \sqrt{d}x & \text{otherwise}\end{cases}\right)$$
$$+bd\left(\begin{cases}\frac{2(d+ex)^{\frac{3}{2}}}{3e} & \text{for}\ e\neq 0\\ \sqrt{d}x & \text{otherwise}\end{cases}\right)\log\left(cx^n\right)$$
$$-ben\left(\begin{cases}-\frac{124d^{\frac{5}{2}}\sqrt{1+\frac{ex}{d}}}{225e^2}-\frac{4d^{\frac{5}{2}}\log\left(\frac{ex}{d}\right)}{15e^2}+\frac{8d^{\frac{5}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{15e^2}+\frac{32d^{\frac{3}{2}}x\sqrt{1+\frac{ex}{d}}}{225e}+\frac{4\sqrt{d}x^2\sqrt{1+\frac{ex}{d}}}{25} & \text{for}\ e>-\infty\wedge e<\infty \\ \frac{\sqrt{d}x^2}{4} & \text{otherwise}\end{cases}\right.$$
$$+be\left(\begin{cases}-\frac{2d(d+ex)^{\frac{3}{2}}}{3e^2}+\frac{2(d+ex)^{\frac{5}{2}}}{5e^2} & \text{for}\ e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}\right)\log\left(cx^n\right)$$

input
```
integrate((e*x+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*Piecewise((2*(d + e*x)**(3/2)/(3*e), Ne(e, 0)), (sqrt(d)*x, True)) + a
*e*Piecewise((-2*d*(d + e*x)**(3/2)/(3*e**2) + 2*(d + e*x)**(5/2)/(5*e**2)
, Ne(e, 0)), (sqrt(d)*x**2/2, True)) - b*d*n*Piecewise((16*d**(3/2)*sqrt(1
 + e*x/d)/(9*e) + 2*d**(3/2)*log(e*x/d)/(3*e) - 4*d**(3/2)*log(sqrt(1 + e*
x/d) + 1)/(3*e) + 4*sqrt(d)*x*sqrt(1 + e*x/d)/9, (e > -oo) & (e < oo) & Ne
(e, 0)), (sqrt(d)*x, True)) + b*d*Piecewise((2*(d + e*x)**(3/2)/(3*e), Ne(
e, 0)), (sqrt(d)*x, True))*log(c*x**n) - b*e*n*Piecewise((-124*d**(5/2)*sq
rt(1 + e*x/d)/(225*e**2) - 4*d**(5/2)*log(e*x/d)/(15*e**2) + 8*d**(5/2)*lo
g(sqrt(1 + e*x/d) + 1)/(15*e**2) + 32*d**(3/2)*x*sqrt(1 + e*x/d)/(225*e) +
 4*sqrt(d)*x**2*sqrt(1 + e*x/d)/25, (e > -oo) & (e < oo) & Ne(e, 0)), (sqr
t(d)*x**2/4, True)) + b*e*Piecewise((-2*d*(d + e*x)**(3/2)/(3*e**2) + 2*(d
 + e*x)**(5/2)/(5*e**2), Ne(e, 0)), (sqrt(d)*x**2/2, True))*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 105, normalized size of antiderivative = 0.91

$$\int (d+ex)^{3/2}(a+b\log(cx^n))\,dx = \frac{2\,(ex+d)^{\frac{5}{2}}b\log(cx^n)}{5\,e} + \frac{2\,(ex+d)^{\frac{5}{2}}a}{5\,e} - \frac{2\left(15\,d^{\frac{5}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right) + 6\,(ex+d)^{\frac{5}{2}} + 10\,(ex+d)^{\frac{3}{2}}d + 30\,\sqrt{ex+d}d^2\right)bn}{75\,e}$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
2/5*(e*x + d)^(5/2)*b*log(c*x^n)/e + 2/5*(e*x + d)^(5/2)*a/e - 2/75*(15*d^
(5/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d))) + 6*(e*x +
d)^(5/2) + 10*(e*x + d)^(3/2)*d + 30*sqrt(e*x + d)*d^2)*b*n/e
```

Giac [F]

$$\int (d+ex)^{3/2}(a+b\log(cx^n))\,dx = \int (ex+d)^{\frac{3}{2}}(b\log(cx^n)+a)\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((e*x + d)^(3/2)*(b*log(c*x^n) + a), x)
```

Mupad [F(-1)]

Timed out.

$$\int (d+ex)^{3/2} (a+b\log(cx^n))\, dx = \int (a+b\,\ln(c\,x^n))\,(d+e\,x)^{3/2}\, dx$$

input
```
int((a + b*log(c*x^n))*(d + e*x)^(3/2),x)
```

output
```
int((a + b*log(c*x^n))*(d + e*x)^(3/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 179, normalized size of antiderivative = 1.56

$$\int (d+ex)^{3/2} (a+b\log(cx^n))\, dx = \frac{\frac{2\sqrt{ex+d}\log(x^n c) b\, d^2}{5} + \frac{4\sqrt{ex+d}\log(x^n c) bdex}{5} + \frac{2\sqrt{ex+d}\log(x^n c) b\, e^2 x^2}{5} + \frac{2\sqrt{ex+d}\, a\, d^2}{5} + \frac{4\sqrt{ex+d}\, adex}{5} + 2\sqrt{\cdots}}{}$$

input
```
int((e*x+d)^(3/2)*(a+b*log(c*x^n)),x)
```

output
```
(2*(15*sqrt(d + e*x)*log(x**n*c)*b*d**2 + 30*sqrt(d + e*x)*log(x**n*c)*b*d
*e*x + 15*sqrt(d + e*x)*log(x**n*c)*b*e**2*x**2 + 15*sqrt(d + e*x)*a*d**2
+ 30*sqrt(d + e*x)*a*d*e*x + 15*sqrt(d + e*x)*a*e**2*x**2 - 46*sqrt(d + e*
x)*b*d**2*n - 22*sqrt(d + e*x)*b*d*e*n*x - 6*sqrt(d + e*x)*b*e**2*n*x**2 -
 30*sqrt(d)*log(sqrt(d + e*x) - sqrt(d))*b*d**2*n + 15*sqrt(d)*log(x**n*c)
*b*d**2))/(75*e)
```

3.141 $\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\,dx$

Optimal result 1197
Mathematica [A] (verified) 1198
Rubi [A] (verified) 1198
Maple [F] 1206
Fricas [F] 1206
Sympy [F(-1)] 1206
Maxima [F] 1207
Giac [F] 1207
Mupad [F(-1)] 1207
Reduce [F] 1208

Optimal result

Integrand size = 23, antiderivative size = 255

$$\int \frac{(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = -\frac{16}{3}bdn\sqrt{d+ex}-\frac{4}{9}bn(d+ex)^{3/2}$$
$$+\frac{16}{3}bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2+2d\sqrt{d+ex}(a+b\log\left(cx^n\right))+\frac{2}{3}(d+ex)^{3/2}\left(\right.$$

output
```
-16/3*b*d*n*(e*x+d)^(1/2)-4/9*b*n*(e*x+d)^(3/2)+16/3*b*d^(3/2)*n*arctanh((
e*x+d)^(1/2)/d^(1/2))+2*b*d^(3/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))^2+2*d*(
e*x+d)^(1/2)*(a+b*ln(c*x^n))+2/3*(e*x+d)^(3/2)*(a+b*ln(c*x^n))-2*d^(3/2)*a
rctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))-4*b*d^(3/2)*n*arctanh((e*x+d
)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))-2*b*d^(3/2)*n*polyl
og(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))
```

Mathematica [A] (verified)

Time = 0.35 (sec) , antiderivative size = 391, normalized size of antiderivative = 1.53

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\,dx = 2ad\sqrt{d+ex}-4bdn\sqrt{d+ex} -\frac{4}{9}bn\sqrt{d+ex}(4d+ex)+\frac{16}{3}bd^{3/2}n\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2bd\sqrt{d+ex}\log(cx^n) +\frac{2}{3}(d+ex)^{3/2}(a+b\log(cx^n))+d^{3/2}(a+b\log(cx^n))\log\left(\sqrt{d}-\sqrt{d+ex}\right)-d^{3/2}(a+b\log(cx^n))\log\left(\sqrt{d}+\sqrt{d}\right.$$

input
```
Integrate[((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/x,x]
```

output
```
2*a*d*Sqrt[d + e*x] - 4*b*d*n*Sqrt[d + e*x] - (4*b*n*Sqrt[d + e*x]*(4*d +
e*x))/9 + (16*b*d^(3/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/3 + 2*b*d*Sqrt[d
 + e*x]*Log[c*x^n] + (2*(d + e*x)^(3/2)*(a + b*Log[c*x^n]))/3 + d^(3/2)*(a
 + b*Log[c*x^n])*Log[Sqrt[d] - Sqrt[d + e*x]] - d^(3/2)*(a + b*Log[c*x^n])
*Log[Sqrt[d] + Sqrt[d + e*x]] + (b*d^(3/2)*n*Log[Sqrt[d] + Sqrt[d + e*x]]*
(Log[Sqrt[d] + Sqrt[d + e*x]] + 2*Log[1/2 - Sqrt[d + e*x]/(2*Sqrt[d])]))/2
 - (b*d^(3/2)*n*Log[Sqrt[d] - Sqrt[d + e*x]]*(Log[Sqrt[d] - Sqrt[d + e*x]]
 + 2*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2]))/2 - b*d^(3/2)*n*PolyLog[2, 1/2 -
 Sqrt[d + e*x]/(2*Sqrt[d])] + b*d^(3/2)*n*PolyLog[2, (1 + Sqrt[d + e*x]/Sq
rt[d])/2]
```

Rubi [A] (verified)

Time = 1.61 (sec) , antiderivative size = 309, normalized size of antiderivative = 1.21, number of steps used = 22, number of rules used = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.913$, Rules used = {2788, 2756, 60, 60, 73, 221, 2788, 2756, 60, 73, 221, 2790, 27, 7267, 25, 6546, 27, 6470, 27, 2849, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \text{2788}$$

$$e\int \sqrt{d+ex}(a+b\log(cx^n))\,dx+d\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \; 2756$$

$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\int \frac{(d+ex)^{3/2}}{x}dx}{3e}\right)+d\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \; 60$$

$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\int \frac{\sqrt{d+ex}}{x}dx+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)+ d\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \; 60$$

$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(d\int \frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)+ d\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \; 73$$

$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(\frac{2d\int \frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)+ d\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \; 221$$

$$d\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}dx+ e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$$\Big\downarrow \; 2788$$

$$d\left(e\int \frac{a+b\log (cx^n)}{\sqrt{d+ex}}dx+d\int \frac{a+b\log (cx^n)}{x\sqrt{d+ex}}dx\right)+e\left(\frac{2(d+ex)^{3/2}(a+b\log (cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$\Big\downarrow$ 2756

$$d\left(e\left(\frac{2\sqrt{d+ex}(a+b\log (cx^n))}{e}-\frac{2bn\int \frac{\sqrt{d+ex}}{x}dx}{e}\right)+d\int \frac{a+b\log (cx^n)}{x\sqrt{d+ex}}dx\right)+e\left(\frac{2(d+ex)^{3/2}(a+b\log (cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$\Big\downarrow$ 60

$$d\left(e\left(\frac{2\sqrt{d+ex}(a+b\log (cx^n))}{e}-\frac{2bn\left(d\int \frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)}{e}\right)+d\int \frac{a+b\log (cx^n)}{x\sqrt{d+ex}}dx\right)+e\left(\frac{2(d+ex)^{3/2}(a+b\log (cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$\Big\downarrow$ 73

$$d\left(e\left(\frac{2\sqrt{d+ex}(a+b\log (cx^n))}{e}-\frac{2bn\left(\frac{2d\int \frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)}{e}\right)+d\int \frac{a+b\log (cx^n)}{x\sqrt{d+ex}}dx\right)+e\left(\frac{2(d+ex)^{3/2}(a+b\log (cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$\Big\downarrow$ 221

$$d\left(d\int \frac{a+b\log (cx^n)}{x\sqrt{d+ex}}dx+e\left(\frac{2\sqrt{d+ex}(a+b\log (cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)\right)+e\left(\frac{2(d+ex)^{3/2}(a+b\log (cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$\Big\downarrow$ 2790

$$d\left(d\left(-bn\int -\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}x}dx-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\right.\right.$$
$$\left.e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)\right)$$

$$\Big\downarrow \; 27$$

$$d\left(d\left(\frac{2bn\int\frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(\right.}{}\right.\right.$$
$$\left.e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)\right)$$

$$\Big\downarrow \; 7267$$

$$d\left(d\left(\frac{4bn\int\frac{\sqrt{d+ex}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(\frac{2\sqrt{d+ex}(a+b\log(c}{e}\right.\right.$$
$$\left.e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)\right)$$

$$\Big\downarrow \; 25$$

$$d\left(d\left(-\frac{4bn\int -\frac{\sqrt{d+ex}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(\frac{2\sqrt{d+ex}(a+b\log}{e}\right.\right.$$
$$\left.e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)\right)$$

$$\Big\downarrow \; 6546$$

$$d\left(d\left(\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\frac{\int\frac{\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{d+ex}}d\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(2\cdots\right.\right.$$

$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$$\downarrow 27$$

$$d\left(d\left(\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\int\frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{d+ex}}d\sqrt{d+ex}\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(2\cdots\right.\right.$$

$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$$\downarrow 6470$$

$$d\left(d\left(\frac{4bn\left(\frac{\int-\frac{d\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\cdots\right.}{}\right.\right.$$

$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$$\downarrow 27$$

$$d\left(d\left(\frac{4bn\left(\sqrt{d}\int -\frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{ex}d\sqrt{d+ex}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arct}\ldots}{}\right.\right.$$
$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$\downarrow$ 2849

$$d\left(d\left(\frac{4bn\left(-\sqrt{d}\int \frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}}d\frac{1}{\sqrt{d}-\sqrt{d+ex}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{ar}\ldots}{}\right.\right.$$
$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$\downarrow$ 2752

$$d\left(d\left(\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)-\frac{1}{2}\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arcta}\ldots}{}\right.\right.$$
$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

input
```
Int[((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/x,x]
```

output
```
e*((-2*b*n*((2*(d + e*x)^(3/2))/3 + d*(2*Sqrt[d + e*x] - 2*Sqrt[d]*ArcTanh
[Sqrt[d + e*x]/Sqrt[d]])))/(3*e) + (2*(d + e*x)^(3/2)*(a + b*Log[c*x^n]))/
(3*e)) + d*(e*((-2*b*n*(2*Sqrt[d + e*x] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x]/
Sqrt[d]]))/e + (2*Sqrt[d + e*x]*(a + b*Log[c*x^n]))/e) + d*((-2*ArcTanh[Sq
rt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^n]))/Sqrt[d] + (4*b*n*(ArcTanh[Sqrt[d
+ e*x]/Sqrt[d]]^2/2 - ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt
[d] - Sqrt[d + e*x])] - PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x
])]/2))/Sqrt[d]))
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2788
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.))
/(x_), x_Symbol] :> Simp[d   Int[(d + e*x)^(q - 1)*((a + b*Log[c*x^n])^p/x)
, x], x] + Simp[e   Int[(d + e*x)^(q - 1)*(a + b*Log[c*x^n])^p, x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && GtQ[q, 0] && IntegerQ[2*q]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

rule 2849
```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Simp
[-e/g   Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[
{c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

rule 6470
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Simp[b*c
*(p/e)   Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^
2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2
, 0]
```

rule 6546
```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Simp[1/
(c*d)   Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

rule 7267
```
Int[u_, x_Symbol] :> With[{lst = SubstForFractionalPowerOfLinear[u, x]}, Si
mp[lst[[2]]*lst[[4]]   Subst[Int[lst[[1]], x], x, lst[[3]]^(1/lst[[2]])], x
] /;  !FalseQ[lst] && SubstForFractionalPowerQ[u, lst[[3]], x]]
```

Maple [F]

$$\int \frac{(ex+d)^{\frac{3}{2}}\,(a+b\ln{(c\,x^n)})}{x}dx$$

input
```
int((e*x+d)^(3/2)*(a+b*ln(c*x^n))/x,x)
```

output
```
int((e*x+d)^(3/2)*(a+b*ln(c*x^n))/x,x)
```

Fricas [F]

$$\int \frac{(d+ex)^{3/2}\,(a+b\log{(cx^n)})}{x}\,dx = \int \frac{(ex+d)^{\frac{3}{2}}(b\log{(cx^n)}+a)}{x}\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
integral(((b*e*x + b*d)*sqrt(e*x + d)*log(c*x^n) + (a*e*x + a*d)*sqrt(e*x
+ d))/x, x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{(d+ex)^{3/2}\,(a+b\log{(cx^n)})}{x}\,dx = \text{Timed out}$$

input
```
integrate((e*x+d)**(3/2)*(a+b*ln(c*x**n))/x,x)
```

output
```
Timed out
```

Maxima [F]

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(ex+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
1/3*(3*d^(3/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d))) +
2*(e*x + d)^(3/2) + 6*sqrt(e*x + d)*d)*a + b*integrate((e*x*log(c) + d*log
(c) + (e*x + d)*log(x^n))*sqrt(e*x + d)/x, x)
```

Giac [F]

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(ex+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x + d)^(3/2)*(b*log(c*x^n) + a)/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(a+b\ln(c\,x^n))\,(d+e\,x)^{3/2}}{x}\,dx$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^(3/2))/x,x)
```

output
```
int(((a + b*log(c*x^n))*(d + e*x)^(3/2))/x, x)
```

Reduce [F]

$$\int \frac{(d+ex)^{3/2}\,(a+b\log(cx^n))}{x}\,dx = \frac{8\sqrt{ex+d}\log(x^n c)\,bd}{3} + \frac{2\sqrt{ex+d}\log(x^n c)\,bex}{3} + \frac{8\sqrt{ex+d}\,ad}{3} + \frac{2\sqrt{ex+d}\,aex}{3} - \frac{52\sqrt{ex+d}\,bdn}{9} - \frac{4\sqrt{ex+d}\,benx}{9} + \sqrt{d}\log\left(\sqrt{ex+d}-\sqrt{d}\right)ad - \frac{8\sqrt{d}\log\left(\sqrt{ex+d}-\sqrt{d}\right)bdn}{3} - \sqrt{d}\log\left(\sqrt{ex+d}+\sqrt{d}\right)ad + \frac{8\sqrt{d}\log\left(\sqrt{ex+d}+\sqrt{d}\right)bdn}{3} + \left(\int \frac{\sqrt{ex+d}\log(x^n c)}{e\,x^2+dx}dx\right)b\,d^2$$

input
```
int((e*x+d)^(3/2)*(a+b*log(c*x^n))/x,x)
```

output
```
(24*sqrt(d + e*x)*log(x**n*c)*b*d + 6*sqrt(d + e*x)*log(x**n*c)*b*e*x + 24
*sqrt(d + e*x)*a*d + 6*sqrt(d + e*x)*a*e*x - 52*sqrt(d + e*x)*b*d*n - 4*sq
rt(d + e*x)*b*e*n*x + 9*sqrt(d)*log(sqrt(d + e*x) - sqrt(d))*a*d - 24*sqrt
(d)*log(sqrt(d + e*x) - sqrt(d))*b*d*n - 9*sqrt(d)*log(sqrt(d + e*x) + sqr
t(d))*a*d + 24*sqrt(d)*log(sqrt(d + e*x) + sqrt(d))*b*d*n + 9*int((sqrt(d
+ e*x)*log(x**n*c))/(d*x + e*x**2),x)*b*d**2)/9
```

3.142 $\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^2}\,dx$

Optimal result 1209
Mathematica [A] (verified) 1210
Rubi [A] (verified) 1210
Maple [F] 1212
Fricas [F] 1213
Sympy [F] 1213
Maxima [F] 1213
Giac [F] 1214
Mupad [F(-1)] 1214
Reduce [F] 1214

Optimal result

Integrand size = 23, antiderivative size = 259

$$\begin{aligned}\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^2}\,dx &= -4ben\sqrt{d+ex}-\frac{bdn\sqrt{d+ex}}{x} \\ &+ 3b\sqrt{d}en\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+3b\sqrt{d}en\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2 \\ &+ 3e\sqrt{d+ex}(a+b\log(cx^n))-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x} \\ &- 3\sqrt{d}e\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n)) \\ &- 6b\sqrt{d}en\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right) \\ &- 3b\sqrt{d}en\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\end{aligned}$$

output

```
-4*b*e*n*(e*x+d)^(1/2)-b*d*n*(e*x+d)^(1/2)/x+3*b*d^(1/2)*e*n*arctanh((e*x+
d)^(1/2)/d^(1/2))+3*b*d^(1/2)*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))^2+3*e*(e*
x+d)^(1/2)*(a+b*ln(c*x^n))-(e*x+d)^(3/2)*(a+b*ln(c*x^n))/x-3*d^(1/2)*e*arc
tanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))-6*b*d^(1/2)*e*n*arctanh((e*x+d
)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))-3*b*d^(1/2)*e*n*pol
ylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))
```

Mathematica [A] (verified)

Time = 0.41 (sec) , antiderivative size = 480, normalized size of antiderivative = 1.85

$$\int \frac{(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx = \frac{-4ad\sqrt{d+ex}-4bdn\sqrt{d+ex}+8aex\sqrt{d+ex}-16benx\sqrt{d+ex}+1}{}$$

input
```
Integrate[((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
(-4*a*d*Sqrt[d + e*x] - 4*b*d*n*Sqrt[d + e*x] + 8*a*e*x*Sqrt[d + e*x] - 16
*b*e*n*x*Sqrt[d + e*x] + 12*b*Sqrt[d]*e*n*x*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]
 - 4*b*d*Sqrt[d + e*x]*Log[c*x^n] + 8*b*e*x*Sqrt[d + e*x]*Log[c*x^n] + 6*a
*Sqrt[d]*e*x*Log[Sqrt[d] - Sqrt[d + e*x]] + 6*b*Sqrt[d]*e*x*Log[c*x^n]*Log
[Sqrt[d] - Sqrt[d + e*x]] - 3*b*Sqrt[d]*e*n*x*Log[Sqrt[d] - Sqrt[d + e*x]]
^2 - 6*a*Sqrt[d]*e*x*Log[Sqrt[d] + Sqrt[d + e*x]] - 6*b*Sqrt[d]*e*x*Log[c*
x^n]*Log[Sqrt[d] + Sqrt[d + e*x]] + 3*b*Sqrt[d]*e*n*x*Log[Sqrt[d] + Sqrt[d
 + e*x]]^2 + 6*b*Sqrt[d]*e*n*x*Log[Sqrt[d] + Sqrt[d + e*x]]*Log[1/2 - Sqrt
[d + e*x]/(2*Sqrt[d])] - 6*b*Sqrt[d]*e*n*x*Log[Sqrt[d] - Sqrt[d + e*x]]*Lo
g[(1 + Sqrt[d + e*x]/Sqrt[d])/2] - 6*b*Sqrt[d]*e*n*x*PolyLog[2, 1/2 - Sqrt
[d + e*x]/(2*Sqrt[d])] + 6*b*Sqrt[d]*e*n*x*PolyLog[2, (1 + Sqrt[d + e*x]/S
qrt[d])/2])/(4*x)
```

Rubi [A] (verified)

Time = 0.68 (sec) , antiderivative size = 251, normalized size of antiderivative = 0.97, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2792, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx$$

$$\Big\downarrow \; 2792$$

$$-bn\int -\frac{\sqrt{d+ex}(d-2ex)+3\sqrt{d}ex\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x^2}dx-3\sqrt{d}e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}+3e\sqrt{d+ex}(a+b\log(cx^n))$$

$\big\downarrow$ 25

$$bn\int \frac{\sqrt{d+ex}(d-2ex)+3\sqrt{d}ex\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x^2}dx-3\sqrt{d}e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}+3e\sqrt{d+ex}(a+b\log(cx^n))$$

$\big\downarrow$ 2010

$$bn\int \left(\frac{\sqrt{d+ex}d}{x^2}+\frac{3e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\sqrt{d}}{x}-\frac{2e\sqrt{d+ex}}{x}\right)dx-3\sqrt{d}e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}+3e\sqrt{d+ex}(a+b\log(cx^n))$$

$\big\downarrow$ 2009

$$-3\sqrt{d}e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}+3e\sqrt{d+ex}(a+b\log(cx^n))+bn\left(3\sqrt{d}e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2+3\sqrt{d}e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)-6\sqrt{d}e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right.$$

input
```
Int[((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
3*e*Sqrt[d + e*x]*(a + b*Log[c*x^n]) - ((d + e*x)^(3/2)*(a + b*Log[c*x^n])
)/x - 3*Sqrt[d]*e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^n]) + b*n*
(-4*e*Sqrt[d + e*x] - (d*Sqrt[d + e*x])/x + 3*Sqrt[d]*e*ArcTanh[Sqrt[d + e
*x]/Sqrt[d]] + 3*Sqrt[d]*e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]^2 - 6*Sqrt[d]*e*
ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])]
- 3*Sqrt[d]*e*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])])
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{(ex+d)^{\frac{3}{2}} (a+b\ln (c\,x^n))}{x^2}dx$$

input
```
int((e*x+d)^(3/2)*(a+b*ln(c*x^n))/x^2,x)
```

output
```
int((e*x+d)^(3/2)*(a+b*ln(c*x^n))/x^2,x)
```

Fricas [F]

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{(ex+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
integral(((b*e*x + b*d)*sqrt(e*x + d)*log(c*x^n) + (a*e*x + a*d)*sqrt(e*x
+ d))/x^2, x)
```

Sympy [F]

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{(a+b\log(cx^n))(d+ex)^{\frac{3}{2}}}{x^2}\,dx$$

input
```
integrate((e*x+d)**(3/2)*(a+b*ln(c*x**n))/x**2,x)
```

output
```
Integral((a + b*log(c*x**n))*(d + e*x)**(3/2)/x**2, x)
```

Maxima [F]

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{(ex+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
1/2*(3*sqrt(d)*e*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))
+ 4*sqrt(e*x + d)*e - 2*sqrt(e*x + d)*d/x)*a + b*integrate((e*x*log(c) + d
*log(c) + (e*x + d)*log(x^n))*sqrt(e*x + d)/x^2, x)
```

Giac [F]

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^2}\,dx=\int \frac{(ex+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
integrate((e*x + d)^(3/2)*(b*log(c*x^n) + a)/x^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^2}\,dx=\int \frac{(a+b\ln(c\,x^n))\,(d+e\,x)^{3/2}}{x^2}\,dx$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^(3/2))/x^2,x)
```

output
```
int(((a + b*log(c*x^n))*(d + e*x)^(3/2))/x^2, x)
```

Reduce [F]

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^2}\,dx=\frac{-8\sqrt{ex+d}\log(x^nc)\,bd+4\sqrt{ex+d}\log(x^nc)\,bex-2\sqrt{ex+d}\,ad+4\sqrt{}}{}$$

input
```
int((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^2,x)
```

output
```
( - 8*sqrt(d + e*x)*log(x**n*c)*b*d + 4*sqrt(d + e*x)*log(x**n*c)*b*e*x -
2*sqrt(d + e*x)*a*d + 4*sqrt(d + e*x)*a*e*x - 8*sqrt(d + e*x)*b*d*n - 8*sq
rt(d + e*x)*b*e*n*x + 3*sqrt(d)*log(sqrt(d + e*x) - sqrt(d))*a*e*x - 3*sqr
t(d)*log(sqrt(d + e*x) + sqrt(d))*a*e*x - 6*int((sqrt(d + e*x)*log(x**n*c)
)/(d*x**2 + e*x**3),x)*b*d**2*x)/(2*x)
```

3.143 $\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^3} dx$

Optimal result 1215
Mathematica [A] (verified) 1216
Rubi [A] (verified) 1216
Maple [F] 1218
Fricas [F] 1219
Sympy [F] 1219
Maxima [F] 1219
Giac [F] 1220
Mupad [F(-1)] 1220
Reduce [F] 1221

Optimal result

Integrand size = 23, antiderivative size = 293

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^3} dx = -\frac{bdn\sqrt{d+ex}}{4x^2} - \frac{11ben\sqrt{d+ex}}{8x} - \frac{9be^2n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{8\sqrt{d}} + \frac{3be^2n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{4\sqrt{d}} - \frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4x} - \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{2x^2} - \frac{3e^2\arctan\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4\sqrt{d}} - \frac{3be^2n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{2\sqrt{d}} - \frac{3be^2n\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{4\sqrt{d}}$$

output
```
-1/4*b*d*n*(e*x+d)^(1/2)/x^2-11/8*b*e*n*(e*x+d)^(1/2)/x-9/8*b*e^2*n*arctan
h((e*x+d)^(1/2)/d^(1/2))/d^(1/2)+3/4*b*e^2*n*arctanh((e*x+d)^(1/2)/d^(1/2)
)^2/d^(1/2)-3/4*e*(e*x+d)^(1/2)*(a+b*ln(c*x^n))/x-1/2*(e*x+d)^(3/2)*(a+b*l
n(c*x^n))/x^2-3/4*e^2*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(1/
2)-3/2*b*e^2*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d
)^(1/2)))/d^(1/2)-3/4*b*e^2*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)
))/d^(1/2)
```

Mathematica [A] (verified)

Time = 0.69 (sec) , antiderivative size = 501, normalized size of antiderivative = 1.71

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^3}\,dx =$$
$$-\frac{8ad^{3/2}\sqrt{d+ex}+4bd^{3/2}n\sqrt{d+ex}+20a\sqrt{d}ex\sqrt{d+ex}+22b\sqrt{d}enx\sqrt{d+ex}+18be^2nx^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right.}{}$$

input
```
Integrate[((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-1/16*(8*a*d^(3/2)*Sqrt[d + e*x] + 4*b*d^(3/2)*n*Sqrt[d + e*x] + 20*a*Sqrt
[d]*e*x*Sqrt[d + e*x] + 22*b*Sqrt[d]*e*n*x*Sqrt[d + e*x] + 18*b*e^2*n*x^2*
ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 8*b*d^(3/2)*Sqrt[d + e*x]*Log[c*x^n] + 20
*b*Sqrt[d]*e*x*Sqrt[d + e*x]*Log[c*x^n] - 6*a*e^2*x^2*Log[Sqrt[d] - Sqrt[d
 + e*x]] - 6*b*e^2*x^2*Log[c*x^n]*Log[Sqrt[d] - Sqrt[d + e*x]] + 3*b*e^2*n
*x^2*Log[Sqrt[d] - Sqrt[d + e*x]]^2 + 6*a*e^2*x^2*Log[Sqrt[d] + Sqrt[d + e
*x]] + 6*b*e^2*x^2*Log[c*x^n]*Log[Sqrt[d] + Sqrt[d + e*x]] - 3*b*e^2*n*x^2
*Log[Sqrt[d] + Sqrt[d + e*x]]^2 - 6*b*e^2*n*x^2*Log[Sqrt[d] + Sqrt[d + e*x
]]*Log[1/2 - Sqrt[d + e*x]/(2*Sqrt[d])] + 6*b*e^2*n*x^2*Log[Sqrt[d] - Sqrt
[d + e*x]]*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2] + 6*b*e^2*n*x^2*PolyLog[2, 1
/2 - Sqrt[d + e*x]/(2*Sqrt[d])] - 6*b*e^2*n*x^2*PolyLog[2, (1 + Sqrt[d + e
*x]/Sqrt[d])/2])/(Sqrt[d]*x^2)
```

Rubi [A] (verified)

Time = 0.71 (sec) , antiderivative size = 280, normalized size of antiderivative = 0.96, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^3}\,dx$$
$$\Big\downarrow \; 2792$$

$$-bn\int -\frac{\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)x^2}{\sqrt{d}}+\sqrt{d+ex}(2d+5ex)}{4x^3}dx-\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4\sqrt{d}}-\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4x}-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{2x^2}$$

$\downarrow$ 27

$$\frac{1}{4}bn\int \frac{\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)x^2}{\sqrt{d}}+\sqrt{d+ex}(2d+5ex)}{x^3}dx-\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4\sqrt{d}}-\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4x}-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{2x^2}$$

$\downarrow$ 2010

$$\frac{1}{4}bn\int\left(\frac{3\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)e^2}{\sqrt{d}x}+\frac{5\sqrt{d+ex}e}{x^2}+\frac{2d\sqrt{d+ex}}{x^3}\right)dx-\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4\sqrt{d}}-\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4x}-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{2x^2}$$

$\downarrow$ 2009

$$-\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4\sqrt{d}}-\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4x}-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{2x^2}+\frac{1}{4}bn\left(\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}}-\frac{9e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{2\sqrt{d}}-\frac{6e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{\sqrt{d}}-\frac{3e^2\text{ PolyLog}\left(2,1\right.}{\sqrt{d}}\right.$$

input
```
Int[((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(-3*e*Sqrt[d + e*x]*(a + b*Log[c*x^n]))/(4*x) - ((d + e*x)^(3/2)*(a + b*Lo
g[c*x^n]))/(2*x^2) - (3*e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^
n]))/(4*Sqrt[d]) + (b*n*(-((d*Sqrt[d + e*x])/x^2) - (11*e*Sqrt[d + e*x])/(
2*x) - (9*e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(2*Sqrt[d]) + (3*e^2*ArcTanh
[Sqrt[d + e*x]/Sqrt[d]]^2)/Sqrt[d] - (6*e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]
*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])])/Sqrt[d] - (3*e^2*PolyLog[2, 1
 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])])/Sqrt[d]))/4
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{(ex+d)^{\frac{3}{2}}\,(a+b\ln(c\,x^n))}{x^3}dx$$

input
```
int((e*x+d)^(3/2)*(a+b*ln(c*x^n))/x^3,x)
```

output
```
int((e*x+d)^(3/2)*(a+b*ln(c*x^n))/x^3,x)
```

Fricas [F]

$$\int \frac{(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx=\int \frac{(ex+d)^{\frac{3}{2}}(b\log\left(cx^n\right)+a)}{x^3}\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
integral(((b*e*x + b*d)*sqrt(e*x + d)*log(c*x^n) + (a*e*x + a*d)*sqrt(e*x
+ d))/x^3, x)
```

Sympy [F]

$$\int \frac{(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx=\int \frac{\left(a+b\log\left(cx^n\right)\right)(d+ex)^{\frac{3}{2}}}{x^3}\,dx$$

input
```
integrate((e*x+d)**(3/2)*(a+b*ln(c*x**n))/x**3,x)
```

output
```
Integral((a + b*log(c*x**n))*(d + e*x)**(3/2)/x**3, x)
```

Maxima [F]

$$\int \frac{(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx=\int \frac{(ex+d)^{\frac{3}{2}}(b\log\left(cx^n\right)+a)}{x^3}\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
1/8*(3*e^2*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))/sqrt(d
) - 2*(5*(e*x + d)^(3/2)*e^2 - 3*sqrt(e*x + d)*d*e^2)/((e*x + d)^2 - 2*(e*
x + d)*d + d^2))*a + b*integrate((e*x*log(c) + d*log(c) + (e*x + d)*log(x^
n))*sqrt(e*x + d)/x^3, x)
```

Giac [F]

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(ex+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
integrate((e*x + d)^(3/2)*(b*log(c*x^n) + a)/x^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(a+b\ln(c\,x^n))\,(d+e\,x)^{3/2}}{x^3}\,dx$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^(3/2))/x^3,x)
```

output
```
int(((a + b*log(c*x^n))*(d + e*x)^(3/2))/x^3, x)
```

Reduce [F]

$$\int \frac{(d+ex)^{3/2}\,(a+b\log(cx^n))}{x^3}\,dx = \frac{-16\sqrt{ex+d}\log(x^n c)\,bdex - 4\sqrt{ex+d}\,a\,d^2 - 10\sqrt{ex+d}\,adex - 16\sqrt{}$$

input
```
int((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^3,x)
```

output
```
( - 16*sqrt(d + e*x)*log(x**n*c)*b*d*e*x - 4*sqrt(d + e*x)*a*d**2 - 10*sqr
t(d + e*x)*a*d*e*x - 16*sqrt(d + e*x)*b*d*e*n*x + 3*sqrt(d)*log(sqrt(d + e
*x) - sqrt(d))*a*e**2*x**2 + 8*sqrt(d)*log(sqrt(d + e*x) - sqrt(d))*b*e**2
*n*x**2 - 3*sqrt(d)*log(sqrt(d + e*x) + sqrt(d))*a*e**2*x**2 - 8*sqrt(d)*l
og(sqrt(d + e*x) + sqrt(d))*b*e**2*n*x**2 + 8*int((sqrt(d + e*x)*log(x**n*
c))/(d*x**3 + e*x**4),x)*b*d**3*x**2)/(8*d*x**2)
```

3.144 $\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$

Optimal result . . . 1222
Mathematica [A] (verified) . . . 1223
Rubi [A] (verified) . . . 1223
Maple [F] . . . 1225
Fricas [A] (verification not implemented) . . . 1225
Sympy [A] (verification not implemented) . . . 1226
Maxima [A] (verification not implemented) . . . 1227
Giac [A] (verification not implemented) . . . 1228
Mupad [F(-1)] . . . 1228
Reduce [B] (verification not implemented) . . . 1229

Optimal result

Integrand size = 23, antiderivative size = 217

$$\begin{aligned}\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx &= \frac{64bd^3n\sqrt{d+ex}}{35e^4}-\frac{76bd^2n(d+ex)^{3/2}}{105e^4}\\&\quad+\frac{64bdn(d+ex)^{5/2}}{175e^4}-\frac{4bn(d+ex)^{7/2}}{49e^4}\\&\quad-\frac{64bd^{7/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{35e^4}-\frac{2d^3\sqrt{d+ex}(a+b\log(cx^n))}{e^4}\\&\quad+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{e^4}\\&\quad-\frac{6d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}\\&\quad+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}\end{aligned}$$

output
```
64/35*b*d^3*n*(e*x+d)^(1/2)/e^4-76/105*b*d^2*n*(e*x+d)^(3/2)/e^4+64/175*b*
d*n*(e*x+d)^(5/2)/e^4-4/49*b*n*(e*x+d)^(7/2)/e^4-64/35*b*d^(7/2)*n*arctanh
((e*x+d)^(1/2)/d^(1/2))/e^4-2*d^3*(e*x+d)^(1/2)*(a+b*ln(c*x^n))/e^4+2*d^2*
(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^4-6/5*d*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^4+
2/7*(e*x+d)^(7/2)*(a+b*ln(c*x^n))/e^4
```

Mathematica [A] (verified)

Time = 0.27 (sec) , antiderivative size = 150, normalized size of antiderivative = 0.69

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = -\frac{2\left(3360bd^{7/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+\sqrt{d+ex}(105a(16d^3-8d^2ex+6de^2x^2-5e^3x^3)+2bn(-1276d^3+2\right.}{3675e^4}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/Sqrt[d + e*x],x]
```

output
```
(-2*(3360*b*d^(7/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + Sqrt[d + e*x]*(105*
a*(16*d^3 - 8*d^2*e*x + 6*d*e^2*x^2 - 5*e^3*x^3) + 2*b*n*(-1276*d^3 + 218*
d^2*e*x - 111*d*e^2*x^2 + 75*e^3*x^3) + 105*b*(16*d^3 - 8*d^2*e*x + 6*d*e^
2*x^2 - 5*e^3*x^3)*Log[c*x^n])))/(3675*e^4)
```

Rubi [A] (verified)

Time = 0.51 (sec) , antiderivative size = 198, normalized size of antiderivative = 0.91, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2792, 27, 2123, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$$

$$\Big\downarrow \ 2792$$

$$-bn\int -\frac{2\sqrt{d+ex}(16d^3-8exd^2+6e^2x^2d-5e^3x^3)}{35e^4x}dx-\frac{2d^3\sqrt{d+ex}(a+b\log(cx^n))}{e^4}+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}-\frac{6d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}$$

$$\Big\downarrow \ 27$$

$$\frac{2bn\int \frac{\sqrt{d+ex}(16d^3-8exd^2+6e^2x^2d-5e^3x^3)}{x}dx}{35e^4}-\frac{2d^3\sqrt{d+ex}(a+b\log(cx^n))}{e^4}+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}-\frac{6d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}$$

$$\Big\downarrow \textbf{2123}$$

$$\frac{2bn\int \left(\frac{16\sqrt{d+ex}d^3}{x}-19e\sqrt{d+ex}d^2+16e(d+ex)^{3/2}d-5e(d+ex)^{5/2}\right)dx}{35e^4}-\frac{2d^3\sqrt{d+ex}(a+b\log(cx^n))}{e^4}+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}-\frac{6d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}$$

$$\Big\downarrow \textbf{2009}$$

$$-\frac{2d^3\sqrt{d+ex}(a+b\log(cx^n))}{e^4}+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}-\frac{6d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}+\frac{2bn\left(-32d^{7/2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+32d^3\sqrt{d+ex}-\frac{38}{3}d^2(d+ex)^{3/2}+\frac{32}{5}d(d+ex)^{5/2}-\frac{10}{7}(d+ex)^{7/2}\right)}{35e^4}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/Sqrt[d + e*x],x]
```

output
```
(2*b*n*(32*d^3*Sqrt[d + e*x] - (38*d^2*(d + e*x)^(3/2))/3 + (32*d*(d + e*x
)^(5/2))/5 - (10*(d + e*x)^(7/2))/7 - 32*d^(7/2)*ArcTanh[Sqrt[d + e*x]/Sqr
t[d]]))/(35*e^4) - (2*d^3*Sqrt[d + e*x]*(a + b*Log[c*x^n]))/e^4 + (2*d^2*(
d + e*x)^(3/2)*(a + b*Log[c*x^n]))/e^4 - (6*d*(d + e*x)^(5/2)*(a + b*Log[c
*x^n]))/(5*e^4) + (2*(d + e*x)^(7/2)*(a + b*Log[c*x^n]))/(7*e^4)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2123
```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x^3(a+b\ln(c\,x^n))}{\sqrt{ex+d}}dx$$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x+d)^(1/2),x)
```

output
```
int(x^3*(a+b*ln(c*x^n))/(e*x+d)^(1/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 392, normalized size of antiderivative = 1.81

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \left[\frac{2\left(1680\,bd^{\frac{7}{2}}n\log\left(\frac{ex-2\,\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)+(2552\,bd^3n-1680\,ad^3-75\,(2\,be^3n-7\,ae^3)x^3+6\,(37\,bde^2n-1\right.}{}\right.$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="fricas")
```

output
```
[2/3675*(1680*b*d^(7/2)*n*log((e*x - 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) + (
2552*b*d^3*n - 1680*a*d^3 - 75*(2*b*e^3*n - 7*a*e^3)*x^3 + 6*(37*b*d*e^2*n
 - 105*a*d*e^2)*x^2 - 4*(109*b*d^2*e*n - 210*a*d^2*e)*x + 105*(5*b*e^3*x^3
 - 6*b*d*e^2*x^2 + 8*b*d^2*e*x - 16*b*d^3)*log(c) + 105*(5*b*e^3*n*x^3 - 6
*b*d*e^2*n*x^2 + 8*b*d^2*e*n*x - 16*b*d^3*n)*log(x))*sqrt(e*x + d))/e^4, 2
/3675*(3360*b*sqrt(-d)*d^3*n*arctan(sqrt(-d)/sqrt(e*x + d)) + (2552*b*d^3*
n - 1680*a*d^3 - 75*(2*b*e^3*n - 7*a*e^3)*x^3 + 6*(37*b*d*e^2*n - 105*a*d*
e^2)*x^2 - 4*(109*b*d^2*e*n - 210*a*d^2*e)*x + 105*(5*b*e^3*x^3 - 6*b*d*e^
2*x^2 + 8*b*d^2*e*x - 16*b*d^3)*log(c) + 105*(5*b*e^3*n*x^3 - 6*b*d*e^2*n*
x^2 + 8*b*d^2*e*n*x - 16*b*d^3*n)*log(x))*sqrt(e*x + d))/e^4]
```

Sympy [A] (verification not implemented)

Time = 58.52 (sec) , antiderivative size = 396, normalized size of antiderivative = 1.82

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$$
$$= a\left(\begin{cases} -\frac{2d^3\sqrt{d+ex}}{e^4}+\frac{2d^2(d+ex)^{\frac{3}{2}}}{e^4}-\frac{6d(d+ex)^{\frac{5}{2}}}{5e^4}+\frac{2(d+ex)^{\frac{7}{2}}}{7e^4} & \text{for } e\neq 0 \\ \frac{x^4}{4\sqrt{d}} & \text{otherwise} \end{cases}\right)$$
$$-bn\left(\begin{cases} \frac{9596d^{\frac{7}{2}}\sqrt{1+\frac{ex}{d}}}{3675e^4}+\frac{38d^{\frac{7}{2}}\log\left(\frac{ex}{d}\right)}{35e^4}-\frac{76d^{\frac{7}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{35e^4}+\frac{4d^{\frac{7}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\sqrt{x}}\right)}{e^4}+\frac{872d^{\frac{5}{2}}x\sqrt{1+\frac{ex}{d}}}{3675e^3}-\frac{148d^{\frac{3}{2}}x^2\sqrt{1+\frac{ex}{d}}}{1225e^2} \\ \frac{x^4}{16\sqrt{d}} \end{cases}\right.$$
$$+b\left(\begin{cases} -\frac{2d^3\sqrt{d+ex}}{e^4}+\frac{2d^2(d+ex)^{\frac{3}{2}}}{e^4}-\frac{6d(d+ex)^{\frac{5}{2}}}{5e^4}+\frac{2(d+ex)^{\frac{7}{2}}}{7e^4} & \text{for } e\neq 0 \\ \frac{x^4}{4\sqrt{d}} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x+d)**(1/2),x)
```

output
```
a*Piecewise((-2*d**3*sqrt(d + e*x)/e**4 + 2*d**2*(d + e*x)**(3/2)/e**4 - 6
*d*(d + e*x)**(5/2)/(5*e**4) + 2*(d + e*x)**(7/2)/(7*e**4), Ne(e, 0)), (x*
*4/(4*sqrt(d)), True)) - b*n*Piecewise((9596*d**(7/2)*sqrt(1 + e*x/d)/(367
5*e**4) + 38*d**(7/2)*log(e*x/d)/(35*e**4) - 76*d**(7/2)*log(sqrt(1 + e*x/
d) + 1)/(35*e**4) + 4*d**(7/2)*asinh(sqrt(d)/(sqrt(e)*sqrt(x)))/e**4 + 872
*d**(5/2)*x*sqrt(1 + e*x/d)/(3675*e**3) - 148*d**(3/2)*x**2*sqrt(1 + e*x/d
)/(1225*e**2) + 4*sqrt(d)*x**3*sqrt(1 + e*x/d)/(49*e) - 4*d**4/(e**(9/2)*s
qrt(x)*sqrt(d/(e*x) + 1)) - 4*d**3*sqrt(x)/(e**(7/2)*sqrt(d/(e*x) + 1)), (
e > -oo) & (e < oo) & Ne(e, 0)), (x**4/(16*sqrt(d)), True)) + b*Piecewise(
(-2*d**3*sqrt(d + e*x)/e**4 + 2*d**2*(d + e*x)**(3/2)/e**4 - 6*d*(d + e*x)
**(5/2)/(5*e**4) + 2*(d + e*x)**(7/2)/(7*e**4), Ne(e, 0)), (x**4/(4*sqrt(d
)), True))*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 215, normalized size of antiderivative = 0.99

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$$
$$= \frac{4}{3675}bn\left(\frac{840\,d^{\frac{7}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^4} - \frac{75\,(ex+d)^{\frac{7}{2}} - 336\,(ex+d)^{\frac{5}{2}}d + 665\,(ex+d)^{\frac{3}{2}}d^2 - 1680\,\sqrt{ex+d}d^3}{e^4}\right.$$
$$+ \frac{2}{35}b\left(\frac{5\,(ex+d)^{\frac{7}{2}}}{e^4} - \frac{21\,(ex+d)^{\frac{5}{2}}d}{e^4} + \frac{35\,(ex+d)^{\frac{3}{2}}d^2}{e^4} - \frac{35\,\sqrt{ex+d}d^3}{e^4}\right)\log(cx^n)$$
$$+ \frac{2}{35}a\left(\frac{5\,(ex+d)^{\frac{7}{2}}}{e^4} - \frac{21\,(ex+d)^{\frac{5}{2}}d}{e^4} + \frac{35\,(ex+d)^{\frac{3}{2}}d^2}{e^4} - \frac{35\,\sqrt{ex+d}d^3}{e^4}\right)$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="maxima")
```

output
```
4/3675*b*n*(840*d^(7/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqr
t(d)))/e^4 - (75*(e*x + d)^(7/2) - 336*(e*x + d)^(5/2)*d + 665*(e*x + d)^(
3/2)*d^2 - 1680*sqrt(e*x + d)*d^3)/e^4) + 2/35*b*(5*(e*x + d)^(7/2)/e^4 -
21*(e*x + d)^(5/2)*d/e^4 + 35*(e*x + d)^(3/2)*d^2/e^4 - 35*sqrt(e*x + d)*d
^3/e^4)*log(c*x^n) + 2/35*a*(5*(e*x + d)^(7/2)/e^4 - 21*(e*x + d)^(5/2)*d/
e^4 + 35*(e*x + d)^(3/2)*d^2/e^4 - 35*sqrt(e*x + d)*d^3/e^4)
```

Giac [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 252, normalized size of antiderivative = 1.16

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \frac{64\,bd^4n\arctan\left(\frac{\sqrt{ex+d}}{\sqrt{-d}}\right)}{35\sqrt{-d}e^4} + \frac{2}{35}\left(\frac{5\,(ex+d)^{\frac{7}{2}}bn}{e^4} - \frac{21\,(ex+d)^{\frac{5}{2}}bdn}{e^4} + \frac{35\,(ex+d)^{\frac{3}{2}}bd^2n}{e^4} - \frac{35\sqrt{ex+d}bd^3n}{e^4}\right)\log(ex) - \frac{2\,(7\,bn\log(e)+2\,bn-7\,b\log(c)-7\,a)(ex+d)^{\frac{7}{2}}}{49\,e^4} + \frac{2\,(105\,bdn\log(e)+32\,bdn-105\,bd\log(c)-105\,ad)(ex+d)^{\frac{5}{2}}}{175\,e^4} - \frac{2\,(105\,bd^2n\log(e)+38\,bd^2n-105\,bd^2\log(c)-105\,ad^2)(ex+d)^{\frac{3}{2}}}{105\,e^4} + \frac{2\,(35\,bd^3n\log(e)+32\,bd^3n-35\,bd^3\log(c)-35\,ad^3)\sqrt{ex+d}}{35\,e^4}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="giac")
```

output
```
64/35*b*d^4*n*arctan(sqrt(e*x + d)/sqrt(-d))/(sqrt(-d)*e^4) + 2/35*(5*(e*x
 + d)^(7/2)*b*n/e^4 - 21*(e*x + d)^(5/2)*b*d*n/e^4 + 35*(e*x + d)^(3/2)*b*
d^2*n/e^4 - 35*sqrt(e*x + d)*b*d^3*n/e^4)*log(e*x) - 2/49*(7*b*n*log(e) +
2*b*n - 7*b*log(c) - 7*a)*(e*x + d)^(7/2)/e^4 + 2/175*(105*b*d*n*log(e) +
32*b*d*n - 105*b*d*log(c) - 105*a*d)*(e*x + d)^(5/2)/e^4 - 2/105*(105*b*d^
2*n*log(e) + 38*b*d^2*n - 105*b*d^2*log(c) - 105*a*d^2)*(e*x + d)^(3/2)/e^
4 + 2/35*(35*b*d^3*n*log(e) + 32*b*d^3*n - 35*b*d^3*log(c) - 35*a*d^3)*sqr
t(e*x + d)/e^4
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))}{\sqrt{d+e\,x}}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^(1/2),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 240, normalized size of antiderivative = 1.11

$$\int \frac{x^3(a + b\log(cx^n))}{\sqrt{d + ex}}\, dx$$

$$= \frac{-\frac{32\sqrt{ex+d}\log(x^n c)b\,d^3}{35} + \frac{16\sqrt{ex+d}\log(x^n c)b\,d^2ex}{35} - \frac{12\sqrt{ex+d}\log(x^n c)bd\,e^2x^2}{35} + \frac{2\sqrt{ex+d}\log(x^n c)b\,e^3x^3}{7} - \frac{32\sqrt{ex+d}\,a\,d^3}{35} + 16\sqrt{e}\cdots}{\cdots}$$

input
```
int(x^3*(a+b*log(c*x^n))/(e*x+d)^(1/2),x)
```

output
```
(2*( - 1680*sqrt(d + e*x)*log(x**n*c)*b*d**3 + 840*sqrt(d + e*x)*log(x**n*
c)*b*d**2*e*x - 630*sqrt(d + e*x)*log(x**n*c)*b*d*e**2*x**2 + 525*sqrt(d +
 e*x)*log(x**n*c)*b*e**3*x**3 - 1680*sqrt(d + e*x)*a*d**3 + 840*sqrt(d + e
*x)*a*d**2*e*x - 630*sqrt(d + e*x)*a*d*e**2*x**2 + 525*sqrt(d + e*x)*a*e**
3*x**3 + 2552*sqrt(d + e*x)*b*d**3*n - 436*sqrt(d + e*x)*b*d**2*e*n*x + 22
2*sqrt(d + e*x)*b*d*e**2*n*x**2 - 150*sqrt(d + e*x)*b*e**3*n*x**3 + 3360*s
qrt(d)*log(sqrt(d + e*x) - sqrt(d))*b*d**3*n - 1680*sqrt(d)*log(x**n*c)*b*
d**3))/(3675*e**4)
```

3.145 $\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$

Optimal result 1230
Mathematica [A] (verified) 1231
Rubi [A] (verified) 1231
Maple [F] 1234
Fricas [A] (verification not implemented) 1234
Sympy [A] (verification not implemented) 1235
Maxima [A] (verification not implemented) 1236
Giac [A] (verification not implemented) 1237
Mupad [F(-1)] 1237
Reduce [B] (verification not implemented) 1238

Optimal result

Integrand size = 23, antiderivative size = 169

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = -\frac{32bd^2n\sqrt{d+ex}}{15e^3}+\frac{28bdn(d+ex)^{3/2}}{45e^3}-\frac{4bn(d+ex)^{5/2}}{25e^3} + \frac{32bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{15e^3}+\frac{2d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^3} - \frac{4d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3} + \frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}$$

output
```
-32/15*b*d^2*n*(e*x+d)^(1/2)/e^3+28/45*b*d*n*(e*x+d)^(3/2)/e^3-4/25*b*n*(e
*x+d)^(5/2)/e^3+32/15*b*d^(5/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e^3+2*d^2
*(e*x+d)^(1/2)*(a+b*ln(c*x^n))/e^3-4/3*d*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^3
+2/5*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^3
```

Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 118, normalized size of antiderivative = 0.70

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \frac{480bd^{5/2}n\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2\sqrt{d+ex}(15a(8d^2-4dex+3e^2x^2)-2bn(94d^2-17dex+9e^2x^2)+15b(8}{225e^3}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/Sqrt[d + e*x],x]
```

output
```
(480*b*d^(5/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 2*Sqrt[d + e*x]*(15*a*(8
*d^2 - 4*d*e*x + 3*e^2*x^2) - 2*b*n*(94*d^2 - 17*d*e*x + 9*e^2*x^2) + 15*b
*(8*d^2 - 4*d*e*x + 3*e^2*x^2)*Log[c*x^n]))/(225*e^3)
```

Rubi [A] (verified)

Time = 0.44 (sec) , antiderivative size = 167, normalized size of antiderivative = 0.99, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2792, 27, 1192, 25, 1584, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int \frac{2\sqrt{d+ex}(8d^2-4exd+3e^2x^2)}{15e^3x}dx+\frac{2d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{4d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{27}$$

$$-\frac{2bn\int \frac{\sqrt{d+ex}(8d^2-4exd+3e^2x^2)}{x}dx}{15e^3}+\frac{2d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{4d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{1192}$$

$$-\frac{4bn\int \frac{(d+ex)(15d^2e^2+3(d+ex)^2e^2-10d(d+ex)e^2)}{ex}d\sqrt{d+ex}}{15e^5}+\frac{2d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{4d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{25}$$

$$\frac{4bn\int -\frac{(d+ex)(15d^2e^2+3(d+ex)^2e^2-10d(d+ex)e^2)}{ex}d\sqrt{d+ex}}{15e^5}+\frac{2d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{4d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{1584}$$

$$\frac{4bn\int \left(-\frac{8ed^3}{x}-8e^2d^2+7e^2(d+ex)d-3e^2(d+ex)^2\right)d\sqrt{d+ex}}{15e^5}+\frac{2d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{4d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{2d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{4d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}-\frac{4bn\left(-8d^{5/2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+8d^2e^2\sqrt{d+ex}-\frac{7}{3}de^2(d+ex)^{3/2}+\frac{3}{5}e^2(d+ex)^{5/2}\right)}{15e^5}$$

input

```
Int[(x^2*(a + b*Log[c*x^n]))/Sqrt[d + e*x],x]
```

output

```
(-4*b*n*(8*d^2*e^2*Sqrt[d + e*x] - (7*d*e^2*(d + e*x)^(3/2))/3 + (3*e^2*(d
 + e*x)^(5/2))/5 - 8*d^(5/2)*e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))/(15*e^5)
 + (2*d^2*Sqrt[d + e*x]*(a + b*Log[c*x^n]))/e^3 - (4*d*(d + e*x)^(3/2)*(a
+ b*Log[c*x^n]))/(3*e^3) + (2*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/(5*e^3)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1192
```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[2/e^(n + 2*p + 1)   Subst[Int[x^(
2*m + 1)*(e*f - d*g + g*x^2)^n*(c*d^2 - b*d*e + a*e^2 - (2*c*d - b*e)*x^2 +
 c*x^4)^p, x], x, Sqrt[d + e*x]], x] /; FreeQ[{a, b, c, d, e, f, g}, x] &&
IGtQ[p, 0] && ILtQ[n, 0] && IntegerQ[m + 1/2]
```

rule 1584
```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x^2(a+b\ln(c\,x^n))}{\sqrt{ex+d}}dx$$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x+d)^(1/2),x)
```

output
```
int(x^2*(a+b*ln(c*x^n))/(e*x+d)^(1/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 293, normalized size of antiderivative = 1.73

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$$
$$= \left[\frac{2\left(120\,bd^{\frac{5}{2}}n\log\left(\frac{ex+2\,\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right) - (188\,bd^2n - 120\,ad^2 + 9\,(2\,be^2n - 5\,ae^2)x^2 - 2\,(17\,bden - 30\,ade\right.}{225\,e^3}\right.$$
$$- \frac{2\left(240\,b\sqrt{-d}d^2n\arctan\left(\frac{\sqrt{-d}}{\sqrt{ex+d}}\right) + (188\,bd^2n - 120\,ad^2 + 9\,(2\,be^2n - 5\,ae^2)x^2 - 2\,(17\,bden - 30\,ade\right.}{225\,e^3}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="fricas")
```

output
```
[2/225*(120*b*d^(5/2)*n*log((e*x + 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) - (18
8*b*d^2*n - 120*a*d^2 + 9*(2*b*e^2*n - 5*a*e^2)*x^2 - 2*(17*b*d*e*n - 30*a
*d*e)*x - 15*(3*b*e^2*x^2 - 4*b*d*e*x + 8*b*d^2)*log(c) - 15*(3*b*e^2*n*x^
2 - 4*b*d*e*n*x + 8*b*d^2*n)*log(x))*sqrt(e*x + d))/e^3, -2/225*(240*b*sqr
t(-d)*d^2*n*arctan(sqrt(-d)/sqrt(e*x + d)) + (188*b*d^2*n - 120*a*d^2 + 9*
(2*b*e^2*n - 5*a*e^2)*x^2 - 2*(17*b*d*e*n - 30*a*d*e)*x - 15*(3*b*e^2*x^2
- 4*b*d*e*x + 8*b*d^2)*log(c) - 15*(3*b*e^2*n*x^2 - 4*b*d*e*n*x + 8*b*d^2*
n)*log(x))*sqrt(e*x + d))/e^3]
```

Sympy [A] (verification not implemented)

Time = 43.51 (sec) , antiderivative size = 337, normalized size of antiderivative = 1.99

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = a\left(\begin{cases} \frac{2d^2\sqrt{d+ex}}{e^3} - \frac{4d(d+ex)^{\frac{3}{2}}}{3e^3} + \frac{2(d+ex)^{\frac{5}{2}}}{5e^3} & \text{for } e\neq 0 \\ \frac{x^3}{3\sqrt{d}} & \text{otherwise} \end{cases}\right) - bn\left(\begin{cases} -\frac{524d^{\frac{5}{2}}\sqrt{1+\frac{ex}{d}}}{225e^3} - \frac{14d^{\frac{5}{2}}\log\left(\frac{ex}{d}\right)}{15e^3} + \frac{28d^{\frac{5}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{15e^3} - \frac{4d^{\frac{5}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\sqrt{x}}\right)}{e^3} - \frac{68d^{\frac{3}{2}}x\sqrt{1+\frac{ex}{d}}}{225e^2} + \frac{4\sqrt{d}x^2\sqrt{1+\frac{ex}{d}}}{25e} + \\ \frac{x^3}{9\sqrt{d}} \end{cases}\right) + b\left(\begin{cases} \frac{2d^2\sqrt{d+ex}}{e^3} - \frac{4d(d+ex)^{\frac{3}{2}}}{3e^3} + \frac{2(d+ex)^{\frac{5}{2}}}{5e^3} & \text{for } e\neq 0 \\ \frac{x^3}{3\sqrt{d}} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x+d)**(1/2),x)
```

output
```
a*Piecewise((2*d**2*sqrt(d + e*x)/e**3 - 4*d*(d + e*x)**(3/2)/(3*e**3) + 2
*(d + e*x)**(5/2)/(5*e**3), Ne(e, 0)), (x**3/(3*sqrt(d)), True)) - b*n*Pie
cewise((-524*d**(5/2)*sqrt(1 + e*x/d)/(225*e**3) - 14*d**(5/2)*log(e*x/d)/
(15*e**3) + 28*d**(5/2)*log(sqrt(1 + e*x/d) + 1)/(15*e**3) - 4*d**(5/2)*as
inh(sqrt(d)/(sqrt(e)*sqrt(x)))/e**3 - 68*d**(3/2)*x*sqrt(1 + e*x/d)/(225*e
**2) + 4*sqrt(d)*x**2*sqrt(1 + e*x/d)/(25*e) + 4*d**3/(e**(7/2)*sqrt(x)*sq
rt(d/(e*x) + 1)) + 4*d**2*sqrt(x)/(e**(5/2)*sqrt(d/(e*x) + 1)), (e > -oo)
& (e < oo) & Ne(e, 0)), (x**3/(9*sqrt(d)), True)) + b*Piecewise((2*d**2*sq
rt(d + e*x)/e**3 - 4*d*(d + e*x)**(3/2)/(3*e**3) + 2*(d + e*x)**(5/2)/(5*e
**3), Ne(e, 0)), (x**3/(3*sqrt(d)), True))*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 172, normalized size of antiderivative = 1.02

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$$
$$= -\frac{4}{225}\,bn\left(\frac{60\,d^{\frac{5}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^3}+\frac{9\,(ex+d)^{\frac{5}{2}}-35\,(ex+d)^{\frac{3}{2}}d+120\,\sqrt{ex+d}d^2}{e^3}\right)$$
$$+\frac{2}{15}\,b\left(\frac{3\,(ex+d)^{\frac{5}{2}}}{e^3}-\frac{10\,(ex+d)^{\frac{3}{2}}d}{e^3}+\frac{15\,\sqrt{ex+d}d^2}{e^3}\right)\log(cx^n)$$
$$+\frac{2}{15}\,a\left(\frac{3\,(ex+d)^{\frac{5}{2}}}{e^3}-\frac{10\,(ex+d)^{\frac{3}{2}}d}{e^3}+\frac{15\,\sqrt{ex+d}d^2}{e^3}\right)$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="maxima")
```

output
```
-4/225*b*n*(60*d^(5/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt
(d)))/e^3 + (9*(e*x + d)^(5/2) - 35*(e*x + d)^(3/2)*d + 120*sqrt(e*x + d)*
d^2)/e^3) + 2/15*b*(3*(e*x + d)^(5/2)/e^3 - 10*(e*x + d)^(3/2)*d/e^3 + 15*
sqrt(e*x + d)*d^2/e^3)*log(c*x^n) + 2/15*a*(3*(e*x + d)^(5/2)/e^3 - 10*(e*
x + d)^(3/2)*d/e^3 + 15*sqrt(e*x + d)*d^2/e^3)
```

Giac [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 192, normalized size of antiderivative = 1.14

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$$
$$= -\frac{32\,bd^3n\arctan\left(\frac{\sqrt{ex+d}}{\sqrt{-d}}\right)}{15\,\sqrt{-d}e^3}$$
$$+\frac{2}{15}\left(\frac{3\,(ex+d)^{\frac{5}{2}}bn}{e^3}-\frac{10\,(ex+d)^{\frac{3}{2}}bdn}{e^3}+\frac{15\,\sqrt{ex+d}bd^2n}{e^3}\right)\log(ex)$$
$$-\frac{2\,(5\,bn\log(e)+2\,bn-5\,b\log(c)-5\,a)(ex+d)^{\frac{5}{2}}}{25\,e^3}$$
$$+\frac{4\,(15\,bdn\log(e)+7\,bdn-15\,bd\log(c)-15\,ad)(ex+d)^{\frac{3}{2}}}{45\,e^3}$$
$$-\frac{2\,(15\,bd^2n\log(e)+16\,bd^2n-15\,bd^2\log(c)-15\,ad^2)\sqrt{ex+d}}{15\,e^3}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="giac")
```

output
```
-32/15*b*d^3*n*arctan(sqrt(e*x + d)/sqrt(-d))/(sqrt(-d)*e^3) + 2/15*(3*(e*
x + d)^(5/2)*b*n/e^3 - 10*(e*x + d)^(3/2)*b*d*n/e^3 + 15*sqrt(e*x + d)*b*d
^2*n/e^3)*log(e*x) - 2/25*(5*b*n*log(e) + 2*b*n - 5*b*log(c) - 5*a)*(e*x +
 d)^(5/2)/e^3 + 4/45*(15*b*d*n*log(e) + 7*b*d*n - 15*b*d*log(c) - 15*a*d)*
(e*x + d)^(3/2)/e^3 - 2/15*(15*b*d^2*n*log(e) + 16*b*d^2*n - 15*b*d^2*log(
c) - 15*a*d^2)*sqrt(e*x + d)/e^3
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{\sqrt{d+e\,x}}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^(1/2),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 179, normalized size of antiderivative = 1.06

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$$

$$= \frac{\frac{16\sqrt{ex+d}\log(x^nc)b\,d^2}{15} - \frac{8\sqrt{ex+d}\log(x^nc)bdex}{15} + \frac{2\sqrt{ex+d}\log(x^nc)b\,e^2x^2}{5} + \frac{16\sqrt{ex+d}\,a\,d^2}{15} - \frac{8\sqrt{ex+d}\,adex}{15} + \frac{2\sqrt{ex+d}\,a\,e^2x^2}{5} - 37}{e^3}$$

input
```
int(x^2*(a+b*log(c*x^n))/(e*x+d)^(1/2),x)
```

output
```
(2*(120*sqrt(d + e*x)*log(x**n*c)*b*d**2 - 60*sqrt(d + e*x)*log(x**n*c)*b*
d*e*x + 45*sqrt(d + e*x)*log(x**n*c)*b*e**2*x**2 + 120*sqrt(d + e*x)*a*d**
2 - 60*sqrt(d + e*x)*a*d*e*x + 45*sqrt(d + e*x)*a*e**2*x**2 - 188*sqrt(d +
 e*x)*b*d**2*n + 34*sqrt(d + e*x)*b*d*e*n*x - 18*sqrt(d + e*x)*b*e**2*n*x*
*2 - 240*sqrt(d)*log(sqrt(d + e*x) - sqrt(d))*b*d**2*n + 120*sqrt(d)*log(x
**n*c)*b*d**2))/(225*e**3)
```

3.146 $\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$

Optimal result 1239
Mathematica [A] (verified) 1239
Rubi [A] (verified) 1240
Maple [F] 1242
Fricas [A] (verification not implemented) 1242
Sympy [A] (verification not implemented) 1243
Maxima [A] (verification not implemented) 1244
Giac [A] (verification not implemented) 1244
Mupad [F(-1)] 1245
Reduce [B] (verification not implemented) 1245

Optimal result

Integrand size = 21, antiderivative size = 119

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \frac{8bdn\sqrt{d+ex}}{3e^2}-\frac{4bn(d+ex)^{3/2}}{9e^2}-\frac{8bd^{3/2}n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{3e^2}-\frac{2d\sqrt{d+ex}(a+b\log(cx^n))}{e^2}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}$$

output
```
8/3*b*d*n*(e*x+d)^(1/2)/e^2-4/9*b*n*(e*x+d)^(3/2)/e^2-8/3*b*d^(3/2)*n*arct
anh((e*x+d)^(1/2)/d^(1/2))/e^2-2*d*(e*x+d)^(1/2)*(a+b*ln(c*x^n))/e^2+2/3*(
e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^2
```

Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 80, normalized size of antiderivative = 0.67

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = -\frac{2\left(12bd^{3/2}n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+\sqrt{d+ex}(6ad-10bdn-3aex+2benx+b(6d-3ex)\log(cx^n))\right)}{9e^2}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/Sqrt[d + e*x],x]
```

output
```
(-2*(12*b*d^(3/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + Sqrt[d + e*x]*(6*a*d
- 10*b*d*n - 3*a*e*x + 2*b*e*n*x + b*(6*d - 3*e*x)*Log[c*x^n])))/(9*e^2)
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.95, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2792, 27, 90, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{ 2792}$$

$$-bn\int -\frac{2(2d-ex)\sqrt{d+ex}}{3e^2x}dx+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{2d\sqrt{d+ex}(a+b\log(cx^n))}{e^2}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{2bn\int \frac{(2d-ex)\sqrt{d+ex}}{x}dx}{3e^2}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{2d\sqrt{d+ex}(a+b\log(cx^n))}{e^2}$$

$$\Big\downarrow \text{ 90}$$

$$\frac{2bn\left(2d\int \frac{\sqrt{d+ex}}{x}dx-\frac{2}{3}(d+ex)^{3/2}\right)}{3e^2}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{2d\sqrt{d+ex}(a+b\log(cx^n))}{e^2}$$

$$\Big\downarrow \text{ 60}$$

$$\frac{2bn\left(2d\left(d\int \frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)-\frac{2}{3}(d+ex)^{3/2}\right)}{3e^2}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{2d\sqrt{d+ex}(a+b\log(cx^n))}{e^2}$$

$$\Big\downarrow \text{ 73}$$

$$\frac{2bn\left(2d\left(\frac{2d\int \frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)-\frac{2}{3}(d+ex)^{3/2}\right)}{3e^2}+\frac{2(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^2}-\frac{2d\sqrt{d+ex}(a+b\log\left(cx^n\right))}{e^2}$$

$$\Big\downarrow \text{221}$$

$$\frac{2(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^2}-\frac{2d\sqrt{d+ex}(a+b\log\left(cx^n\right))}{e^2}+\frac{2bn\left(2d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)-\frac{2}{3}(d+ex)^{3/2}\right)}{3e^2}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/Sqrt[d + e*x],x]
```

output
```
(2*b*n*((-2*(d + e*x)^(3/2))/3 + 2*d*(2*Sqrt[d + e*x] - 2*Sqrt[d]*ArcTanh[
Sqrt[d + e*x]/Sqrt[d]])))/(3*e^2) - (2*d*Sqrt[d + e*x]*(a + b*Log[c*x^n]))
/e^2 + (2*(d + e*x)^(3/2)*(a + b*Log[c*x^n]))/(3*e^2)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x(a+b\ln(c\,x^n))}{\sqrt{ex+d}}dx$$

input
```
int(x*(a+b*ln(c*x^n))/(e*x+d)^(1/2),x)
```

output
```
int(x*(a+b*ln(c*x^n))/(e*x+d)^(1/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 186, normalized size of antiderivative = 1.56

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \left[\frac{2\left(6\,bd^{\frac{3}{2}}n\log\left(\frac{ex-2\,\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)+(10\,bdn-6\,ad-(2\,ben-3\,ae)x+3\,(bex-2\,bd)\log(c)+3\,(benx\right.}{9\,e^2}\right.$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="fricas")
```

output
```
[2/9*(6*b*d^(3/2)*n*log((e*x - 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) + (10*b*d
*n - 6*a*d - (2*b*e*n - 3*a*e)*x + 3*(b*e*x - 2*b*d)*log(c) + 3*(b*e*n*x -
 2*b*d*n)*log(x))*sqrt(e*x + d))/e^2, 2/9*(12*b*sqrt(-d)*d*n*arctan(sqrt(-
d)/sqrt(e*x + d)) + (10*b*d*n - 6*a*d - (2*b*e*n - 3*a*e)*x + 3*(b*e*x - 2
*b*d)*log(c) + 3*(b*e*n*x - 2*b*d*n)*log(x))*sqrt(e*x + d))/e^2]
```

Sympy [A] (verification not implemented)

Time = 34.76 (sec) , antiderivative size = 272, normalized size of antiderivative = 2.29

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = a\left(\begin{cases} -\frac{2d\sqrt{d+ex}}{e^2}+\frac{2(d+ex)^{\frac{3}{2}}}{3e^2} & \text{for } e\neq 0 \\ \frac{x^2}{2\sqrt{d}} & \text{otherwise} \end{cases}\right) - bn\left(\begin{cases} \frac{16d^{\frac{3}{2}}\sqrt{1+\frac{ex}{d}}}{9e^2}+\frac{2d^{\frac{3}{2}}\log\left(\frac{ex}{d}\right)}{3e^2}-\frac{4d^{\frac{3}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{3e^2}+\frac{4d^{\frac{3}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\sqrt{x}}\right)}{e^2}+\frac{4\sqrt{d}x\sqrt{1+\frac{ex}{d}}}{9e}-\frac{4d^2}{e^{\frac{5}{2}}\sqrt{x}\sqrt{\frac{d}{ex}+1}}-\frac{4d\sqrt{\ }}{e^{\frac{3}{2}}\sqrt{\ }} \\ \frac{x^2}{4\sqrt{d}} \end{cases}\right) + b\left(\begin{cases} -\frac{2d\sqrt{d+ex}}{e^2}+\frac{2(d+ex)^{\frac{3}{2}}}{3e^2} & \text{for } e\neq 0 \\ \frac{x^2}{2\sqrt{d}} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x+d)**(1/2),x)
```

output
```
a*Piecewise((-2*d*sqrt(d + e*x)/e**2 + 2*(d + e*x)**(3/2)/(3*e**2), Ne(e,
0)), (x**2/(2*sqrt(d)), True)) - b*n*Piecewise((16*d**(3/2)*sqrt(1 + e*x/d
)/(9*e**2) + 2*d**(3/2)*log(e*x/d)/(3*e**2) - 4*d**(3/2)*log(sqrt(1 + e*x/
d) + 1)/(3*e**2) + 4*d**(3/2)*asinh(sqrt(d)/(sqrt(e)*sqrt(x)))/e**2 + 4*sq
rt(d)*x*sqrt(1 + e*x/d)/(9*e) - 4*d**2/(e**(5/2)*sqrt(x)*sqrt(d/(e*x) + 1)
) - 4*d*sqrt(x)/(e**(3/2)*sqrt(d/(e*x) + 1)), (e > -oo) & (e < oo) & Ne(e,
 0)), (x**2/(4*sqrt(d)), True)) + b*Piecewise((-2*d*sqrt(d + e*x)/e**2 + 2
*(d + e*x)**(3/2)/(3*e**2), Ne(e, 0)), (x**2/(2*sqrt(d)), True))*log(c*x**
n)
```

Maxima [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.07

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \frac{4}{9}\,bn\left(\frac{3\,d^{\frac{3}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^2} - \frac{(ex+d)^{\frac{3}{2}} - 6\,\sqrt{ex+d}d}{e^2}\right) + \frac{2}{3}\,b\left(\frac{(ex+d)^{\frac{3}{2}}}{e^2} - \frac{3\,\sqrt{ex+d}d}{e^2}\right)\log\left(cx^n\right) + \frac{2}{3}\,a\left(\frac{(ex+d)^{\frac{3}{2}}}{e^2} - \frac{3\,\sqrt{ex+d}d}{e^2}\right)$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="maxima")
```

output
```
4/9*b*n*(3*d^(3/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d))
)/e^2 - ((e*x + d)^(3/2) - 6*sqrt(e*x + d)*d)/e^2) + 2/3*b*((e*x + d)^(3/2
)/e^2 - 3*sqrt(e*x + d)*d/e^2)*log(c*x^n) + 2/3*a*((e*x + d)^(3/2)/e^2 - 3
*sqrt(e*x + d)*d/e^2)
```

Giac [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 131, normalized size of antiderivative = 1.10

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \frac{8\,bd^2n\arctan\left(\frac{\sqrt{ex+d}}{\sqrt{-d}}\right)}{3\,\sqrt{-d}e^2} + \frac{2}{3}\left(\frac{(ex+d)^{\frac{3}{2}}bn}{e^2} - \frac{3\,\sqrt{ex+d}bdn}{e^2}\right)\log\left(ex\right) - \frac{2\left(3\,bn\log\left(e\right) + 2\,bn - 3\,b\log\left(c\right) - 3\,a\right)(ex+d)^{\frac{3}{2}}}{9\,e^2} + \frac{2\left(3\,bdn\log\left(e\right) + 4\,bdn - 3\,bd\log\left(c\right) - 3\,ad\right)\sqrt{ex+d}}{3\,e^2}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="giac")
```

output
```
8/3*b*d^2*n*arctan(sqrt(e*x + d)/sqrt(-d))/(sqrt(-d)*e^2) + 2/3*((e*x + d)
^(3/2)*b*n/e^2 - 3*sqrt(e*x + d)*b*d*n/e^2)*log(e*x) - 2/9*(3*b*n*log(e) +
 2*b*n - 3*b*log(c) - 3*a)*(e*x + d)^(3/2)/e^2 + 2/3*(3*b*d*n*log(e) + 4*b
*d*n - 3*b*d*log(c) - 3*a*d)*sqrt(e*x + d)/e^2
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{\sqrt{d+e\,x}}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x)^(1/2),x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 114, normalized size of antiderivative = 0.96

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$$
$$= \frac{-\frac{4\sqrt{ex+d}\log(x^n c)bd}{3} + \frac{2\sqrt{ex+d}\log(x^n c)bex}{3} - \frac{4\sqrt{ex+d}\,ad}{3} + \frac{2\sqrt{ex+d}\,aex}{3} + \frac{20\sqrt{ex+d}\,bdn}{9} - \frac{4\sqrt{ex+d}\,benx}{9} + \frac{8\sqrt{d}\log\left(\sqrt{ex+d}-\right.}{3}}{e^2}$$

input
```
int(x*(a+b*log(c*x^n))/(e*x+d)^(1/2),x)
```

output
```
(2*( - 6*sqrt(d + e*x)*log(x**n*c)*b*d + 3*sqrt(d + e*x)*log(x**n*c)*b*e*x
 - 6*sqrt(d + e*x)*a*d + 3*sqrt(d + e*x)*a*e*x + 10*sqrt(d + e*x)*b*d*n -
2*sqrt(d + e*x)*b*e*n*x + 12*sqrt(d)*log(sqrt(d + e*x) - sqrt(d))*b*d*n -
6*sqrt(d)*log(x**n*c)*b*d))/(9*e**2)
```

3.147 $\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}\,dx$

Optimal result 1246
Mathematica [A] (verified) 1246
Rubi [A] (verified) 1247
Maple [A] (verified) 1248
Fricas [A] (verification not implemented) 1249
Sympy [A] (verification not implemented) 1250
Maxima [A] (verification not implemented) 1250
Giac [A] (verification not implemented) 1251
Mupad [F(-1)] 1251
Reduce [B] (verification not implemented) 1252

Optimal result

Integrand size = 20, antiderivative size = 69

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}\,dx=-\frac{4bn\sqrt{d+ex}}{e}+\frac{4b\sqrt{d}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{e}+\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}$$

output
```
-4*b*n*(e*x+d)^(1/2)/e+4*b*d^(1/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e+2*(e
*x+d)^(1/2)*(a+b*ln(c*x^n))/e
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 55, normalized size of antiderivative = 0.80

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}\,dx=\frac{4b\sqrt{d}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2\sqrt{d+ex}(a-2bn+b\log(cx^n))}{e}$$

input
```
Integrate[(a + b*Log[c*x^n])/Sqrt[d + e*x],x]
```

output
```
(4*b*Sqrt[d]*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 2*Sqrt[d + e*x]*(a - 2*b*n
 + b*Log[c*x^n]))/e
```

Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 67, normalized size of antiderivative = 0.97, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2756, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}dx$$

$$\Big\downarrow \ 2756$$

$$\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\int\frac{\sqrt{d+ex}}{x}dx}{e}$$

$$\Big\downarrow \ 60$$

$$\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(d\int\frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)}{e}$$

$$\Big\downarrow \ 73$$

$$\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(\frac{2d\int\frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)}{e}$$

$$\Big\downarrow \ 221$$

$$\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}$$

input
```
Int[(a + b*Log[c*x^n])/Sqrt[d + e*x],x]
```

output
```
(-2*b*n*(2*Sqrt[d + e*x] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))/e +
(2*Sqrt[b + e*x]*(a + b*Log[c*x^n]))/e
```

Defintions of rubi rules used

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

Maple [A] (verified)

Time = 0.57 (sec) , antiderivative size = 62, normalized size of antiderivative = 0.90

method	result	size
derivativedivides	$\frac{2\sqrt{ex+d}\,a+2b\left(\sqrt{ex+d}\,\ln\left(c\,x^{n}\right)+2n\left(-\sqrt{ex+d}+\sqrt{d}\,\operatorname{arctanh}\left(\frac{\sqrt{ex+d}}{\sqrt{d}}\right)\right)\right)}{e}$	62
default	$\frac{2\sqrt{ex+d}\,a+2b\left(\sqrt{ex+d}\,\ln\left(c\,x^{n}\right)+2n\left(-\sqrt{ex+d}+\sqrt{d}\,\operatorname{arctanh}\left(\frac{\sqrt{ex+d}}{\sqrt{d}}\right)\right)\right)}{e}$	62
parts	$\frac{2a\sqrt{ex+d}}{e}+\frac{2b\left(\sqrt{ex+d}\,\ln\left(c\,x^{n}\right)-2n\left(\sqrt{ex+d}-\sqrt{d}\,\operatorname{arctanh}\left(\frac{\sqrt{ex+d}}{\sqrt{d}}\right)\right)\right)}{e}$	64

input
```
int((a+b*ln(c*x^n))/(e*x+d)^(1/2),x,method=_RETURNVERBOSE)
```

output
```
2/e*((e*x+d)^(1/2)*a+b*((e*x+d)^(1/2)*ln(c*x^n)+2*n*(-(e*x+d)^(1/2)+d^(1/2
)*arctanh((e*x+d)^(1/2)/d^(1/2)))))
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 113, normalized size of antiderivative = 1.64

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}\,dx = \left[\frac{2\left(b\sqrt{d}n\log\left(\frac{ex+2\sqrt{ex+d}\sqrt{d}+2d}{x}\right)+(bn\log(x)-2bn+b\log(c)+a)\sqrt{ex+d}\right)}{e}, -\frac{2\left(2b\sqrt{-d}n\arctan\left(\frac{\sqrt{-d}}{\sqrt{ex+d}}\right)-(bn\log(x)-2bn+b\log(c)+a)\sqrt{ex+d}\right)}{e}\right]$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="fricas")
```

output
```
[2*(b*sqrt(d)*n*log((e*x + 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) + (b*n*log(x)
 - 2*b*n + b*log(c) + a)*sqrt(e*x + d))/e, -2*(2*b*sqrt(-d)*n*arctan(sqrt(
-d)/sqrt(e*x + d)) - (b*n*log(x) - 2*b*n + b*log(c) + a)*sqrt(e*x + d))/e]
```

Sympy [A] (verification not implemented)

Time = 2.26 (sec) , antiderivative size = 131, normalized size of antiderivative = 1.90

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}\,dx = a\left(\begin{cases}\frac{2\sqrt{d+ex}}{e} & \text{for } e\neq 0\\ \frac{x}{\sqrt{d}} & \text{otherwise}\end{cases}\right) - bn\left(\begin{cases}-\frac{4\sqrt{d}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\sqrt{x}}\right)}{e}+\frac{4d}{e^{\frac{3}{2}}\sqrt{x}\sqrt{\frac{d}{ex}+1}}+\frac{4\sqrt{x}}{\sqrt{e}\sqrt{\frac{d}{ex}+1}} & \text{for } e>-\infty\wedge e<\infty\wedge e\neq 0\\ \frac{x}{\sqrt{d}} & \text{otherwise}\end{cases}\right) + b\left(\begin{cases}\frac{2\sqrt{d+ex}}{e} & \text{for } e\neq 0\\ \frac{x}{\sqrt{d}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((a+b*ln(c*x**n))/(e*x+d)**(1/2),x)
```

output
```
a*Piecewise((2*sqrt(d + e*x)/e, Ne(e, 0)), (x/sqrt(d), True)) - b*n*Piecew
ise((-4*sqrt(d)*asinh(sqrt(d)/(sqrt(e)*sqrt(x)))/e + 4*d/(e**(3/2)*sqrt(x)
*sqrt(d/(e*x) + 1)) + 4*sqrt(x)/(sqrt(e)*sqrt(d/(e*x) + 1)), (e > -oo) & (
e < oo) & Ne(e, 0)), (x/sqrt(d), True)) + b*Piecewise((2*sqrt(d + e*x)/e,
Ne(e, 0)), (x/sqrt(d), True))*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.19

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}\,dx = -\frac{2\left(\sqrt{d}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)+2\sqrt{ex+d}\right)bn}{e} + \frac{2\sqrt{ex+d}b\log(cx^n)}{e} + \frac{2\sqrt{ex+d}a}{e}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="maxima")
```

output
```
-2*(sqrt(d)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d))) + 2*s
qrt(e*x + d))*b*n/e + 2*sqrt(e*x + d)*b*log(c*x^n)/e + 2*sqrt(e*x + d)*a/e
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 74, normalized size of antiderivative = 1.07

$$\int \frac{a + b\log\left(cx^n\right)}{\sqrt{d + ex}}\,dx = -\frac{2\left(\left(\frac{2\,d\arctan\left(\frac{\sqrt{ex+d}}{\sqrt{-d}}\right)}{\sqrt{-d}} - \sqrt{ex+d}\log\left(x\right) + 2\sqrt{ex+d}\right)bn - \sqrt{ex+d}b\log\left(c\right) - \sqrt{ex+d}a\right)}{e}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="giac")
```

output
```
-2*((2*d*arctan(sqrt(e*x + d)/sqrt(-d))/sqrt(-d) - sqrt(e*x + d)*log(x) +
2*sqrt(e*x + d))*b*n - sqrt(e*x + d)*b*log(c) - sqrt(e*x + d)*a)/e
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a + b\log\left(cx^n\right)}{\sqrt{d + ex}}\,dx = \int \frac{a + b\,\ln\left(c\,x^n\right)}{\sqrt{d + e\,x}}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x)^(1/2),x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 66, normalized size of antiderivative = 0.96

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}\,dx$$
$$= \frac{2\sqrt{ex+d}\log(x^n c)\,b+2\sqrt{ex+d}\,a-4\sqrt{ex+d}\,bn-4\sqrt{d}\log\left(\sqrt{ex+d}-\sqrt{d}\right)bn+2\sqrt{d}\log(x^n c)\,b}{e}$$

input
```
int((a+b*log(c*x^n))/(e*x+d)^(1/2),x)
```

output
```
(2*(sqrt(d + e*x)*log(x**n*c)*b + sqrt(d + e*x)*a - 2*sqrt(d + e*x)*b*n -
2*sqrt(d)*log(sqrt(d + e*x) - sqrt(d))*b*n + sqrt(d)*log(x**n*c)*b))/e
```

3.148 $\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx$

Optimal result 1253
Mathematica [A] (verified) 1254
Rubi [A] (verified) 1254
Maple [F] 1258
Fricas [F] 1258
Sympy [F] 1258
Maxima [F] 1259
Giac [F] 1259
Mupad [F(-1)] 1259
Reduce [F] 1260

Optimal result

Integrand size = 23, antiderivative size = 152

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx = \frac{2bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}} - \frac{2\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} - \frac{4bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{\sqrt{d}} - \frac{2bn\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{\sqrt{d}}$$

output
```
2*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))^2/d^(1/2)-2*arctanh((e*x+d)^(1/2)/d^(
1/2))*(a+b*ln(c*x^n))/d^(1/2)-4*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^
(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(1/2)-2*b*n*polylog(2,1-2*d^(1/2)/(d^(1/2
)-(e*x+d)^(1/2)))/d^(1/2)
```

Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 249, normalized size of antiderivative = 1.64

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx = \frac{2(a+b\log(cx^n))\log\left(\sqrt{d}-\sqrt{d+ex}\right)-2(a+b\log(cx^n))\log\left(\sqrt{d}+\sqrt{d+ex}\right)-bn\Big(\log\left(\sqrt{d}-\sqrt{d+\right.}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x]),x]
```

output
```
(2*(a + b*Log[c*x^n])*Log[Sqrt[d] - Sqrt[d + e*x]] - 2*(a + b*Log[c*x^n])*
Log[Sqrt[d] + Sqrt[d + e*x]] - b*n*(Log[Sqrt[d] - Sqrt[d + e*x]]*(Log[Sqrt
[d] - Sqrt[d + e*x]] + 2*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2]) + 2*PolyLog[2
, 1/2 - Sqrt[d + e*x]/(2*Sqrt[d])]) + b*n*(Log[Sqrt[d] + Sqrt[d + e*x]]*(L
og[Sqrt[d] + Sqrt[d + e*x]] + 2*Log[1/2 - Sqrt[d + e*x]/(2*Sqrt[d])]) + 2*
PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2]))/(2*Sqrt[d])
```

Rubi [A] (verified)

Time = 0.66 (sec) , antiderivative size = 145, normalized size of antiderivative = 0.95, number of steps used = 11, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.435, Rules used = {2790, 27, 7267, 25, 6546, 27, 6470, 27, 2849, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx$$

$$\Big\downarrow \text{2790}$$

$$-bn\int -\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}x}dx-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{27}$$

$$\frac{2bn\int \frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{ 7267}$$

$$\frac{4bn\int \frac{\sqrt{d+ex}\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{ 25}$$

$$-\frac{4bn\int -\frac{\sqrt{d+ex}\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{ 6546}$$

$$\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\frac{\int \frac{\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{d+ex}}d\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\int \frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{d+ex}}d\sqrt{d+ex}\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{ 6470}$$

$$\frac{4bn\left(\frac{\int -\frac{d\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{4bn\left(\sqrt{d}\int -\frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{ex}d\sqrt{d+ex}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{ 2849}$$

$$\frac{4bn\left(-\sqrt{d}\int \frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}}d\frac{1}{\sqrt{d}-\sqrt{d+ex}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{ 2752}$$

$$\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)-\frac{1}{2}\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

input
```
Int[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x]),x]
```

output
```
(-2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^n]))/Sqrt[d] + (4*b*n*(A
rcTanh[Sqrt[d + e*x]/Sqrt[d]]^2/2 - ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*
Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])] - PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d]
- Sqrt[d + e*x])]/2))/Sqrt[d]
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

rule 2849
```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Simp
[-e/g   Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[
{c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

rule 6470
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Simp[b*c
*(p/e)   Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^
2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2
, 0]
```

rule 6546
```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Simp[1/
(c*d)   Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

rule 7267
```
Int[u_, x_Symbol] :> With[{lst = SubstForFractionalPowerOfLinear[u, x]}, Si
mp[lst[[2]]*lst[[4]]   Subst[Int[lst[[1]], x], x, lst[[3]]^(1/lst[[2]])], x
] /;  !FalseQ[lst] && SubstForFractionalPowerQ[u, lst[[3]], x]]
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x\sqrt{ex+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x/(e*x+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(e*x+d)^(1/2),x)
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\sqrt{d+ex}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\sqrt{ex+d}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^(1/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*a)/(e*x^2 + d*x), x)
```

Sympy [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\sqrt{d+ex}}\,dx=\int \frac{a+b\log\left(cx^{n}\right)}{x\sqrt{d+ex}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x*sqrt(d + e*x)), x)
```

Maxima [F]

$$\int \frac{a + b\log(cx^n)}{x\sqrt{d+ex}}\,dx = \int \frac{b\log(cx^n) + a}{\sqrt{ex+d}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^(1/2),x, algorithm="maxima")
```

output
```
b*integrate((log(c) + log(x^n))/(sqrt(e*x + d)*x), x) + a*log((sqrt(e*x +
d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))/sqrt(d)
```

Giac [F]

$$\int \frac{a + b\log(cx^n)}{x\sqrt{d+ex}}\,dx = \int \frac{b\log(cx^n) + a}{\sqrt{ex+d}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x + d)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a + b\log(cx^n)}{x\sqrt{d+ex}}\,dx = \int \frac{a + b\,\ln(c\,x^n)}{x\,\sqrt{d+e\,x}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x)^(1/2)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx$$
$$=\frac{\sqrt{d}\log\left(\sqrt{ex+d}-\sqrt{d}\right)a-\sqrt{d}\log\left(\sqrt{ex+d}+\sqrt{d}\right)a+\left(\int\frac{\sqrt{ex+d}\log(x^nc)}{e\,x^2+dx}dx\right)bd}{d}$$

input
```
int((a+b*log(c*x^n))/x/(e*x+d)^(1/2),x)
```

output
```
(sqrt(d)*log(sqrt(d + e*x) - sqrt(d))*a - sqrt(d)*log(sqrt(d + e*x) + sqrt
(d))*a + int((sqrt(d + e*x)*log(x**n*c))/(d*x + e*x**2),x)*b*d)/d
```

3.149 $\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex}}\,dx$

Optimal result 1261
Mathematica [A] (verified) 1262
Rubi [A] (verified) 1262
Maple [F] 1264
Fricas [F] 1265
Sympy [F] 1265
Maxima [F] 1265
Giac [F] 1266
Mupad [F(-1)] 1266
Reduce [F] 1266

Optimal result

Integrand size = 23, antiderivative size = 226

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex}}\,dx = -\frac{bn\sqrt{d+ex}}{dx}-\frac{ben\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}}-\frac{ben\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{3/2}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{dx}+\frac{e\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}}+\frac{2ben\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{d^{3/2}}+\frac{ben\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{d^{3/2}}$$

output
```
-b*n*(e*x+d)^(1/2)/d/x-b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))/d^(3/2)-b*e*n*
arctanh((e*x+d)^(1/2)/d^(1/2))^2/d^(3/2)-(e*x+d)^(1/2)*(a+b*ln(c*x^n))/d/x
+e*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(3/2)+2*b*e*n*arctanh(
(e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(3/2)+b*e*n
*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(3/2)
```

Mathematica [A] (verified)

Time = 0.31 (sec) , antiderivative size = 392, normalized size of antiderivative = 1.73

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex}}\,dx =$$
$$-\frac{4a\sqrt{d}\sqrt{d+ex}+4b\sqrt{d}n\sqrt{d+ex}+4benx\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+4b\sqrt{d}\sqrt{d+ex}\log(cx^n)+2aex\log\left(\sqrt{d}\right.}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*Sqrt[d + e*x]),x]
```

output
```
-1/4*(4*a*Sqrt[d]*Sqrt[d + e*x] + 4*b*Sqrt[d]*n*Sqrt[d + e*x] + 4*b*e*n*x*
ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 4*b*Sqrt[d]*Sqrt[d + e*x]*Log[c*x^n] + 2*
a*e*x*Log[Sqrt[d] - Sqrt[d + e*x]] + 2*b*e*x*Log[c*x^n]*Log[Sqrt[d] - Sqrt
[d + e*x]] - b*e*n*x*Log[Sqrt[d] - Sqrt[d + e*x]]^2 - 2*a*e*x*Log[Sqrt[d]
+ Sqrt[d + e*x]] - 2*b*e*x*Log[c*x^n]*Log[Sqrt[d] + Sqrt[d + e*x]] + b*e*n
*x*Log[Sqrt[d] + Sqrt[d + e*x]]^2 + 2*b*e*n*x*Log[Sqrt[d] + Sqrt[d + e*x]]
*Log[1/2 - Sqrt[d + e*x]/(2*Sqrt[d])] - 2*b*e*n*x*Log[Sqrt[d] - Sqrt[d + e
*x]]*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2] - 2*b*e*n*x*PolyLog[2, 1/2 - Sqrt[
d + e*x]/(2*Sqrt[d])] + 2*b*e*n*x*PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2
])/(d^(3/2)*x)
```

Rubi [A] (verified)

Time = 0.59 (sec) , antiderivative size = 220, normalized size of antiderivative = 0.97, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2792, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex}}\,dx$$
$$\Big\downarrow \; 2792$$

$$-bn\int -\frac{\frac{\sqrt{d+ex}}{d}-\frac{ex\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}}}{x^2}dx+\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{dx}$$

$$\Big\downarrow \text{ 25}$$

$$bn\int \frac{\frac{\sqrt{d+ex}}{d}-\frac{ex\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}}}{x^2}dx+\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{dx}$$

$$\Big\downarrow \text{ 2010}$$

$$bn\int \left(\frac{\sqrt{d+ex}}{dx^2}-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}x}\right)dx+\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{dx}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{dx}+ bn\left(-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{3/2}}-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}}+\frac{2e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{d^{3/2}}+\frac{e\,\text{PolyLog}\left(2,1-\frac{2}{\sqrt{d-}}\right.}{d^{3/2}}\right.$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*Sqrt[d + e*x]),x]
```

output
```
-((Sqrt[d + e*x]*(a + b*Log[c*x^n]))/(d*x)) + (e*ArcTanh[Sqrt[d + e*x]/Sqr
t[d]]*(a + b*Log[c*x^n]))/d^(3/2) + b*n*(-(Sqrt[d + e*x]/(d*x)) - (e*ArcTa
nh[Sqrt[d + e*x]/Sqrt[d]])/d^(3/2) - (e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]^2)/
d^(3/2) + (2*e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - S
qrt[d + e*x])])/d^(3/2) + (e*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d
+ e*x])])/d^(3/2))
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{2}\sqrt{ex+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^2/(e*x+d)^(1/2),x)
```

Fricas [F]

$$\int \frac{a + b\log(cx^n)}{x^2\sqrt{d + ex}}\,dx = \int \frac{b\log(cx^n) + a}{\sqrt{ex + dx^2}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^(1/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*a)/(e*x^3 + d*x^2), x
)
```

Sympy [F]

$$\int \frac{a + b\log(cx^n)}{x^2\sqrt{d + ex}}\,dx = \int \frac{a + b\log(cx^n)}{x^2\sqrt{d + ex}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*sqrt(d + e*x)), x)
```

Maxima [F]

$$\int \frac{a + b\log(cx^n)}{x^2\sqrt{d + ex}}\,dx = \int \frac{b\log(cx^n) + a}{\sqrt{ex + dx^2}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^(1/2),x, algorithm="maxima")
```

output
```
-1/2*a*(2*sqrt(e*x + d)*e/((e*x + d)*d - d^2) + e*log((sqrt(e*x + d) - sqr
t(d))/(sqrt(e*x + d) + sqrt(d)))/d^(3/2)) + b*integrate((log(c) + log(x^n)
)/(sqrt(e*x + d)*x^2), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex}}\,dx=\int \frac{b\log(cx^n)+a}{\sqrt{ex+d}x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x + d)*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex}}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{x^2\,\sqrt{d+e\,x}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^(1/2)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex}}\,dx$$
$$=\frac{-2\sqrt{ex+d}\,ad-\sqrt{d}\log\left(\sqrt{ex+d}-\sqrt{d}\right)aex+\sqrt{d}\log\left(\sqrt{ex+d}+\sqrt{d}\right)aex+2\left(\int\frac{\sqrt{ex+d}\log(x^nc)}{e\,x^3+d\,x^2}dx\right)b\,d}{2d^2x}$$

input
```
int((a+b*log(c*x^n))/x^2/(e*x+d)^(1/2),x)
```

output
```
( - 2*sqrt(d + e*x)*a*d - sqrt(d)*log(sqrt(d + e*x) - sqrt(d))*a*e*x + sqr
t(d)*log(sqrt(d + e*x) + sqrt(d))*a*e*x + 2*int((sqrt(d + e*x)*log(x**n*c)
)/(d*x**2 + e*x**3),x)*b*d**2*x)/(2*d**2*x)
```

3.150 $\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx$

Optimal result . . . 1267
Mathematica [A] (verified) . . . 1268
Rubi [A] (verified) . . . 1269
Maple [F] . . . 1271
Fricas [F] . . . 1271
Sympy [F] . . . 1271
Maxima [F] . . . 1272
Giac [F] . . . 1272
Mupad [F(-1)] . . . 1272
Reduce [F] . . . 1273

Optimal result

Integrand size = 23, antiderivative size = 304

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx &= -\frac{bn\sqrt{d+ex}}{4dx^2}+\frac{5ben\sqrt{d+ex}}{8d^2x}\\
&+\frac{7be^2n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{8d^{5/2}}+\frac{3be^2n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{4d^{5/2}}\\
&-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2dx^2}+\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4d^2x}\\
&-\frac{3e^2\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{5/2}}\\
&-\frac{3be^2n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{2d^{5/2}}\\
&-\frac{3be^2n\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{4d^{5/2}}\end{aligned}$$

output
```
-1/4*b*n*(e*x+d)^(1/2)/d/x^2+5/8*b*e*n*(e*x+d)^(1/2)/d^2/x+7/8*b*e^2*n*arc
tanh((e*x+d)^(1/2)/d^(1/2))/d^(5/2)+3/4*b*e^2*n*arctanh((e*x+d)^(1/2)/d^(1
/2))^2/d^(5/2)-1/2*(e*x+d)^(1/2)*(a+b*ln(c*x^n))/d/x^2+3/4*e*(e*x+d)^(1/2)
*(a+b*ln(c*x^n))/d^2/x-3/4*e^2*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^
n))/d^(5/2)-3/2*b*e^2*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/
2)-(e*x+d)^(1/2)))/d^(5/2)-3/4*b*e^2*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x
+d)^(1/2)))/d^(5/2)
```

Mathematica [A] (verified)

Time = 0.43 (sec) , antiderivative size = 501, normalized size of antiderivative = 1.65

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx$$
$$= \frac{-8ad^{3/2}\sqrt{d+ex} - 4bd^{3/2}n\sqrt{d+ex} + 12a\sqrt{d}ex\sqrt{d+ex} + 10b\sqrt{d}enx\sqrt{d+ex} + 14be^2nx^2\operatorname{arctanh}\left(\frac{\sqrt{d+}}{\sqrt{d}}\right.}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*Sqrt[d + e*x]),x]
```

output
```
(-8*a*d^(3/2)*Sqrt[d + e*x] - 4*b*d^(3/2)*n*Sqrt[d + e*x] + 12*a*Sqrt[d]*e
*x*Sqrt[d + e*x] + 10*b*Sqrt[d]*e*n*x*Sqrt[d + e*x] + 14*b*e^2*n*x^2*ArcTa
nh[Sqrt[d + e*x]/Sqrt[d]] - 8*b*d^(3/2)*Sqrt[d + e*x]*Log[c*x^n] + 12*b*Sq
rt[d]*e*x*Sqrt[d + e*x]*Log[c*x^n] + 6*a*e^2*x^2*Log[Sqrt[d] - Sqrt[d + e*
x]] + 6*b*e^2*x^2*Log[c*x^n]*Log[Sqrt[d] - Sqrt[d + e*x]] - 3*b*e^2*n*x^2*
Log[Sqrt[d] - Sqrt[d + e*x]]^2 - 6*a*e^2*x^2*Log[Sqrt[d] + Sqrt[d + e*x]]
- 6*b*e^2*x^2*Log[c*x^n]*Log[Sqrt[d] + Sqrt[d + e*x]] + 3*b*e^2*n*x^2*Log[
Sqrt[d] + Sqrt[d + e*x]]^2 + 6*b*e^2*n*x^2*Log[Sqrt[d] + Sqrt[d + e*x]]*Lo
g[1/2 - Sqrt[d + e*x]/(2*Sqrt[d])] - 6*b*e^2*n*x^2*Log[Sqrt[d] - Sqrt[d +
e*x]]*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2] - 6*b*e^2*n*x^2*PolyLog[2, 1/2 -
Sqrt[d + e*x]/(2*Sqrt[d])] + 6*b*e^2*n*x^2*PolyLog[2, (1 + Sqrt[d + e*x]/S
qrt[d])/2])/(16*d^(5/2)*x^2)
```

Rubi [A] (verified)

Time = 0.68 (sec) , antiderivative size = 280, normalized size of antiderivative = 0.92, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)x^2+\sqrt{d}(2d-3ex)\sqrt{d+ex}}{4d^{5/2}x^3}dx-\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{5/2}}+\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4d^2x}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2dx^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)x^2+\sqrt{d}(2d-3ex)\sqrt{d+ex}}{x^3}dx}{4d^{5/2}}-\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{5/2}}+\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4d^2x}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2dx^2}$$

$$\Big\downarrow \text{2010}$$

$$\frac{bn\int\left(\frac{3\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)e^2}{x}-\frac{3\sqrt{d}\sqrt{d+ex}e}{x^2}+\frac{2d^{3/2}\sqrt{d+ex}}{x^3}\right)dx}{4d^{5/2}}-\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{5/2}}+\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4d^2x}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2dx^2}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{5/2}}+\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4d^2x}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2dx^2}+\frac{bn\left(3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2+\frac{7}{2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)-6e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)-\frac{d^{3/2}\sqrt{d+ex}}{x^2}-3e^2\text{Poly}\right.}{4d^{5/2}}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*Sqrt[d + e*x]),x]
```

output
```
-1/2*(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/(d*x^2) + (3*e*Sqrt[d + e*x]*(a +
b*Log[c*x^n]))/(4*d^2*x) - (3*e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Lo
g[c*x^n]))/(4*d^(5/2)) + (b*n*(-((d^(3/2)*Sqrt[d + e*x])/x^2) + (5*Sqrt[d]
*e*Sqrt[d + e*x])/(2*x) + (7*e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/2 + 3*e^2
*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]^2 - 6*e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*L
og[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])] - 3*e^2*PolyLog[2, 1 - (2*Sqrt[d
])/(Sqrt[d] - Sqrt[d + e*x])]))/(4*d^(5/2))
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{3}\sqrt{ex+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^3/(e*x+d)^(1/2),x)
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{3}\sqrt{d+ex}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\sqrt{ex+d}x^{3}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^(1/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*a)/(e*x^4 + d*x^3), x
)
```

Sympy [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{3}\sqrt{d+ex}}\,dx=\int \frac{a+b\log\left(cx^{n}\right)}{x^{3}\sqrt{d+ex}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**3*sqrt(d + e*x)), x)
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx=\int \frac{b\log(cx^n)+a}{\sqrt{ex+dx^3}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^(1/2),x, algorithm="maxima")
```

output
```
1/8*a*(3*e^2*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))/d^(5
/2) + 2*(3*(e*x + d)^(3/2)*e^2 - 5*sqrt(e*x + d)*d*e^2)/((e*x + d)^2*d^2 -
 2*(e*x + d)*d^3 + d^4)) + b*integrate((log(c) + log(x^n))/(sqrt(e*x + d)*
x^3), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx=\int \frac{b\log(cx^n)+a}{\sqrt{ex+dx^3}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x + d)*x^3), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{x^3\,\sqrt{d+e\,x}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^(1/2)), x)
```

Reduce [F]

$$\int \frac{a + b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx$$
$$= \frac{-4\sqrt{ex+d}\,a\,d^2 + 6\sqrt{ex+d}\,adex + 3\sqrt{d}\log\left(\sqrt{ex+d}-\sqrt{d}\right)a\,e^2x^2 - 3\sqrt{d}\log\left(\sqrt{ex+d}+\sqrt{d}\right)a\,e^2x^2}{8d^3x^2}$$

input
```
int((a+b*log(c*x^n))/x^3/(e*x+d)^(1/2),x)
```

output
```
( - 4*sqrt(d + e*x)*a*d**2 + 6*sqrt(d + e*x)*a*d*e*x + 3*sqrt(d)*log(sqrt(
d + e*x) - sqrt(d))*a*e**2*x**2 - 3*sqrt(d)*log(sqrt(d + e*x) + sqrt(d))*a
*e**2*x**2 + 8*int((sqrt(d + e*x)*log(x**n*c))/(d*x**3 + e*x**4),x)*b*d**3
*x**2)/(8*d**3*x**2)
```

3.151 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx$

Optimal result 1274
Mathematica [A] (verified) 1275
Rubi [A] (verified) 1275
Maple [F] 1277
Fricas [A] (verification not implemented) 1277
Sympy [A] (verification not implemented) 1278
Maxima [A] (verification not implemented) 1279
Giac [F] 1280
Mupad [F(-1)] 1280
Reduce [B] (verification not implemented) 1280

Optimal result

Integrand size = 23, antiderivative size = 194

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = -\frac{44bd^2n\sqrt{d+ex}}{5e^4} + \frac{16bdn(d+ex)^{3/2}}{15e^4} - \frac{4bn(d+ex)^{5/2}}{25e^4} + \frac{64bd^{5/2}n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{5e^4} + \frac{2d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex}} + \frac{6d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^4} - \frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{e^4} + \frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}$$

output
```
-44/5*b*d^2*n*(e*x+d)^(1/2)/e^4+16/15*b*d*n*(e*x+d)^(3/2)/e^4-4/25*b*n*(e*
x+d)^(5/2)/e^4+64/5*b*d^(5/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e^4+2*d^3*(
a+b*ln(c*x^n))/e^4/(e*x+d)^(1/2)+6*d^2*(e*x+d)^(1/2)*(a+b*ln(c*x^n))/e^4-2
*d*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^4+2/5*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^4
```

Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 159, normalized size of antiderivative = 0.82

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \frac{480ad^3-592bd^3n+240ad^2ex-536bd^2enx-60ade^2x^2+44bde^2nx^2+30ae^3x}{}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^(3/2),x]
```

output
```
(480*a*d^3 - 592*b*d^3*n + 240*a*d^2*e*x - 536*b*d^2*e*n*x - 60*a*d*e^2*x^
2 + 44*b*d*e^2*n*x^2 + 30*a*e^3*x^3 - 12*b*e^3*n*x^3 + 960*b*d^(5/2)*n*Sqr
t[d + e*x]*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 30*b*(16*d^3 + 8*d^2*e*x - 2*d
*e^2*x^2 + e^3*x^3)*Log[c*x^n])/(75*e^4*Sqrt[d + e*x])
```

Rubi [A] (verified)

Time = 0.52 (sec) , antiderivative size = 180, normalized size of antiderivative = 0.93, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2792, 27, 2123, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx$$

$$\Big\downarrow \textit{2792}$$

$$-bn\int \frac{2\left(16d^3+8exd^2-2e^2x^2d+e^3x^3\right)}{5e^4x\sqrt{d+ex}}dx+\frac{2d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex}}+\frac{6d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^4}-\frac{2d(d+ex)^{3/2}\left(a+b\log(cx^n)\right)}{e^4}+\frac{2(d+ex)^{5/2}\left(a+b\log(cx^n)\right)}{5e^4}$$

$$\Big\downarrow \textit{27}$$

$$-\frac{2bn\int \frac{16d^3+8exd^2-2e^2x^2d+e^3x^3}{x\sqrt{d+ex}}dx}{5e^4}+\frac{2d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex}}+\frac{6d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^4}-\frac{2d(d+ex)^{3/2}\left(a+b\log(cx^n)\right)}{e^4}+\frac{2(d+ex)^{5/2}\left(a+b\log(cx^n)\right)}{5e^4}$$

$$\Big\downarrow \; 2123$$

$$-\frac{2bn\int \left(\frac{16d^3}{x\sqrt{d+ex}}+\frac{11ed^2}{\sqrt{d+ex}}-4e\sqrt{d+ex}d+e(d+ex)^{3/2}\right)dx}{5e^4}+\frac{2d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex}}+\frac{6d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^4}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}$$

$$\Big\downarrow \; 2009$$

$$\frac{2d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex}}+\frac{6d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^4}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}-\frac{2bn\left(-32d^{5/2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+22d^2\sqrt{d+ex}-\frac{8}{3}d(d+ex)^{3/2}+\frac{2}{5}(d+ex)^{5/2}\right)}{5e^4}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^(3/2),x]
```

output
```
(-2*b*n*(22*d^2*Sqrt[d + e*x] - (8*d*(d + e*x)^(3/2))/3 + (2*(d + e*x)^(5/
2))/5 - 32*d^(5/2)*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))/(5*e^4) + (2*d^3*(a +
b*Log[c*x^n]))/(e^4*Sqrt[d + e*x]) + (6*d^2*Sqrt[d + e*x]*(a + b*Log[c*x^n
]))/e^4 - (2*d*(d + e*x)^(3/2)*(a + b*Log[c*x^n]))/e^4 + (2*(d + e*x)^(5/2
)*(a + b*Log[c*x^n]))/(5*e^4)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2123
```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x^3(a+b\ln(c\,x^n))}{(ex+d)^{\frac{3}{2}}}dx$$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

output
```
int(x^3*(a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 432, normalized size of antiderivative = 2.23

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \left[\frac{2\left(240\,(bd^2enx+bd^3n)\sqrt{d}\log\left(\frac{ex+2\,\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)-(296\,bd^3n-240\,ad^3+3\,(\right.}{}\right.$$
$$-\frac{2\left(480\,(bd^2enx+bd^3n)\sqrt{-d}\arctan\left(\frac{\sqrt{-d}}{\sqrt{ex+d}}\right)+(296\,bd^3n-240\,ad^3+3\,(2\,be^3n-5\,ae^3)x^3-2\,(11\,bde^2n\right.}{}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="fricas")
```

output
```
[2/75*(240*(b*d^2*e*n*x + b*d^3*n)*sqrt(d)*log((e*x + 2*sqrt(e*x + d)*sqrt
(d) + 2*d)/x) - (296*b*d^3*n - 240*a*d^3 + 3*(2*b*e^3*n - 5*a*e^3)*x^3 - 2
*(11*b*d*e^2*n - 15*a*d*e^2)*x^2 + 4*(67*b*d^2*e*n - 30*a*d^2*e)*x - 15*(b
*e^3*x^3 - 2*b*d*e^2*x^2 + 8*b*d^2*e*x + 16*b*d^3)*log(c) - 15*(b*e^3*n*x^
3 - 2*b*d*e^2*n*x^2 + 8*b*d^2*e*n*x + 16*b*d^3*n)*log(x))*sqrt(e*x + d))/(
e^5*x + d*e^4), -2/75*(480*(b*d^2*e*n*x + b*d^3*n)*sqrt(-d)*arctan(sqrt(-d
)/sqrt(e*x + d)) + (296*b*d^3*n - 240*a*d^3 + 3*(2*b*e^3*n - 5*a*e^3)*x^3
- 2*(11*b*d*e^2*n - 15*a*d*e^2)*x^2 + 4*(67*b*d^2*e*n - 30*a*d^2*e)*x - 15
*(b*e^3*x^3 - 2*b*d*e^2*x^2 + 8*b*d^2*e*x + 16*b*d^3)*log(c) - 15*(b*e^3*n
*x^3 - 2*b*d*e^2*n*x^2 + 8*b*d^2*e*n*x + 16*b*d^3*n)*log(x))*sqrt(e*x + d)
)/(e^5*x + d*e^4)]
```

Sympy [A] (verification not implemented)

Time = 122.12 (sec) , antiderivative size = 369, normalized size of antiderivative = 1.90

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = a\left(\begin{cases}\frac{2d^3}{e^4\sqrt{d+ex}}+\frac{6d^2\sqrt{d+ex}}{e^4}-\frac{2d(d+ex)^{\frac{3}{2}}}{e^4}+\frac{2(d+ex)^{\frac{5}{2}}}{5e^4} & \text{for } e\neq 0\\ \frac{x^4}{4d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right)$$
$$-bn\left(\begin{cases}-\frac{308d^{\frac{5}{2}}\sqrt{1+\frac{ex}{d}}}{75e^4}-\frac{8d^{\frac{5}{2}}\log\left(\frac{ex}{d}\right)}{5e^4}+\frac{16d^{\frac{5}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{5e^4}-\frac{16d^{\frac{5}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\sqrt{x}}\right)}{e^4}-\frac{56d^{\frac{3}{2}}x\sqrt{1+\frac{ex}{d}}}{75e^3}+\frac{4\sqrt{d}x^2\sqrt{1+\frac{ex}{d}}}{25e^2}+\frac{}{e^{}}\\ \frac{x^4}{16d^{\frac{3}{2}}}\end{cases}\right)$$
$$+b\left(\begin{cases}\frac{2d^3}{e^4\sqrt{d+ex}}+\frac{6d^2\sqrt{d+ex}}{e^4}-\frac{2d(d+ex)^{\frac{3}{2}}}{e^4}+\frac{2(d+ex)^{\frac{5}{2}}}{5e^4} & \text{for } e\neq 0\\ \frac{x^4}{4d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x+d)**(3/2),x)
```

output
```
a*Piecewise((2*d**3/(e**4*sqrt(d + e*x)) + 6*d**2*sqrt(d + e*x)/e**4 - 2*d
*(d + e*x)**(3/2)/e**4 + 2*(d + e*x)**(5/2)/(5*e**4), Ne(e, 0)), (x**4/(4*
d**(3/2)), True)) - b*n*Piecewise((-308*d**(5/2)*sqrt(1 + e*x/d)/(75*e**4)
 - 8*d**(5/2)*log(e*x/d)/(5*e**4) + 16*d**(5/2)*log(sqrt(1 + e*x/d) + 1)/(
5*e**4) - 16*d**(5/2)*asinh(sqrt(d)/(sqrt(e)*sqrt(x)))/e**4 - 56*d**(3/2)*
x*sqrt(1 + e*x/d)/(75*e**3) + 4*sqrt(d)*x**2*sqrt(1 + e*x/d)/(25*e**2) + 1
2*d**3/(e**(9/2)*sqrt(x)*sqrt(d/(e*x) + 1)) + 12*d**2*sqrt(x)/(e**(7/2)*sq
rt(d/(e*x) + 1)), (e > -oo) & (e < oo) & Ne(e, 0)), (x**4/(16*d**(3/2)), T
rue)) + b*Piecewise((2*d**3/(e**4*sqrt(d + e*x)) + 6*d**2*sqrt(d + e*x)/e*
*4 - 2*d*(d + e*x)**(3/2)/e**4 + 2*(d + e*x)**(5/2)/(5*e**4), Ne(e, 0)), (
x**4/(4*d**(3/2)), True))*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 200, normalized size of antiderivative = 1.03

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx =$$

$$-\frac{4}{75}\,bn\left(\frac{120\,d^{\frac{5}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^4}+\frac{3\,(ex+d)^{\frac{5}{2}}-20\,(ex+d)^{\frac{3}{2}}d+165\,\sqrt{ex+d}d^2}{e^4}\right)$$
$$+\frac{2}{5}\,b\left(\frac{(ex+d)^{\frac{5}{2}}}{e^4}-\frac{5\,(ex+d)^{\frac{3}{2}}d}{e^4}+\frac{15\,\sqrt{ex+d}d^2}{e^4}+\frac{5\,d^3}{\sqrt{ex+d}e^4}\right)\log(cx^n)$$
$$+\frac{2}{5}\,a\left(\frac{(ex+d)^{\frac{5}{2}}}{e^4}-\frac{5\,(ex+d)^{\frac{3}{2}}d}{e^4}+\frac{15\,\sqrt{ex+d}d^2}{e^4}+\frac{5\,d^3}{\sqrt{ex+d}e^4}\right)$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="maxima")
```

output
```
-4/75*b*n*(120*d^(5/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt
(d)))/e^4 + (3*(e*x + d)^(5/2) - 20*(e*x + d)^(3/2)*d + 165*sqrt(e*x + d)*
d^2)/e^4) + 2/5*b*((e*x + d)^(5/2)/e^4 - 5*(e*x + d)^(3/2)*d/e^4 + 15*sqrt
(e*x + d)*d^2/e^4 + 5*d^3/(sqrt(e*x + d)*e^4))*log(c*x^n) + 2/5*a*((e*x +
d)^(5/2)/e^4 - 5*(e*x + d)^(3/2)*d/e^4 + 15*sqrt(e*x + d)*d^2/e^4 + 5*d^3/
(sqrt(e*x + d)*e^4))
```

Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x + d)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^{3/2}}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^(3/2),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^(3/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 188, normalized size of antiderivative = 0.97

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \frac{-\frac{64\sqrt{d}\,\sqrt{ex+d}\log\left(\sqrt{ex+d}-\sqrt{d}\right)b\,d^2n}{5} + \frac{32\sqrt{d}\,\sqrt{ex+d}\log(x^nc)b\,d^2}{5} + \frac{32\log(x^nc)b\,d^3}{5} + \frac{16\log(x^nc)b}{5}}{}$$

input
```
int(x^3*(a+b*log(c*x^n))/(e*x+d)^(3/2),x)
```

output

```
(2*( - 480*sqrt(d)*sqrt(d + e*x)*log(sqrt(d + e*x) - sqrt(d))*b*d**2*n + 2
40*sqrt(d)*sqrt(d + e*x)*log(x**n*c)*b*d**2 + 240*log(x**n*c)*b*d**3 + 120
*log(x**n*c)*b*d**2*e*x - 30*log(x**n*c)*b*d*e**2*x**2 + 15*log(x**n*c)*b*
e**3*x**3 + 240*a*d**3 + 120*a*d**2*e*x - 30*a*d*e**2*x**2 + 15*a*e**3*x**
3 - 296*b*d**3*n - 268*b*d**2*e*n*x + 22*b*d*e**2*n*x**2 - 6*b*e**3*n*x**3
))/(75*sqrt(d + e*x)*e**4)
```

3.152 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx$

Optimal result . . . 1282
Mathematica [A] (verified) . . . 1283
Rubi [A] (verified) . . . 1283
Maple [F] . . . 1285
Fricas [A] (verification not implemented) . . . 1286
Sympy [A] (verification not implemented) . . . 1286
Maxima [A] (verification not implemented) . . . 1287
Giac [F] . . . 1288
Mupad [F(-1)] . . . 1288
Reduce [B] (verification not implemented) . . . 1288

Optimal result

Integrand size = 23, antiderivative size = 146

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \frac{20bdn\sqrt{d+ex}}{3e^3} - \frac{4bn(d+ex)^{3/2}}{9e^3} - \frac{32bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{3e^3} - \frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}} - \frac{4d\sqrt{d+ex}(a+b\log(cx^n))}{e^3} + \frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

output

```
20/3*b*d*n*(e*x+d)^(1/2)/e^3-4/9*b*n*(e*x+d)^(3/2)/e^3-32/3*b*d^(3/2)*n*ar
ctanh((e*x+d)^(1/2)/d^(1/2))/e^3-2*d^2*(a+b*ln(c*x^n))/e^3/(e*x+d)^(1/2)-4
*d*(e*x+d)^(1/2)*(a+b*ln(c*x^n))/e^3+2/3*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^3
```

Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 124, normalized size of antiderivative = 0.85

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \frac{-48ad^2+56bd^2n-24adex+52bdenx+6ae^2x^2-4be^2nx^2-96bd^{3/2}n\sqrt{d+e}}{9e^3\sqrt{d+ex}}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^(3/2),x]
```

output
```
(-48*a*d^2 + 56*b*d^2*n - 24*a*d*e*x + 52*b*d*e*n*x + 6*a*e^2*x^2 - 4*b*e^
2*n*x^2 - 96*b*d^(3/2)*n*Sqrt[d + e*x]*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] - 6*
b*(8*d^2 + 4*d*e*x - e^2*x^2)*Log[c*x^n])/(9*e^3*Sqrt[d + e*x])
```

Rubi [A] (verified)

Time = 0.44 (sec) , antiderivative size = 146, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.261, Rules used = {2792, 27, 1192, 25, 1467, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{2(8d^2+4exd-e^2x^2)}{3e^3x\sqrt{d+ex}}dx-\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}}-\frac{4d\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{27}$$

$$\frac{2bn\int \frac{8d^2+4exd-e^2x^2}{x\sqrt{d+ex}}dx}{3e^3}-\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}}-\frac{4d\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{1192}$$

$$\frac{4bn\int \frac{3d^2e^2-(d+ex)^2e^2+6d(d+ex)e^2}{ex}d\sqrt{d+ex}}{3e^5}-\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}}-\frac{4d\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{25}$$

$$-\frac{4bn\int -\frac{3d^2e^2-(d+ex)^2e^2+6d(d+ex)e^2}{ex}d\sqrt{d+ex}}{3e^5}-\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}}-\frac{4d\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{1467}$$

$$-\frac{4bn\int \left(-\frac{8ed^2}{x}-5e^2d+e^2(d+ex)\right)d\sqrt{d+ex}}{3e^5}-\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}}-\frac{4d\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}}-\frac{4d\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{4bn\left(-8d^{3/2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)-\frac{1}{3}e^2(d+ex)^{3/2}+5de^2\sqrt{d+ex}\right)}{3e^5}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^(3/2),x]
```

output
```
(4*b*n*(5*d*e^2*Sqrt[d + e*x] - (e^2*(d + e*x)^(3/2))/3 - 8*d^(3/2)*e^2*Ar
cTanh[Sqrt[d + e*x]/Sqrt[d]]))/(3*e^5) - (2*d^2*(a + b*Log[c*x^n]))/(e^3*S
qrt[d + e*x]) - (4*d*Sqrt[d + e*x]*(a + b*Log[c*x^n]))/e^3 + (2*(d + e*x)^
(3/2)*(a + b*Log[c*x^n]))/(3*e^3)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1192
```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[2/e^(n + 2*p + 1)   Subst[Int[x^(
2*m + 1)*(e*f - d*g + g*x^2)^n*(c*d^2 - b*d*e + a*e^2 - (2*c*d - b*e)*x^2 +
 c*x^4)^p, x], x, Sqrt[d + e*x]], x] /; FreeQ[{a, b, c, d, e, f, g}, x] &&
IGtQ[p, 0] && ILtQ[n, 0] && IntegerQ[m + 1/2]
```

rule 1467
```
Int[((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.),
 x_Symbol] :> Int[ExpandIntegrand[(d + e*x^2)^q*(a + b*x^2 + c*x^4)^p, x],
x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e
 + a*e^2, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x^2(a+b\ln(c\,x^n))}{(ex+d)^{\frac{3}{2}}}dx$$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

output
```
int(x^2*(a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 327, normalized size of antiderivative = 2.24

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \left[\frac{2\left(24\,(bdenx+bd^2n)\sqrt{d}\log\left(\frac{ex-2\,\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)+(28\,bd^2n-24\,ad^2-(2\,be^2n\right.}{}\right.$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="fricas")
```

output
```
[2/9*(24*(b*d*e*n*x + b*d^2*n)*sqrt(d)*log((e*x - 2*sqrt(e*x + d)*sqrt(d)
+ 2*d)/x) + (28*b*d^2*n - 24*a*d^2 - (2*b*e^2*n - 3*a*e^2)*x^2 + 2*(13*b*d
*e*n - 6*a*d*e)*x + 3*(b*e^2*x^2 - 4*b*d*e*x - 8*b*d^2)*log(c) + 3*(b*e^2*
n*x^2 - 4*b*d*e*n*x - 8*b*d^2*n)*log(x))*sqrt(e*x + d))/(e^4*x + d*e^3), 2
/9*(48*(b*d*e*n*x + b*d^2*n)*sqrt(-d)*arctan(sqrt(-d)/sqrt(e*x + d)) + (28
*b*d^2*n - 24*a*d^2 - (2*b*e^2*n - 3*a*e^2)*x^2 + 2*(13*b*d*e*n - 6*a*d*e)
*x + 3*(b*e^2*x^2 - 4*b*d*e*x - 8*b*d^2)*log(c) + 3*(b*e^2*n*x^2 - 4*b*d*e
*n*x - 8*b*d^2*n)*log(x))*sqrt(e*x + d))/(e^4*x + d*e^3)]
```

Sympy [A] (verification not implemented)

Time = 141.32 (sec) , antiderivative size = 308, normalized size of antiderivative = 2.11

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = a\left(\begin{cases} -\frac{2d^2}{e^3\sqrt{d+ex}}-\frac{4d\sqrt{d+ex}}{e^3}+\frac{2(d+ex)^{\frac{3}{2}}}{3e^3} & \text{for } e\neq 0\\ \frac{x^3}{3d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right)$$
$$-bn\left(\begin{cases} \frac{16d^{\frac{3}{2}}\sqrt{1+\frac{ex}{d}}}{9e^3}+\frac{2d^{\frac{3}{2}}\log\left(\frac{ex}{d}\right)}{3e^3}-\frac{4d^{\frac{3}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{3e^3}+\frac{12d^{\frac{3}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\sqrt{x}}\right)}{e^3}+\frac{4\sqrt{d}x\sqrt{1+\frac{ex}{d}}}{9e^2}-\frac{8d^2}{e^{\frac{7}{2}}\sqrt{x}\sqrt{\frac{d}{ex}+1}}-\frac{8d\sqrt{x}}{e^{\frac{5}{2}}\sqrt{\frac{d}{ex}}} \\ \frac{x^3}{9d^{\frac{3}{2}}} \end{cases}\right.$$
$$+b\left(\begin{cases} -\frac{2d^2}{e^3\sqrt{d+ex}}-\frac{4d\sqrt{d+ex}}{e^3}+\frac{2(d+ex)^{\frac{3}{2}}}{3e^3} & \text{for } e\neq 0\\ \frac{x^3}{3d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x+d)**(3/2),x)
```

output
```
a*Piecewise((-2*d**2/(e**3*sqrt(d + e*x)) - 4*d*sqrt(d + e*x)/e**3 + 2*(d
+ e*x)**(3/2)/(3*e**3), Ne(e, 0)), (x**3/(3*d**(3/2)), True)) - b*n*Piecew
ise((16*d**(3/2)*sqrt(1 + e*x/d)/(9*e**3) + 2*d**(3/2)*log(e*x/d)/(3*e**3)
 - 4*d**(3/2)*log(sqrt(1 + e*x/d) + 1)/(3*e**3) + 12*d**(3/2)*asinh(sqrt(d
)/(sqrt(e)*sqrt(x)))/e**3 + 4*sqrt(d)*x*sqrt(1 + e*x/d)/(9*e**2) - 8*d**2/
(e**(7/2)*sqrt(x)*sqrt(d/(e*x) + 1)) - 8*d*sqrt(x)/(e**(5/2)*sqrt(d/(e*x)
+ 1)), (e > -oo) & (e < oo) & Ne(e, 0)), (x**3/(9*d**(3/2)), True)) + b*Pi
ecewise((-2*d**2/(e**3*sqrt(d + e*x)) - 4*d*sqrt(d + e*x)/e**3 + 2*(d + e*
x)**(3/2)/(3*e**3), Ne(e, 0)), (x**3/(3*d**(3/2)), True))*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 157, normalized size of antiderivative = 1.08

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \frac{4}{9}\,bn\left(\frac{12\,d^{\frac{3}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^3} - \frac{(ex+d)^{\frac{3}{2}} - 15\,\sqrt{ex+d}d}{e^3}\right) + \frac{2}{3}\,b\left(\frac{(ex+d)^{\frac{3}{2}}}{e^3} - \frac{6\,\sqrt{ex+d}d}{e^3} - \frac{3\,d^2}{\sqrt{ex+d}e^3}\right)\log(cx^n) + \frac{2}{3}\,a\left(\frac{(ex+d)^{\frac{3}{2}}}{e^3} - \frac{6\,\sqrt{ex+d}d}{e^3} - \frac{3\,d^2}{\sqrt{ex+d}e^3}\right)$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="maxima")
```

output
```
4/9*b*n*(12*d^(3/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)
))/e^3 - ((e*x + d)^(3/2) - 15*sqrt(e*x + d)*d)/e^3) + 2/3*b*((e*x + d)^(3
/2)/e^3 - 6*sqrt(e*x + d)*d/e^3 - 3*d^2/(sqrt(e*x + d)*e^3))*log(c*x^n) +
2/3*a*((e*x + d)^(3/2)/e^3 - 6*sqrt(e*x + d)*d/e^3 - 3*d^2/(sqrt(e*x + d)*
e^3))
```

Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x + d)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^{3/2}}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^(3/2),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^(3/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 141, normalized size of antiderivative = 0.97

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \frac{\frac{32\sqrt{d}\,\sqrt{ex+d}\log\left(\sqrt{ex+d}-\sqrt{d}\right)bdn}{3} - \frac{16\sqrt{d}\,\sqrt{ex+d}\log(x^n c)bd}{3} - \frac{16\log(x^n c)b\,d^2}{3} - \frac{8\log(x^n c)bdex}{3} + \cdots}{\sqrt{ex+d}\,e^3}$$

input
```
int(x^2*(a+b*log(c*x^n))/(e*x+d)^(3/2),x)
```

output
```
(2*(48*sqrt(d)*sqrt(d + e*x)*log(sqrt(d + e*x) - sqrt(d))*b*d*n - 24*sqrt(
d)*sqrt(d + e*x)*log(x**n*c)*b*d - 24*log(x**n*c)*b*d**2 - 12*log(x**n*c)*
b*d*e*x + 3*log(x**n*c)*b*e**2*x**2 - 24*a*d**2 - 12*a*d*e*x + 3*a*e**2*x*
*2 + 28*b*d**2*n + 26*b*d*e*n*x - 2*b*e**2*n*x**2))/(9*sqrt(d + e*x)*e**3)
```

3.153 $\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}} \, dx$

Optimal result 1289
Mathematica [A] (verified) 1289
Rubi [A] (verified) 1290
Maple [F] 1292
Fricas [A] (verification not implemented) 1292
Sympy [A] (verification not implemented) 1293
Maxima [A] (verification not implemented) 1293
Giac [F] 1294
Mupad [F(-1)] 1294
Reduce [B] (verification not implemented) 1294

Optimal result

Integrand size = 21, antiderivative size = 94

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}} \, dx = -\frac{4bn\sqrt{d+ex}}{e^2} + \frac{8b\sqrt{d}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{e^2} + \frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}} + \frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e^2}$$

output
```
-4*b*n*(e*x+d)^(1/2)/e^2+8*b*d^(1/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e^2+
2*d*(a+b*ln(c*x^n))/e^2/(e*x+d)^(1/2)+2*(e*x+d)^(1/2)*(a+b*ln(c*x^n))/e^2
```

Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 83, normalized size of antiderivative = 0.88

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}} \, dx = \frac{2\left(2ad-2bdn+aex-2benx+4b\sqrt{d}n\sqrt{d+ex}\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+b(2d+ex)\,\mathrm{l}\ldots\right.}{e^2\sqrt{d+ex}}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x)^(3/2),x]
```

output
```
(2*(2*a*d - 2*b*d*n + a*e*x - 2*b*e*n*x + 4*b*Sqrt[d]*n*Sqrt[d + e*x]*ArcT
anh[Sqrt[d + e*x]/Sqrt[d]] + b*(2*d + e*x)*Log[c*x^n]))/(e^2*Sqrt[d + e*x]
)
```

Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 92, normalized size of antiderivative = 0.98, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.238$, Rules used = {2792, 27, 90, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}}dx$$

$$\Big\downarrow \text{ 2792}$$

$$-bn\int \frac{2(2d+ex)}{e^2x\sqrt{d+ex}}dx+\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e^2}+\frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 27}$$

$$-\frac{2bn\int \frac{2d+ex}{x\sqrt{d+ex}}dx}{e^2}+\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e^2}+\frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 90}$$

$$-\frac{2bn\left(2d\int \frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)}{e^2}+\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e^2}+\frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 73}$$

$$-\frac{2bn\left(\frac{4d\int \frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)}{e^2}+\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e^2}+\frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 221}$$

$$\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e^2}+\frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}}-\frac{2bn\left(2\sqrt{d+ex}-4\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e^2}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x)^(3/2),x]
```

output
```
(-2*b*n*(2*Sqrt[d + e*x] - 4*Sqrt[d]*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))/e^2
+ (2*d*(a + b*Log[c*x^n]))/(e^2*Sqrt[d + e*x]) + (2*Sqrt[d + e*x]*(a + b*L
og[c*x^n]))/e^2
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x(a+b\ln(c\,x^{n}))}{(ex+d)^{\frac{3}{2}}}dx$$

input
```
int(x*(a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

output
```
int(x*(a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 220, normalized size of antiderivative = 2.34

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \left[\frac{2\left(2\,(benx+bdn)\sqrt{d}\log\left(\frac{ex+2\,\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)-(2\,bdn-2\,ad+(2\,ben-ae)x-\right.}{e^3x+de^2}\right.$$
$$-\frac{2\left(4\,(benx+bdn)\sqrt{-d}\arctan\left(\frac{\sqrt{-d}}{\sqrt{ex+d}}\right)+(2\,bdn-2\,ad+(2\,ben-ae)x-(bex+2\,bd)\log(c)-(benx+\right.}{e^3x+de^2}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="fricas")
```

output
```
[2*(2*(b*e*n*x + b*d*n)*sqrt(d)*log((e*x + 2*sqrt(e*x + d)*sqrt(d) + 2*d)/
x) - (2*b*d*n - 2*a*d + (2*b*e*n - a*e)*x - (b*e*x + 2*b*d)*log(c) - (b*e*
n*x + 2*b*d*n)*log(x))*sqrt(e*x + d))/(e^3*x + d*e^2), -2*(4*(b*e*n*x + b*
d*n)*sqrt(-d)*arctan(sqrt(-d)/sqrt(e*x + d)) + (2*b*d*n - 2*a*d + (2*b*e*n
 - a*e)*x - (b*e*x + 2*b*d)*log(c) - (b*e*n*x + 2*b*d*n)*log(x))*sqrt(e*x
+ d))/(e^3*x + d*e^2)]
```

Sympy [A] (verification not implemented)

Time = 93.53 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.88

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = a\left(\begin{cases} \frac{2d}{e^2\sqrt{d+ex}}+\frac{2\sqrt{d+ex}}{e^2} & \text{for } e\neq 0 \\ \frac{x^2}{2d^{\frac{3}{2}}} & \text{otherwise} \end{cases}\right) - bn\left(\begin{cases} -\frac{8\sqrt{d}\,\mathrm{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\sqrt{x}}\right)}{e^2}+\frac{4d}{e^{\frac{5}{2}}\sqrt{x}\sqrt{\frac{d}{ex}+1}}+\frac{4\sqrt{x}}{e^{\frac{3}{2}}\sqrt{\frac{d}{ex}+1}} & \text{for } e>-\infty\wedge e<\infty\wedge e\neq 0 \\ \frac{x^2}{4d^{\frac{3}{2}}} & \text{otherwise} \end{cases}\right) + b\left(\begin{cases} \frac{2d}{e^2\sqrt{d+ex}}+\frac{2\sqrt{d+ex}}{e^2} & \text{for } e\neq 0 \\ \frac{x^2}{2d^{\frac{3}{2}}} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x+d)**(3/2),x)
```

output
```
a*Piecewise((2*d/(e**2*sqrt(d + e*x)) + 2*sqrt(d + e*x)/e**2, Ne(e, 0)), (
x**2/(2*d**(3/2)), True)) - b*n*Piecewise((-8*sqrt(d)*asinh(sqrt(d)/(sqrt(
e)*sqrt(x)))/e**2 + 4*d/(e**(5/2)*sqrt(x)*sqrt(d/(e*x) + 1)) + 4*sqrt(x)/(
e**(3/2)*sqrt(d/(e*x) + 1)), (e > -oo) & (e < oo) & Ne(e, 0)), (x**2/(4*d*
*(3/2)), True)) + b*Piecewise((2*d/(e**2*sqrt(d + e*x)) + 2*sqrt(d + e*x)/
e**2, Ne(e, 0)), (x**2/(2*d**(3/2)), True))*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.19

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = -4\,bn\left(\frac{\sqrt{d}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^2}+\frac{\sqrt{ex+d}}{e^2}\right) + 2\,b\left(\frac{\sqrt{ex+d}}{e^2}+\frac{d}{\sqrt{ex+d}e^2}\right)\log(cx^n)+2\,a\left(\frac{\sqrt{ex+d}}{e^2}+\frac{d}{\sqrt{ex+d}e^2}\right)$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="maxima")
```

output
```
-4*b*n*(sqrt(d)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))/e
^2 + sqrt(e*x + d)/e^2) + 2*b*(sqrt(e*x + d)/e^2 + d/(sqrt(e*x + d)*e^2))*
log(c*x^n) + 2*a*(sqrt(e*x + d)/e^2 + d/(sqrt(e*x + d)*e^2))
```

Giac [F]

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx=\int \frac{(b\log(cx^n)+a)x}{(ex+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x + d)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx=\int \frac{x\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^{3/2}}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x)^(3/2),x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x)^(3/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 94, normalized size of antiderivative = 1.00

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx=\frac{-8\sqrt{d}\,\sqrt{ex+d}\log\left(\sqrt{ex+d}-\sqrt{d}\right)bn+4\sqrt{d}\,\sqrt{ex+d}\log(x^nc)\,b+4\log(x^nc)\,b}{\sqrt{ex+d}\,e^2}$$

input
```
int(x*(a+b*log(c*x^n))/(e*x+d)^(3/2),x)
```

output
```
(2*( - 4*sqrt(d)*sqrt(d + e*x)*log(sqrt(d + e*x) - sqrt(d))*b*n + 2*sqrt(d
)*sqrt(d + e*x)*log(x**n*c)*b + 2*log(x**n*c)*b*d + log(x**n*c)*b*e*x + 2*
a*d + a*e*x - 2*b*d*n - 2*b*e*n*x))/(sqrt(d + e*x)*e**2)
```

3.154 $\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx$

Optimal result 1296
Mathematica [A] (verified) 1296
Rubi [A] (verified) 1297
Maple [F] 1298
Fricas [A] (verification not implemented) 1299
Sympy [A] (verification not implemented) 1299
Maxima [A] (verification not implemented) 1300
Giac [A] (verification not implemented) 1300
Mupad [F(-1)] 1300
Reduce [B] (verification not implemented) 1301

Optimal result

Integrand size = 20, antiderivative size = 53

$$\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx = -\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e} - \frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}$$

output
```
-4*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))/d^(1/2)/e-2*(a+b*ln(c*x^n))/e/(e*x+d
)^(1/2)
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.00

$$\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx = -\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e} - \frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x)^(3/2),x]
```

output
```
(-4*b*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(Sqrt[d]*e) - (2*(a + b*Log[c*x^n]
))/(e*Sqrt[d + e*x])
```

Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.150, Rules used = {2756, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx$$

$$\Big\downarrow \text{ 2756}$$

$$\frac{2bn\int \frac{1}{x\sqrt{d+ex}}dx}{e}-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 73}$$

$$\frac{4bn\int \frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e^2}-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 221}$$

$$-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x)^(3/2),x]
```

output
```
(-4*b*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(Sqrt[d]*e) - (2*(a + b*Log[c*x^n]
))/(e*Sqrt[d + e*x])
```

Defintions of rubi rules used

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{\left(ex+d\right)^{\frac{3}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 152, normalized size of antiderivative = 2.87

$$\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx = \left[\frac{2\left((benx+bdn)\sqrt{d}\log\left(\frac{ex-2\sqrt{ex+d}\sqrt{d}+2d}{x}\right)-(bdn\log(x)+bd\log(c)+ad)\sqrt{ex+\right.}{de^2x+d^2e}\right.$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="fricas")
```

output
```
[2*((b*e*n*x + b*d*n)*sqrt(d)*log((e*x - 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x)
 - (b*d*n*log(x) + b*d*log(c) + a*d)*sqrt(e*x + d))/(d*e^2*x + d^2*e), 2*(
2*(b*e*n*x + b*d*n)*sqrt(-d)*arctan(sqrt(-d)/sqrt(e*x + d)) - (b*d*n*log(x
) + b*d*log(c) + a*d)*sqrt(e*x + d))/(d*e^2*x + d^2*e)]
```

Sympy [A] (verification not implemented)

Time = 3.94 (sec) , antiderivative size = 88, normalized size of antiderivative = 1.66

$$\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx = a\left(\begin{cases}-\frac{2}{e\sqrt{d+ex}} & \text{for } e\neq 0\\ \frac{x}{d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right) - bn\left(\begin{cases}\frac{4\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\sqrt{x}}\right)}{\sqrt{d}e} & \text{for } e>-\infty \wedge e<\infty \wedge e\neq 0\\ \frac{x}{d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right) + b\left(\begin{cases}-\frac{2}{e\sqrt{d+ex}} & \text{for } e\neq 0\\ \frac{x}{d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((a+b*ln(c*x**n))/(e*x+d)**(3/2),x)
```

output
```
a*Piecewise((-2/(e*sqrt(d + e*x)), Ne(e, 0)), (x/d**(3/2), True)) - b*n*Pi
ecewise((4*asinh(sqrt(d)/(sqrt(e)*sqrt(x)))/(sqrt(d)*e), (e > -oo) & (e <
oo) & Ne(e, 0)), (x/d**(3/2), True)) + b*Piecewise((-2/(e*sqrt(d + e*x)),
Ne(e, 0)), (x/d**(3/2), True))*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.34

$$\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx = \frac{2\,bn\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{\sqrt{d}e} - \frac{2\,b\log(cx^n)}{\sqrt{ex+d}e} - \frac{2\,a}{\sqrt{ex+d}e}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="maxima")
```

output
```
2*b*n*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))/(sqrt(d)*e)
 - 2*b*log(c*x^n)/(sqrt(e*x + d)*e) - 2*a/(sqrt(e*x + d)*e)
```

Giac [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.34

$$\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx = \frac{4\,bn\arctan\left(\frac{\sqrt{ex+d}}{\sqrt{-d}}\right)}{\sqrt{-d}e} - \frac{2\,bn\log(ex)}{\sqrt{ex+d}e} + \frac{2\,(bn\log(e)-b\log(c)-a)}{\sqrt{ex+d}e}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="giac")
```

output
```
4*b*n*arctan(sqrt(e*x + d)/sqrt(-d))/(sqrt(-d)*e) - 2*b*n*log(e*x)/(sqrt(e
*x + d)*e) + 2*(b*n*log(e) - b*log(c) - a)/(sqrt(e*x + d)*e)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{(d+e\,x)^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x)^(3/2),x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x)^(3/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 72, normalized size of antiderivative = 1.36

$$\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx = \frac{4\sqrt{d}\,\sqrt{ex+d}\log\left(\sqrt{ex+d}-\sqrt{d}\right)bn-2\sqrt{d}\,\sqrt{ex+d}\log(x^nc)\,b-2\log(x^nc)\,bd-}{\sqrt{ex+d}\,de}$$

input
```
int((a+b*log(c*x^n))/(e*x+d)^(3/2),x)
```

output
```
(2*(2*sqrt(d)*sqrt(d + e*x)*log(sqrt(d + e*x) - sqrt(d))*b*n - sqrt(d)*sqr
t(d + e*x)*log(x**n*c)*b - log(x**n*c)*b*d - a*d))/(sqrt(d + e*x)*d*e)
```

3.155 $\int \frac{a+b\log(cx^n)}{x(d+ex)^{3/2}}\,dx$

Optimal result 1302
Mathematica [A] (verified) 1303
Rubi [A] (verified) 1303
Maple [F] 1308
Fricas [F] 1308
Sympy [F] 1309
Maxima [F] 1309
Giac [F] 1310
Mupad [F(-1)] 1310
Reduce [F] 1310

Optimal result

Integrand size = 23, antiderivative size = 201

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^{3/2}}\,dx = \frac{4bn\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}} + \frac{2bn\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{3/2}} + \frac{2(a+b\log(cx^n))}{d\sqrt{d+ex}} - \frac{2\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}} - \frac{4bn\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{d^{3/2}} - \frac{2bn\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{d^{3/2}}$$

output
```
4*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))/d^(3/2)+2*b*n*arctanh((e*x+d)^(1/2)/d
^(1/2))^2/d^(3/2)+2*(a+b*ln(c*x^n))/d/(e*x+d)^(1/2)-2*arctanh((e*x+d)^(1/2
)/d^(1/2))*(a+b*ln(c*x^n))/d^(3/2)-4*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln
(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(3/2)-2*b*n*polylog(2,1-2*d^(1/2)/(d
^(1/2)-(e*x+d)^(1/2)))/d^(3/2)
```

Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 295, normalized size of antiderivative = 1.47

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^{3/2}}\,dx = \frac{8bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+\frac{4\sqrt{d}(a+b\log(cx^n))}{\sqrt{d+ex}}+2(a+b\log(cx^n))\log\left(\sqrt{d}-\sqrt{d+ex}\right)-2}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x)^(3/2)),x]
```

output
```
(8*b*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + (4*Sqrt[d]*(a + b*Log[c*x^n]))/Sqr
t[d + e*x] + 2*(a + b*Log[c*x^n])*Log[Sqrt[d] - Sqrt[d + e*x]] - 2*(a + b*
Log[c*x^n])*Log[Sqrt[d] + Sqrt[d + e*x]] - b*n*(Log[Sqrt[d] - Sqrt[d + e*x
]]*(Log[Sqrt[d] - Sqrt[d + e*x]] + 2*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2]) +
 2*PolyLog[2, 1/2 - Sqrt[d + e*x]/(2*Sqrt[d])]) + b*n*(Log[Sqrt[d] + Sqrt[
d + e*x]]*(Log[Sqrt[d] + Sqrt[d + e*x]] + 2*Log[1/2 - Sqrt[d + e*x]/(2*Sqr
t[d])]) + 2*PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2]))/(2*d^(3/2))
```

Rubi [A] (verified)

Time = 1.07 (sec) , antiderivative size = 209, normalized size of antiderivative = 1.04, number of steps used = 15, number of rules used = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.609$, Rules used = {2789, 2756, 73, 221, 2790, 27, 7267, 25, 6546, 27, 6470, 27, 2849, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^{3/2}}\,dx$$

$$\Big\downarrow \; 2789$$

$$\frac{\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}dx}{d}$$

$$\Big\downarrow \; 2756$$

$$\frac{\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx}{d}-\frac{e\left(\frac{2bn\int \frac{1}{x\sqrt{d+ex}}dx}{e}-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}\right)}{d}$$

$$\Big\downarrow \; 73$$

$$\frac{\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx}{d}-\frac{e\left(\frac{4bn\int \frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e^2}-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}\right)}{d}$$

$$\Big\downarrow \; 221$$

$$\frac{\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx}{d}-\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$$\Big\downarrow \; 2790$$

$$\frac{-bn\int -\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}x}dx-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}}{d}-\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$$\Big\downarrow \; 27$$

$$\frac{\frac{2bn\int \frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}}{d}-\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$$\Big\downarrow \; 7267$$

$$\frac{\frac{4bn\int \frac{\sqrt{d+ex}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}}{d}-\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$$\Big\downarrow \; 25$$

$$\frac{-\frac{4bn\int -\frac{\sqrt{d+ex}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}}{d}-\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$$\Big\downarrow \; 6546$$

$$\frac{\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\frac{\int \frac{\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{d+ex}}d\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}}{d}-\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$$\Big\downarrow \; 27$$

$$\frac{\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\int \frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{d+ex}}d\sqrt{d+ex}\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}}{d}-\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$$\Big\downarrow \; 6470$$

$$\frac{\frac{4bn\left(\frac{\int -\frac{d\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}}{d}-\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$$\Big\downarrow \; 27$$

$$\frac{\frac{4bn\left(\sqrt{d}\int -\frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{ex}d\sqrt{d+ex}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}}{d}-\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$$\Big\downarrow \; 2849$$

$$\frac{\frac{4bn\left(-\sqrt{d}\int \frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}}d\frac{1}{\sqrt{d}-\sqrt{d+ex}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(}{\sqrt{d}}}{d}$$
$$\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$$\Big\downarrow \; 2752$$

$$\frac{\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)-\frac{1}{2}\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}}{d}-$$
$$\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x)^(3/2)),x]
```

output
```
-((e*((-4*b*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(Sqrt[d]*e) - (2*(a + b*Log[
c*x^n]))/(e*Sqrt[d + e*x])))/d) + ((-2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a +
 b*Log[c*x^n]))/Sqrt[d] + (4*b*n*(ArcTanh[Sqrt[d + e*x]/Sqrt[d]]^2/2 - Arc
Tanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])] - P
olyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])]/2))/Sqrt[d])/d
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

rule 2849
```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Simp
[-e/g   Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[
{c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

rule 6470
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Simp[b*c
*(p/e)   Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^
2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2
, 0]
```

rule 6546
```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Simp[1/
(c*d)   Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

rule 7267
```
Int[u_, x_Symbol] :> With[{lst = SubstForFractionalPowerOfLinear[u, x]}, Si
mp[lst[[2]]*lst[[4]]   Subst[Int[lst[[1]], x], x, lst[[3]]^(1/lst[[2]])], x
] /;  !FalseQ[lst] && SubstForFractionalPowerQ[u, lst[[3]], x]]
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x\left(ex+d\right)^{\frac{3}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x/(e*x+d)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(e*x+d)^(3/2),x)
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x(d+ex)^{3/2}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\left(ex+d\right)^{\frac{3}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^(3/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*a)/(e^2*x^3 + 2*d*e*x
^2 + d^2*x), x)
```

Sympy [F]

$$\int \frac{a + b\log(cx^n)}{x(d + ex)^{3/2}}\,dx = \int \frac{a + b\log(cx^n)}{x\,(d + ex)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x+d)**(3/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x*(d + e*x)**(3/2)), x)
```

Maxima [F]

$$\int \frac{a + b\log(cx^n)}{x(d + ex)^{3/2}}\,dx = \int \frac{b\log(cx^n) + a}{(ex + d)^{\frac{3}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^(3/2),x, algorithm="maxima")
```

output
```
a*(log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))/d^(3/2) + 2/(s
qrt(e*x + d)*d)) + b*integrate((log(c) + log(x^n))/((e*x^2 + d*x)*sqrt(e*x
 + d)), x)
```

Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x(d+ex)^{3/2}}\,dx = \int \frac{b\log\left(cx^n\right)+a}{(ex+d)^{\frac{3}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^(3/2)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x(d+ex)^{3/2}}\,dx = \int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,{\left(d+e\,x\right)}^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x)^(3/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x)^(3/2)), x)
```

Reduce [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x(d+ex)^{3/2}}\,dx = \frac{\sqrt{d}\,\sqrt{ex+d}\log\left(\sqrt{ex+d}-\sqrt{d}\right)a-\sqrt{d}\,\sqrt{ex+d}\log\left(\sqrt{ex+d}+\sqrt{d}\right)a+\sqrt{ex+}}{\sqrt{ex+d}\,d^2}$$

input
```
int((a+b*log(c*x^n))/x/(e*x+d)^(3/2),x)
```

output
```
(sqrt(d)*sqrt(d + e*x)*log(sqrt(d + e*x) - sqrt(d))*a - sqrt(d)*sqrt(d + e
*x)*log(sqrt(d + e*x) + sqrt(d))*a + sqrt(d + e*x)*int((sqrt(d + e*x)*log(
x**n*c))/(d**2*x + 2*d*e*x**2 + e**2*x**3),x)*b*d**2 + 2*a*d)/(sqrt(d + e*
x)*d**2)
```

3.156 $\int \frac{a+b\log(cx^n)}{x^2(d+ex)^{3/2}}\,dx$

Optimal result 1311
Mathematica [A] (verified) 1312
Rubi [A] (verified) 1313
Maple [F] 1315
Fricas [F] 1315
Sympy [F] 1316
Maxima [F] 1316
Giac [F] 1316
Mupad [F(-1)] 1317
Reduce [F] 1317

Optimal result

Integrand size = 23, antiderivative size = 253

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^2(d+ex)^{3/2}}\,dx = & -\frac{bn\sqrt{d+ex}}{d^2x}-\frac{5ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{5/2}} \\ & -\frac{3ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{5/2}}-\frac{3e(a+b\log(cx^n))}{d^2\sqrt{d+ex}} \\ & -\frac{a+b\log(cx^n)}{dx\sqrt{d+ex}}+\frac{3e\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{5/2}} \\ & +\frac{6ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{d^{5/2}}+\frac{3ben\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{d^{5/2}}\end{aligned}$$

output
```
-b*n*(e*x+d)^(1/2)/d^2/x-5*b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))/d^(5/2)-3*
b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))^2/d^(5/2)-3*e*(a+b*ln(c*x^n))/d^2/(e*
x+d)^(1/2)-(a+b*ln(c*x^n))/d/x/(e*x+d)^(1/2)+3*e*arctanh((e*x+d)^(1/2)/d^(
1/2))*(a+b*ln(c*x^n))/d^(5/2)+6*b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*
d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(5/2)+3*b*e*n*polylog(2,1-2*d^(1/2)/(d^
(1/2)-(e*x+d)^(1/2)))/d^(5/2)
```

Mathematica [A] (verified)

Time = 0.55 (sec) , antiderivative size = 506, normalized size of antiderivative = 2.00

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^{3/2}}\,dx = 2e\left(-\frac{2bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{5/2}} + \frac{bn\left(\frac{1}{\sqrt{d}-\sqrt{d+ex}}-\frac{\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}\right)}{4d^2} - \frac{bn\left(\frac{1}{\sqrt{d}+\sqrt{d+ex}}+\frac{\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}\right)}{4d^2} - \frac{a+b\log(cx^n)}{d^2\sqrt{d+ex}} + \frac{a+b\log(cx^n)}{4d^2\left(\sqrt{d}-\sqrt{d+ex}\right)} - \frac{a+b\log(cx^n)}{4d^2\left(\sqrt{d}+\sqrt{d+ex}\right)} - \frac{3(a+b\log(cx^n))\log\left(\sqrt{d}-\sqrt{d+ex}\right)}{4d^{5/2}} + \frac{3(a+b\log(cx^n))\log\left(\sqrt{d}+\sqrt{d+ex}\right)}{4d^{5/2}} + \frac{3bn\left(\log^2\left(\sqrt{d}-\sqrt{d+ex}\right)+2\log\left(\sqrt{d}-\sqrt{d+ex}\right)\log\left(\frac{\sqrt{d}+\sqrt{d+ex}}{2\sqrt{d}}\right)+2\operatorname{PolyLog}\left(2,\frac{\sqrt{d}-\sqrt{d+ex}}{2\sqrt{d}}\right)\right)}{8d^{5/2}} - \frac{3bn\left(2\log\left(\frac{\sqrt{d}-\sqrt{d+ex}}{2\sqrt{d}}\right)\log\left(\sqrt{d}+\sqrt{d+ex}\right)+\log^2\left(\sqrt{d}+\sqrt{d+ex}\right)+2\operatorname{PolyLog}\left(2,\frac{\sqrt{d}+\sqrt{d+ex}}{2\sqrt{d}}\right)\right)}{8d^{5/2}}\right)$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x)^(3/2)),x]
```

output
```
2*e*((-2*b*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/d^(5/2) + (b*n*((Sqrt[d] - Sq
rt[d + e*x])^(-1) - ArcTanh[Sqrt[d + e*x]/Sqrt[d]]/Sqrt[d]))/(4*d^2) - (b*
n*((Sqrt[d] + Sqrt[d + e*x])^(-1) + ArcTanh[Sqrt[d + e*x]/Sqrt[d]]/Sqrt[d]
))/(4*d^2) - (a + b*Log[c*x^n])/(d^2*Sqrt[d + e*x]) + (a + b*Log[c*x^n])/(
4*d^2*(Sqrt[d] - Sqrt[d + e*x])) - (a + b*Log[c*x^n])/(4*d^2*(Sqrt[d] + Sq
rt[d + e*x])) - (3*(a + b*Log[c*x^n])*Log[Sqrt[d] - Sqrt[d + e*x]])/(4*d^(
5/2)) + (3*(a + b*Log[c*x^n])*Log[Sqrt[d] + Sqrt[d + e*x]])/(4*d^(5/2)) +
(3*b*n*(Log[Sqrt[d] - Sqrt[d + e*x]]^2 + 2*Log[Sqrt[d] - Sqrt[d + e*x]]*Lo
g[(Sqrt[d] + Sqrt[d + e*x])/(2*Sqrt[d])] + 2*PolyLog[2, (Sqrt[d] - Sqrt[d
+ e*x])/(2*Sqrt[d])]))/(8*d^(5/2)) - (3*b*n*(2*Log[(Sqrt[d] - Sqrt[d + e*x
])/(2*Sqrt[d])]*Log[Sqrt[d] + Sqrt[d + e*x]] + Log[Sqrt[d] + Sqrt[d + e*x]
]^2 + 2*PolyLog[2, (Sqrt[d] + Sqrt[d + e*x])/(2*Sqrt[d])]))/(8*d^(5/2)))
```

Rubi [A] (verified)

Time = 0.78 (sec) , antiderivative size = 234, normalized size of antiderivative = 0.92, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {2792, 25, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^{3/2}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{\frac{\sqrt{d}(d+3ex)}{\sqrt{d+ex}}-3ex\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{5/2}x^2}dx+\frac{3e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{5/2}}-\frac{3e(a+b\log(cx^n))}{d^2\sqrt{d+ex}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex}}$$

$$\Big\downarrow \text{25}$$

$$bn\int \frac{\frac{\sqrt{d}(d+3ex)}{\sqrt{d+ex}}-3ex\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{5/2}x^2}dx+\frac{3e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{5/2}}-\frac{3e(a+b\log(cx^n))}{d^2\sqrt{d+ex}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex}}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{\frac{\sqrt{d}(d+3ex)}{\sqrt{d+ex}}-3ex\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x^2}dx}{d^{5/2}}+\frac{3e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{5/2}}-\frac{3e(a+b\log(cx^n))}{d^2\sqrt{d+ex}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex}}$$

$$\Big\downarrow \text{2010}$$

$$\frac{bn\int \left(-\frac{2e^2}{\sqrt{d}\sqrt{d+ex}}-\frac{3\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)e}{x}+\frac{2\sqrt{d+ex}e}{\sqrt{d}x}+\frac{\sqrt{d}\sqrt{d+ex}}{x^2}\right)dx}{d^{5/2}}+\frac{3e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{5/2}}-\frac{3e(a+b\log(cx^n))}{d^2\sqrt{d+ex}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex}}$$

$$\Big\downarrow \text{2009}$$

$$\frac{3e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{5/2}}-\frac{3e(a+b\log(cx^n))}{d^2\sqrt{d+ex}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex}}+\frac{bn\left(-3e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-5e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+6e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)+3e\,\text{PolyLog}\left(2,1-\frac{}{\sqrt{d}}\right.\right.}{d^{5/2}}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x)^(3/2)),x]
```

output
```
(-3*e*(a + b*Log[c*x^n]))/(d^2*Sqrt[d + e*x]) - (a + b*Log[c*x^n])/(d*x*Sq
rt[d + e*x]) + (3*e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^n]))/d^(
5/2) + (b*n*(-((Sqrt[d]*Sqrt[d + e*x])/x) - 5*e*ArcTanh[Sqrt[d + e*x]/Sqrt
[d]] - 3*e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]^2 + 6*e*ArcTanh[Sqrt[d + e*x]/Sq
rt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])] + 3*e*PolyLog[2, 1 - (2*
Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])]))/d^(5/2)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{2}\left(ex+d\right)^{\frac{3}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x+d)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^2/(e*x+d)^(3/2),x)
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{2}(d+ex)^{3/2}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\left(ex+d\right)^{\frac{3}{2}}x^{2}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^(3/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*a)/(e^2*x^4 + 2*d*e*x
^3 + d^2*x^2), x)
```

Sympy [F]

$$\int \frac{a + b\log(cx^n)}{x^2(d + ex)^{3/2}}\,dx = \int \frac{a + b\log(cx^n)}{x^2(d + ex)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x+d)**(3/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*(d + e*x)**(3/2)), x)
```

Maxima [F]

$$\int \frac{a + b\log(cx^n)}{x^2(d + ex)^{3/2}}\,dx = \int \frac{b\log(cx^n) + a}{(ex + d)^{\frac{3}{2}}x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^(3/2),x, algorithm="maxima")
```

output
```
-1/2*a*(2*(3*(e*x + d)*e - 2*d*e)/((e*x + d)^(3/2)*d^2 - sqrt(e*x + d)*d^3
) + 3*e*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))/d^(5/2))
+ b*integrate((log(c) + log(x^n))/((e*x^3 + d*x^2)*sqrt(e*x + d)), x)
```

Giac [F]

$$\int \frac{a + b\log(cx^n)}{x^2(d + ex)^{3/2}}\,dx = \int \frac{b\log(cx^n) + a}{(ex + d)^{\frac{3}{2}}x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^(3/2)*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^{3/2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^2\,(d+e\,x)^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^(3/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^(3/2)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^{3/2}}\,dx = \frac{-3\sqrt{d}\,\sqrt{ex+d}\log\left(\sqrt{ex+d}-\sqrt{d}\right)aex+3\sqrt{d}\,\sqrt{ex+d}\log\left(\sqrt{ex+d}+\sqrt{d}\right)aex}{2\sqrt{ex+d}\,d^3x}$$

input
```
int((a+b*log(c*x^n))/x^2/(e*x+d)^(3/2),x)
```

output
```
( - 3*sqrt(d)*sqrt(d + e*x)*log(sqrt(d + e*x) - sqrt(d))*a*e*x + 3*sqrt(d)
*sqrt(d + e*x)*log(sqrt(d + e*x) + sqrt(d))*a*e*x + 2*sqrt(d + e*x)*int((s
qrt(d + e*x)*log(x**n*c))/(d**2*x**2 + 2*d*e*x**3 + e**2*x**4),x)*b*d**3*x
 - 2*a*d**2 - 6*a*d*e*x)/(2*sqrt(d + e*x)*d**3*x)
```

3.157 $\int \frac{x^2}{(d+ex)(a+b\log(cx^n))}\,dx$

Optimal result 1318
Mathematica [N/A] 1318
Rubi [N/A] 1319
Maple [N/A] 1319
Fricas [N/A] 1320
Sympy [N/A] 1320
Maxima [N/A] 1321
Giac [N/A] 1321
Mupad [N/A] 1321
Reduce [N/A] 1322

Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{x^2}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\operatorname{Int}\left(\frac{x^2}{(d+ex)\left(a+b\log\left(cx^n\right)\right)},x\right)$$

output
```
Defer(Int)(x^2/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Mathematica [N/A]

Not integrable

Time = 2.85 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{x^2}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx$$

input
```
Integrate[x^2/((d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
Integrate[x^2/((d + e*x)*(a + b*Log[c*x^n])), x]
```

Rubi [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = $\{2796\}$

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2}{(d+ex)(a+b\log(cx^n))} \, dx$$
$$\Big\downarrow \; 2796$$
$$\int \frac{x^2}{(d+ex)(a+b\log(cx^n))}dx$$

input
```
Int[x^2/((d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.00 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{x^2}{(ex+d)(a+b\ln(c\,x^n))}dx$$

input
```
int(x^2/(e*x+d)/(a+b*ln(c*x^n)),x)
```

output
```
int(x^2/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Fricas [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.35

$$\int \frac{x^2}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{x^2}{(ex+d)(b\log\left(cx^n\right)+a)}\,dx$$

input
```
integrate(x^2/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral(x^2/(a*e*x + a*d + (b*e*x + b*d)*log(c*x^n)), x)
```

Sympy [N/A]

Not integrable

Time = 0.83 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int \frac{x^2}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{x^2}{\left(a+b\log\left(cx^n\right)\right)(d+ex)}\,dx$$

input
```
integrate(x**2/(e*x+d)/(a+b*ln(c*x**n)),x)
```

output
```
Integral(x**2/((a + b*log(c*x**n))*(d + e*x)), x)
```

Maxima [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2}{(d+ex)\,(a+b\log{(cx^n)})}\,dx = \int \frac{x^2}{(ex+d)(b\log{(cx^n)}+a)}\,dx$$

input
```
integrate(x^2/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
integrate(x^2/((e*x + d)*(b*log(c*x^n) + a)), x)
```

Giac [N/A]

Not integrable

Time = 0.12 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2}{(d+ex)\,(a+b\log{(cx^n)})}\,dx = \int \frac{x^2}{(ex+d)(b\log{(cx^n)}+a)}\,dx$$

input
```
integrate(x^2/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(x^2/((e*x + d)*(b*log(c*x^n) + a)), x)
```

Mupad [N/A]

Not integrable

Time = 26.24 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2}{(d+ex)\,(a+b\log{(cx^n)})}\,dx = \int \frac{x^2}{(a+b\,\ln{(c\,x^n)})\,(d+e\,x)}\,dx$$

input
```
int(x^2/((a + b*log(c*x^n))*(d + e*x)),x)
```

output
```
int(x^2/((a + b*log(c*x^n))*(d + e*x)), x)
```

Reduce [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.52

$$\int \frac{x^2}{(d+ex)(a+b\log(cx^n))}\,dx = \int \frac{x^2}{\log(x^n c)\,bd + \log(x^n c)\,bex + ad + aex}dx$$

input
```
int(x^2/(e*x+d)/(a+b*log(c*x^n)),x)
```

output
```
int(x**2/(log(x**n*c)*b*d + log(x**n*c)*b*e*x + a*d + a*e*x),x)
```

3.158 $\int \frac{x}{(d+ex)(a+b\log(cx^n))} dx$

Optimal result 1323
Mathematica [N/A] 1323
Rubi [N/A] 1324
Maple [N/A] 1324
Fricas [N/A] 1325
Sympy [N/A] 1325
Maxima [N/A] 1326
Giac [N/A] 1326
Mupad [N/A] 1326
Reduce [N/A] 1327

Optimal result

Integrand size = 21, antiderivative size = 21

$$\int \frac{x}{(d+ex)\left(a+b\log\left(cx^n\right)\right)} dx = \operatorname{Int}\left(\frac{x}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}, x\right)$$

output
```
Defer(Int)(x/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Mathematica [N/A]

Not integrable

Time = 2.04 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x}{(d+ex)\left(a+b\log\left(cx^n\right)\right)} dx = \int \frac{x}{(d+ex)\left(a+b\log\left(cx^n\right)\right)} dx$$

input
```
Integrate[x/((d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
Integrate[x/((d + e*x)*(a + b*Log[c*x^n])), x]
```

Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x}{(d+ex)(a+b\log(cx^n))}dx$$
$$\Big\downarrow \text{ 2796}$$
$$\int \frac{x}{(d+ex)(a+b\log(cx^n))}dx$$

input
```
Int[x/((d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.03 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{x}{(ex+d)(a+b\ln(c\,x^n))}dx$$

input
```
int(x/(e*x+d)/(a+b*ln(c*x^n)),x)
```

output
```
int(x/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.38

$$\int \frac{x}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{x}{(ex+d)(b\log\left(cx^n\right)+a)}\,dx$$

input
```
integrate(x/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral(x/(a*e*x + a*d + (b*e*x + b*d)*log(c*x^n)), x)
```

Sympy [N/A]

Not integrable

Time = 0.94 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{x}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{x}{\left(a+b\log\left(cx^n\right)\right)(d+ex)}\,dx$$

input
```
integrate(x/(e*x+d)/(a+b*ln(c*x**n)),x)
```

output
```
Integral(x/((a + b*log(c*x**n))*(d + e*x)), x)
```

Maxima [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x}{(d+ex)(a+b\log(cx^n))} \, dx = \int \frac{x}{(ex+d)(b\log(cx^n)+a)} \, dx$$

input
```
integrate(x/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
integrate(x/((e*x + d)*(b*log(c*x^n) + a)), x)
```

Giac [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x}{(d+ex)(a+b\log(cx^n))} \, dx = \int \frac{x}{(ex+d)(b\log(cx^n)+a)} \, dx$$

input
```
integrate(x/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(x/((e*x + d)*(b*log(c*x^n) + a)), x)
```

Mupad [N/A]

Not integrable

Time = 26.73 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x}{(d+ex)(a+b\log(cx^n))} \, dx = \int \frac{x}{(a+b\ln(c\,x^n))\,(d+e\,x)} \, dx$$

input
```
int(x/((a + b*log(c*x^n))*(d + e*x)),x)
```

output
```
int(x/((a + b*log(c*x^n))*(d + e*x)), x)
```

Reduce [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.57

$$\int \frac{x}{(d+ex)(a+b\log(cx^n))}\,dx = \int \frac{x}{\log(x^n c)\,bd+\log(x^n c)\,bex+ad+aex}dx$$

input
```
int(x/(e*x+d)/(a+b*log(c*x^n)),x)
```

output
```
int(x/(log(x**n*c)*b*d + log(x**n*c)*b*e*x + a*d + a*e*x),x)
```

3.159 $\int \frac{1}{(d+ex)(a+b\log(cx^n))}\,dx$

Optimal result 1328
Mathematica [N/A] 1328
Rubi [N/A] 1329
Maple [N/A] 1329
Fricas [N/A] 1330
Sympy [N/A] 1330
Maxima [N/A] 1331
Giac [N/A] 1331
Mupad [N/A] 1331
Reduce [N/A] 1332

Optimal result

Integrand size = 20, antiderivative size = 20

$$\int \frac{1}{(d+ex)\,(a+b\log(cx^n))}\,dx = \text{Int}\left(\frac{1}{(d+ex)\,(a+b\log(cx^n))},x\right)$$

output
```
Defer(Int)(1/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Mathematica [N/A]

Not integrable

Time = 0.04 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(d+ex)\,(a+b\log(cx^n))}\,dx = \int \frac{1}{(d+ex)\,(a+b\log(cx^n))}\,dx$$

input
```
Integrate[1/((d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
Integrate[1/((d + e*x)*(a + b*Log[c*x^n])), x]
```

Rubi [N/A]

Not integrable

Time = 0.20 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2768}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex)(a+b\log(cx^n))}dx$$

$$\Big\downarrow \text{2768}$$

$$\int \frac{1}{(d+ex)(a+b\log(cx^n))}dx$$

input
```
Int[1/((d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2768
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> Unintegrable[(d + e*x^r)^q*(a + b*Log[c*x^n])^p, x] /; F
reeQ[{a, b, c, d, e, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.03 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{1}{(ex+d)(a+b\ln(c\,x^n))}dx$$

input
```
int(1/(e*x+d)/(a+b*ln(c*x^n)),x)
```

output
```
int(1/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.35

$$\int \frac{1}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{(ex+d)(b\log\left(cx^n\right)+a)}\,dx$$

input
```
integrate(1/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral(1/(a*e*x + a*d + (b*e*x + b*d)*log(c*x^n)), x)
```

Sympy [N/A]

Not integrable

Time = 0.99 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{1}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{\left(a+b\log\left(cx^n\right)\right)(d+ex)}\,dx$$

input
```
integrate(1/(e*x+d)/(a+b*ln(c*x**n)),x)
```

output
```
Integral(1/((a + b*log(c*x**n))*(d + e*x)), x)
```

Maxima [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{(ex+d)(b\log\left(cx^n\right)+a)}\,dx$$

input
```
integrate(1/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
integrate(1/((e*x + d)*(b*log(c*x^n) + a)), x)
```

Giac [N/A]

Not integrable

Time = 0.12 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{(ex+d)(b\log\left(cx^n\right)+a)}\,dx$$

input
```
integrate(1/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(1/((e*x + d)*(b*log(c*x^n) + a)), x)
```

Mupad [N/A]

Not integrable

Time = 26.71 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{\left(a+b\,\ln\left(c\,x^n\right)\right)\,\left(d+e\,x\right)}\,dx$$

input
```
int(1/((a + b*log(c*x^n))*(d + e*x)),x)
```

output
```
int(1/((a + b*log(c*x^n))*(d + e*x)), x)
```

Reduce [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 64, normalized size of antiderivative = 3.20

$$\int \frac{1}{(d+ex)\,(a+b\log{(cx^n)})}\,dx = \frac{-\left(\int \frac{1}{\log(x^n c)bdx+\log(x^n c)be\,x^2+adx+ae\,x^2}dx\right)bdn+\log(\log(x^n c)\,b+a)}{ben}$$

input
```
int(1/(e*x+d)/(a+b*log(c*x^n)),x)
```

output
```
( - int(1/(log(x**n*c)*b*d*x + log(x**n*c)*b*e*x**2 + a*d*x + a*e*x**2),x)
*b*d*n + log(log(x**n*c)*b + a))/(b*e*n)
```

3.160 $\int \frac{1}{x(d+ex)(a+b\log(cx^n))}\,dx$

Optimal result 1333
Mathematica [N/A] 1333
Rubi [N/A] 1334
Maple [N/A] 1334
Fricas [N/A] 1335
Sympy [N/A] 1335
Maxima [N/A] 1336
Giac [N/A] 1336
Mupad [N/A] 1336
Reduce [N/A] 1337

Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{1}{x(d+ex)\,(a+b\log(cx^n))}\,dx = \text{Int}\left(\frac{1}{x(d+ex)\,(a+b\log(cx^n))},x\right)$$

output
```
Defer(Int)(1/x/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Mathematica [N/A]

Not integrable

Time = 1.57 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{1}{x(d+ex)\,(a+b\log(cx^n))}\,dx = \int \frac{1}{x(d+ex)\,(a+b\log(cx^n))}\,dx$$

input
```
Integrate[1/(x*(d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
Integrate[1/(x*(d + e*x)*(a + b*Log[c*x^n])), x]
```

Rubi [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{x(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx$$
$$\Big\downarrow \text{2796}$$
$$\int \frac{1}{x(d+ex)\left(a+b\log\left(cx^n\right)\right)}dx$$

input
```
Int[1/(x*(d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{1}{x\left(ex+d\right)\left(a+b\ln\left(c\,x^n\right)\right)}dx$$

input
```
int(1/x/(e*x+d)/(a+b*ln(c*x^n)),x)
```

output
```
int(1/x/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.43

$$\int \frac{1}{x(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{(ex+d)(b\log\left(cx^n\right)+a)x}\,dx$$

input
```
integrate(1/x/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral(1/(a*e*x^2 + a*d*x + (b*e*x^2 + b*d*x)*log(c*x^n)), x)
```

Sympy [N/A]

Not integrable

Time = 1.44 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int \frac{1}{x(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{x\left(a+b\log\left(cx^n\right)\right)(d+ex)}\,dx$$

input
```
integrate(1/x/(e*x+d)/(a+b*ln(c*x**n)),x)
```

output
```
Integral(1/(x*(a + b*log(c*x**n))*(d + e*x)), x)
```

Maxima [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{1}{x(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx = \int \frac{1}{(ex+d)(b\log\left(cx^n\right)+a)x}\,dx$$

input
```
integrate(1/x/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
integrate(1/((e*x + d)*(b*log(c*x^n) + a)*x), x)
```

Giac [N/A]

Not integrable

Time = 0.11 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{1}{x(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx = \int \frac{1}{(ex+d)(b\log\left(cx^n\right)+a)x}\,dx$$

input
```
integrate(1/x/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(1/((e*x + d)*(b*log(c*x^n) + a)*x), x)
```

Mupad [N/A]

Not integrable

Time = 25.84 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{1}{x(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx = \int \frac{1}{x\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,\left(d+e\,x\right)}\,dx$$

input
```
int(1/(x*(a + b*log(c*x^n))*(d + e*x)),x)
```

output
```
int(1/(x*(a + b*log(c*x^n))*(d + e*x)), x)
```

Reduce [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.61

$$\int \frac{1}{x(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx = \int \frac{1}{\log\left(x^n c\right) bdx+\log\left(x^n c\right) be\,x^2+adx+ae\,x^2}dx$$

input
```
int(1/x/(e*x+d)/(a+b*log(c*x^n)),x)
```

output
```
int(1/(log(x**n*c)*b*d*x + log(x**n*c)*b*e*x**2 + a*d*x + a*e*x**2),x)
```

3.161 $\int \frac{1}{x^2(d+ex)(a+b\log(cx^n))}\,dx$

Optimal result 1338
Mathematica [N/A] 1338
Rubi [N/A] 1339
Maple [N/A] 1339
Fricas [N/A] 1340
Sympy [N/A] 1340
Maxima [N/A] 1341
Giac [N/A] 1341
Mupad [N/A] 1341
Reduce [N/A] 1342

Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx = \text{Int}\left(\frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)},x\right)$$

output
```
Defer(Int)(1/x^2/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Mathematica [N/A]

Not integrable

Time = 1.78 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx = \int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx$$

input
```
Integrate[1/(x^2*(d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
Integrate[1/(x^2*(d + e*x)*(a + b*Log[c*x^n])), x]
```

Rubi [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx$$

$$\Big\downarrow \ 2796$$

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}dx$$

input
```
Int[1/(x^2*(d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.01 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{1}{x^2\left(ex+d\right)\left(a+b\ln\left(c\,x^n\right)\right)}dx$$

input
```
int(1/x^2/(e*x+d)/(a+b*ln(c*x^n)),x)
```

output
```
int(1/x^2/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.61

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{(ex+d)(b\log\left(cx^n\right)+a)x^2}\,dx$$

input
```
integrate(1/x^2/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral(1/(a*e*x^3 + a*d*x^2 + (b*e*x^3 + b*d*x^2)*log(c*x^n)), x)
```

Sympy [N/A]

Not integrable

Time = 1.08 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{x^2\left(a+b\log\left(cx^n\right)\right)(d+ex)}\,dx$$

input
```
integrate(1/x**2/(e*x+d)/(a+b*ln(c*x**n)),x)
```

output
```
Integral(1/(x**2*(a + b*log(c*x**n))*(d + e*x)), x)
```

Maxima [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{(ex+d)(b\log\left(cx^n\right)+a)x^2}\,dx$$

input
```
integrate(1/x^2/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
integrate(1/((e*x + d)*(b*log(c*x^n) + a)*x^2), x)
```

Giac [N/A]

Not integrable

Time = 0.11 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{(ex+d)(b\log\left(cx^n\right)+a)x^2}\,dx$$

input
```
integrate(1/x^2/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(1/((e*x + d)*(b*log(c*x^n) + a)*x^2), x)
```

Mupad [N/A]

Not integrable

Time = 26.80 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,\left(d+e\,x\right)}\,dx$$

input
```
int(1/(x^2*(a + b*log(c*x^n))*(d + e*x)),x)
```

output
```
int(1/(x^2*(a + b*log(c*x^n))*(d + e*x)), x)
```

Reduce [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.78

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx = \int \frac{1}{\log\left(x^n c\right)bd\,x^2+\log\left(x^n c\right)be\,x^3+ad\,x^2+ae\,x^3}dx$$

input
```
int(1/x^2/(e*x+d)/(a+b*log(c*x^n)),x)
```

output
```
int(1/(log(x**n*c)*b*d*x**2 + log(x**n*c)*b*e*x**3 + a*d*x**2 + a*e*x**3),
x)
```

3.162 $\int (fx)^m(d+ex)^3 (a+b\log(cx^n)) \, dx$

Optimal result 1343
Mathematica [A] (verified) 1344
Rubi [A] (verified) 1344
Maple [B] (verified) 1346
Fricas [B] (verification not implemented) 1347
Sympy [B] (verification not implemented) 1348
Maxima [A] (verification not implemented) 1349
Giac [B] (verification not implemented) 1350
Mupad [F(-1)] 1351
Reduce [B] (verification not implemented) 1351

Optimal result

Integrand size = 23, antiderivative size = 211

$$\int (fx)^m(d+ex)^3 (a+b\log(cx^n)) \, dx = -\frac{bd^3n(fx)^{1+m}}{f(1+m)^2} - \frac{3bd^2en(fx)^{2+m}}{f^2(2+m)^2} - \frac{3bde^2n(fx)^{3+m}}{f^3(3+m)^2} - \frac{be^3n(fx)^{4+m}}{f^4(4+m)^2} + \frac{d^3(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)} + \frac{3d^2e(fx)^{2+m}(a+b\log(cx^n))}{f^2(2+m)} + \frac{3de^2(fx)^{3+m}(a+b\log(cx^n))}{f^3(3+m)} + \frac{e^3(fx)^{4+m}(a+b\log(cx^n))}{f^4(4+m)}$$

output
```
-b*d^3*n*(f*x)^(1+m)/f/(1+m)^2-3*b*d^2*e*n*(f*x)^(2+m)/f^2/(2+m)^2-3*b*d*e
^2*n*(f*x)^(3+m)/f^3/(3+m)^2-b*e^3*n*(f*x)^(4+m)/f^4/(4+m)^2+d^3*(f*x)^(1+
m)*(a+b*ln(c*x^n))/f/(1+m)+3*d^2*e*(f*x)^(2+m)*(a+b*ln(c*x^n))/f^2/(2+m)+3
*d*e^2*(f*x)^(3+m)*(a+b*ln(c*x^n))/f^3/(3+m)+e^3*(f*x)^(4+m)*(a+b*ln(c*x^n
))/f^4/(4+m)
```

Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 152, normalized size of antiderivative = 0.72

$$\int (fx)^m(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx=x(fx)^m\left(-\frac{bd^3n}{(1+m)^2}-\frac{3bd^2enx}{(2+m)^2}-\frac{3bde^2nx^2}{(3+m)^2}-\frac{be^3nx^3}{(4+m)^2}+\frac{d^3(a+b\log(cx^n))}{1+m}+\frac{3d^2ex(a+b\log(cx^n))}{2+m}+\frac{3de^2x^2(a+b\log(cx^n))}{3+m}+\frac{e^3x^3(a+b\log(cx^n))}{4+m}\right)$$

input
```
Integrate[(f*x)^m*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
x*(f*x)^m*(-((b*d^3*n)/(1 + m)^2) - (3*b*d^2*e*n*x)/(2 + m)^2 - (3*b*d*e^2
*n*x^2)/(3 + m)^2 - (b*e^3*n*x^3)/(4 + m)^2 + (d^3*(a + b*Log[c*x^n]))/(1
+ m) + (3*d^2*e*x*(a + b*Log[c*x^n]))/(2 + m) + (3*d*e^2*x^2*(a + b*Log[c*
x^n]))/(3 + m) + (e^3*x^3*(a + b*Log[c*x^n]))/(4 + m))
```

Rubi [A] (verified)

Time = 0.59 (sec) , antiderivative size = 206, normalized size of antiderivative = 0.98, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {2792, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)^3(fx)^m\left(a+b\log\left(cx^n\right)\right)\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int (fx)^m\left(\frac{d^3}{m+1}+\frac{3exd^2}{m+2}+\frac{3e^2x^2d}{m+3}+\frac{e^3x^3}{m+4}\right)dx+\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2e(fx)^{m+2}(a+b\log(cx^n))}{f^2(m+2)}+\frac{3de^2(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{e^3(fx)^{m+4}(a+b\log(cx^n))}{f^4(m+4)}$$

$$\Big\downarrow \text{2010}$$

$$-bn\int\left(\frac{d^3(fx)^m}{m+1}+\frac{3d^2e(fx)^{m+1}}{f(m+2)}+\frac{3de^2(fx)^{m+2}}{f^2(m+3)}+\frac{e^3(fx)^{m+3}}{f^3(m+4)}\right)dx+\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2e(fx)^{m+2}(a+b\log(cx^n))}{f^2(m+2)}+\frac{3de^2(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{e^3(fx)^{m+4}(a+b\log(cx^n))}{f^4(m+4)}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2e(fx)^{m+2}(a+b\log(cx^n))}{f^2(m+2)}+\frac{3de^2(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{e^3(fx)^{m+4}(a+b\log(cx^n))}{f^4(m+4)}-bn\left(\frac{d^3(fx)^{m+1}}{f(m+1)^2}+\frac{3d^2e(fx)^{m+2}}{f^2(m+2)^2}+\frac{3de^2(fx)^{m+3}}{f^3(m+3)^2}+\frac{e^3(fx)^{m+4}}{f^4(m+4)^2}\right)$$

input
```
Int[(f*x)^m*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d^3*(f*x)^(1 + m))/(f*(1 + m)^2) + (3*d^2*e*(f*x)^(2 + m))/(f^2*(2
 + m)^2) + (3*d*e^2*(f*x)^(3 + m))/(f^3*(3 + m)^2) + (e^3*(f*x)^(4 + m))/(
f^4*(4 + m)^2))) + (d^3*(f*x)^(1 + m)*(a + b*Log[c*x^n]))/(f*(1 + m)) + (3
*d^2*e*(f*x)^(2 + m)*(a + b*Log[c*x^n]))/(f^2*(2 + m)) + (3*d*e^2*(f*x)^(3
 + m)*(a + b*Log[c*x^n]))/(f^3*(3 + m)) + (e^3*(f*x)^(4 + m)*(a + b*Log[c*
x^n]))/(f^4*(4 + m))
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1765 vs. $2(211) = 422$.

Time = 5.77 (sec) , antiderivative size = 1766, normalized size of antiderivative = 8.37

method	result	size
parallelrisch	Expression too large to display	1766
risch	Expression too large to display	4955

input
```
int((f*x)^m*(e*x+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-3168*x^2*(f*x)^m*ln(c*x^n)*b*d^2*e*m+1368*x^2*(f*x)^m*b*d^2*e*m*n-3*x^3
*(f*x)^m*ln(c*x^n)*b*d*e^2*m^7+672*x^3*(f*x)^m*b*d*e^2*m*n-4686*x^2*(f*x)^
m*ln(c*x^n)*b*d^2*e*m^2+1659*x^2*(f*x)^m*b*d^2*e*m^2*n-144*x^4*(f*x)^m*a*e
^3-576*x*(f*x)^m*a*d^3-576*x*(f*x)^m*ln(c*x^n)*b*d^3-144*x^4*(f*x)^m*ln(c*
x^n)*b*e^3-2356*x*(f*x)^m*a*d^3*m^2-864*x^2*(f*x)^m*a*d^2*e-1824*x*(f*x)^m
*a*d^3*m+576*x*(f*x)^m*b*d^3*n-x^4*(f*x)^m*a*e^3*m^7-16*x^4*(f*x)^m*a*e^3*
m^6-106*x^4*(f*x)^m*a*e^3*m^5-376*x^4*(f*x)^m*a*e^3*m^4-x*(f*x)^m*a*d^3*m^
7-769*x^4*(f*x)^m*a*e^3*m^3-19*x*(f*x)^m*a*d^3*m^6-904*x^4*(f*x)^m*a*e^3*m
^2-151*x*(f*x)^m*a*d^3*m^5-564*x^4*(f*x)^m*a*e^3*m+36*x^4*(f*x)^m*b*e^3*n-
649*x*(f*x)^m*a*d^3*m^4-1624*x*(f*x)^m*a*d^3*m^3-576*x^3*(f*x)^m*a*d*e^2-3
444*x^3*(f*x)^m*a*d*e^2*m^2-3627*x^2*(f*x)^m*a*d^2*e*m^3-1624*x*(f*x)^m*ln
(c*x^n)*b*d^3*m^3+516*x*(f*x)^m*b*d^3*m^3*n-2208*x^3*(f*x)^m*a*d*e^2*m+192
*x^3*(f*x)^m*b*d*e^2*n-4686*x^2*(f*x)^m*a*d^2*e*m^2-2356*x*(f*x)^m*ln(c*x^
n)*b*d^3*m^2+1108*x*(f*x)^m*b*d^3*m^2*n-3168*x^2*(f*x)^m*a*d^2*e*m+432*x^2
*(f*x)^m*b*d^2*e*n-1824*x*(f*x)^m*ln(c*x^n)*b*d^3*m+1248*x*(f*x)^m*b*d^3*m
*n-864*x^2*(f*x)^m*ln(c*x^n)*b*d^2*e-576*x^3*(f*x)^m*ln(c*x^n)*b*d*e^2-159
6*x^2*(f*x)^m*ln(c*x^n)*b*d^2*e*m^4+306*x^2*(f*x)^m*b*d^2*e*m^4*n-3444*x^3
*(f*x)^m*ln(c*x^n)*b*d*e^2*m^2+924*x^3*(f*x)^m*b*d*e^2*m^2*n-3627*x^2*(f*x
)^m*ln(c*x^n)*b*d^2*e*m^3+984*x^2*(f*x)^m*b*d^2*e*m^3*n-2208*x^3*(f*x)^m*l
n(c*x^n)*b*d*e^2*m-51*x^3*(f*x)^m*ln(c*x^n)*b*d*e^2*m^6+3*x^3*(f*x)^m*b...
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1222 vs. $2(211) = 422$.

Time = 0.10 (sec) , antiderivative size = 1222, normalized size of antiderivative = 5.79

$$\int (fx)^m(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx = \text{Too large to display}$$

input
```
integrate((f*x)^m*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((a*e^3*m^7 + 16*a*e^3*m^6 + 106*a*e^3*m^5 + 376*a*e^3*m^4 + 769*a*e^3*m^3
 + 904*a*e^3*m^2 + 564*a*e^3*m + 144*a*e^3 - (b*e^3*m^6 + 12*b*e^3*m^5 + 5
8*b*e^3*m^4 + 144*b*e^3*m^3 + 193*b*e^3*m^2 + 132*b*e^3*m + 36*b*e^3)*n)*x
^4 + 3*(a*d*e^2*m^7 + 17*a*d*e^2*m^6 + 119*a*d*e^2*m^5 + 443*a*d*e^2*m^4 +
 944*a*d*e^2*m^3 + 1148*a*d*e^2*m^2 + 736*a*d*e^2*m + 192*a*d*e^2 - (b*d*e
^2*m^6 + 14*b*d*e^2*m^5 + 77*b*d*e^2*m^4 + 212*b*d*e^2*m^3 + 308*b*d*e^2*m
^2 + 224*b*d*e^2*m + 64*b*d*e^2)*n)*x^3 + 3*(a*d^2*e*m^7 + 18*a*d^2*e*m^6
+ 134*a*d^2*e*m^5 + 532*a*d^2*e*m^4 + 1209*a*d^2*e*m^3 + 1562*a*d^2*e*m^2
+ 1056*a*d^2*e*m + 288*a*d^2*e - (b*d^2*e*m^6 + 16*b*d^2*e*m^5 + 102*b*d^2
*e*m^4 + 328*b*d^2*e*m^3 + 553*b*d^2*e*m^2 + 456*b*d^2*e*m + 144*b*d^2*e)*
n)*x^2 + (a*d^3*m^7 + 19*a*d^3*m^6 + 151*a*d^3*m^5 + 649*a*d^3*m^4 + 1624*
a*d^3*m^3 + 2356*a*d^3*m^2 + 1824*a*d^3*m + 576*a*d^3 - (b*d^3*m^6 + 18*b*
d^3*m^5 + 133*b*d^3*m^4 + 516*b*d^3*m^3 + 1108*b*d^3*m^2 + 1248*b*d^3*m +
576*b*d^3)*n)*x + ((b*e^3*m^7 + 16*b*e^3*m^6 + 106*b*e^3*m^5 + 376*b*e^3*m
^4 + 769*b*e^3*m^3 + 904*b*e^3*m^2 + 564*b*e^3*m + 144*b*e^3)*x^4 + 3*(b*d
*e^2*m^7 + 17*b*d*e^2*m^6 + 119*b*d*e^2*m^5 + 443*b*d*e^2*m^4 + 944*b*d*e^
2*m^3 + 1148*b*d*e^2*m^2 + 736*b*d*e^2*m + 192*b*d*e^2)*x^3 + 3*(b*d^2*e*m
^7 + 18*b*d^2*e*m^6 + 134*b*d^2*e*m^5 + 532*b*d^2*e*m^4 + 1209*b*d^2*e*m^3
 + 1562*b*d^2*e*m^2 + 1056*b*d^2*e*m + 288*b*d^2*e)*x^2 + (b*d^3*m^7 + 19*
b*d^3*m^6 + 151*b*d^3*m^5 + 649*b*d^3*m^4 + 1624*b*d^3*m^3 + 2356*b*d^3...
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 6156 vs. $2(206) = 412$.

Time = 5.20 (sec) , antiderivative size = 6156, normalized size of antiderivative = 29.18

$$\int (fx)^m (d+ex)^3 (a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate((f*x)**m*(e*x+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise(((-a*d**3/(3*x**3) - 3*a*d**2*e/(2*x**2) - 3*a*d*e**2/x + a*e**3
*log(x) + b*d**3*(-n/(9*x**3) - log(c*x**n)/(3*x**3)) + 3*b*d**2*e*(-n/(4*
x**2) - log(c*x**n)/(2*x**2)) + 3*b*d*e**2*(-n/x - log(c*x**n)/x) - b*e**3
*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)))/f**
4, Eq(m, -4)), ((-a*d**3/(2*x**2) - 3*a*d**2*e/x + 3*a*d*e**2*log(c*x**n)/
n + a*e**3*x - b*d**3*n/(4*x**2) - b*d**3*log(c*x**n)/(2*x**2) - 3*b*d**2*
e*n/x - 3*b*d**2*e*log(c*x**n)/x + 3*b*d*e**2*log(c*x**n)**2/(2*n) - b*e**
3*n*x + b*e**3*x*log(c*x**n))/f**3, Eq(m, -3)), ((-a*d**3/x + 3*a*d**2*e*l
og(c*x**n)/n + 3*a*d*e**2*x + a*e**3*x**2/2 - b*d**3*n/x - b*d**3*log(c*x*
*n)/x + 3*b*d**2*e*log(c*x**n)**2/(2*n) - 3*b*d*e**2*n*x + 3*b*d*e**2*x*lo
g(c*x**n) - b*e**3*n*x**2/4 + b*e**3*x**2*log(c*x**n)/2)/f**2, Eq(m, -2)),
 ((a*d**3*log(c*x**n)/n + 3*a*d**2*e*x + 3*a*d*e**2*x**2/2 + a*e**3*x**3/3
 + b*d**3*log(c*x**n)**2/(2*n) - 3*b*d**2*e*n*x + 3*b*d**2*e*x*log(c*x**n)
 - 3*b*d*e**2*n*x**2/4 + 3*b*d*e**2*x**2*log(c*x**n)/2 - b*e**3*n*x**3/9 +
 b*e**3*x**3*log(c*x**n)/3)/f, Eq(m, -1)), (a*d**3*m**7*x*(f*x)**m/(m**8 +
 20*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m**2 + 2400*
m + 576) + 19*a*d**3*m**6*x*(f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5
 + 2273*m**4 + 3980*m**3 + 4180*m**2 + 2400*m + 576) + 151*a*d**3*m**5*x*(
f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 41
80*m**2 + 2400*m + 576) + 649*a*d**3*m**4*x*(f*x)**m/(m**8 + 20*m**7 + ...
```

Maxima [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 271, normalized size of antiderivative = 1.28

$$\int (fx)^m(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{be^3f^mx^4x^m\log\left(cx^n\right)}{m+4}+\frac{ae^3f^mx^4x^m}{m+4} - \frac{be^3f^mnx^4x^m}{(m+4)^2}+\frac{3\,bde^2f^mx^3x^m\log\left(cx^n\right)}{m+3} + \frac{3\,ade^2f^mx^3x^m}{m+3}-\frac{3\,bde^2f^mnx^3x^m}{(m+3)^2} + \frac{3\,bd^2ef^mx^2x^m\log\left(cx^n\right)}{m+2}+\frac{3\,ad^2ef^mx^2x^m}{m+2} - \frac{3\,bd^2ef^mnx^2x^m}{(m+2)^2}-\frac{bd^3f^mnxx^m}{(m+1)^2} + \frac{(fx)^{m+1}\,bd^3\log\left(cx^n\right)}{f(m+1)}+\frac{(fx)^{m+1}\,ad^3}{f(m+1)}$$

input
```
integrate((f*x)^m*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
b*e^3*f^m*x^4*x^m*log(c*x^n)/(m + 4) + a*e^3*f^m*x^4*x^m/(m + 4) - b*e^3*f
^m*n*x^4*x^m/(m + 4)^2 + 3*b*d*e^2*f^m*x^3*x^m*log(c*x^n)/(m + 3) + 3*a*d*
e^2*f^m*x^3*x^m/(m + 3) - 3*b*d*e^2*f^m*n*x^3*x^m/(m + 3)^2 + 3*b*d^2*e*f^
m*x^2*x^m*log(c*x^n)/(m + 2) + 3*a*d^2*e*f^m*x^2*x^m/(m + 2) - 3*b*d^2*e*f
^m*n*x^2*x^m/(m + 2)^2 - b*d^3*f^m*n*x*x^m/(m + 1)^2 + (f*x)^(m + 1)*b*d^3
*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d^3/(f*(m + 1))
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 536 vs. $2(211) = 422$.

Time = 0.15 (sec) , antiderivative size = 536, normalized size of antiderivative = 2.54

$$\int (fx)^m (d+ex)^3 (a+b\log(cx^n))\,dx = \frac{be^3f^3f^mx^4x^m\log(c)}{f^3m+4f^3} + \frac{ae^3f^3f^mx^4x^m}{f^3m+4f^3} + \frac{be^3f^mmnx^4x^m\log(x)}{m^2+8m+16} + \frac{3bde^2f^2f^mx^3x^m\log(c)}{f^2m+3f^2} + \frac{3bde^2f^mmnx^3x^m\log(x)}{m^2+6m+9} + \frac{4be^3f^mnx^4x^m\log(x)}{m^2+8m+16} + \frac{3ade^2f^2f^mx^3x^m}{f^2m+3f^2} - \frac{be^3f^mnx^4x^m}{m^2+8m+16} + \frac{3bd^2ef^mmnx^2x^m\log(x)}{m^2+4m+4} + \frac{9bde^2f^mnx^3x^m\log(x)}{m^2+6m+9} - \frac{3bde^2f^mnx^3x^m}{m^2+6m+9} + \frac{bd^3f^mmnxx^m\log(x)}{m^2+2m+1} + \frac{6bd^2ef^mnx^2x^m\log(x)}{m^2+4m+4} - \frac{3bd^2ef^mnx^2x^m}{m^2+4m+4} + \frac{3bd^2ef^mx^2x^m\log(c)}{m+2} + \frac{bd^3f^mnxx^m\log(x)}{m^2+2m+1} - \frac{bd^3f^mnxx^m}{m^2+2m+1} + \frac{3ad^2ef^mx^2x^m}{m+2} + \frac{(fx)^m bd^3x\log(c)}{m+1} + \frac{(fx)^m ad^3x}{m+1}$$

input
```
integrate((f*x)^m*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e^3*f^3*f^m*x^4*x^m*log(c)/(f^3*m + 4*f^3) + a*e^3*f^3*f^m*x^4*x^m/(f^3*
m + 4*f^3) + b*e^3*f^m*m*n*x^4*x^m*log(x)/(m^2 + 8*m + 16) + 3*b*d*e^2*f^2
*f^m*x^3*x^m*log(c)/(f^2*m + 3*f^2) + 3*b*d*e^2*f^m*m*n*x^3*x^m*log(x)/(m^
2 + 6*m + 9) + 4*b*e^3*f^m*n*x^4*x^m*log(x)/(m^2 + 8*m + 16) + 3*a*d*e^2*f
^2*f^m*x^3*x^m/(f^2*m + 3*f^2) - b*e^3*f^m*n*x^4*x^m/(m^2 + 8*m + 16) + 3*
b*d^2*e*f^m*m*n*x^2*x^m*log(x)/(m^2 + 4*m + 4) + 9*b*d*e^2*f^m*n*x^3*x^m*l
og(x)/(m^2 + 6*m + 9) - 3*b*d*e^2*f^m*n*x^3*x^m/(m^2 + 6*m + 9) + b*d^3*f^
m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + 6*b*d^2*e*f^m*n*x^2*x^m*log(x)/(m^2 +
 4*m + 4) - 3*b*d^2*e*f^m*n*x^2*x^m/(m^2 + 4*m + 4) + 3*b*d^2*e*f^m*x^2*x^
m*log(c)/(m + 2) + b*d^3*f^m*n*x*x^m*log(x)/(m^2 + 2*m + 1) - b*d^3*f^m*n*
x*x^m/(m^2 + 2*m + 1) + 3*a*d^2*e*f^m*x^2*x^m/(m + 2) + (f*x)^m*b*d^3*x*lo
g(c)/(m + 1) + (f*x)^m*a*d^3*x/(m + 1)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^m(d+ex)^3\,(a+b\log(cx^n))\;dx=\int (f\,x)^m\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,{\left(d+e\,x\right)}^3\;dx$$

input
```
int((f*x)^m*(a + b*log(c*x^n))*(d + e*x)^3,x)
```

output
```
int((f*x)^m*(a + b*log(c*x^n))*(d + e*x)^3, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 1240, normalized size of antiderivative = 5.88

$$\int (fx)^m(d+ex)^3\,(a+b\log(cx^n))\;dx=\text{Too large to display}$$

input
```
int((f*x)^m*(e*x+d)^3*(a+b*log(c*x^n)),x)
```

output
```
(x**m*f**m*x*(log(x**n*c)*b*d**3*m**7 + 19*log(x**n*c)*b*d**3*m**6 + 151*l
og(x**n*c)*b*d**3*m**5 + 649*log(x**n*c)*b*d**3*m**4 + 1624*log(x**n*c)*b*
d**3*m**3 + 2356*log(x**n*c)*b*d**3*m**2 + 1824*log(x**n*c)*b*d**3*m + 576
*log(x**n*c)*b*d**3 + 3*log(x**n*c)*b*d**2*e*m**7*x + 54*log(x**n*c)*b*d**
2*e*m**6*x + 402*log(x**n*c)*b*d**2*e*m**5*x + 1596*log(x**n*c)*b*d**2*e*m
**4*x + 3627*log(x**n*c)*b*d**2*e*m**3*x + 4686*log(x**n*c)*b*d**2*e*m**2*
x + 3168*log(x**n*c)*b*d**2*e*m*x + 864*log(x**n*c)*b*d**2*e*x + 3*log(x**
n*c)*b*d*e**2*m**7*x**2 + 51*log(x**n*c)*b*d*e**2*m**6*x**2 + 357*log(x**n
*c)*b*d*e**2*m**5*x**2 + 1329*log(x**n*c)*b*d*e**2*m**4*x**2 + 2832*log(x*
*n*c)*b*d*e**2*m**3*x**2 + 3444*log(x**n*c)*b*d*e**2*m**2*x**2 + 2208*log(
x**n*c)*b*d*e**2*m*x**2 + 576*log(x**n*c)*b*d*e**2*x**2 + log(x**n*c)*b*e*
*3*m**7*x**3 + 16*log(x**n*c)*b*e**3*m**6*x**3 + 106*log(x**n*c)*b*e**3*m*
*5*x**3 + 376*log(x**n*c)*b*e**3*m**4*x**3 + 769*log(x**n*c)*b*e**3*m**3*x
**3 + 904*log(x**n*c)*b*e**3*m**2*x**3 + 564*log(x**n*c)*b*e**3*m*x**3 + 1
44*log(x**n*c)*b*e**3*x**3 + a*d**3*m**7 + 19*a*d**3*m**6 + 151*a*d**3*m**
5 + 649*a*d**3*m**4 + 1624*a*d**3*m**3 + 2356*a*d**3*m**2 + 1824*a*d**3*m
+ 576*a*d**3 + 3*a*d**2*e*m**7*x + 54*a*d**2*e*m**6*x + 402*a*d**2*e*m**5*
x + 1596*a*d**2*e*m**4*x + 3627*a*d**2*e*m**3*x + 4686*a*d**2*e*m**2*x + 3
168*a*d**2*e*m*x + 864*a*d**2*e*x + 3*a*d*e**2*m**7*x**2 + 51*a*d*e**2*m**
6*x**2 + 357*a*d*e**2*m**5*x**2 + 1329*a*d*e**2*m**4*x**2 + 2832*a*d*e*...
```

3.163 $\int (fx)^m(d+ex)^2 (a+b\log(cx^n))\,dx$

Optimal result 1353
Mathematica [A] (verified) 1354
Rubi [A] (verified) 1354
Maple [B] (verified) 1356
Fricas [B] (verification not implemented) 1357
Sympy [B] (verification not implemented) 1358
Maxima [A] (verification not implemented) 1359
Giac [B] (verification not implemented) 1360
Mupad [F(-1)] 1361
Reduce [B] (verification not implemented) 1361

Optimal result

Integrand size = 23, antiderivative size = 153

$$\int (fx)^m(d+ex)^2 (a+b\log(cx^n))\,dx = -\frac{bd^2n(fx)^{1+m}}{f(1+m)^2}-\frac{2bden(fx)^{2+m}}{f^2(2+m)^2} -\frac{be^2n(fx)^{3+m}}{f^3(3+m)^2}+\frac{d^2(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)} +\frac{2de(fx)^{2+m}(a+b\log(cx^n))}{f^2(2+m)} +\frac{e^2(fx)^{3+m}(a+b\log(cx^n))}{f^3(3+m)}$$

output
```
-b*d^2*n*(f*x)^(1+m)/f/(1+m)^2-2*b*d*e*n*(f*x)^(2+m)/f^2/(2+m)^2-b*e^2*n*(
f*x)^(3+m)/f^3/(3+m)^2+d^2*(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)+2*d*e*(f*x)
^(2+m)*(a+b*ln(c*x^n))/f^2/(2+m)+e^2*(f*x)^(3+m)*(a+b*ln(c*x^n))/f^3/(3+m)
```

Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 108, normalized size of antiderivative = 0.71

$$\int (fx)^m(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx=x(fx)^m\left(-\frac{bd^2n}{(1+m)^2}-\frac{2bdenx}{(2+m)^2}-\frac{be^2nx^2}{(3+m)^2}+\frac{d^2(a+b\log(cx^n))}{1+m}+\frac{2dex(a+b\log(cx^n))}{2+m}+\frac{e^2x^2(a+b\log(cx^n))}{3+m}\right)$$

input
```
Integrate[(f*x)^m*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
x*(f*x)^m*(-((b*d^2*n)/(1 + m)^2) - (2*b*d*e*n*x)/(2 + m)^2 - (b*e^2*n*x^2
)/(3 + m)^2 + (d^2*(a + b*Log[c*x^n]))/(1 + m) + (2*d*e*x*(a + b*Log[c*x^n
]))/(2 + m) + (e^2*x^2*(a + b*Log[c*x^n]))/(3 + m))
```

Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 183, normalized size of antiderivative = 1.20, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2792, 27, 1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)^2(fx)^m\left(a+b\log\left(cx^n\right)\right)dx$$

$$\Big\downarrow \text{ 2792}$$

$$-bn\int \frac{(fx)^m\left((m+2)(m+3)d^2+2e(m+1)(m+3)xd+e^2(m+1)(m+2)x^2\right)}{m^3+6m^2+11m+6}dx+\frac{d^2(fx)^{m+1}\left(a+b\log\left(cx^n\right)\right)}{f(m+1)}+\frac{2de(fx)^{m+2}\left(a+b\log\left(cx^n\right)\right)}{f^2(m+2)}+\frac{e^2(fx)^{m+3}\left(a+b\log\left(cx^n\right)\right)}{f^3(m+3)}$$

$$\Big\downarrow \text{ 27}$$

$$-\frac{bn\int (fx)^m \left((m+2)(m+3)d^2+2e(m+1)(m+3)xd+e^2(m+1)(m+2)x^2\right)dx}{m^3+6m^2+11m+6}+\frac{d^2(fx)^{m+1}\left(a+b\log\left(cx^n\right)\right)}{f(m+1)}+\frac{2de(fx)^{m+2}\left(a+b\log\left(cx^n\right)\right)}{f^2(m+2)}+\frac{e^2(fx)^{m+3}\left(a+b\log\left(cx^n\right)\right)}{f^3(m+3)}$$

$$\Big\downarrow \text{ 1140}$$

$$-\frac{bn\int \left(d^2(m+2)(m+3)(fx)^m+\frac{2de(m+1)(m+3)(fx)^{m+1}}{f}+\frac{e^2(m+1)(m+2)(fx)^{m+2}}{f^2}\right)dx}{m^3+6m^2+11m+6}+\frac{d^2(fx)^{m+1}\left(a+b\log\left(cx^n\right)\right)}{f(m+1)}+\frac{2de(fx)^{m+2}\left(a+b\log\left(cx^n\right)\right)}{f^2(m+2)}+\frac{e^2(fx)^{m+3}\left(a+b\log\left(cx^n\right)\right)}{f^3(m+3)}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{d^2(fx)^{m+1}\left(a+b\log\left(cx^n\right)\right)}{f(m+1)}+\frac{2de(fx)^{m+2}\left(a+b\log\left(cx^n\right)\right)}{f^2(m+2)}+\frac{e^2(fx)^{m+3}\left(a+b\log\left(cx^n\right)\right)}{f^3(m+3)}-\frac{bn\left(\frac{d^2(m+2)(m+3)(fx)^{m+1}}{f(m+1)}+\frac{2de(m+1)(m+3)(fx)^{m+2}}{f^2(m+2)}+\frac{e^2(m+1)(m+2)(fx)^{m+3}}{f^3(m+3)}\right)}{m^3+6m^2+11m+6}$$

input
```
Int[(f*x)^m*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
-((b*n*((d^2*(2 + m)*(3 + m)*(f*x)^(1 + m))/(f*(1 + m)) + (2*d*e*(1 + m)*(
3 + m)*(f*x)^(2 + m))/(f^2*(2 + m)) + (e^2*(1 + m)*(2 + m)*(f*x)^(3 + m))/
(f^3*(3 + m))))/(6 + 11*m + 6*m^2 + m^3)) + (d^2*(f*x)^(1 + m)*(a + b*Log[
c*x^n]))/(f*(1 + m)) + (2*d*e*(f*x)^(2 + m)*(a + b*Log[c*x^n]))/(f^2*(2 +
m)) + (e^2*(f*x)^(3 + m)*(a + b*Log[c*x^n]))/(f^3*(3 + m))
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 910 vs. $2(153) = 306$.

Time = 1.84 (sec) , antiderivative size = 911, normalized size of antiderivative = 5.95

method	result
parallelrisch	$-\frac{48x^2(fx)^m bdemn-2x^2(fx)^m \ln(c\,x^n)bde\,m^5-20x^2(fx)^m \ln(c\,x^n)bde\,m^4+2x^2(fx)^m bde\,m^4n-76x^2(fx)^m \ln(c\,x^n)bde\,m}{}$
risch	Expression too large to display

input
```
int((f*x)^m*(e*x+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(48*x^2*(f*x)^m*b*d*e*m*n-2*x^2*(f*x)^m*ln(c*x^n)*b*d*e*m^5-20*x^2*(f*x)^
m*ln(c*x^n)*b*d*e*m^4+2*x^2*(f*x)^m*b*d*e*m^4*n-76*x^2*(f*x)^m*ln(c*x^n)*b
*d*e*m^3+4*x^3*(f*x)^m*b*e^2*n-47*x*(f*x)^m*a*d^2*m^3-97*x*(f*x)^m*a*d^2*m
^2-36*x^2*(f*x)^m*a*d*e-96*x*(f*x)^m*a*d^2*m+36*x*(f*x)^m*b*d^2*n-36*x*(f*
x)^m*ln(c*x^n)*b*d^2-12*x^3*(f*x)^m*ln(c*x^n)*b*e^2-x^3*(f*x)^m*a*e^2*m^5-
9*x^3*(f*x)^m*a*e^2*m^4-31*x^3*(f*x)^m*a*e^2*m^3-x*(f*x)^m*a*d^2*m^5-51*x^
3*(f*x)^m*a*e^2*m^2-11*x*(f*x)^m*a*d^2*m^4-40*x^3*(f*x)^m*a*e^2*m-36*x^2*(
f*x)^m*ln(c*x^n)*b*d*e-x^3*(f*x)^m*ln(c*x^n)*b*e^2*m^5-9*x^3*(f*x)^m*ln(c*
x^n)*b*e^2*m^4+x^3*(f*x)^m*b*e^2*m^4*n-31*x^3*(f*x)^m*ln(c*x^n)*b*e^2*m^3+
6*x^3*(f*x)^m*b*e^2*m^3*n-2*x^2*(f*x)^m*a*d*e*m^5-x*(f*x)^m*ln(c*x^n)*b*d^
2*m^5-51*x^3*(f*x)^m*ln(c*x^n)*b*e^2*m^2+13*x^3*(f*x)^m*b*e^2*m^2*n-20*x^2
*(f*x)^m*a*d*e*m^4-11*x*(f*x)^m*ln(c*x^n)*b*d^2*m^4+x*(f*x)^m*b*d^2*m^4*n-
40*x^3*(f*x)^m*ln(c*x^n)*b*e^2*m+12*x^3*(f*x)^m*b*e^2*m*n-76*x^2*(f*x)^m*a
*d*e*m^3-47*x*(f*x)^m*ln(c*x^n)*b*d^2*m^3+10*x*(f*x)^m*b*d^2*m^3*n-136*x^2
*(f*x)^m*a*d*e*m^2-97*x*(f*x)^m*ln(c*x^n)*b*d^2*m^2-12*x^3*(f*x)^m*a*e^2-3
6*x*(f*x)^m*a*d^2+37*x*(f*x)^m*b*d^2*m^2*n-114*x^2*(f*x)^m*a*d*e*m+18*x^2*
(f*x)^m*b*d*e*n-96*x*(f*x)^m*ln(c*x^n)*b*d^2*m+60*x*(f*x)^m*b*d^2*m*n+16*x
^2*(f*x)^m*b*d*e*m^3*n-136*x^2*(f*x)^m*ln(c*x^n)*b*d*e*m^2+44*x^2*(f*x)^m*
b*d*e*m^2*n-114*x^2*(f*x)^m*ln(c*x^n)*b*d*e*m)/(3+m)^2/(1+m)^2/(2+m)^2
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 633 vs. $2(153) = 306$.

Time = 0.09 (sec) , antiderivative size = 633, normalized size of antiderivative = 4.14

$$\int (fx)^m (d+ex)^2 (a+b\log(cx^n))\,dx = \frac{((ae^2m^5 + 9\,ae^2m^4 + 31\,ae^2m^3 + 51\,ae^2m^2 + 40\,ae^2m + 12\,ae^2 - (be^2m^4 + 6\,be^2m^3 + 13\,be^2m^2 + 12\,be^2}{}$$

input
```
integrate((f*x)^m*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((a*e^2*m^5 + 9*a*e^2*m^4 + 31*a*e^2*m^3 + 51*a*e^2*m^2 + 40*a*e^2*m + 12*
a*e^2 - (b*e^2*m^4 + 6*b*e^2*m^3 + 13*b*e^2*m^2 + 12*b*e^2*m + 4*b*e^2)*n)
*x^3 + 2*(a*d*e*m^5 + 10*a*d*e*m^4 + 38*a*d*e*m^3 + 68*a*d*e*m^2 + 57*a*d*
e*m + 18*a*d*e - (b*d*e*m^4 + 8*b*d*e*m^3 + 22*b*d*e*m^2 + 24*b*d*e*m + 9*
b*d*e)*n)*x^2 + (a*d^2*m^5 + 11*a*d^2*m^4 + 47*a*d^2*m^3 + 97*a*d^2*m^2 +
96*a*d^2*m + 36*a*d^2 - (b*d^2*m^4 + 10*b*d^2*m^3 + 37*b*d^2*m^2 + 60*b*d^
2*m + 36*b*d^2)*n)*x + ((b*e^2*m^5 + 9*b*e^2*m^4 + 31*b*e^2*m^3 + 51*b*e^2
*m^2 + 40*b*e^2*m + 12*b*e^2)*x^3 + 2*(b*d*e*m^5 + 10*b*d*e*m^4 + 38*b*d*e
*m^3 + 68*b*d*e*m^2 + 57*b*d*e*m + 18*b*d*e)*x^2 + (b*d^2*m^5 + 11*b*d^2*m
^4 + 47*b*d^2*m^3 + 97*b*d^2*m^2 + 96*b*d^2*m + 36*b*d^2)*x)*log(c) + ((b*
e^2*m^5 + 9*b*e^2*m^4 + 31*b*e^2*m^3 + 51*b*e^2*m^2 + 40*b*e^2*m + 12*b*e^
2)*n*x^3 + 2*(b*d*e*m^5 + 10*b*d*e*m^4 + 38*b*d*e*m^3 + 68*b*d*e*m^2 + 57*
b*d*e*m + 18*b*d*e)*n*x^2 + (b*d^2*m^5 + 11*b*d^2*m^4 + 47*b*d^2*m^3 + 97*
b*d^2*m^2 + 96*b*d^2*m + 36*b*d^2)*n*x)*log(x))*e^(m*log(f) + m*log(x))/(m
^6 + 12*m^5 + 58*m^4 + 144*m^3 + 193*m^2 + 132*m + 36)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 2791 vs. $2(146) = 292$.

Time = 3.65 (sec) , antiderivative size = 2791, normalized size of antiderivative = 18.24

$$\int (fx)^m (d+ex)^2 \left(a+b\log\left(cx^n\right)\right)\,dx = \text{Too large to display}$$

input
```
integrate((f*x)**m*(e*x+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise(((-a*d**2/(2*x**2) - 2*a*d*e/x + a*e**2*log(x) + b*d**2*(-n/(4*x
**2) - log(c*x**n)/(2*x**2)) + 2*b*d*e*(-n/x - log(c*x**n)/x) - b*e**2*Pie
cewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)))/f**3, E
q(m, -3)), ((-a*d**2/x + 2*a*d*e*log(c*x**n)/n + a*e**2*x - b*d**2*n/x - b
*d**2*log(c*x**n)/x + b*d*e*log(c*x**n)**2/n - b*e**2*n*x + b*e**2*x*log(c
*x**n))/f**2, Eq(m, -2)), ((a*d**2*log(c*x**n)/n + 2*a*d*e*x + a*e**2*x**2
/2 + b*d**2*log(c*x**n)**2/(2*n) - 2*b*d*e*n*x + 2*b*d*e*x*log(c*x**n) - b
*e**2*n*x**2/4 + b*e**2*x**2*log(c*x**n)/2)/f, Eq(m, -1)), (a*d**2*m**5*x*
(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 1
1*a*d**2*m**4*x*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 +
 132*m + 36) + 47*a*d**2*m**3*x*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m
**3 + 193*m**2 + 132*m + 36) + 97*a*d**2*m**2*x*(f*x)**m/(m**6 + 12*m**5 +
 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 96*a*d**2*m*x*(f*x)**m/(m**
6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 36*a*d**2*x*(f
*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 2*a
*d*e*m**5*x**2*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 +
132*m + 36) + 20*a*d*e*m**4*x**2*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*
m**3 + 193*m**2 + 132*m + 36) + 76*a*d*e*m**3*x**2*(f*x)**m/(m**6 + 12*m**
5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 136*a*d*e*m**2*x**2*(f*x
)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 11...
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 195, normalized size of antiderivative = 1.27

$$\int (fx)^m(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{be^2f^mx^3x^m\log\left(cx^n\right)}{m+3} + \frac{ae^2f^mx^3x^m}{m+3} - \frac{be^2f^mnx^3x^m}{(m+3)^2} + \frac{2\,bdef^mx^2x^m\log\left(cx^n\right)}{m+2} + \frac{2\,adef^mx^2x^m}{m+2} - \frac{2\,bdef^mnx^2x^m}{(m+2)^2} - \frac{bd^2f^mnxx^m}{(m+1)^2} + \frac{(fx)^{m+1}\,bd^2\log\left(cx^n\right)}{f(m+1)} + \frac{(fx)^{m+1}\,ad^2}{f(m+1)}$$

input
```
integrate((f*x)^m*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
b*e^2*f^m*x^3*x^m*log(c*x^n)/(m + 3) + a*e^2*f^m*x^3*x^m/(m + 3) - b*e^2*f
^m*n*x^3*x^m/(m + 3)^2 + 2*b*d*e*f^m*x^2*x^m*log(c*x^n)/(m + 2) + 2*a*d*e*
f^m*x^2*x^m/(m + 2) - 2*b*d*e*f^m*n*x^2*x^m/(m + 2)^2 - b*d^2*f^m*n*x*x^m/
(m + 1)^2 + (f*x)^(m + 1)*b*d^2*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d
^2/(f*(m + 1))
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 374 vs. $2(153) = 306$.

Time = 0.15 (sec) , antiderivative size = 374, normalized size of antiderivative = 2.44

$$\int (fx)^m(d+ex)^2(a+b\log(cx^n))\,dx = \frac{be^2f^2f^mx^3x^m\log(c)}{f^2m+3f^2} + \frac{be^2f^mmnx^3x^m\log(x)}{m^2+6m+9} + \frac{ae^2f^2f^mx^3x^m}{f^2m+3f^2} + \frac{2bdef^mmnx^2x^m\log(x)}{m^2+4m+4} + \frac{3be^2f^mnx^3x^m\log(x)}{m^2+6m+9} - \frac{be^2f^mnx^3x^m}{m^2+6m+9} + \frac{bd^2f^mmnxx^m\log(x)}{m^2+2m+1} + \frac{4bdef^mnx^2x^m\log(x)}{m^2+4m+4} - \frac{2bdef^mnx^2x^m}{m^2+4m+4} + \frac{2bdef^mx^2x^m\log(c)}{m+2} + \frac{bd^2f^mnxx^m\log(x)}{m^2+2m+1} - \frac{bd^2f^mnxx^m}{m^2+2m+1} + \frac{2adef^mx^2x^m}{m+2} + \frac{(fx)^m bd^2x\log(c)}{m+1} + \frac{(fx)^m ad^2x}{m+1}$$

input
```
integrate((f*x)^m*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e^2*f^2*f^m*x^3*x^m*log(c)/(f^2*m + 3*f^2) + b*e^2*f^m*m*n*x^3*x^m*log(x
)/(m^2 + 6*m + 9) + a*e^2*f^2*f^m*x^3*x^m/(f^2*m + 3*f^2) + 2*b*d*e*f^m*m*
n*x^2*x^m*log(x)/(m^2 + 4*m + 4) + 3*b*e^2*f^m*n*x^3*x^m*log(x)/(m^2 + 6*m
 + 9) - b*e^2*f^m*n*x^3*x^m/(m^2 + 6*m + 9) + b*d^2*f^m*m*n*x*x^m*log(x)/(
m^2 + 2*m + 1) + 4*b*d*e*f^m*n*x^2*x^m*log(x)/(m^2 + 4*m + 4) - 2*b*d*e*f^
m*n*x^2*x^m/(m^2 + 4*m + 4) + 2*b*d*e*f^m*x^2*x^m*log(c)/(m + 2) + b*d^2*f
^m*n*x*x^m*log(x)/(m^2 + 2*m + 1) - b*d^2*f^m*n*x*x^m/(m^2 + 2*m + 1) + 2*
a*d*e*f^m*x^2*x^m/(m + 2) + (f*x)^m*b*d^2*x*log(c)/(m + 1) + (f*x)^m*a*d^2
*x/(m + 1)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^m(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\int {\left(f\,x\right)}^m\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,{\left(d+e\,x\right)}^2\,dx$$

input
```
int((f*x)^m*(a + b*log(c*x^n))*(d + e*x)^2,x)
```

output
```
int((f*x)^m*(a + b*log(c*x^n))*(d + e*x)^2, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 623, normalized size of antiderivative = 4.07

$$\int (fx)^m(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$=\frac{x^m f^m x(11a\,d^2m^4+47a\,d^2m^3+97a\,d^2m^2+96a\,d^2m+36\log(x^nc)\,b\,d^2+12a\,e^2x^2-36b\,d^2n+11\log(x}{}$$

input
```
int((f*x)^m*(e*x+d)^2*(a+b*log(c*x^n)),x)
```

output
```
(x**m*f**m*x*(log(x**n*c)*b*d**2*m**5 + 11*log(x**n*c)*b*d**2*m**4 + 47*lo
g(x**n*c)*b*d**2*m**3 + 97*log(x**n*c)*b*d**2*m**2 + 96*log(x**n*c)*b*d**2
*m + 36*log(x**n*c)*b*d**2 + 2*log(x**n*c)*b*d*e*m**5*x + 20*log(x**n*c)*b
*d*e*m**4*x + 76*log(x**n*c)*b*d*e*m**3*x + 136*log(x**n*c)*b*d*e*m**2*x +
 114*log(x**n*c)*b*d*e*m*x + 36*log(x**n*c)*b*d*e*x + log(x**n*c)*b*e**2*m
**5*x**2 + 9*log(x**n*c)*b*e**2*m**4*x**2 + 31*log(x**n*c)*b*e**2*m**3*x**
2 + 51*log(x**n*c)*b*e**2*m**2*x**2 + 40*log(x**n*c)*b*e**2*m*x**2 + 12*lo
g(x**n*c)*b*e**2*x**2 + a*d**2*m**5 + 11*a*d**2*m**4 + 47*a*d**2*m**3 + 97
*a*d**2*m**2 + 96*a*d**2*m + 36*a*d**2 + 2*a*d*e*m**5*x + 20*a*d*e*m**4*x
+ 76*a*d*e*m**3*x + 136*a*d*e*m**2*x + 114*a*d*e*m*x + 36*a*d*e*x + a*e**2
*m**5*x**2 + 9*a*e**2*m**4*x**2 + 31*a*e**2*m**3*x**2 + 51*a*e**2*m**2*x**
2 + 40*a*e**2*m*x**2 + 12*a*e**2*x**2 - b*d**2*m**4*n - 10*b*d**2*m**3*n -
 37*b*d**2*m**2*n - 60*b*d**2*m*n - 36*b*d**2*n - 2*b*d*e*m**4*n*x - 16*b*
d*e*m**3*n*x - 44*b*d*e*m**2*n*x - 48*b*d*e*m*n*x - 18*b*d*e*n*x - b*e**2*
m**4*n*x**2 - 6*b*e**2*m**3*n*x**2 - 13*b*e**2*m**2*n*x**2 - 12*b*e**2*m*n
*x**2 - 4*b*e**2*n*x**2))/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2
+ 132*m + 36)
```

3.164 $\int (fx)^m(d+ex)(a+b\log(cx^n))\,dx$

Optimal result 1363
Mathematica [A] (verified) 1363
Rubi [A] (verified) 1364
Maple [B] (verified) 1365
Fricas [B] (verification not implemented) 1366
Sympy [B] (verification not implemented) 1366
Maxima [A] (verification not implemented) 1367
Giac [B] (verification not implemented) 1368
Mupad [F(-1)] 1369
Reduce [B] (verification not implemented) 1369

Optimal result

Integrand size = 21, antiderivative size = 95

$$\int (fx)^m(d+ex)(a+b\log(cx^n))\,dx = -\frac{bdn(fx)^{1+m}}{f(1+m)^2} - \frac{ben(fx)^{2+m}}{f^2(2+m)^2} + \frac{d(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)} + \frac{e(fx)^{2+m}(a+b\log(cx^n))}{f^2(2+m)}$$

output
```
-b*d*n*(f*x)^(1+m)/f/(1+m)^2-b*e*n*(f*x)^(2+m)/f^2/(2+m)^2+d*(f*x)^(1+m)*(
a+b*ln(c*x^n))/f/(1+m)+e*(f*x)^(2+m)*(a+b*ln(c*x^n))/f^2/(2+m)
```

Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 64, normalized size of antiderivative = 0.67

$$\int (fx)^m(d+ex)(a+b\log(cx^n))\,dx = x(fx)^m\left(-\frac{bdn}{(1+m)^2} - \frac{benx}{(2+m)^2} + \frac{d(a+b\log(cx^n))}{1+m} + \frac{ex(a+b\log(cx^n))}{2+m}\right)$$

input
```
Integrate[(f*x)^m*(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
x*(f*x)^m*(-((b*d*n)/(1 + m)^2) - (b*e*n*x)/(2 + m)^2 + (d*(a + b*Log[c*x^
n]))/(1 + m) + (e*x*(a + b*Log[c*x^n]))/(2 + m))
```

Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 94, normalized size of antiderivative = 0.99, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2792, 53, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)(fx)^m \left(a+b\log\left(cx^n\right)\right) dx$$

$$\Big\downarrow \text{ 2792}$$

$$-bn\int (fx)^m\left(\frac{d}{m+1}+\frac{ex}{m+2}\right)dx+\frac{d(fx)^{m+1}\left(a+b\log\left(cx^n\right)\right)}{f(m+1)}+\frac{e(fx)^{m+2}\left(a+b\log\left(cx^n\right)\right)}{f^2(m+2)}$$

$$\Big\downarrow \text{ 53}$$

$$-bn\int \left(\frac{d(fx)^m}{m+1}+\frac{e(fx)^{m+1}}{f(m+2)}\right)dx+\frac{d(fx)^{m+1}\left(a+b\log\left(cx^n\right)\right)}{f(m+1)}+\frac{e(fx)^{m+2}\left(a+b\log\left(cx^n\right)\right)}{f^2(m+2)}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{d(fx)^{m+1}\left(a+b\log\left(cx^n\right)\right)}{f(m+1)}+\frac{e(fx)^{m+2}\left(a+b\log\left(cx^n\right)\right)}{f^2(m+2)}-bn\left(\frac{d(fx)^{m+1}}{f(m+1)^2}+\frac{e(fx)^{m+2}}{f^2(m+2)^2}\right)$$

input
```
Int[(f*x)^m*(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d*(f*x)^(1 + m))/(f*(1 + m)^2) + (e*(f*x)^(2 + m))/(f^2*(2 + m)^2)
)) + (d*(f*x)^(1 + m)*(a + b*Log[c*x^n]))/(f*(1 + m)) + (e*(f*x)^(2 + m)*(
a + b*Log[c*x^n]))/(f^2*(2 + m))
```

Defintions of rubi rules used

rule 53
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && LeQ[7*m + 4*n + 4, 0])
|| LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 342 vs. $2(95) = 190$.

Time = 0.54 (sec) , antiderivative size = 343, normalized size of antiderivative = 3.61

method	result
parallelrisch	$-\frac{-2x^2(fx)^m ae-4x(fx)^m ad-2x^2(fx)^m \ln(c\,x^n)be-x^2(fx)^m ae\,m^3-4x^2(fx)^m ae\,m^2-x(fx)^m ad\,m^3-5x^2(fx)^m aem+x^2}{}$
risch	Expression too large to display

input
```
int((f*x)^m*(e*x+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-2*x^2*(f*x)^m*a*e-4*x*(f*x)^m*a*d-2*x^2*(f*x)^m*ln(c*x^n)*b*e-x^2*(f*x)
^m*a*e*m^3-4*x^2*(f*x)^m*a*e*m^2-x*(f*x)^m*a*d*m^3-5*x^2*(f*x)^m*a*e*m+x^2
*(f*x)^m*b*e*n-5*x*(f*x)^m*a*d*m^2-8*x*(f*x)^m*a*d*m+4*x*(f*x)^m*b*d*n-4*x
*(f*x)^m*ln(c*x^n)*b*d-4*x^2*(f*x)^m*ln(c*x^n)*b*e*m^2+x^2*(f*x)^m*b*e*m^2
*n-x*(f*x)^m*ln(c*x^n)*b*d*m^3-5*x^2*(f*x)^m*ln(c*x^n)*b*e*m+2*x^2*(f*x)^m
*b*e*m*n-5*x*(f*x)^m*ln(c*x^n)*b*d*m^2+x*(f*x)^m*b*d*m^2*n-8*x*(f*x)^m*ln(
c*x^n)*b*d*m+4*x*(f*x)^m*b*d*m*n-x^2*(f*x)^m*ln(c*x^n)*b*e*m^3)/(2+m)^2/(1
+m)^2
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 235 vs. $2(95) = 190$.

Time = 0.08 (sec) , antiderivative size = 235, normalized size of antiderivative = 2.47

$$\int (fx)^m(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{((aem^3+4\,aem^2+5\,aem+2\,ae-(bem^2+2\,bem+be)n)x^2+(adm^3+5\,adm^2+8\,adm+4\,ad-(bdm$$

input
```
integrate((f*x)^m*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((a*e*m^3 + 4*a*e*m^2 + 5*a*e*m + 2*a*e - (b*e*m^2 + 2*b*e*m + b*e)*n)*x^2
 + (a*d*m^3 + 5*a*d*m^2 + 8*a*d*m + 4*a*d - (b*d*m^2 + 4*b*d*m + 4*b*d)*n)
*x + ((b*e*m^3 + 4*b*e*m^2 + 5*b*e*m + 2*b*e)*x^2 + (b*d*m^3 + 5*b*d*m^2 +
 8*b*d*m + 4*b*d)*x)*log(c) + ((b*e*m^3 + 4*b*e*m^2 + 5*b*e*m + 2*b*e)*n*x
^2 + (b*d*m^3 + 5*b*d*m^2 + 8*b*d*m + 4*b*d)*n*x)*log(x))*e^(m*log(f) + m*
log(x))/(m^4 + 6*m^3 + 13*m^2 + 12*m + 4)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 899 vs. $2(87) = 174$.

Time = 2.37 (sec) , antiderivative size = 899, normalized size of antiderivative = 9.46

$$\int (fx)^m(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx = \text{Too large to display}$$

input
```
integrate((f*x)**m*(e*x+d)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise(((-a*d/x + a*e*log(x) + b*d*(-n/x - log(c*x**n)/x) - b*e*Piecewi
se((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)))/f**2, Eq(m,
 -2)), ((a*d*log(c*x**n)/n + a*e*x + b*d*log(c*x**n)**2/(2*n) - b*e*n*x +
b*e*x*log(c*x**n))/f, Eq(m, -1)), (a*d*m**3*x*(f*x)**m/(m**4 + 6*m**3 + 13
*m**2 + 12*m + 4) + 5*a*d*m**2*x*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m
+ 4) + 8*a*d*m*x*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + 4*a*d*x*(
f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + a*e*m**3*x**2*(f*x)**m/(m**
4 + 6*m**3 + 13*m**2 + 12*m + 4) + 4*a*e*m**2*x**2*(f*x)**m/(m**4 + 6*m**3
 + 13*m**2 + 12*m + 4) + 5*a*e*m*x**2*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 +
12*m + 4) + 2*a*e*x**2*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + b*d
*m**3*x*(f*x)**m*log(c*x**n)/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) - b*d*m*
*2*n*x*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + 5*b*d*m**2*x*(f*x)*
*m*log(c*x**n)/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) - 4*b*d*m*n*x*(f*x)**m
/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + 8*b*d*m*x*(f*x)**m*log(c*x**n)/(m*
*4 + 6*m**3 + 13*m**2 + 12*m + 4) - 4*b*d*n*x*(f*x)**m/(m**4 + 6*m**3 + 13
*m**2 + 12*m + 4) + 4*b*d*x*(f*x)**m*log(c*x**n)/(m**4 + 6*m**3 + 13*m**2
+ 12*m + 4) + b*e*m**3*x**2*(f*x)**m*log(c*x**n)/(m**4 + 6*m**3 + 13*m**2
+ 12*m + 4) - b*e*m**2*n*x**2*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4
) + 4*b*e*m**2*x**2*(f*x)**m*log(c*x**n)/(m**4 + 6*m**3 + 13*m**2 + 12*m +
 4) - 2*b*e*m*n*x**2*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + 5*...
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 119, normalized size of antiderivative = 1.25

$$\int (fx)^m(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{bef^mx^2x^m\log\left(cx^n\right)}{m+2} + \frac{aef^mx^2x^m}{m+2} - \frac{bef^mnx^2x^m}{(m+2)^2} - \frac{bdf^mnxx^m}{(m+1)^2} + \frac{(fx)^{m+1}\,bd\log\left(cx^n\right)}{f(m+1)} + \frac{(fx)^{m+1}\,ad}{f(m+1)}$$

input
```
integrate((f*x)^m*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
b*e*f^m*x^2*x^m*log(c*x^n)/(m + 2) + a*e*f^m*x^2*x^m/(m + 2) - b*e*f^m*n*x
^2*x^m/(m + 2)^2 - b*d*f^m*n*x*x^m/(m + 1)^2 + (f*x)^(m + 1)*b*d*log(c*x^n
)/(f*(m + 1)) + (f*x)^(m + 1)*a*d/(f*(m + 1))
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 212 vs. 2(95) = 190.

Time = 0.13 (sec) , antiderivative size = 212, normalized size of antiderivative = 2.23

$$\int (fx)^m(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{bef^m mnx^2x^m\log(x)}{m^2+4m+4} + \frac{bdf^m mnxx^m\log(x)}{m^2+2m+1} + \frac{2\,bef^m nx^2x^m\log(x)}{m^2+4m+4} - \frac{bef^m nx^2x^m}{m^2+4m+4} + \frac{bef^m x^2x^m\log(c)}{m+2} + \frac{bdf^m nxx^m\log(x)}{m^2+2m+1} - \frac{bdf^m nxx^m}{m^2+2m+1} + \frac{aef^m x^2x^m}{m+2} + \frac{(fx)^m\,bdx\log(c)}{m+1} + \frac{(fx)^m\,adx}{m+1}$$

input
```
integrate((f*x)^m*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e*f^m*m*n*x^2*x^m*log(x)/(m^2 + 4*m + 4) + b*d*f^m*m*n*x*x^m*log(x)/(m^2
 + 2*m + 1) + 2*b*e*f^m*n*x^2*x^m*log(x)/(m^2 + 4*m + 4) - b*e*f^m*n*x^2*x
^m/(m^2 + 4*m + 4) + b*e*f^m*x^2*x^m*log(c)/(m + 2) + b*d*f^m*n*x*x^m*log(
x)/(m^2 + 2*m + 1) - b*d*f^m*n*x*x^m/(m^2 + 2*m + 1) + a*e*f^m*x^2*x^m/(m
+ 2) + (f*x)^m*b*d*x*log(c)/(m + 1) + (f*x)^m*a*d*x/(m + 1)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^m(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=\int (f\,x)^m\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,\left(d+e\,x\right)\,dx$$

input
```
int((f*x)^m*(a + b*log(c*x^n))*(d + e*x),x)
```

output
```
int((f*x)^m*(a + b*log(c*x^n))*(d + e*x), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 214, normalized size of antiderivative = 2.25

$$\int (fx)^m(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$=\frac{x^m f^m x(\log(x^n c)\,bd\,m^3+5\log(x^n c)\,bd\,m^2+8\log(x^n c)\,bdm+4\log(x^n c)\,bd+\log(x^n c)\,be\,m^3x+4\log(x^n}{}$$

input
```
int((f*x)^m*(e*x+d)*(a+b*log(c*x^n)),x)
```

output
```
(x**m*f**m*x*(log(x**n*c)*b*d*m**3 + 5*log(x**n*c)*b*d*m**2 + 8*log(x**n*c
)*b*d*m + 4*log(x**n*c)*b*d + log(x**n*c)*b*e*m**3*x + 4*log(x**n*c)*b*e*m
**2*x + 5*log(x**n*c)*b*e*m*x + 2*log(x**n*c)*b*e*x + a*d*m**3 + 5*a*d*m**
2 + 8*a*d*m + 4*a*d + a*e*m**3*x + 4*a*e*m**2*x + 5*a*e*m*x + 2*a*e*x - b*
d*m**2*n - 4*b*d*m*n - 4*b*d*n - b*e*m**2*n*x - 2*b*e*m*n*x - b*e*n*x))/(m
**4 + 6*m**3 + 13*m**2 + 12*m + 4)
```

3.165 $\int (fx)^m (a + b\log(cx^n))\,dx$

Optimal result 1370
Mathematica [A] (verified) 1370
Rubi [A] (verified) 1371
Maple [A] (verified) 1371
Fricas [A] (verification not implemented) 1372
Sympy [B] (verification not implemented) 1372
Maxima [A] (verification not implemented) 1373
Giac [B] (verification not implemented) 1373
Mupad [F(-1)] 1374
Reduce [B] (verification not implemented) 1374

Optimal result

Integrand size = 16, antiderivative size = 46

$$\int (fx)^m (a + b\log(cx^n))\,dx = -\frac{bn(fx)^{1+m}}{f(1+m)^2} + \frac{(fx)^{1+m}(a + b\log(cx^n))}{f(1+m)}$$

output
```
-b*n*(f*x)^(1+m)/f/(1+m)^2+(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)
```

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.70

$$\int (fx)^m (a + b\log(cx^n))\,dx = \frac{x(fx)^m(a + am - bn + b(1+m)\log(cx^n))}{(1+m)^2}$$

input
```
Integrate[(f*x)^m*(a + b*Log[c*x^n]),x]
```

output
```
(x*(f*x)^m*(a + a*m - b*n + b*(1 + m)*Log[c*x^n]))/(1 + m)^2
```

Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.062, Rules used = {2741}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m (a + b\log(cx^n))\,dx$$

$$\Big\downarrow \; 2741$$

$$\frac{(fx)^{m+1}(a + b\log(cx^n))}{f(m+1)} - \frac{bn(fx)^{m+1}}{f(m+1)^2}$$

input
```
Int[(f*x)^m*(a + b*Log[c*x^n]),x]
```

output
```
-((b*n*(f*x)^(1 + m))/(f*(1 + m)^2)) + ((f*x)^(1 + m)*(a + b*Log[c*x^n]))/
(f*(1 + m))
```

Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 73, normalized size of antiderivative = 1.59

method	result
parallelrisch	$-\frac{-x(fx)^m \ln(cx^n)bm - x(fx)^m \ln(cx^n)b - x(fx)^m am + x(fx)^m bn - a(fx)^m x}{m^2+2m+1}$
risch	$\frac{bx\,x^m f^m \mathrm{e}^{\frac{i\,\mathrm{csgn}(ifx)\pi m(\mathrm{csgn}(ifx)-\mathrm{csgn}(ix))(-\mathrm{csgn}(ifx)+\mathrm{csgn}(if))}{2}} \ln(x^n)}{1+m} - \frac{\left(-i\pi b\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(icx^n)^2 m + i\pi b\ \mathrm{csgn}(ix^n)\right.}{}$

input
```
int((f*x)^m*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-x*(f*x)^m*ln(c*x^n)*b*m-x*(f*x)^m*ln(c*x^n)*b-x*(f*x)^m*a*m+x*(f*x)^m*b
*n-a*(f*x)^m*x)/(m^2+2*m+1)
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.13

$$\int (fx)^m (a + b\log(cx^n))\,dx = \frac{((bm+b)nx\log(x) + (bm+b)x\log(c) + (am-bn+a)x)e^{(m\log(f)+m\log(x))}}{m^2+2m+1}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((b*m + b)*n*x*log(x) + (b*m + b)*x*log(c) + (a*m - b*n + a)*x)*e^(m*log(f
) + m*log(x))/(m^2 + 2*m + 1)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 141 vs. 2(37) = 74.

Time = 2.01 (sec) , antiderivative size = 141, normalized size of antiderivative = 3.07

$$\int (fx)^m (a + b\log(cx^n))\,dx = \begin{cases} \frac{amx(fx)^m}{m^2+2m+1} + \frac{ax(fx)^m}{m^2+2m+1} + \frac{bmx(fx)^m\log(cx^n)}{m^2+2m+1} - \frac{bnx(fx)^m}{m^2+2m+1} + \frac{bx(fx)^m\log(cx^n)}{m^2+2m+1} & \text{for } m \neq -1 \\ \frac{\begin{cases} a\log(x) & \text{for } b = 0 \\ -(-a-b\log(c))\log(x) & \text{for } n = 0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}}{f} & \text{otherwise} \end{cases}$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*m*x*(f*x)**m/(m**2 + 2*m + 1) + a*x*(f*x)**m/(m**2 + 2*m + 1)
 + b*m*x*(f*x)**m*log(c*x**n)/(m**2 + 2*m + 1) - b*n*x*(f*x)**m/(m**2 + 2*
m + 1) + b*x*(f*x)**m*log(c*x**n)/(m**2 + 2*m + 1), Ne(m, -1)), (Piecewise
((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c
*x**n))**2/(2*b*n), True))/f, True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.24

$$\int (fx)^m (a + b\log(cx^n)) \, dx = -\frac{bf^m nxx^m}{(m+1)^2} + \frac{(fx)^{m+1} b\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1} a}{f(m+1)}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-b*f^m*n*x*x^m/(m + 1)^2 + (f*x)^(m + 1)*b*log(c*x^n)/(f*(m + 1)) + (f*x)^
(m + 1)*a/(f*(m + 1))
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 95 vs. 2(46) = 92.

Time = 0.13 (sec) , antiderivative size = 95, normalized size of antiderivative = 2.07

$$\int (fx)^m (a + b\log(cx^n)) \, dx = \frac{bf^m mnxx^m \log(x)}{m^2 + 2m + 1} + \frac{bf^m nxx^m \log(x)}{m^2 + 2m + 1} - \frac{bf^m nxx^m}{m^2 + 2m + 1} + \frac{(fx)^m bx\log(c)}{m+1} + \frac{(fx)^m ax}{m+1}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + b*f^m*n*x*x^m*log(x)/(m^2 + 2*m +
 1) - b*f^m*n*x*x^m/(m^2 + 2*m + 1) + (f*x)^m*b*x*log(c)/(m + 1) + (f*x)^m
*a*x/(m + 1)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^m (a + b\log(cx^n)) \, dx = \int (f\,x)^m \left(a + b\,\ln\left(c\,x^n\right)\right) \, dx$$

input
```
int((f*x)^m*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^m*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 44, normalized size of antiderivative = 0.96

$$\int (fx)^m (a + b\log(cx^n)) \, dx = \frac{x^m f^m x(\log(x^n c)\,bm + \log(x^n c)\,b + am + a - bn)}{m^2 + 2m + 1}$$

input
```
int((f*x)^m*(a+b*log(c*x^n)),x)
```

output
```
(x**m*f**m*x*(log(x**n*c)*b*m + log(x**n*c)*b + a*m + a - b*n))/(m**2 + 2*
m + 1)
```

3.166 $\int \frac{(fx)^m(a+b\log(cx^n))}{d+ex}\,dx$

Optimal result 1375
Mathematica [B] (verified) 1375
Rubi [N/A] 1376
Maple [N/A] 1377
Fricas [N/A] 1377
Sympy [N/A] 1377
Maxima [N/A] 1378
Giac [N/A] 1378
Mupad [N/A] 1378
Reduce [N/A] 1379

Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{d+ex}\,dx=\operatorname{Int}\left(\frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{d+ex},x\right)$$

output
```
Defer(Int)((f*x)^m*(a+b*ln(c*x^n))/(e*x+d),x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 72 vs. 2(26) = 52.

Time = 0.23 (sec) , antiderivative size = 72, normalized size of antiderivative = 3.13

$$\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{d+ex}\,dx$$
$$=\frac{x(fx)^m\left(-bn\,{}_3F_2\left(1,1+m,1+m;2+m,2+m;-\frac{ex}{d}\right)+(1+m)\operatorname{Hypergeometric2F1}\left(1,1+m,2+m\right.\right.}{d(1+m)^2}$$

input
```
Integrate[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x),x]
```

output
```
(x*(f*x)^m*(-(b*n*HypergeometricPFQ[{1, 1 + m, 1 + m}, {2 + m, 2 + m}, -((
e*x)/d)]) + (1 + m)*Hypergeometric2F1[1, 1 + m, 2 + m, -((e*x)/d)]*(a + b*
Log[c*x^n])))/(d*(1 + m)^2)
```

Rubi [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex} \, dx$$
$$\Big\downarrow \text{2796}$$
$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex} dx$$

input
```
Int[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^m (a + b \ln (c\, x^n))}{ex + d} dx$$

input
```
int((f*x)^m*(a+b*ln(c*x^n))/(e*x+d),x)
```

output
```
int((f*x)^m*(a+b*ln(c*x^n))/(e*x+d),x)
```

Fricas [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.35

$$\int \frac{(fx)^m (a + b \log (cx^n))}{d + ex} \, dx = \int \frac{(b \log (cx^n) + a)(fx)^m}{ex + d} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x+d),x, algorithm="fricas")
```

output
```
integral(((f*x)^m*b*log(c*x^n) + (f*x)^m*a)/(e*x + d), x)
```

Sympy [N/A]

Not integrable

Time = 2.59 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{(fx)^m (a + b \log (cx^n))}{d + ex} \, dx = \int \frac{(fx)^m (a + b \log (cx^n))}{d + ex} \, dx$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n))/(e*x+d),x)
```

output
```
Integral((f*x)**m*(a + b*log(c*x**n))/(d + e*x), x)
```

Maxima [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex} \, dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{ex + d} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x+d),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x + d), x)
```

Giac [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex} \, dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{ex + d} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x + d), x)
```

Mupad [N/A]

Not integrable

Time = 26.73 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex} \, dx = \int \frac{(f\,x)^m\,\left(a + b\,\ln\left(c\,x^n\right)\right)}{d + e\,x} \, dx$$

input
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x),x)
```

output
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x), x)
```

Reduce [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 90, normalized size of antiderivative = 3.91

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex} dx$$
$$= \frac{f^m \left(x^m \log(x^n c) bm + x^m am - x^m bn - \left(\int \frac{x^m}{e x^2 + dx} dx\right) ad\, m^2 - \left(\int \frac{x^m \log(x^n c)}{e x^2 + dx} dx\right) bd\, m^2\right)}{e\, m^2}$$

input
```
int((f*x)^m*(a+b*log(c*x^n))/(e*x+d),x)
```

output
```
(f**m*(x**m*log(x**n*c)*b*m + x**m*a*m - x**m*b*n - int(x**m/(d*x + e*x**2
),x)*a*d*m**2 - int((x**m*log(x**n*c))/(d*x + e*x**2),x)*b*d*m**2))/(e*m**
2)
```

3.167 $\int \frac{(fx)^m(a+b\log(cx^n))}{(d+ex)^2}\,dx$

Optimal result 1380
Mathematica [B] (verified) 1380
Rubi [N/A] 1381
Maple [N/A] 1382
Fricas [N/A] 1382
Sympy [N/A] 1382
Maxima [N/A] 1383
Giac [N/A] 1383
Mupad [N/A] 1384
Reduce [N/A] 1384

Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{(fx)^m(a+b\log(cx^n))}{(d+ex)^2}\,dx = \operatorname{Int}\left(\frac{(fx)^m(a+b\log(cx^n))}{(d+ex)^2},x\right)$$

output
```
Defer(Int)((f*x)^m*(a+b*ln(c*x^n))/(e*x+d)^2,x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 72 vs. 2(26) = 52.

Time = 0.21 (sec) , antiderivative size = 72, normalized size of antiderivative = 3.13

$$\int \frac{(fx)^m(a+b\log(cx^n))}{(d+ex)^2}\,dx = \frac{x(fx)^m\left(-bn\,{}_3F_2\left(2,1+m,1+m;2+m,2+m;-\frac{ex}{d}\right)+(1+m)\,\text{Hypergeometric2F1}\left(2,1+m,2+m\right.\right.}{d^2(1+m)^2}$$

input
```
Integrate[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

output
```
(x*(f*x)^m*(-(b*n*HypergeometricPFQ[{2, 1 + m, 1 + m}, {2 + m, 2 + m}, -((
e*x)/d)]) + (1 + m)*Hypergeometric2F1[2, 1 + m, 2 + m, -((e*x)/d)]*(a + b*
Log[c*x^n])))/(d^2*(1 + m)^2)
```

Rubi [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex)^2} \, dx$$
$$\Big\downarrow \text{2796}$$
$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex)^2} dx$$

input
```
Int[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^m (a + b\ln(c\,x^n))}{(ex+d)^2}dx$$

input
```
int((f*x)^m*(a+b*ln(c*x^n))/(e*x+d)^2,x)
```

output
```
int((f*x)^m*(a+b*ln(c*x^n))/(e*x+d)^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.83

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{(ex+d)^2}\,dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral(((f*x)^m*b*log(c*x^n) + (f*x)^m*a)/(e^2*x^2 + 2*d*e*x + d^2), x)
```

Sympy [N/A]

Not integrable

Time = 4.92 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{(fx)^m (a + b\log(cx^n))}{(d+ex)^2}\,dx$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n))/(e*x+d)**2,x)
```

output
```
Integral((f*x)**m*(a + b*log(c*x**n))/(d + e*x)**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex)^2} \, dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{(ex + d)^2} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x + d)^2, x)
```

Giac [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex)^2} \, dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{(ex + d)^2} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x + d)^2, x)
```

Mupad [N/A]

Not integrable

Time = 26.80 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{(f\,x)^m\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^2}\,dx$$

input
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x)^2,x)
```

output
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x)^2, x)
```

Reduce [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 2064, normalized size of antiderivative = 89.74

$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex)^2}\,dx = \text{Too large to display}$$

input
```
int((f*x)^m*(a+b*log(c*x^n))/(e*x+d)^2,x)
```

output
```
(f**m*(x**m*log(x**n*c)*b*m - x**m*log(x**n*c)*b + x**m*a*m - x**m*a - x**
m*b*n - int(x**m/(d**2*m**2*x - 2*d**2*m*x + d**2*x + 2*d*e*m**2*x**2 - 4*
d*e*m*x**2 + 2*d*e*x**2 + e**2*m**2*x**3 - 2*e**2*m*x**3 + e**2*x**3),x)*a
*d**2*m**4 + 3*int(x**m/(d**2*m**2*x - 2*d**2*m*x + d**2*x + 2*d*e*m**2*x*
*2 - 4*d*e*m*x**2 + 2*d*e*x**2 + e**2*m**2*x**3 - 2*e**2*m*x**3 + e**2*x**
3),x)*a*d**2*m**3 - 3*int(x**m/(d**2*m**2*x - 2*d**2*m*x + d**2*x + 2*d*e*
m**2*x**2 - 4*d*e*m*x**2 + 2*d*e*x**2 + e**2*m**2*x**3 - 2*e**2*m*x**3 + e
**2*x**3),x)*a*d**2*m**2 + int(x**m/(d**2*m**2*x - 2*d**2*m*x + d**2*x + 2
*d*e*m**2*x**2 - 4*d*e*m*x**2 + 2*d*e*x**2 + e**2*m**2*x**3 - 2*e**2*m*x**
3 + e**2*x**3),x)*a*d**2*m - int(x**m/(d**2*m**2*x - 2*d**2*m*x + d**2*x +
 2*d*e*m**2*x**2 - 4*d*e*m*x**2 + 2*d*e*x**2 + e**2*m**2*x**3 - 2*e**2*m*x
**3 + e**2*x**3),x)*a*d*e*m**4*x + 3*int(x**m/(d**2*m**2*x - 2*d**2*m*x +
d**2*x + 2*d*e*m**2*x**2 - 4*d*e*m*x**2 + 2*d*e*x**2 + e**2*m**2*x**3 - 2*
e**2*m*x**3 + e**2*x**3),x)*a*d*e*m**3*x - 3*int(x**m/(d**2*m**2*x - 2*d**
2*m*x + d**2*x + 2*d*e*m**2*x**2 - 4*d*e*m*x**2 + 2*d*e*x**2 + e**2*m**2*x
**3 - 2*e**2*m*x**3 + e**2*x**3),x)*a*d*e*m**2*x + int(x**m/(d**2*m**2*x -
 2*d**2*m*x + d**2*x + 2*d*e*m**2*x**2 - 4*d*e*m*x**2 + 2*d*e*x**2 + e**2*
m**2*x**3 - 2*e**2*m*x**3 + e**2*x**3),x)*a*d*e*m*x + int(x**m/(d**2*m**2*
x - 2*d**2*m*x + d**2*x + 2*d*e*m**2*x**2 - 4*d*e*m*x**2 + 2*d*e*x**2 + e*
*2*m**2*x**3 - 2*e**2*m*x**3 + e**2*x**3),x)*b*d**2*m**2*n - 2*int(x**m...
```

3.168 $\int x(a+bx)^m \log(cx^n)\,dx$

Optimal result 1386
Mathematica [B] (verified) 1386
Rubi [N/A] 1387
Maple [N/A] 1388
Fricas [N/A] 1388
Sympy [N/A] 1388
Maxima [N/A] 1389
Giac [N/A] 1389
Mupad [N/A] 1389
Reduce [N/A] 1390

Optimal result

Integrand size = 15, antiderivative size = 15

$$\int x(a+bx)^m \log(cx^n)\,dx = \text{Int}(x(a+bx)^m \log(cx^n), x)$$

output
```
Defer(Int)(x*(b*x+a)^m*ln(c*x^n),x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 173 vs. 2(18) = 36.

Time = 0.28 (sec) , antiderivative size = 173, normalized size of antiderivative = 11.53

$$\int x(a+bx)^m \log(cx^n)\,dx = \frac{(a+bx)^m\left(1+\frac{bx}{a}\right)^{-m}\left(-n\left(2abx\left(1+\frac{bx}{a}\right)^m+b^2x^2\left(1+\frac{bx}{a}\right)^m+a^2\left(-1+\left(1+\frac{bx}{a}\right)^m\right)\right)+ab(2+m)nx\,{}_3F_2\right.}{b^2(1+m}$$

input
```
Integrate[x*(a + b*x)^m*Log[c*x^n],x]
```

output
```
((a + b*x)^m*(-(n*(2*a*b*x*(1 + (b*x)/a)^m + b^2*x^2*(1 + (b*x)/a)^m + a^2
*(-1 + (1 + (b*x)/a)^m))) + a*b*(2 + m)*n*x*HypergeometricPFQ[{1, 1, -1 -
m}, {2, 2}, -((b*x)/a)] + (a*b*m*x*(1 + (b*x)/a)^m + b^2*(1 + m)*x^2*(1 +
(b*x)/a)^m - a^2*(-1 + (1 + (b*x)/a)^m))*Log[c*x^n]))/(b^2*(1 + m)*(2 + m)
*(1 + (b*x)/a)^m)
```

Rubi [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(a+bx)^m \log(cx^n)\,dx$$

$$\Big\downarrow \text{2796}$$

$$\int x(a+bx)^m \log(cx^n)dx$$

input
```
Int[x*(a + b*x)^m*Log[c*x^n],x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int x(bx+a)^m \ln\left(c\,x^n\right) dx$$

input
```
int(x*(b*x+a)^m*ln(c*x^n),x)
```

output
```
int(x*(b*x+a)^m*ln(c*x^n),x)
```

Fricas [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.13

$$\int x(a+bx)^m \log\left(cx^n\right)\, dx = \int (bx+a)^m x \log\left(cx^n\right)\, dx$$

input
```
integrate(x*(b*x+a)^m*log(c*x^n),x, algorithm="fricas")
```

output
```
integral((b*x + a)^m*x*log(c*x^n), x)
```

Sympy [N/A]

Not integrable

Time = 8.01 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int x(a+bx)^m \log\left(cx^n\right)\, dx = \int x(a+bx)^m \log\left(cx^n\right) dx$$

input
```
integrate(x*(b*x+a)**m*ln(c*x**n),x)
```

output
```
Integral(x*(a + b*x)**m*log(c*x**n), x)
```

Maxima [N/A]

Not integrable

Time = 0.12 (sec) , antiderivative size = 112, normalized size of antiderivative = 7.47

$$\int x(a+bx)^m \log(cx^n) \, dx = \int (bx+a)^m x \log(cx^n) \, dx$$

input
```
integrate(x*(b*x+a)^m*log(c*x^n),x, algorithm="maxima")
```

output
```
(b^2*(m + 1)*x^2 + a*b*m*x - a^2)*(b*x + a)^m*log(x^n)/((m^2 + 3*m + 2)*b^
2) + integrate(-(a*b*m*n*x + (m*n - (m^2 + 3*m + 2)*log(c) + n)*b^2*x^2 -
a^2*n)*(b*x + a)^m/x, x)/((m^2 + 3*m + 2)*b^2)
```

Giac [N/A]

Not integrable

Time = 0.13 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.13

$$\int x(a+bx)^m \log(cx^n) \, dx = \int (bx+a)^m x \log(cx^n) \, dx$$

input
```
integrate(x*(b*x+a)^m*log(c*x^n),x, algorithm="giac")
```

output
```
integrate((b*x + a)^m*x*log(c*x^n), x)
```

Mupad [N/A]

Not integrable

Time = 26.67 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.13

$$\int x(a+bx)^m \log(cx^n) \, dx = \int x \ln(c\,x^n) \, (a+b\,x)^m \, dx$$

input
```
int(x*log(c*x^n)*(a + b*x)^m,x)
```

output
```
int(x*log(c*x^n)*(a + b*x)^m, x)
```

Reduce [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 661, normalized size of antiderivative = 44.07

$$\int x(a+bx)^m \log(cx^n)\, dx$$
$$= \frac{-(bx+a)^m \log(x^n c)\, a^2 m^3 - 3(bx+a)^m \log(x^n c)\, a^2 m^2 - 2(bx+a)^m \log(x^n c)\, a^2 m + (bx+a)^m \log(x^n c)}{}$$

input
```
int(x*(b*x+a)^m*log(c*x^n),x)
```

output
```
( - (a + b*x)**m*log(x**n*c)*a**2*m**3 - 3*(a + b*x)**m*log(x**n*c)*a**2*m
**2 - 2*(a + b*x)**m*log(x**n*c)*a**2*m + (a + b*x)**m*log(x**n*c)*a*b*m**
4*x + 3*(a + b*x)**m*log(x**n*c)*a*b*m**3*x + 2*(a + b*x)**m*log(x**n*c)*a
*b*m**2*x + (a + b*x)**m*log(x**n*c)*b**2*m**4*x**2 + 4*(a + b*x)**m*log(x
**n*c)*b**2*m**3*x**2 + 5*(a + b*x)**m*log(x**n*c)*b**2*m**2*x**2 + 2*(a +
 b*x)**m*log(x**n*c)*b**2*m*x**2 - (a + b*x)**m*a**2*m**3*n + 4*(a + b*x)*
*m*a**2*m*n + 2*(a + b*x)**m*a**2*n - 2*(a + b*x)**m*a*b*m**3*n*x - 3*(a +
 b*x)**m*a*b*m**2*n*x - (a + b*x)**m*b**2*m**3*n*x**2 - 2*(a + b*x)**m*b**
2*m**2*n*x**2 - (a + b*x)**m*b**2*m*n*x**2 + int((a + b*x)**m/(a*m**2*x +
3*a*m*x + 2*a*x + b*m**2*x**2 + 3*b*m*x**2 + 2*b*x**2),x)*a**3*m**5*n + 6*
int((a + b*x)**m/(a*m**2*x + 3*a*m*x + 2*a*x + b*m**2*x**2 + 3*b*m*x**2 +
2*b*x**2),x)*a**3*m**4*n + 13*int((a + b*x)**m/(a*m**2*x + 3*a*m*x + 2*a*x
 + b*m**2*x**2 + 3*b*m*x**2 + 2*b*x**2),x)*a**3*m**3*n + 12*int((a + b*x)*
*m/(a*m**2*x + 3*a*m*x + 2*a*x + b*m**2*x**2 + 3*b*m*x**2 + 2*b*x**2),x)*a
**3*m**2*n + 4*int((a + b*x)**m/(a*m**2*x + 3*a*m*x + 2*a*x + b*m**2*x**2
+ 3*b*m*x**2 + 2*b*x**2),x)*a**3*m*n)/(b**2*m*(m**4 + 6*m**3 + 13*m**2 + 1
2*m + 4))
```

3.169 $\int (a+bx)^m \log(cx^n)\, dx$

Optimal result 1391
Mathematica [A] (verified) 1391
Rubi [A] (verified) 1392
Maple [F] 1393
Fricas [F] 1393
Sympy [A] (verification not implemented) 1394
Maxima [F] 1395
Giac [F] 1395
Mupad [F(-1)] 1395
Reduce [F] 1396

Optimal result

Integrand size = 14, antiderivative size = 68

$$\int (a+bx)^m \log(cx^n)\, dx = \frac{n(a+bx)^{2+m}\,\text{Hypergeometric2F1}\left(1,2+m,3+m,1+\frac{bx}{a}\right)}{ab\,(2+3m+m^2)} + \frac{(a+bx)^{1+m}\log(cx^n)}{b(1+m)}$$

output
```
n*(b*x+a)^(2+m)*hypergeom([1, 2+m],[3+m],1+b*x/a)/a/b/(m^2+3*m+2)+(b*x+a)^
(1+m)*ln(c*x^n)/b/(1+m)
```

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 61, normalized size of antiderivative = 0.90

$$\int (a+bx)^m \log(cx^n)\, dx = \frac{(a+bx)^{1+m}\left(n(a+bx)\,\text{Hypergeometric2F1}\left(1,2+m,3+m,1+\frac{bx}{a}\right)+a(2+m)\log(cx^n)\right)}{ab(1+m)(2+m)}$$

input
```
Integrate[(a + b*x)^m*Log[c*x^n],x]
```

output
```
((a + b*x)^(1 + m)*(n*(a + b*x)*Hypergeometric2F1[1, 2 + m, 3 + m, 1 + (b*
x)/a] + a*(2 + m)*Log[c*x^n]))/(a*b*(1 + m)*(2 + m))
```

Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {2756, 75}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (a+bx)^m \log(cx^n) \, dx$$

$$\Big\downarrow \; 2756$$

$$\frac{(a+bx)^{m+1}\log(cx^n)}{b(m+1)}-\frac{n\int \frac{(a+bx)^{m+1}}{x}dx}{b(m+1)}$$

$$\Big\downarrow \; 75$$

$$\frac{(a+bx)^{m+1}\log(cx^n)}{b(m+1)}+\frac{n(a+bx)^{m+2}\,\text{Hypergeometric2F1}\left(1,m+2,m+3,\frac{bx}{a}+1\right)}{ab(m+1)(m+2)}$$

input
```
Int[(a + b*x)^m*Log[c*x^n],x]
```

output
```
(n*(a + b*x)^(2 + m)*Hypergeometric2F1[1, 2 + m, 3 + m, 1 + (b*x)/a])/(a*b
*(1 + m)*(2 + m)) + ((a + b*x)^(1 + m)*Log[c*x^n])/(b*(1 + m))
```

Defintions of rubi rules used

rule 75
```
Int[((b_.)*(x_))^(m_)*((c_) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[((c + d*x
)^(n + 1)/(d*(n + 1)*(-d/(b*c))^m))*Hypergeometric2F1[-m, n + 1, n + 2, 1 +
 d*(x/c)], x] /; FreeQ[{b, c, d, m, n}, x] &&  !IntegerQ[n] && (IntegerQ[m]
 || GtQ[-d/(b*c), 0])
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

Maple [F]

$$\int (bx+a)^{m} \ln \left(c\,x^{n}\right) dx$$

input
```
int((b*x+a)^m*ln(c*x^n),x)
```

output
```
int((b*x+a)^m*ln(c*x^n),x)
```

Fricas [F]

$$\int (a+bx)^m \log \left(cx^n\right)\,dx=\int (bx+a)^{m} \log \left(cx^{n}\right)\,dx$$

input
```
integrate((b*x+a)^m*log(c*x^n),x, algorithm="fricas")
```

output
```
integral((b*x + a)^m*log(c*x^n), x)
```

Sympy [A] (verification not implemented)

Time = 6.51 (sec) , antiderivative size = 238, normalized size of antiderivative = 3.50

$$\int (a+bx)^m \log(cx^n)\,dx = -n\left(\begin{cases} a^m x \\ -\frac{b^{m+2}m\left(\frac{a}{b}+x\right)^{m+2}\Phi\left(1+\frac{bx}{a},1,m+2\right)\Gamma(m+2)}{abm\Gamma(m+3)+ab\Gamma(m+3)} - \frac{2b^{m+2}\left(\frac{a}{b}+x\right)^{m+2}\Phi\left(1+\frac{bx}{a},1,m+2\right)\Gamma(m+2)}{abm\Gamma(m+3)+ab\Gamma(m+3)} \\ \frac{\begin{cases} -\operatorname{Li}_2\left(\frac{bxe^{i\pi}}{a}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1 \\ \log(a)\log(x)-\operatorname{Li}_2\left(\frac{bxe^{i\pi}}{a}\right) & \text{for } |x|<1 \\ -\log(a)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{bxe^{i\pi}}{a}\right) & \text{for } \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(a)+G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)\log(a)-\operatorname{Li}_2\left(\frac{bxe^{i\pi}}{a}\right) & \text{otherwise} \end{cases}}{b} \end{cases}\right) + \left(\begin{cases} a^m x & \text{for } b=0 \\ \frac{\begin{cases} \frac{(a+bx)^{m+1}}{m+1} & \text{for } m\neq -1 \\ \log(a+bx) & \text{otherwise} \end{cases}}{b} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate((b*x+a)**m*ln(c*x**n),x)
```

output
```
-n*Piecewise((a**m*x, Eq(b, 0) | (Eq(b, 0) & Ne(m, -1))), (-b**(m + 2)*m*(
a/b + x)**(m + 2)*lerchphi(1 + b*x/a, 1, m + 2)*gamma(m + 2)/(a*b*m*gamma(
m + 3) + a*b*gamma(m + 3)) - 2*b**(m + 2)*(a/b + x)**(m + 2)*lerchphi(1 +
b*x/a, 1, m + 2)*gamma(m + 2)/(a*b*m*gamma(m + 3) + a*b*gamma(m + 3)), (m
> -oo) & (m < oo) & Ne(m, -1)), (Piecewise((-polylog(2, b*x*exp_polar(I*pi
)/a), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(a)*log(x) - polylog(2, b*x*exp_
polar(I*pi)/a), Abs(x) < 1), (-log(a)*log(1/x) - polylog(2, b*x*exp_polar(
I*pi)/a), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(a) +
 meijerg(((1, 1), ()), ((), (0, 0)), x)*log(a) - polylog(2, b*x*exp_polar(
I*pi)/a), True))/b, True)) + Piecewise((a**m*x, Eq(b, 0)), (Piecewise(((a
+ b*x)**(m + 1)/(m + 1), Ne(m, -1)), (log(a + b*x), True))/b, True))*log(c
*x**n)
```

Maxima [F]

$$\int (a+bx)^m \log(cx^n)\,dx = \int (bx+a)^m \log(cx^n)\,dx$$

input
```
integrate((b*x+a)^m*log(c*x^n),x, algorithm="maxima")
```

output
```
(b*x + a)*(b*x + a)^m*log(x^n)/(b*(m + 1)) + integrate((((m + 1)*log(c) -
n)*b*x - a*n)*(b*x + a)^m/x, x)/(b*(m + 1))
```

Giac [F]

$$\int (a+bx)^m \log(cx^n)\,dx = \int (bx+a)^m \log(cx^n)\,dx$$

input
```
integrate((b*x+a)^m*log(c*x^n),x, algorithm="giac")
```

output
```
integrate((b*x + a)^m*log(c*x^n), x)
```

Mupad [F(-1)]

Timed out.

$$\int (a+bx)^m \log(cx^n)\,dx = \int \ln(c\,x^n)\,(a+b\,x)^m\,dx$$

input
```
int(log(c*x^n)*(a + b*x)^m,x)
```

output
```
int(log(c*x^n)*(a + b*x)^m, x)
```

Reduce [F]

$$\int (a+bx)^m \log (cx^n) \, dx$$

$$= \frac{(bx+a)^m \log(x^n c) \, a \, m^2 + (bx+a)^m \log(x^n c) \, am + (bx+a)^m \log(x^n c) \, b \, m^2 x + (bx+a)^m \log(x^n c) \, bmx}{}$$

input

```
int((b*x+a)^m*log(c*x^n),x)
```

output

```
((a + b*x)**m*log(x**n*c)*a*m**2 + (a + b*x)**m*log(x**n*c)*a*m + (a + b*x
)**m*log(x**n*c)*b*m**2*x + (a + b*x)**m*log(x**n*c)*b*m*x - 2*(a + b*x)**
m*a*m*n - (a + b*x)**m*a*n - (a + b*x)**m*b*m*n*x - int((a + b*x)**m/(a*m*
x + a*x + b*m*x**2 + b*x**2),x)*a**2*m**3*n - 2*int((a + b*x)**m/(a*m*x +
a*x + b*m*x**2 + b*x**2),x)*a**2*m**2*n - int((a + b*x)**m/(a*m*x + a*x +
b*m*x**2 + b*x**2),x)*a**2*m*n)/(b*m*(m**2 + 2*m + 1))
```

3.170 $\int \frac{(a+bx)^m \log(cx^n)}{x} dx$

Optimal result 1397
Mathematica [B] (verified) 1397
Rubi [N/A] 1398
Maple [N/A] 1399
Fricas [N/A] 1399
Sympy [N/A] 1399
Maxima [N/A] 1400
Giac [N/A] 1400
Mupad [N/A] 1400
Reduce [N/A] 1401

Optimal result

Integrand size = 17, antiderivative size = 17

$$\int \frac{(a+bx)^m \log(cx^n)}{x} dx = \text{Int}\left(\frac{(a+bx)^m \log(cx^n)}{x}, x\right)$$

output
```
Defer(Int)((b*x+a)^m*ln(c*x^n)/x,x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 89 vs. 2(20) = 40.

Time = 0.07 (sec) , antiderivative size = 89, normalized size of antiderivative = 5.24

$$\int \frac{(a+bx)^m \log(cx^n)}{x} dx = \frac{\left(1+\frac{a}{bx}\right)^{-m} (a+bx)^m \left(-n\, {}_3F_2\left(-m,-m,-m;1-m,1-m;-\frac{a}{bx}\right) + m\, \text{Hypergeometric2F1}\left(-m,-m,\right.\right.}{m^2}$$

input
```
Integrate[((a + b*x)^m*Log[c*x^n])/x,x]
```

output
```
((a + b*x)^m*(-(n*HypergeometricPFQ[{-m, -m, -m}, {1 - m, 1 - m}, -(a/(b*x
))]) + m*Hypergeometric2F1[-m, -m, 1 - m, -(a/(b*x))]*Log[c*x^n]))/(m^2*(1
 + a/(b*x))^m)
```

Rubi [N/A]

Not integrable

Time = 0.19 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+bx)^m \log(cx^n)}{x} \, dx$$
$$\Big\downarrow \text{2796}$$
$$\int \frac{(a+bx)^m \log(cx^n)}{x} dx$$

input
```
Int[((a + b*x)^m*Log[c*x^n])/x,x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{(bx+a)^m \ln(c\,x^n)}{x}dx$$

input
```
int((b*x+a)^m*ln(c*x^n)/x,x)
```

output
```
int((b*x+a)^m*ln(c*x^n)/x,x)
```

Fricas [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{(a+bx)^m \log(cx^n)}{x}\,dx = \int \frac{(bx+a)^m \log(cx^n)}{x}\,dx$$

input
```
integrate((b*x+a)^m*log(c*x^n)/x,x, algorithm="fricas")
```

output
```
integral((b*x + a)^m*log(c*x^n)/x, x)
```

Sympy [N/A]

Not integrable

Time = 5.35 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{(a+bx)^m \log(cx^n)}{x}\,dx = \int \frac{(a+bx)^m \log(cx^n)}{x}\,dx$$

input
```
integrate((b*x+a)**m*ln(c*x**n)/x,x)
```

output
```
Integral((a + b*x)**m*log(c*x**n)/x, x)
```

Maxima [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{(a+bx)^m \log(cx^n)}{x} \, dx = \int \frac{(bx+a)^m \log(cx^n)}{x} \, dx$$

input
```
integrate((b*x+a)^m*log(c*x^n)/x,x, algorithm="maxima")
```

output
```
integrate((b*x + a)^m*log(c*x^n)/x, x)
```

Giac [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{(a+bx)^m \log(cx^n)}{x} \, dx = \int \frac{(bx+a)^m \log(cx^n)}{x} \, dx$$

input
```
integrate((b*x+a)^m*log(c*x^n)/x,x, algorithm="giac")
```

output
```
integrate((b*x + a)^m*log(c*x^n)/x, x)
```

Mupad [N/A]

Not integrable

Time = 26.70 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{(a+bx)^m \log(cx^n)}{x} \, dx = \int \frac{\ln(c\,x^n)\,(a+b\,x)^m}{x} \, dx$$

input
```
int((log(c*x^n)*(a + b*x)^m)/x,x)
```

output
```
int((log(c*x^n)*(a + b*x)^m)/x, x)
```

Reduce [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 88, normalized size of antiderivative = 5.18

$$\int \frac{(a+bx)^m \log(cx^n)}{x}\,dx$$
$$= \frac{(bx+a)^m \log(x^n c)\, m-(bx+a)^m\, n-\left(\int \frac{(bx+a)^m}{b\,x^2+ax}dx\right) amn+\left(\int \frac{(bx+a)^m \log(x^n c)}{b\,x^2+ax}dx\right) a\,m^2}{m^2}$$

input
```
int((b*x+a)^m*log(c*x^n)/x,x)
```

output
```
((a + b*x)**m*log(x**n*c)*m - (a + b*x)**m*n - int((a + b*x)**m/(a*x + b*x
**2),x)*a*m*n + int(((a + b*x)**m*log(x**n*c))/(a*x + b*x**2),x)*a*m**2)/m
**2
```

3.171 $\int x^5(d+ex^2)\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal result 1402
Mathematica [A] (verified) 1402
Rubi [A] (verified) 1403
Maple [A] (verified) 1404
Fricas [A] (verification not implemented) 1404
Sympy [A] (verification not implemented) 1405
Maxima [A] (verification not implemented) 1405
Giac [A] (verification not implemented) 1406
Mupad [B] (verification not implemented) 1406
Reduce [B] (verification not implemented) 1407

Optimal result

Integrand size = 21, antiderivative size = 48

$$\int x^5\left(d+ex^2\right)\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{36}bdnx^6-\frac{1}{64}benx^8+\frac{1}{24}\left(4dx^6+3ex^8\right)\left(a+b\log\left(cx^n\right)\right)$$

output
```
-1/36*b*d*n*x^6-1/64*b*e*n*x^8+1/24*(3*e*x^8+4*d*x^6)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^5\left(d+ex^2\right)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{1}{6}adx^6-\frac{1}{36}bdnx^6+\frac{1}{8}aex^8-\frac{1}{64}benx^8+\frac{1}{6}bdx^6\log\left(cx^n\right)+\frac{1}{8}bex^8\log\left(cx^n\right)$$

input
```
Integrate[x^5*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
(a*d*x^6)/6 - (b*d*n*x^6)/36 + (a*e*x^8)/8 - (b*e*n*x^8)/64 + (b*d*x^6*Log
[c*x^n])/6 + (b*e*x^8*Log[c*x^n])/8
```

Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.02, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2771, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^5 (d+ex^2) (a+b\log(cx^n)) \, dx$$

$$\Big\downarrow \text{ 2771}$$

$$\frac{1}{24}(4dx^6+3ex^8)(a+b\log(cx^n))-bn\int\left(\frac{ex^7}{8}+\frac{dx^5}{6}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{24}(4dx^6+3ex^8)(a+b\log(cx^n))-bn\left(\frac{dx^6}{36}+\frac{ex^8}{64}\right)$$

input
```
Int[x^5*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d*x^6)/36 + (e*x^8)/64)) + ((4*d*x^6 + 3*e*x^8)*(a + b*Log[c*x^n])
)/24
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 1.18 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.21

method	result
parallelrisch	$\frac{x^{8} \ln\left(c\,x^{n}\right) b e}{8}-\frac{b e n\,x^{8}}{64}+\frac{e a\,x^{8}}{8}+\frac{x^{6} \ln\left(c\,x^{n}\right) b d}{6}-\frac{b d n\,x^{6}}{36}+\frac{d a\,x^{6}}{6}$
risch	$\frac{b\,x^{6}\left(3 e\,x^{2}+4 d\right) \ln\left(x^{n}\right)}{24}+\frac{i \pi b e\,x^{8} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c\,x^{n}\right)^{2}}{16}-\frac{i \pi b e\,x^{8} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c\,x^{n}\right) \operatorname{csgn}\left(i c\right)}{16}-\frac{i \pi b e\,x^{8} \operatorname{csgn}\left(i c\,x^{n}\right)}{16}$

input
```
int(x^5*(e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/8*x^8*ln(c*x^n)*b*e-1/64*b*e*n*x^8+1/8*e*a*x^8+1/6*x^6*ln(c*x^n)*b*d-1/3
6*b*d*n*x^6+1/6*d*a*x^6
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^5 \left(d+ex^2\right) \left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{64}\,(ben-8\,ae)x^8-\frac{1}{36}\,(bdn-6\,ad)x^6 + \frac{1}{24}\left(3\,bex^8+4\,bdx^6\right)\log\left(c\right) + \frac{1}{24}\left(3\,benx^8+4\,bdnx^6\right)\log\left(x\right)$$

input
```
integrate(x^5*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/64*(b*e*n - 8*a*e)*x^8 - 1/36*(b*d*n - 6*a*d)*x^6 + 1/24*(3*b*e*x^8 + 4
*b*d*x^6)*log(c) + 1/24*(3*b*e*n*x^8 + 4*b*d*n*x^6)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.93 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.38

$$\int x^5(d+ex^2)(a+b\log(cx^n))\,dx = \frac{adx^6}{6}+\frac{aex^8}{8}-\frac{bdnx^6}{36}+\frac{bdx^6\log(cx^n)}{6} - \frac{benx^8}{64}+\frac{bex^8\log(cx^n)}{8}$$

input
```
integrate(x**5*(e*x**2+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x**6/6 + a*e*x**8/8 - b*d*n*x**6/36 + b*d*x**6*log(c*x**n)/6 - b*e*n*x
**8/64 + b*e*x**8*log(c*x**n)/8
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.19

$$\int x^5(d+ex^2)(a+b\log(cx^n))\,dx = -\frac{1}{64}benx^8+\frac{1}{8}bex^8\log(cx^n)+\frac{1}{8}aex^8 - \frac{1}{36}bdnx^6+\frac{1}{6}bdx^6\log(cx^n)+\frac{1}{6}adx^6$$

input
```
integrate(x^5*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/64*b*e*n*x^8 + 1/8*b*e*x^8*log(c*x^n) + 1/8*a*e*x^8 - 1/36*b*d*n*x^6 +
1/6*b*d*x^6*log(c*x^n) + 1/6*a*d*x^6
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^5(d+ex^2)(a+b\log(cx^n))\,dx = \frac{1}{8}benx^8\log(x) - \frac{1}{64}benx^8 + \frac{1}{8}bex^8\log(c) + \frac{1}{8}aex^8 + \frac{1}{6}bdnx^6\log(x) - \frac{1}{36}bdnx^6 + \frac{1}{6}bdx^6\log(c) + \frac{1}{6}adx^6$$

input
```
integrate(x^5*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/8*b*e*n*x^8*log(x) - 1/64*b*e*n*x^8 + 1/8*b*e*x^8*log(c) + 1/8*a*e*x^8 +
 1/6*b*d*n*x^6*log(x) - 1/36*b*d*n*x^6 + 1/6*b*d*x^6*log(c) + 1/6*a*d*x^6
```

Mupad [B] (verification not implemented)

Time = 26.24 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06

$$\int x^5(d+ex^2)(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,e\,x^8}{8} + \frac{b\,d\,x^6}{6}\right) + \frac{d\,x^6\,(6\,a-b\,n)}{36} + \frac{e\,x^8\,(8\,a-b\,n)}{64}$$

input
```
int(x^5*(d + e*x^2)*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d*x^6)/6 + (b*e*x^8)/8) + (d*x^6*(6*a - b*n))/36 + (e*x^8*(
8*a - b*n))/64
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.10

$$\int x^5 \left(d+ex^2\right) \left(a+b\log \left(cx^n\right)\right) \, dx$$
$$= \frac{x^6(96 \log(x^n c) \, bd + 72 \log(x^n c) \, be \, x^2 + 96ad + 72ae \, x^2 - 16bdn - 9ben \, x^2)}{576}$$

input
```
int(x^5*(e*x^2+d)*(a+b*log(c*x^n)),x)
```

output
```
(x**6*(96*log(x**n*c)*b*d + 72*log(x**n*c)*b*e*x**2 + 96*a*d + 72*a*e*x**2
 - 16*b*d*n - 9*b*e*n*x**2))/576
```

3.172 $\int x^3(d+ex^2)(a+b\log(cx^n))\,dx$

Optimal result . . . 1408
Mathematica [A] (verified) . . . 1408
Rubi [A] (verified) . . . 1409
Maple [A] (verified) . . . 1410
Fricas [A] (verification not implemented) . . . 1410
Sympy [A] (verification not implemented) . . . 1411
Maxima [A] (verification not implemented) . . . 1411
Giac [A] (verification not implemented) . . . 1412
Mupad [B] (verification not implemented) . . . 1412
Reduce [B] (verification not implemented) . . . 1413

Optimal result

Integrand size = 21, antiderivative size = 48

$$\int x^3(d+ex^2)(a+b\log(cx^n))\,dx=-\frac{1}{16}bdnx^4-\frac{1}{36}benx^6+\frac{1}{12}(3dx^4+2ex^6)(a+b\log(cx^n))$$

output
```
-1/16*b*d*n*x^4-1/36*b*e*n*x^6+1/12*(2*e*x^6+3*d*x^4)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^3(d+ex^2)(a+b\log(cx^n))\,dx=\frac{1}{4}adx^4-\frac{1}{16}bdnx^4+\frac{1}{6}aex^6-\frac{1}{36}benx^6+\frac{1}{4}bdx^4\log(cx^n)+\frac{1}{6}bex^6\log(cx^n)$$

input
```
Integrate[x^3*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
(a*d*x^4)/4 - (b*d*n*x^4)/16 + (a*e*x^6)/6 - (b*e*n*x^6)/36 + (b*d*x^4*Log
[c*x^n])/4 + (b*e*x^6*Log[c*x^n])/6
```

Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.02, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2771, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3(d+ex^2)(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{12}(3dx^4+2ex^6)(a+b\log(cx^n))-bn\int\left(\frac{ex^5}{6}+\frac{dx^3}{4}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{12}(3dx^4+2ex^6)(a+b\log(cx^n))-bn\left(\frac{dx^4}{16}+\frac{ex^6}{36}\right)$$

input
```
Int[x^3*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d*x^4)/16 + (e*x^6)/36)) + ((3*d*x^4 + 2*e*x^6)*(a + b*Log[c*x^n])
)/12
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.58 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.21

method	result
parallelrisch	$\frac{x^{6} \ln \left(c \,x^{n}\right) b e}{6}-\frac{b e n \,x^{6}}{36}+\frac{e a \,x^{6}}{6}+\frac{x^{4} \ln \left(c \,x^{n}\right) b d}{4}-\frac{b d n \,x^{4}}{16}+\frac{d a \,x^{4}}{4}$
risch	$\frac{b \,x^{4} \left(2 e \,x^{2}+3 d \right) \ln \left(x^{n}\right)}{12}+\frac{i \pi b e \,x^{6} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right)^{2}}{12}-\frac{i \pi b e \,x^{6} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right) \operatorname{csgn}\left(i c \right)}{12}-\frac{i \pi b e \,x^{6} \operatorname{csgn}\left(i c \,x^{n}\right)^{3}}{12}$

input
```
int(x^3*(e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/6*x^6*ln(c*x^n)*b*e-1/36*b*e*n*x^6+1/6*e*a*x^6+1/4*x^4*ln(c*x^n)*b*d-1/1
6*b*d*n*x^4+1/4*d*a*x^4
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^3 \left(d+ex^2\right) (a+b\log (cx^n))\, dx = -\frac{1}{36}\,(ben-6\,ae)x^6-\frac{1}{16}\,(bdn-4\,ad)x^4+\frac{1}{12}\,\left(2\,bex^6+3\,bdx^4\right)\log\left(c\right)+\frac{1}{12}\,\left(2\,benx^6+3\,bdnx^4\right)\log\left(x\right)$$

input
```
integrate(x^3*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/36*(b*e*n - 6*a*e)*x^6 - 1/16*(b*d*n - 4*a*d)*x^4 + 1/12*(2*b*e*x^6 + 3
*b*d*x^4)*log(c) + 1/12*(2*b*e*n*x^6 + 3*b*d*n*x^4)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.47 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.38

$$\int x^3(d+ex^2)(a+b\log(cx^n))\,dx = \frac{adx^4}{4}+\frac{aex^6}{6}-\frac{bdnx^4}{16}+\frac{bdx^4\log(cx^n)}{4} - \frac{benx^6}{36}+\frac{bex^6\log(cx^n)}{6}$$

input
```
integrate(x**3*(e*x**2+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x**4/4 + a*e*x**6/6 - b*d*n*x**4/16 + b*d*x**4*log(c*x**n)/4 - b*e*n*x
**6/36 + b*e*x**6*log(c*x**n)/6
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.19

$$\int x^3(d+ex^2)(a+b\log(cx^n))\,dx = -\frac{1}{36}\,benx^6+\frac{1}{6}\,bex^6\log(cx^n)+\frac{1}{6}\,aex^6 - \frac{1}{16}\,bdnx^4+\frac{1}{4}\,bdx^4\log(cx^n)+\frac{1}{4}\,adx^4$$

input
```
integrate(x^3*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/36*b*e*n*x^6 + 1/6*b*e*x^6*log(c*x^n) + 1/6*a*e*x^6 - 1/16*b*d*n*x^4 +
1/4*b*d*x^4*log(c*x^n) + 1/4*a*d*x^4
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^3(d+ex^2)(a+b\log(cx^n))\,dx = \frac{1}{6}benx^6\log(x) - \frac{1}{36}benx^6 + \frac{1}{6}bex^6\log(c) + \frac{1}{6}aex^6 + \frac{1}{4}bdnx^4\log(x) - \frac{1}{16}bdnx^4 + \frac{1}{4}bdx^4\log(c) + \frac{1}{4}adx^4$$

input
```
integrate(x^3*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/6*b*e*n*x^6*log(x) - 1/36*b*e*n*x^6 + 1/6*b*e*x^6*log(c) + 1/6*a*e*x^6 +
 1/4*b*d*n*x^4*log(x) - 1/16*b*d*n*x^4 + 1/4*b*d*x^4*log(c) + 1/4*a*d*x^4
```

Mupad [B] (verification not implemented)

Time = 26.76 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06

$$\int x^3(d+ex^2)(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,e\,x^6}{6} + \frac{b\,d\,x^4}{4}\right) + \frac{d\,x^4\,(4\,a-b\,n)}{16} + \frac{e\,x^6\,(6\,a-b\,n)}{36}$$

input
```
int(x^3*(d + e*x^2)*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d*x^4)/4 + (b*e*x^6)/6) + (d*x^4*(4*a - b*n))/16 + (e*x^6*(
6*a - b*n))/36
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.10

$$\int x^3(d+ex^2)(a+b\log(cx^n))\,dx$$
$$=\frac{x^4(36\log(x^nc)\,bd+24\log(x^nc)\,be\,x^2+36ad+24ae\,x^2-9bdn-4ben\,x^2)}{144}$$

input
```
int(x^3*(e*x^2+d)*(a+b*log(c*x^n)),x)
```

output
```
(x**4*(36*log(x**n*c)*b*d + 24*log(x**n*c)*b*e*x**2 + 36*a*d + 24*a*e*x**2
 - 9*b*d*n - 4*b*e*n*x**2))/144
```

3.173 $\int x(d+ex^2)(a+b\log(cx^n))\,dx$

Optimal result . . . 1414
Mathematica [A] (verified) . . . 1414
Rubi [A] (verified) . . . 1415
Maple [A] (verified) . . . 1416
Fricas [A] (verification not implemented) . . . 1417
Sympy [A] (verification not implemented) . . . 1417
Maxima [A] (verification not implemented) . . . 1418
Giac [A] (verification not implemented) . . . 1418
Mupad [B] (verification not implemented) . . . 1418
Reduce [B] (verification not implemented) . . . 1419

Optimal result

Integrand size = 19, antiderivative size = 47

$$\int x(d+ex^2)(a+b\log(cx^n))\,dx = -\frac{1}{4}bdnx^2-\frac{1}{16}benx^4+\frac{1}{4}(2dx^2+ex^4)(a+b\log(cx^n))$$

output
```
-1/4*b*d*n*x^2-1/16*b*e*n*x^4+1/4*(e*x^4+2*d*x^2)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.47

$$\int x(d+ex^2)(a+b\log(cx^n))\,dx = \frac{1}{2}adx^2-\frac{1}{4}bdnx^2+\frac{1}{4}aex^4-\frac{1}{16}benx^4 + \frac{1}{2}bdx^2\log(cx^n)+\frac{1}{4}bex^4\log(cx^n)$$

input
```
Integrate[x*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
(a*d*x^2)/2 - (b*d*n*x^2)/4 + (a*e*x^4)/4 - (b*e*n*x^4)/16 + (b*d*x^2*Log[
c*x^n])/2 + (b*e*x^4*Log[c*x^n])/4
```

Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.211, Rules used = {2771, 27, 244, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex^2)(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{4}(2dx^2+ex^4)(a+b\log(cx^n))-bn\int \frac{1}{4}x(ex^2+2d)\,dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}(2dx^2+ex^4)(a+b\log(cx^n))-\frac{1}{4}bn\int x(ex^2+2d)\,dx$$

$$\Big\downarrow \text{244}$$

$$\frac{1}{4}(2dx^2+ex^4)(a+b\log(cx^n))-\frac{1}{4}bn\int (ex^3+2dx)\,dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}(2dx^2+ex^4)(a+b\log(cx^n))-\frac{1}{4}bn\left(dx^2+\frac{ex^4}{4}\right)$$

input
```
Int[x*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
-1/4*(b*n*(d*x^2 + (e*x^4)/4)) + ((2*d*x^2 + e*x^4)*(a + b*Log[c*x^n]))/4
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.44 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.23

method	result	size
parallelrisch	$\frac{x^{4} \ln \left(c \,x^{n}\right) b e}{4}-\frac{b e n \,x^{4}}{16}+\frac{x^{4} a e}{4}+\frac{x^{2} \ln \left(c \,x^{n}\right) b d}{2}-\frac{b d n \,x^{2}}{4}+\frac{d a \,x^{2}}{2}$	58
risch	Expression too large to display	2346

input
```
int(x*(e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/4*x^4*ln(c*x^n)*b*e-1/16*b*e*n*x^4+1/4*x^4*a*e+1/2*x^2*ln(c*x^n)*b*d-1/4
*b*d*n*x^2+1/2*d*a*x^2
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 67, normalized size of antiderivative = 1.43

$$\int x(d+ex^2)(a+b\log(cx^n))\,dx = -\frac{1}{16}(ben-4ae)x^4 - \frac{1}{4}(bdn-2ad)x^2 + \frac{1}{4}(bex^4+2bdx^2)\log(c) + \frac{1}{4}(benx^4+2bdnx^2)\log(x)$$

input
```
integrate(x*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/16*(b*e*n - 4*a*e)*x^4 - 1/4*(b*d*n - 2*a*d)*x^2 + 1/4*(b*e*x^4 + 2*b*d
*x^2)*log(c) + 1/4*(b*e*n*x^4 + 2*b*d*n*x^2)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.40

$$\int x(d+ex^2)(a+b\log(cx^n))\,dx = \frac{adx^2}{2} + \frac{aex^4}{4} - \frac{bdnx^2}{4} + \frac{bdx^2\log(cx^n)}{2} - \frac{benx^4}{16} + \frac{bex^4\log(cx^n)}{4}$$

input
```
integrate(x*(e*x**2+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x**2/2 + a*e*x**4/4 - b*d*n*x**2/4 + b*d*x**2*log(c*x**n)/2 - b*e*n*x*
*4/16 + b*e*x**4*log(c*x**n)/4
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.21

$$\int x(d+ex^2)(a+b\log(cx^n))\,dx = -\frac{1}{16}benx^4 + \frac{1}{4}bex^4\log(cx^n) + \frac{1}{4}aex^4 - \frac{1}{4}bdnx^2 + \frac{1}{2}bdx^2\log(cx^n) + \frac{1}{2}adx^2$$

input
```
integrate(x*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/16*b*e*n*x^4 + 1/4*b*e*x^4*log(c*x^n) + 1/4*a*e*x^4 - 1/4*b*d*n*x^2 + 1
/2*b*d*x^2*log(c*x^n) + 1/2*a*d*x^2
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.47

$$\int x(d+ex^2)(a+b\log(cx^n))\,dx = \frac{1}{4}benx^4\log(x) - \frac{1}{16}benx^4 + \frac{1}{4}bex^4\log(c) + \frac{1}{4}aex^4 + \frac{1}{2}bdnx^2\log(x) - \frac{1}{4}bdnx^2 + \frac{1}{2}bdx^2\log(c) + \frac{1}{2}adx^2$$

input
```
integrate(x*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/4*b*e*n*x^4*log(x) - 1/16*b*e*n*x^4 + 1/4*b*e*x^4*log(c) + 1/4*a*e*x^4 +
 1/2*b*d*n*x^2*log(x) - 1/4*b*d*n*x^2 + 1/2*b*d*x^2*log(c) + 1/2*a*d*x^2
```

Mupad [B] (verification not implemented)

Time = 26.30 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.09

$$\int x(d+ex^2)(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,e\,x^4}{4} + \frac{b\,d\,x^2}{2}\right) + \frac{d\,x^2\,(2\,a-b\,n)}{4} + \frac{e\,x^4\,(4\,a-b\,n)}{16}$$

input
```
int(x*(d + e*x^2)*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d*x^2)/2 + (b*e*x^4)/4) + (d*x^2*(2*a - b*n))/4 + (e*x^4*(4
*a - b*n))/16
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.13

$$\int x(d+ex^2)(a+b\log(cx^n))\,dx$$
$$=\frac{x^2(8\log(x^nc)\,bd+4\log(x^nc)\,be\,x^2+8ad+4ae\,x^2-4bdn-ben\,x^2)}{16}$$

input
```
int(x*(e*x^2+d)*(a+b*log(c*x^n)),x)
```

output
```
(x**2*(8*log(x**n*c)*b*d + 4*log(x**n*c)*b*e*x**2 + 8*a*d + 4*a*e*x**2 - 4
*b*d*n - b*e*n*x**2))/16
```

3.174 $\int \frac{(d+ex^2)(a+b\log(cx^n))}{x}\,dx$

Optimal result 1420
Mathematica [A] (verified) 1420
Rubi [A] (verified) 1421
Maple [A] (verified) 1422
Fricas [A] (verification not implemented) 1422
Sympy [A] (verification not implemented) 1423
Maxima [A] (verification not implemented) 1423
Giac [A] (verification not implemented) 1424
Mupad [B] (verification not implemented) 1424
Reduce [B] (verification not implemented) 1425

Optimal result

Integrand size = 21, antiderivative size = 52

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x}\,dx = -\frac{1}{4}benx^2+\frac{1}{2}ex^2(a+b\log(cx^n))+\frac{d(a+b\log(cx^n))^2}{2bn}$$

output
```
-1/4*b*e*n*x^2+1/2*e*x^2*(a+b*ln(c*x^n))+1/2*d*(a+b*ln(c*x^n))^2/b/n
```

Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.10

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x}\,dx = \frac{1}{2}aex^2-\frac{1}{4}benx^2+ad\log(x)+\frac{1}{2}bex^2\log(cx^n)+\frac{bd\log^2(cx^n)}{2n}$$

input
```
Integrate[((d + e*x^2)*(a + b*Log[c*x^n]))/x,x]
```

output
```
(a*e*x^2)/2 - (b*e*n*x^2)/4 + a*d*Log[x] + (b*e*x^2*Log[c*x^n])/2 + (b*d*L
og[c*x^n]^2)/(2*n)
```

Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{d(a+b\log(cx^n))}{x}+ex(a+b\log(cx^n))\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{d(a+b\log(cx^n))^2}{2bn}+\frac{1}{2}ex^2(a+b\log(cx^n))-\frac{1}{4}benx^2$$

input
```
Int[((d + e*x^2)*(a + b*Log[c*x^n]))/x,x]
```

output
```
-1/4*(b*e*n*x^2) + (e*x^2*(a + b*Log[c*x^n]))/2 + (d*(a + b*Log[c*x^n])^2)
/(2*b*n)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [A] (verified)

Time = 0.24 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.12

method	result
parallelrisch	$\frac{2x^2 \ln(c\,x^n) ben - x^2 be\,n^2 + 2x^2 aen + 4\ln(x) adn + 2bd\ln(c\,x^n)^2}{4n}$
risch	$\left(\frac{be\,x^2}{2} + bd\ln(x)\right)\ln(x^n) - \frac{bdn\ln(x)^2}{2} + \frac{i\pi be\,x^2\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2}{4} - \frac{i\pi be\,x^2\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)\,\mathrm{csgn}(}{4}$

input
```
int((e*x^2+d)*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/4*(2*x^2*ln(c*x^n)*b*e*n-x^2*b*e*n^2+2*x^2*a*e*n+4*ln(x)*a*d*n+2*b*d*ln(
c*x^n)^2)/n
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.06

$$\int \frac{(d+ex^2)\,(a+b\log(cx^n))}{x}\,dx = \frac{1}{2}\,bex^2\log(c) + \frac{1}{2}\,bdn\log(x)^2 - \frac{1}{4}\,(ben - 2\,ae)x^2 + \frac{1}{2}\left(benx^2 + 2\,bd\log(c) + 2\,ad\right)\log(x)$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/2*b*e*x^2*log(c) + 1/2*b*d*n*log(x)^2 - 1/4*(b*e*n - 2*a*e)*x^2 + 1/2*(b
*e*n*x^2 + 2*b*d*log(c) + 2*a*d)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 78, normalized size of antiderivative = 1.50

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x}\,dx = \begin{cases} \frac{ad\log(cx^n)}{n} + \frac{aex^2}{2} + \frac{bd\log(cx^n)^2}{2n} - \frac{benx^2}{4} + \frac{bex^2\log(cx^n)}{2} & \text{for } n \neq 0 \\ (a+b\log(c))\left(d\log(x) + \frac{ex^2}{2}\right) & \text{otherwise} \end{cases}$$

input
```
integrate((e*x**2+d)*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise((a*d*log(c*x**n)/n + a*e*x**2/2 + b*d*log(c*x**n)**2/(2*n) - b*e
*n*x**2/4 + b*e*x**2*log(c*x**n)/2, Ne(n, 0)), ((a + b*log(c))*(d*log(x) +
 e*x**2/2), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 49, normalized size of antiderivative = 0.94

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x}\,dx = -\frac{1}{4}\,benx^2 + \frac{1}{2}\,bex^2\log(cx^n) + \frac{1}{2}\,aex^2 + \frac{bd\log(cx^n)^2}{2\,n} + ad\log(x)$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
-1/4*b*e*n*x^2 + 1/2*b*e*x^2*log(c*x^n) + 1/2*a*e*x^2 + 1/2*b*d*log(c*x^n)
^2/n + a*d*log(x)
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x}\,dx = \frac{1}{2}benx^2\log(x) + \frac{1}{2}bdn\log(x)^2 - \frac{1}{4}(ben - 2\,be\log(c) - 2\,ae)x^2 + (bd\log(c) + ad)\log(x)$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
1/2*b*e*n*x^2*log(x) + 1/2*b*d*n*log(x)^2 - 1/4*(b*e*n - 2*b*e*log(c) - 2*
a*e)*x^2 + (b*d*log(c) + a*d)*log(x)
```

Mupad [B] (verification not implemented)

Time = 25.24 (sec) , antiderivative size = 48, normalized size of antiderivative = 0.92

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x}\,dx = a\,d\,\ln(x) + \frac{e\,x^2\,(2\,a-b\,n)}{4} + \frac{b\,e\,x^2\,\ln(c\,x^n)}{2} + \frac{b\,d\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((d + e*x^2)*(a + b*log(c*x^n)))/x,x)
```

output
```
a*d*log(x) + (e*x^2*(2*a - b*n))/4 + (b*e*x^2*log(c*x^n))/2 + (b*d*log(c*x
^n)^2)/(2*n)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.10

$$\int \frac{(d + ex^2)(a + b\log(cx^n))}{x} dx$$
$$= \frac{2\log(x^n c)^2 bd + 2\log(x^n c)\, ben\, x^2 + 4\log(x)\, adn + 2aen\, x^2 - be\, n^2 x^2}{4n}$$

input
```
int((e*x^2+d)*(a+b*log(c*x^n))/x,x)
```

output
```
(2*log(x**n*c)**2*b*d + 2*log(x**n*c)*b*e*n*x**2 + 4*log(x)*a*d*n + 2*a*e*
n*x**2 - b*e*n**2*x**2)/(4*n)
```

3.175 $\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3} dx$

Optimal result 1426
Mathematica [A] (verified) 1426
Rubi [A] (verified) 1427
Maple [A] (verified) 1428
Fricas [A] (verification not implemented) 1428
Sympy [A] (verification not implemented) 1429
Maxima [A] (verification not implemented) 1429
Giac [A] (verification not implemented) 1429
Mupad [B] (verification not implemented) 1430
Reduce [B] (verification not implemented) 1430

Optimal result

Integrand size = 21, antiderivative size = 52

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3} dx = -\frac{bdn}{4x^2} - \frac{d(a+b\log(cx^n))}{2x^2} + \frac{e(a+b\log(cx^n))^2}{2bn}$$

output
```
-1/4*b*d*n/x^2-1/2*d*(a+b*ln(c*x^n))/x^2+1/2*e*(a+b*ln(c*x^n))^2/b/n
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.10

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3} dx = -\frac{ad}{2x^2} - \frac{bdn}{4x^2} + ae\log(x) - \frac{bd\log(cx^n)}{2x^2} + \frac{be\log^2(cx^n)}{2n}$$

input
```
Integrate[((d + e*x^2)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-1/2*(a*d)/x^2 - (b*d*n)/(4*x^2) + a*e*Log[x] - (b*d*Log[c*x^n])/(2*x^2) +
 (b*e*Log[c*x^n]^2)/(2*n)
```

Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.06, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(\frac{e\log(x)}{x}-\frac{d}{2x^3}\right)dx-\frac{d(a+b\log(cx^n))}{2x^2}+e\log(x)(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d(a+b\log(cx^n))}{2x^2}+e\log(x)(a+b\log(cx^n))-bn\left(\frac{d}{4x^2}+\frac{1}{2}e\log^2(x)\right)$$

input
```
Int[((d + e*x^2)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-(b*n*(d/(4*x^2) + (e*Log[x]^2)/2)) - (d*(a + b*Log[c*x^n]))/(2*x^2) + e*L
og[x]*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.12

method	result
parallelrisch	$\frac{4\ln(x)x^2aen+2be\ln(c\,x^n)^2x^2-2\ln(c\,x^n)bdn-bd\,n^2-2adn}{4x^2n}$
risch	$-\frac{b(-2e\ln(x)x^2+d)\ln(x^n)}{2x^2}-\frac{-2i\ln(x)\pi be\ \mathrm{csgn}(ix^n)\ \mathrm{csgn}(ic\,x^n)^2x^2+2i\ln(x)\pi be\ \mathrm{csgn}(ix^n)\ \mathrm{csgn}(ic\,x^n)\ \mathrm{csgn}(ic)x^2+2i\ln$

input
```
int((e*x^2+d)*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

output
```
1/4/x^2*(4*ln(x)*x^2*a*e*n+2*b*e*ln(c*x^n)^2*x^2-2*ln(c*x^n)*b*d*n-b*d*n^2
-2*a*d*n)/n
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.13

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3}\,dx = \frac{2\,benx^2\log(x)^2-bdn-2\,bd\log(c)-2\,ad+2\,(2\,bex^2\log(c)+2\,aex^2-bdn)\log(x)}{4\,x^2}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
1/4*(2*b*e*n*x^2*log(x)^2 - b*d*n - 2*b*d*log(c) - 2*a*d + 2*(2*b*e*x^2*lo
g(c) + 2*a*e*x^2 - b*d*n)*log(x))/x^2
```

Sympy [A] (verification not implemented)

Time = 1.34 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3}\,dx = -\frac{ad}{2x^2} + ae\log(x) + bd\left(-\frac{n}{4x^2} - \frac{\log(cx^n)}{2x^2}\right) - be\left(\begin{cases} -\log(c)\log(x) & \text{for}\ n = 0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right)$$

input
```
integrate((e*x**2+d)*(a+b*ln(c*x**n))/x**3,x)
```

output
```
-a*d/(2*x**2) + a*e*log(x) + b*d*(-n/(4*x**2) - log(c*x**n)/(2*x**2)) - b*
e*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 49, normalized size of antiderivative = 0.94

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3}\,dx = \frac{be\log(cx^n)^2}{2\,n} + ae\log(x) - \frac{bdn}{4\,x^2} - \frac{bd\log(cx^n)}{2\,x^2} - \frac{ad}{2\,x^2}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
1/2*b*e*log(c*x^n)^2/n + a*e*log(x) - 1/4*b*d*n/x^2 - 1/2*b*d*log(c*x^n)/x
^2 - 1/2*a*d/x^2
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.08

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3}\,dx = \frac{1}{2}\,ben\log(x)^2 - \frac{1}{4}\,bdn\left(\frac{2\,\log(x)}{x^2} + \frac{1}{x^2}\right) + be\log(c)\log(|x|) + ae\log(|x|) - \frac{bd\log(c)}{2\,x^2} - \frac{ad}{2\,x^2}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
1/2*b*e*n*log(x)^2 - 1/4*b*d*n*(2*log(x)/x^2 + 1/x^2) + b*e*log(c)*log(abs
(x)) + a*e*log(abs(x)) - 1/2*b*d*log(c)/x^2 - 1/2*a*d/x^2
```

Mupad [B] (verification not implemented)

Time = 25.56 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.27

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3}\,dx = \ln(x)\left(a\,e+\frac{b\,e\,n}{2}\right)-\frac{\frac{a\,d}{2}+\frac{b\,d\,n}{4}}{x^2}-\frac{\ln(c\,x^n)\left(\frac{b\,e\,x^2}{2}+\frac{b\,d}{2}\right)}{x^2}+\frac{b\,e\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((d + e*x^2)*(a + b*log(c*x^n)))/x^3,x)
```

output
```
log(x)*(a*e + (b*e*n)/2) - ((a*d)/2 + (b*d*n)/4)/x^2 - (log(c*x^n)*((b*d)/
2 + (b*e*x^2)/2))/x^2 + (b*e*log(c*x^n)^2)/(2*n)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.10

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3}\,dx = \frac{2\log(x^n c)^2 be\,x^2-2\log(x^n c)\,bdn+4\log(x)\,aen\,x^2-2adn-bd\,n^2}{4n\,x^2}$$

input
```
int((e*x^2+d)*(a+b*log(c*x^n))/x^3,x)
```

output
```
(2*log(x**n*c)**2*b*e*x**2 - 2*log(x**n*c)*b*d*n + 4*log(x)*a*e*n*x**2 - 2
*a*d*n - b*d*n**2)/(4*n*x**2)
```

3.176 $\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^5}\,dx$

Optimal result . . . 1431
Mathematica [A] (verified) . . . 1431
Rubi [A] (verified) . . . 1432
Maple [A] (verified) . . . 1433
Fricas [A] (verification not implemented) . . . 1434
Sympy [A] (verification not implemented) . . . 1434
Maxima [A] (verification not implemented) . . . 1434
Giac [A] (verification not implemented) . . . 1435
Mupad [B] (verification not implemented) . . . 1435
Reduce [B] (verification not implemented) . . . 1436

Optimal result

Integrand size = 21, antiderivative size = 64

$$\int \frac{(d+ex^2)\,(a+b\log(cx^n))}{x^5}\,dx = -\frac{bdn}{16x^4}-\frac{ben}{4x^2}+\frac{be^2n\log(x)}{4d}-\frac{(d+ex^2)^2\,(a+b\log(cx^n))}{4dx^4}$$

output
```
-1/16*b*d*n/x^4-1/4*b*e*n/x^2+1/4*b*e^2*n*ln(x)/d-1/4*(e*x^2+d)^2*(a+b*ln(
c*x^n))/d/x^4
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.08

$$\int \frac{(d+ex^2)\,(a+b\log(cx^n))}{x^5}\,dx = -\frac{ad}{4x^4}-\frac{bdn}{16x^4}-\frac{ae}{2x^2}-\frac{ben}{4x^2}-\frac{bd\log(cx^n)}{4x^4}-\frac{be\log(cx^n)}{2x^2}$$

input
```
Integrate[((d + e*x^2)*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
-1/4*(a*d)/x^4 - (b*d*n)/(16*x^4) - (a*e)/(2*x^2) - (b*e*n)/(4*x^2) - (b*d
*Log[c*x^n])/(4*x^4) - (b*e*Log[c*x^n])/(2*x^2)
```

Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 58, normalized size of antiderivative = 0.91, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2772, 27, 244, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^5}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{2ex^2+d}{4x^5}dx-\frac{d(a+b\log(cx^n))}{4x^4}-\frac{e(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}bn\int \frac{2ex^2+d}{x^5}dx-\frac{d(a+b\log(cx^n))}{4x^4}-\frac{e(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{244}$$

$$\frac{1}{4}bn\int \left(\frac{d}{x^5}+\frac{2e}{x^3}\right)dx-\frac{d(a+b\log(cx^n))}{4x^4}-\frac{e(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d(a+b\log(cx^n))}{4x^4}-\frac{e(a+b\log(cx^n))}{2x^2}+\frac{1}{4}bn\left(-\frac{d}{4x^4}-\frac{e}{x^2}\right)$$

input
```
Int[((d + e*x^2)*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(b*n*(-1/4*d/x^4 - e/x^2))/4 - (d*(a + b*Log[c*x^n]))/(4*x^4) - (e*(a + b*
Log[c*x^n]))/(2*x^2)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.17 (sec) , antiderivative size = 53, normalized size of antiderivative = 0.83

method	result
parallelrisch	$-\frac{8 \ln\left(c\,x^{n}\right) b e\,x^{2}+4 b e n\,x^{2}+8 a e\,x^{2}+4 \ln\left(c\,x^{n}\right) b d+b d n+4 d a}{16 x^{4}}$
risch	$-\frac{b\left(2 e\,x^{2}+d\right) \ln\left(x^{n}\right)}{4 x^{4}}-\frac{4 i \pi b e\,x^{2} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c\,x^{n}\right)^{2}-4 i \pi b e\,x^{2} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c\,x^{n}\right) \operatorname{csgn}\left(i c\right)-4 i \pi b e\,x^{2} \operatorname{csgn}\left(i c\,x^{n}\right)^{3}+4}{}$

input
```
int((e*x^2+d)*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

output
```
-1/16/x^4*(8*ln(c*x^n)*b*e*x^2+4*b*e*n*x^2+8*a*e*x^2+4*ln(c*x^n)*b*d+b*d*n
+4*d*a)
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 60, normalized size of antiderivative = 0.94

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^5}\,dx = -\frac{bdn+4(ben+2ae)x^2+4ad+4(2bex^2+bd)\log(c)+4(2benx^2+bdn)\log(x)}{16x^4}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

output
```
-1/16*(b*d*n + 4*(b*e*n + 2*a*e)*x^2 + 4*a*d + 4*(2*b*e*x^2 + b*d)*log(c)
+ 4*(2*b*e*n*x^2 + b*d*n)*log(x))/x^4
```

Sympy [A] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.06

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^5}\,dx = -\frac{ad}{4x^4}-\frac{ae}{2x^2}-\frac{bdn}{16x^4}-\frac{bd\log(cx^n)}{4x^4}-\frac{ben}{4x^2}-\frac{be\log(cx^n)}{2x^2}$$

input
```
integrate((e*x**2+d)*(a+b*ln(c*x**n))/x**5,x)
```

output
```
-a*d/(4*x**4) - a*e/(2*x**2) - b*d*n/(16*x**4) - b*d*log(c*x**n)/(4*x**4)
- b*e*n/(4*x**2) - b*e*log(c*x**n)/(2*x**2)
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 57, normalized size of antiderivative = 0.89

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^5}\,dx = -\frac{ben}{4x^2}-\frac{be\log(cx^n)}{2x^2}-\frac{ae}{2x^2}-\frac{bdn}{16x^4}-\frac{bd\log(cx^n)}{4x^4}-\frac{ad}{4x^4}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

output
```
-1/4*b*e*n/x^2 - 1/2*b*e*log(c*x^n)/x^2 - 1/2*a*e/x^2 - 1/16*b*d*n/x^4 - 1
/4*b*d*log(c*x^n)/x^4 - 1/4*a*d/x^4
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 65, normalized size of antiderivative = 1.02

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^5}\,dx = -\frac{(2\,benx^2+bdn)\log(x)}{4\,x^4} - \frac{4\,benx^2+8\,bex^2\log(c)+8\,aex^2+bdn+4\,bd\log(c)+4\,ad}{16\,x^4}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

output
```
-1/4*(2*b*e*n*x^2 + b*d*n)*log(x)/x^4 - 1/16*(4*b*e*n*x^2 + 8*b*e*x^2*log(
c) + 8*a*e*x^2 + b*d*n + 4*b*d*log(c) + 4*a*d)/x^4
```

Mupad [B] (verification not implemented)

Time = 25.67 (sec) , antiderivative size = 51, normalized size of antiderivative = 0.80

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^5}\,dx = -\frac{(2\,a\,e+b\,e\,n)\,x^2+a\,d+\frac{b\,d\,n}{4}}{4\,x^4} - \frac{\ln(c\,x^n)\,\left(\frac{b\,e\,x^2}{2}+\frac{b\,d}{4}\right)}{x^4}$$

input
```
int(((d + e*x^2)*(a + b*log(c*x^n)))/x^5,x)
```

output
```
- (a*d + x^2*(2*a*e + b*e*n) + (b*d*n)/4)/(4*x^4) - (log(c*x^n)*((b*d)/4 +
 (b*e*x^2)/2))/x^4
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 53, normalized size of antiderivative = 0.83

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^5}\,dx = \frac{-4\log(x^nc)\,bd-8\log(x^nc)\,be\,x^2-4ad-8ae\,x^2-bdn-4ben\,x^2}{16x^4}$$

input
```
int((e*x^2+d)*(a+b*log(c*x^n))/x^5,x)
```

output
```
( - 4*log(x**n*c)*b*d - 8*log(x**n*c)*b*e*x**2 - 4*a*d - 8*a*e*x**2 - b*d*
n - 4*b*e*n*x**2)/(16*x**4)
```

3.177 $\int x^4(d+ex^2)\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal result 1437
Mathematica [A] (verified) 1437
Rubi [A] (verified) 1438
Maple [A] (verified) 1439
Fricas [A] (verification not implemented) 1439
Sympy [A] (verification not implemented) 1440
Maxima [A] (verification not implemented) 1440
Giac [A] (verification not implemented) 1441
Mupad [B] (verification not implemented) 1441
Reduce [B] (verification not implemented) 1442

Optimal result

Integrand size = 21, antiderivative size = 48

$$\int x^4\left(d+ex^2\right)\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{25}bdnx^5-\frac{1}{49}benx^7+\frac{1}{35}\left(7dx^5+5ex^7\right)\left(a+b\log\left(cx^n\right)\right)$$

output
```
-1/25*b*d*n*x^5-1/49*b*e*n*x^7+1/35*(5*e*x^7+7*d*x^5)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^4\left(d+ex^2\right)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{1}{5}adx^5-\frac{1}{25}bdnx^5+\frac{1}{7}aex^7-\frac{1}{49}benx^7+\frac{1}{5}bdx^5\log\left(cx^n\right)+\frac{1}{7}bex^7\log\left(cx^n\right)$$

input
```
Integrate[x^4*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
(a*d*x^5)/5 - (b*d*n*x^5)/25 + (a*e*x^7)/7 - (b*e*n*x^7)/49 + (b*d*x^5*Log
[c*x^n])/5 + (b*e*x^7*Log[c*x^n])/7
```

Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.02, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2771, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^4 (d+ex^2) (a+b\log(cx^n)) \, dx$$

$$\Big\downarrow \text{ 2771}$$

$$\frac{1}{35}(7dx^5+5ex^7) (a+b\log(cx^n)) - bn \int \left(\frac{ex^6}{7}+\frac{dx^4}{5}\right) dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{35}(7dx^5+5ex^7) (a+b\log(cx^n)) - bn \left(\frac{dx^5}{25}+\frac{ex^7}{49}\right)$$

input
```
Int[x^4*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d*x^5)/25 + (e*x^7)/49)) + ((7*d*x^5 + 5*e*x^7)*(a + b*Log[c*x^n])
)/35
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.77 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.21

method	result
parallelrisch	$\frac{x^7 \ln(c x^n) b e}{7} - \frac{ben x^7}{49} + \frac{x^7 a e}{7} + \frac{x^5 \ln(c x^n) b d}{5} - \frac{bdn x^5}{25} + \frac{x^5 d a}{5}$
risch	$\frac{b x^5 (5e x^2+7d) \ln(x^n)}{35} + \frac{i\pi be x^7 \operatorname{csgn}(ix^n) \operatorname{csgn}(ic x^n)^2}{14} - \frac{i\pi be x^7 \operatorname{csgn}(ix^n) \operatorname{csgn}(ic x^n) \operatorname{csgn}(ic)}{14} - \frac{i\pi be x^7 \operatorname{csgn}(ic x^n)^3}{14}$

input
```
int(x^4*(e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/7*x^7*ln(c*x^n)*b*e-1/49*b*e*n*x^7+1/7*x^7*a*e+1/5*x^5*ln(c*x^n)*b*d-1/2
5*b*d*n*x^5+1/5*x^5*d*a
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^4(d+ex^2)(a+b\log(cx^n))\,dx = -\frac{1}{49}(ben-7ae)x^7 - \frac{1}{25}(bdn-5ad)x^5 + \frac{1}{35}\left(5bex^7+7bdx^5\right)\log(c) + \frac{1}{35}\left(5benx^7+7bdnx^5\right)\log(x)$$

input
```
integrate(x^4*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/49*(b*e*n - 7*a*e)*x^7 - 1/25*(b*d*n - 5*a*d)*x^5 + 1/35*(5*b*e*x^7 + 7
*b*d*x^5)*log(c) + 1/35*(5*b*e*n*x^7 + 7*b*d*n*x^5)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.66 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.38

$$\int x^4 (d+ex^2) (a+b\log(cx^n)) \, dx = \frac{adx^5}{5} + \frac{aex^7}{7} - \frac{bdnx^5}{25} + \frac{bdx^5\log(cx^n)}{5} - \frac{benx^7}{49} + \frac{bex^7\log(cx^n)}{7}$$

input
```
integrate(x**4*(e*x**2+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x**5/5 + a*e*x**7/7 - b*d*n*x**5/25 + b*d*x**5*log(c*x**n)/5 - b*e*n*x
**7/49 + b*e*x**7*log(c*x**n)/7
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.19

$$\int x^4 (d+ex^2) (a+b\log(cx^n)) \, dx = -\frac{1}{49}\,benx^7 + \frac{1}{7}\,bex^7\log(cx^n) + \frac{1}{7}\,aex^7 - \frac{1}{25}\,bdnx^5 + \frac{1}{5}\,bdx^5\log(cx^n) + \frac{1}{5}\,adx^5$$

input
```
integrate(x^4*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/49*b*e*n*x^7 + 1/7*b*e*x^7*log(c*x^n) + 1/7*a*e*x^7 - 1/25*b*d*n*x^5 +
1/5*b*d*x^5*log(c*x^n) + 1/5*a*d*x^5
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^4(d+ex^2)(a+b\log(cx^n))\,dx = \frac{1}{7}benx^7\log(x) - \frac{1}{49}benx^7 + \frac{1}{7}bex^7\log(c) + \frac{1}{7}aex^7 + \frac{1}{5}bdnx^5\log(x) - \frac{1}{25}bdnx^5 + \frac{1}{5}bdx^5\log(c) + \frac{1}{5}adx^5$$

input
```
integrate(x^4*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/7*b*e*n*x^7*log(x) - 1/49*b*e*n*x^7 + 1/7*b*e*x^7*log(c) + 1/7*a*e*x^7 +
 1/5*b*d*n*x^5*log(x) - 1/25*b*d*n*x^5 + 1/5*b*d*x^5*log(c) + 1/5*a*d*x^5
```

Mupad [B] (verification not implemented)

Time = 25.82 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06

$$\int x^4(d+ex^2)(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,e\,x^7}{7} + \frac{b\,d\,x^5}{5}\right) + \frac{d\,x^5\,(5\,a-b\,n)}{25} + \frac{e\,x^7\,(7\,a-b\,n)}{49}$$

input
```
int(x^4*(d + e*x^2)*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d*x^5)/5 + (b*e*x^7)/7) + (d*x^5*(5*a - b*n))/25 + (e*x^7*(
7*a - b*n))/49
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.10

$$\int x^4 (d + ex^2) (a + b\log(cx^n)) \, dx = \frac{x^5 (245 \log(x^n c) bd + 175 \log(x^n c) be x^2 + 245ad + 175ae x^2 - 49bdn - 25ben x^2)}{1225}$$

input
```
int(x^4*(e*x^2+d)*(a+b*log(c*x^n)),x)
```

output
```
(x**5*(245*log(x**n*c)*b*d + 175*log(x**n*c)*b*e*x**2 + 245*a*d + 175*a*e*
x**2 - 49*b*d*n - 25*b*e*n*x**2))/1225
```

3.178 $\int x^2(d+ex^2)(a+b\log(cx^n))\,dx$

Optimal result 1443
Mathematica [A] (verified) 1443
Rubi [A] (verified) 1444
Maple [A] (verified) 1445
Fricas [A] (verification not implemented) 1445
Sympy [A] (verification not implemented) 1446
Maxima [A] (verification not implemented) 1446
Giac [A] (verification not implemented) 1447
Mupad [B] (verification not implemented) 1447
Reduce [B] (verification not implemented) 1448

Optimal result

Integrand size = 21, antiderivative size = 48

$$\int x^2(d+ex^2)(a+b\log(cx^n))\,dx = -\frac{1}{9}bdnx^3-\frac{1}{25}benx^5+\frac{1}{15}(5dx^3+3ex^5)(a+b\log(cx^n))$$

output
```
-1/9*b*d*n*x^3-1/25*b*e*n*x^5+1/15*(3*e*x^5+5*d*x^3)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^2(d+ex^2)(a+b\log(cx^n))\,dx = \frac{1}{3}adx^3-\frac{1}{9}bdnx^3+\frac{1}{5}aex^5-\frac{1}{25}benx^5+\frac{1}{3}bdx^3\log(cx^n)+\frac{1}{5}bex^5\log(cx^n)$$

input
```
Integrate[x^2*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
(a*d*x^3)/3 - (b*d*n*x^3)/9 + (a*e*x^5)/5 - (b*e*n*x^5)/25 + (b*d*x^3*Log[
c*x^n])/3 + (b*e*x^5*Log[c*x^n])/5
```

Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.02, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2771, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2 (d+ex^2) (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{15}(5dx^3+3ex^5)(a+b\log(cx^n))-bn\int\left(\frac{ex^4}{5}+\frac{dx^2}{3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{15}(5dx^3+3ex^5)(a+b\log(cx^n))-bn\left(\frac{dx^3}{9}+\frac{ex^5}{25}\right)$$

input
```
Int[x^2*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d*x^3)/9 + (e*x^5)/25)) + ((5*d*x^3 + 3*e*x^5)*(a + b*Log[c*x^n]))
/15
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.48 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.21

method	result
parallelrisch	$\frac{x^{5} \ln \left(c \,x^{n}\right) b e}{5}-\frac{b e n \,x^{5}}{25}+\frac{e a \,x^{5}}{5}+\frac{x^{3} \ln \left(c \,x^{n}\right) b d}{3}-\frac{b d n \,x^{3}}{9}+\frac{x^{3} d a}{3}$
risch	$\frac{b \,x^{3} \left(3 e \,x^{2}+5 d \right) \ln \left(x^{n}\right)}{15}+\frac{i \pi b e \,x^{5} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right)^{2}}{10}-\frac{i \pi b e \,x^{5} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right) \operatorname{csgn}\left(i c \right)}{10}-\frac{i \pi b e \,x^{5} \operatorname{csgn}\left(i c \,x^{n}\right)^{3}}{10}$

input
```
int(x^2*(e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/5*x^5*ln(c*x^n)*b*e-1/25*b*e*n*x^5+1/5*e*a*x^5+1/3*x^3*ln(c*x^n)*b*d-1/9
*b*d*n*x^3+1/3*x^3*d*a
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^2 \left(d+ex^2\right) \left(a+b\log \left(cx^n\right)\right) \, dx=-\frac{1}{25} \, (ben-5 \, ae)x^5-\frac{1}{9} \, (bdn-3 \, ad)x^3+\frac{1}{15} \, \left(3 \, bex^5+5 \, bdx^3\right) \log \left(c\right)+\frac{1}{15} \, \left(3 \, benx^5+5 \, bdnx^3\right) \log \left(x\right)$$

input
```
integrate(x^2*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/25*(b*e*n - 5*a*e)*x^5 - 1/9*(b*d*n - 3*a*d)*x^3 + 1/15*(3*b*e*x^5 + 5*
b*d*x^3)*log(c) + 1/15*(3*b*e*n*x^5 + 5*b*d*n*x^3)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.38

$$\int x^2(d+ex^2)\,(a+b\log(cx^n))\;dx = \frac{adx^3}{3}+\frac{aex^5}{5}-\frac{bdnx^3}{9}+\frac{bdx^3\log(cx^n)}{3} - \frac{benx^5}{25}+\frac{bex^5\log(cx^n)}{5}$$

input
```
integrate(x**2*(e*x**2+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x**3/3 + a*e*x**5/5 - b*d*n*x**3/9 + b*d*x**3*log(c*x**n)/3 - b*e*n*x*
*5/25 + b*e*x**5*log(c*x**n)/5
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.19

$$\int x^2(d+ex^2)\,(a+b\log(cx^n))\;dx = -\frac{1}{25}\,benx^5+\frac{1}{5}\,bex^5\log(cx^n)+\frac{1}{5}\,aex^5 - \frac{1}{9}\,bdnx^3+\frac{1}{3}\,bdx^3\log(cx^n)+\frac{1}{3}\,adx^3$$

input
```
integrate(x^2*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/25*b*e*n*x^5 + 1/5*b*e*x^5*log(c*x^n) + 1/5*a*e*x^5 - 1/9*b*d*n*x^3 + 1
/3*b*d*x^3*log(c*x^n) + 1/3*a*d*x^3
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^2(d+ex^2)(a+b\log(cx^n))\,dx = \frac{1}{5}benx^5\log(x)-\frac{1}{25}benx^5+\frac{1}{5}bex^5\log(c)+\frac{1}{5}aex^5+\frac{1}{3}bdnx^3\log(x)-\frac{1}{9}bdnx^3+\frac{1}{3}bdx^3\log(c)+\frac{1}{3}adx^3$$

input
```
integrate(x^2*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/5*b*e*n*x^5*log(x) - 1/25*b*e*n*x^5 + 1/5*b*e*x^5*log(c) + 1/5*a*e*x^5 +
 1/3*b*d*n*x^3*log(x) - 1/9*b*d*n*x^3 + 1/3*b*d*x^3*log(c) + 1/3*a*d*x^3
```

Mupad [B] (verification not implemented)

Time = 25.70 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06

$$\int x^2(d+ex^2)(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,e\,x^5}{5}+\frac{b\,d\,x^3}{3}\right)+\frac{d\,x^3\,(3\,a-b\,n)}{9}+\frac{e\,x^5\,(5\,a-b\,n)}{25}$$

input
```
int(x^2*(d + e*x^2)*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d*x^3)/3 + (b*e*x^5)/5) + (d*x^3*(3*a - b*n))/9 + (e*x^5*(5
*a - b*n))/25
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.10

$$\int x^2(d+ex^2)(a+b\log(cx^n))\,dx = \frac{x^3(75\log(x^n c)\,bd+45\log(x^n c)\,be\,x^2+75ad+45ae\,x^2-25bdn-9ben\,x^2)}{225}$$

input
```
int(x^2*(e*x^2+d)*(a+b*log(c*x^n)),x)
```

output
```
(x**3*(75*log(x**n*c)*b*d + 45*log(x**n*c)*b*e*x**2 + 75*a*d + 45*a*e*x**2
 - 25*b*d*n - 9*b*e*n*x**2))/225
```

3.179 $\int (d+ex^2)(a+b\log(cx^n))\,dx$

Optimal result 1449
Mathematica [A] (verified) 1449
Rubi [A] (verified) 1450
Maple [A] (verified) 1451
Fricas [A] (verification not implemented) 1451
Sympy [A] (verification not implemented) 1452
Maxima [A] (verification not implemented) 1452
Giac [A] (verification not implemented) 1452
Mupad [B] (verification not implemented) 1453
Reduce [B] (verification not implemented) 1453

Optimal result

Integrand size = 18, antiderivative size = 48

$$\int (d+ex^2)(a+b\log(cx^n))\,dx = -bdnx-\frac{1}{9}benx^3+dx(a+b\log(cx^n)) + \frac{1}{3}ex^3(a+b\log(cx^n))$$

output
```
-b*d*n*x-1/9*b*e*n*x^3+d*x*(a+b*ln(c*x^n))+1/3*e*x^3*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.15

$$\int (d+ex^2)(a+b\log(cx^n))\,dx = adx-bdnx+\frac{1}{3}aex^3-\frac{1}{9}benx^3 + bdx\log(cx^n)+\frac{1}{3}bex^3\log(cx^n)$$

input
```
Integrate[(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
a*d*x - b*d*n*x + (a*e*x^3)/3 - (b*e*n*x^3)/9 + b*d*x*Log[c*x^n] + (b*e*x^
3*Log[c*x^n])/3
```

Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2750, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d+ex^2\right) \left(a+b\log \left(cx^n\right)\right) \, dx$$

$$\Big\downarrow \text{ 2750}$$

$$-bn\int \left(\frac{ex^2}{3}+d\right)dx+dx(a+b\log \left(cx^n\right))+\frac{1}{3}ex^3(a+b\log \left(cx^n\right))$$

$$\Big\downarrow \text{ 2009}$$

$$dx(a+b\log \left(cx^n\right))+\frac{1}{3}ex^3(a+b\log \left(cx^n\right))-bn\left(dx+\frac{ex^3}{9}\right)$$

input
```
Int[(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*(d*x + (e*x^3)/9)) + d*x*(a + b*Log[c*x^n]) + (e*x^3*(a + b*Log[c*x^
n]))/3
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2750
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Simp[(a + b*Log[c*x^n])
  u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b,
 c, d, e, n, r}, x] && IGtQ[q, 0]
```

Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.04

method	result
parallelrisch	$\frac{x^{3} b e \ln\left(c \,x^{n}\right)}{3}-\frac{b e n \,x^{3}}{9}+\frac{x^{3} a e}{3}+x \ln \left(c \,x^{n}\right) b d -b d n x +x d a$
risch	$\frac{b x \left(e \,x^{2}+3 d \right) \ln \left(x^{n}\right)}{3}+\frac{i \pi \,\operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right)^{2} b e \,x^{3}}{6}-\frac{i \pi \,\operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right) \operatorname{csgn}\left(i c \right) b e \,x^{3}}{6}-\frac{i \pi \,\operatorname{csgn}\left(i c \,x^{n}\right)^{3} b e \,x^{3}}{6}$

input
```
int((e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/3*x^3*b*e*ln(c*x^n)-1/9*b*e*n*x^3+1/3*x^3*a*e+x*ln(c*x^n)*b*d-b*d*n*x+x*
d*a
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.27

$$\int \left(d+ex^2\right) \left(a+b\log \left(cx^n\right)\right) \, dx=-\frac{1}{9}\,(ben-3\,ae)x^3-(bdn-ad)x+\frac{1}{3}\,\left(bex^3+3\,bdx\right)\log\left(c\right)+\frac{1}{3}\,\left(benx^3+3\,bdnx\right)\log\left(x\right)$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/9*(b*e*n - 3*a*e)*x^3 - (b*d*n - a*d)*x + 1/3*(b*e*x^3 + 3*b*d*x)*log(c
) + 1/3*(b*e*n*x^3 + 3*b*d*n*x)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.17

$$\int (d+ex^2)(a+b\log(cx^n))\,dx = adx + \frac{aex^3}{3} - bdnx + bdx\log(cx^n) - \frac{benx^3}{9} + \frac{bex^3\log(cx^n)}{3}$$

input
```
integrate((e*x**2+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x + a*e*x**3/3 - b*d*n*x + b*d*x*log(c*x**n) - b*e*n*x**3/9 + b*e*x**3
*log(c*x**n)/3
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.02

$$\int (d+ex^2)(a+b\log(cx^n))\,dx = -\frac{1}{9}benx^3 + \frac{1}{3}bex^3\log(cx^n) + \frac{1}{3}aex^3 - bdnx + bdx\log(cx^n) + adx$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/9*b*e*n*x^3 + 1/3*b*e*x^3*log(c*x^n) + 1/3*a*e*x^3 - b*d*n*x + b*d*x*lo
g(c*x^n) + a*d*x
```

Giac [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.21

$$\int (d+ex^2)(a+b\log(cx^n))\,dx = \frac{1}{3}benx^3\log(x) - \frac{1}{9}benx^3 + \frac{1}{3}bex^3\log(c) + \frac{1}{3}aex^3 + bdnx\log(x) - bdnx + bdx\log(c) + adx$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/3*b*e*n*x^3*log(x) - 1/9*b*e*n*x^3 + 1/3*b*e*x^3*log(c) + 1/3*a*e*x^3 +
b*d*n*x*log(x) - b*d*n*x + b*d*x*log(c) + a*d*x
```

Mupad [B] (verification not implemented)

Time = 25.68 (sec) , antiderivative size = 43, normalized size of antiderivative = 0.90

$$\int \left(d+ex^2\right) \left(a+b\log\left(cx^n\right)\right) \, dx = \ln\left(c\,x^n\right)\,\left(\frac{b\,e\,x^3}{3}+b\,d\,x\right)+d\,x\,\left(a-b\,n\right)+\frac{e\,x^3\,\left(3\,a-b\,n\right)}{9}$$

input
```
int((d + e*x^2)*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*(b*d*x + (b*e*x^3)/3) + d*x*(a - b*n) + (e*x^3*(3*a - b*n))/9
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06

$$\int \left(d+ex^2\right) \left(a+b\log\left(cx^n\right)\right) \, dx = \frac{x(9\log(x^n c)\,bd+3\log(x^n c)\,be\,x^2+9ad+3ae\,x^2-9bdn-ben\,x^2)}{9}$$

input
```
int((e*x^2+d)*(a+b*log(c*x^n)),x)
```

output
```
(x*(9*log(x**n*c)*b*d + 3*log(x**n*c)*b*e*x**2 + 9*a*d + 3*a*e*x**2 - 9*b*
d*n - b*e*n*x**2))/9
```

3.180 $\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2}\,dx$

Optimal result 1454
Mathematica [A] (verified) 1454
Rubi [A] (verified) 1455
Maple [A] (verified) 1456
Fricas [A] (verification not implemented) 1456
Sympy [A] (verification not implemented) 1456
Maxima [A] (verification not implemented) 1457
Giac [A] (verification not implemented) 1457
Mupad [B] (verification not implemented) 1458
Reduce [B] (verification not implemented) 1458

Optimal result

Integrand size = 21, antiderivative size = 44

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2}\,dx = -\frac{bdn}{x} - benx - \frac{d(a+b\log(cx^n))}{x} + ex(a+b\log(cx^n))$$

output
```
-b*d*n/x-b*e*n*x-d*(a+b*ln(c*x^n))/x+e*x*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2}\,dx = -\frac{ad}{x} - \frac{bdn}{x} + aex - benx - \frac{bd\log(cx^n)}{x} + bex\log(cx^n)$$

input
```
Integrate[((d + e*x^2)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-((a*d)/x) - (b*d*n)/x + a*e*x - b*e*n*x - (b*d*Log[c*x^n])/x + b*e*x*Log[
c*x^n]
```

Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 43, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(e-\frac{d}{x^2}\right)dx-\frac{d(a+b\log(cx^n))}{x}+ex(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d(a+b\log(cx^n))}{x}+ex(a+b\log(cx^n))-bn\left(\frac{d}{x}+ex\right)$$

input
```
Int[((d + e*x^2)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-(b*n*(d/x + e*x)) - (d*(a + b*Log[c*x^n]))/x + e*x*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.14

method	result
parallelrisch	$-\frac{-\ln(c\,x^n)be\,x^2+ben\,x^2-ae\,x^2+\ln(c\,x^n)bd+bdn+da}{x}$
risch	$-\frac{b(-e\,x^2+d)\ln(x^n)}{x}-\frac{-i\pi be\,x^2\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2+i\pi be\,x^2\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)\operatorname{csgn}(ic)+i\pi be\,x^2\operatorname{csgn}(ic\,x^n)^3-i\pi$

input
```
int((e*x^2+d)*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

output
```
-1/x*(-ln(c*x^n)*b*e*x^2+b*e*n*x^2-a*e*x^2+ln(c*x^n)*b*d+b*d*n+d*a)
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.32

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2}\,dx = -\frac{bdn+(ben-ae)x^2+ad-(bex^2-bd)\log(c)-(benx^2-bdn)\log(x)}{x}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
-(b*d*n + (b*e*n - a*e)*x^2 + a*d - (b*e*x^2 - b*d)*log(c) - (b*e*n*x^2 -
b*d*n)*log(x))/x
```

Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.05

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2}\,dx = -\frac{ad}{x}+aex-\frac{bdn}{x}-\frac{bd\log(cx^n)}{x}-benx+bex\log(cx^n)$$

input
```
integrate((e*x**2+d)*(a+b*ln(c*x**n))/x**2,x)
```

output
```
-a*d/x + a*e*x - b*d*n/x - b*d*log(c*x**n)/x - b*e*n*x + b*e*x*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2}\,dx = -benx+bex\log(cx^n)+aex-\frac{bdn}{x}-\frac{bd\log(cx^n)}{x}-\frac{ad}{x}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
-b*e*n*x + b*e*x*log(c*x^n) + a*e*x - b*d*n/x - b*d*log(c*x^n)/x - a*d/x
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2}\,dx = -(ben-be\log(c)-ae)x + \left(benx-\frac{bdn}{x}\right)\log(x)-\frac{bdn+bd\log(c)+ad}{x}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
-(b*e*n - b*e*log(c) - a*e)*x + (b*e*n*x - b*d*n/x)*log(x) - (b*d*n + b*d*
log(c) + a*d)/x
```

Mupad [B] (verification not implemented)

Time = 25.81 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.16

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2}\,dx = e\,x\,(a-b\,n) - \ln(c\,x^n)\left(\frac{b\,e\,x^2+b\,d}{x} - 2\,b\,e\,x\right) - \frac{a\,d+b\,d\,n}{x}$$

input
```
int(((d + e*x^2)*(a + b*log(c*x^n)))/x^2,x)
```

output
```
e*x*(a - b*n) - log(c*x^n)*((b*d + b*e*x^2)/x - 2*b*e*x) - (a*d + b*d*n)/x
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.14

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2}\,dx = \frac{-\log(x^n c)\,bd + \log(x^n c)\,be\,x^2 - ad + ae\,x^2 - bdn - ben\,x^2}{x}$$

input
```
int((e*x^2+d)*(a+b*log(c*x^n))/x^2,x)
```

output
```
( - log(x**n*c)*b*d + log(x**n*c)*b*e*x**2 - a*d + a*e*x**2 - b*d*n - b*e*
n*x**2)/x
```

3.181 $\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4} dx$

Optimal result 1459
Mathematica [A] (verified) 1459
Rubi [A] (verified) 1460
Maple [A] (verified) 1461
Fricas [A] (verification not implemented) 1462
Sympy [A] (verification not implemented) 1462
Maxima [A] (verification not implemented) 1462
Giac [A] (verification not implemented) 1463
Mupad [B] (verification not implemented) 1463
Reduce [B] (verification not implemented) 1464

Optimal result

Integrand size = 21, antiderivative size = 53

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4} dx = -\frac{bdn}{9x^3} - \frac{ben}{x} - \frac{d(a+b\log(cx^n))}{3x^3} - \frac{e(a+b\log(cx^n))}{x}$$

output
```
-1/9*b*d*n/x^3-b*e*n/x-1/3*d*(a+b*ln(c*x^n))/x^3-e*(a+b*ln(c*x^n))/x
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4} dx = -\frac{ad}{3x^3} - \frac{bdn}{9x^3} - \frac{ae}{x} - \frac{ben}{x} - \frac{bd\log(cx^n)}{3x^3} - \frac{be\log(cx^n)}{x}$$

input
```
Integrate[((d + e*x^2)*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-1/3*(a*d)/x^3 - (b*d*n)/(9*x^3) - (a*e)/x - (b*e*n)/x - (b*d*Log[c*x^n])/
(3*x^3) - (b*e*Log[c*x^n])/x
```

Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.06, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2772, 27, 244, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{3ex^2+d}{3x^4}dx-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{3}bn\int \frac{3ex^2+d}{x^4}dx-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{244}$$

$$\frac{1}{3}bn\int \left(\frac{d}{x^4}+\frac{3e}{x^2}\right)dx-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{x}+\frac{1}{3}bn\left(-\frac{d}{3x^3}-\frac{3e}{x}\right)$$

input
```
Int[((d + e*x^2)*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(b*n*(-1/3*d/x^3 - (3*e)/x))/3 - (d*(a + b*Log[c*x^n]))/(3*x^3) - (e*(a +
b*Log[c*x^n]))/x
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.17 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.00

method	result
parallelrisch	$-\frac{9 \ln \left(c \,x^{n}\right) b e \,x^{2}+9 b e n \,x^{2}+9 a e \,x^{2}+3 \ln \left(c \,x^{n}\right) b d +b d n +3 d a}{9 x^{3}}$
risch	$-\frac{b \left(3 e \,x^{2}+d \right) \ln \left(x^{n}\right)}{3 x^{3}}-\frac{9 i \pi b e \,x^{2} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right)^{2}-9 i \pi b e \,x^{2} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right) \operatorname{csgn}\left(i c \right)-9 i \pi b e \,x^{2} \operatorname{csgn}\left(i c \,x^{n}\right)^{3}+9$

input
```
int((e*x^2+d)*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/9/x^3*(9*ln(c*x^n)*b*e*x^2+9*b*e*n*x^2+9*a*e*x^2+3*ln(c*x^n)*b*d+b*d*n+
3*d*a)
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4}\,dx$$
$$= -\frac{bdn+9(ben+ae)x^2+3\,ad+3\,(3\,bex^2+bd)\log(c)+3\,(3\,benx^2+bdn)\log(x)}{9\,x^3}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
-1/9*(b*d*n + 9*(b*e*n + a*e)*x^2 + 3*a*d + 3*(3*b*e*x^2 + b*d)*log(c) + 3
*(3*b*e*n*x^2 + b*d*n)*log(x))/x^3
```

Sympy [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.09

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4}\,dx = -\frac{ad}{3x^3}-\frac{ae}{x}-\frac{bdn}{9x^3}-\frac{bd\log(cx^n)}{3x^3}-\frac{ben}{x}-\frac{be\log(cx^n)}{x}$$

input
```
integrate((e*x**2+d)*(a+b*ln(c*x**n))/x**4,x)
```

output
```
-a*d/(3*x**3) - a*e/x - b*d*n/(9*x**3) - b*d*log(c*x**n)/(3*x**3) - b*e*n/
x - b*e*log(c*x**n)/x
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.08

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4}\,dx = -\frac{ben}{x}-\frac{be\log(cx^n)}{x}-\frac{ae}{x}-\frac{bdn}{9\,x^3}-\frac{bd\log(cx^n)}{3\,x^3}-\frac{ad}{3\,x^3}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
-b*e*n/x - b*e*log(c*x^n)/x - a*e/x - 1/9*b*d*n/x^3 - 1/3*b*d*log(c*x^n)/x
^3 - 1/3*a*d/x^3
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 65, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4}\,dx = -\frac{(3\,benx^2+bdn)\log(x)}{3\,x^3} - \frac{9\,benx^2+9\,bex^2\log(c)+9\,aex^2+bdn+3\,bd\log(c)+3\,ad}{9\,x^3}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
-1/3*(3*b*e*n*x^2 + b*d*n)*log(x)/x^3 - 1/9*(9*b*e*n*x^2 + 9*b*e*x^2*log(c
) + 9*a*e*x^2 + b*d*n + 3*b*d*log(c) + 3*a*d)/x^3
```

Mupad [B] (verification not implemented)

Time = 25.62 (sec) , antiderivative size = 51, normalized size of antiderivative = 0.96

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4}\,dx = -\frac{(3\,a\,e+3\,b\,e\,n)\;x^2+a\,d+\frac{b\,d\,n}{3}}{3\,x^3} - \frac{\ln(c\,x^n)\;\left(b\,e\,x^2+\frac{b\,d}{3}\right)}{x^3}$$

input
```
int(((d + e*x^2)*(a + b*log(c*x^n)))/x^4,x)
```

output
```
- (a*d + x^2*(3*a*e + 3*b*e*n) + (b*d*n)/3)/(3*x^3) - (log(c*x^n)*((b*d)/3
 + b*e*x^2))/x^3
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4}\,dx = \frac{-3\log(x^nc)\,bd-9\log(x^nc)\,be\,x^2-3ad-9ae\,x^2-bdn-9ben\,x^2}{9x^3}$$

input
```
int((e*x^2+d)*(a+b*log(c*x^n))/x^4,x)
```

output
```
( - 3*log(x**n*c)*b*d - 9*log(x**n*c)*b*e*x**2 - 3*a*d - 9*a*e*x**2 - b*d*
n - 9*b*e*n*x**2)/(9*x**3)
```

3.182 $\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}\,dx$

Optimal result 1465
Mathematica [A] (verified) 1465
Rubi [A] (verified) 1466
Maple [A] (verified) 1467
Fricas [A] (verification not implemented) 1468
Sympy [A] (verification not implemented) 1468
Maxima [A] (verification not implemented) 1468
Giac [A] (verification not implemented) 1469
Mupad [B] (verification not implemented) 1469
Reduce [B] (verification not implemented) 1470

Optimal result

Integrand size = 21, antiderivative size = 57

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}\,dx = -\frac{bdn}{25x^5}-\frac{ben}{9x^3}-\frac{d(a+b\log(cx^n))}{5x^5}-\frac{e(a+b\log(cx^n))}{3x^3}$$

output
```
-1/25*b*d*n/x^5-1/9*b*e*n/x^3-1/5*d*(a+b*ln(c*x^n))/x^5-1/3*e*(a+b*ln(c*x^
n))/x^3
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}\,dx = -\frac{ad}{5x^5}-\frac{bdn}{25x^5}-\frac{ae}{3x^3}-\frac{ben}{9x^3}-\frac{bd\log(cx^n)}{5x^5}-\frac{be\log(cx^n)}{3x^3}$$

input
```
Integrate[((d + e*x^2)*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-1/5*(a*d)/x^5 - (b*d*n)/(25*x^5) - (a*e)/(3*x^3) - (b*e*n)/(9*x^3) - (b*d
*Log[c*x^n])/(5*x^5) - (b*e*Log[c*x^n])/(3*x^3)
```

Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 60, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2772, 27, 244, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{5ex^2+3d}{15x^6}dx-\frac{d(a+b\log(cx^n))}{5x^5}-\frac{e(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{15}bn\int \frac{5ex^2+3d}{x^6}dx-\frac{d(a+b\log(cx^n))}{5x^5}-\frac{e(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{244}$$

$$\frac{1}{15}bn\int \left(\frac{3d}{x^6}+\frac{5e}{x^4}\right)dx-\frac{d(a+b\log(cx^n))}{5x^5}-\frac{e(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d(a+b\log(cx^n))}{5x^5}-\frac{e(a+b\log(cx^n))}{3x^3}+\frac{1}{15}bn\left(-\frac{3d}{5x^5}-\frac{5e}{3x^3}\right)$$

input
```
Int[((d + e*x^2)*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*((-3*d)/(5*x^5) - (5*e)/(3*x^3)))/15 - (d*(a + b*Log[c*x^n]))/(5*x^5)
 - (e*(a + b*Log[c*x^n]))/(3*x^3)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 54, normalized size of antiderivative = 0.95

method	result
parallelrisch	$-\frac{75 \ln \left(c \,x^{n}\right) b e \,x^{2}+25 b e n \,x^{2}+75 a e \,x^{2}+45 \ln \left(c \,x^{n}\right) b d +9 b d n +45 d a}{225 x^{5}}$
risch	$-\frac{b \left(5 e \,x^{2}+3 d \right) \ln \left(x^{n}\right)}{15 x^{5}}-\frac{75 i \pi b e \,x^{2} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right)^{2}-75 i \pi b e \,x^{2} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right) \operatorname{csgn}\left(i c \right)-75 i \pi b e \,x^{2} \operatorname{csgn}\left(i c \,x^{n}\right.}{}$

input
```
int((e*x^2+d)*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

output
```
-1/225/x^5*(75*ln(c*x^n)*b*e*x^2+25*b*e*n*x^2+75*a*e*x^2+45*ln(c*x^n)*b*d+
9*b*d*n+45*d*a)
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}\,dx = -\frac{9\,bdn+25\,(ben+3\,ae)x^2+45\,ad+15\,(5\,bex^2+3\,bd)\log(c)+15\,(5\,benx^2+3\,bdn)\log(x)}{225\,x^5}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
-1/225*(9*b*d*n + 25*(b*e*n + 3*a*e)*x^2 + 45*a*d + 15*(5*b*e*x^2 + 3*b*d)
*log(c) + 15*(5*b*e*n*x^2 + 3*b*d*n)*log(x))/x^5
```

Sympy [A] (verification not implemented)

Time = 0.56 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}\,dx = -\frac{ad}{5x^5}-\frac{ae}{3x^3}-\frac{bdn}{25x^5}-\frac{bd\log(cx^n)}{5x^5}-\frac{ben}{9x^3}-\frac{be\log(cx^n)}{3x^3}$$

input
```
integrate((e*x**2+d)*(a+b*ln(c*x**n))/x**6,x)
```

output
```
-a*d/(5*x**5) - a*e/(3*x**3) - b*d*n/(25*x**5) - b*d*log(c*x**n)/(5*x**5)
- b*e*n/(9*x**3) - b*e*log(c*x**n)/(3*x**3)
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}\,dx = -\frac{ben}{9\,x^3}-\frac{be\log(cx^n)}{3\,x^3}-\frac{ae}{3\,x^3}-\frac{bdn}{25\,x^5}-\frac{bd\log(cx^n)}{5\,x^5}-\frac{ad}{5\,x^5}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
-1/9*b*e*n/x^3 - 1/3*b*e*log(c*x^n)/x^3 - 1/3*a*e/x^3 - 1/25*b*d*n/x^5 - 1
/5*b*d*log(c*x^n)/x^5 - 1/5*a*d/x^5
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 67, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}\,dx = -\frac{(5\,benx^2+3\,bdn)\log(x)}{15\,x^5} - \frac{25\,benx^2+75\,bex^2\log(c)+75\,aex^2+9\,bdn+45\,bd\log(c)+45\,ad}{225\,x^5}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
-1/15*(5*b*e*n*x^2 + 3*b*d*n)*log(x)/x^5 - 1/225*(25*b*e*n*x^2 + 75*b*e*x^
2*log(c) + 75*a*e*x^2 + 9*b*d*n + 45*b*d*log(c) + 45*a*d)/x^5
```

Mupad [B] (verification not implemented)

Time = 26.06 (sec) , antiderivative size = 53, normalized size of antiderivative = 0.93

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}\,dx = -\frac{\left(5\,a\,e+\frac{5\,b\,e\,n}{3}\right)\,x^2+3\,a\,d+\frac{3\,b\,d\,n}{5}}{15\,x^5} - \frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,e\,x^2}{3}+\frac{b\,d}{5}\right)}{x^5}$$

input
```
int(((d + e*x^2)*(a + b*log(c*x^n)))/x^6,x)
```

output
```
- (3*a*d + x^2*(5*a*e + (5*b*e*n)/3) + (3*b*d*n)/5)/(15*x^5) - (log(c*x^n)
*((b*d)/5 + (b*e*x^2)/3))/x^5
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 53, normalized size of antiderivative = 0.93

$$\int \frac{(d+ex^2)\,(a+b\log\,(cx^n))}{x^6}\,dx = \frac{-45\log(x^nc)\,bd-75\log(x^nc)\,be\,x^2-45ad-75ae\,x^2-9bdn-25ben\,x^2}{225x^5}$$

input
```
int((e*x^2+d)*(a+b*log(c*x^n))/x^6,x)
```

output
```
( - 45*log(x**n*c)*b*d - 75*log(x**n*c)*b*e*x**2 - 45*a*d - 75*a*e*x**2 -
9*b*d*n - 25*b*e*n*x**2)/(225*x**5)
```

3.183 $\int x^5(d+ex^2)^2(a+b\log(cx^n))\,dx$

Optimal result . . . 1471
Mathematica [A] (verified) . . . 1471
Rubi [A] (verified) . . . 1472
Maple [A] (verified) . . . 1473
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Optimal result

Integrand size = 23, antiderivative size = 74

$$\int x^5\left(d+ex^2\right)^2(a+b\log(cx^n))\,dx=-\frac{1}{36}bd^2nx^6-\frac{1}{32}bdenx^8-\frac{1}{100}be^2nx^{10}+\frac{1}{60}\left(10d^2x^6+15dex^8+6e^2x^{10}\right)(a+b\log(cx^n))$$

output
```
-1/36*b*d^2*n*x^6-1/32*b*d*e*n*x^8-1/100*b*e^2*n*x^10+1/60*(6*e^2*x^10+15*
d*e*x^8+10*d^2*x^6)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 84, normalized size of antiderivative = 1.14

$$\int x^5\left(d+ex^2\right)^2(a+b\log(cx^n))\,dx=\frac{x^6(-200bd^2n-225bdenx^2-72be^2nx^4+1200d^2(a+b\log(cx^n))+1800dex^2(a+b\log(cx^n))+720e^2x^4}{7200}$$

input
```
Integrate[x^5*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^6*(-200*b*d^2*n - 225*b*d*e*n*x^2 - 72*b*e^2*n*x^4 + 1200*d^2*(a + b*Lo
g[c*x^n]) + 1800*d*e*x^2*(a + b*Log[c*x^n]) + 720*e^2*x^4*(a + b*Log[c*x^n
])))/7200
```

Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 75, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2771, 27, 1433, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^5 \left(d+ex^2\right)^2 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{ 2771}$$

$$\frac{1}{60}\left(10d^2x^6+15dex^8+6e^2x^{10}\right)(a+b\log(cx^n))-bn\int \frac{1}{60}x^5\left(6e^2x^4+15dex^2+10d^2\right)dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{60}\left(10d^2x^6+15dex^8+6e^2x^{10}\right)(a+b\log(cx^n))-\frac{1}{60}bn\int x^5\left(6e^2x^4+15dex^2+10d^2\right)dx$$

$$\Big\downarrow \text{ 1433}$$

$$\frac{1}{60}\left(10d^2x^6+15dex^8+6e^2x^{10}\right)(a+b\log(cx^n))-\frac{1}{60}bn\int \left(6e^2x^9+15dex^7+10d^2x^5\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{60}\left(10d^2x^6+15dex^8+6e^2x^{10}\right)(a+b\log(cx^n))-\frac{1}{60}bn\left(\frac{5d^2x^6}{3}+\frac{15}{8}dex^8+\frac{3e^2x^{10}}{5}\right)$$

input
```
Int[x^5*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/60*(b*n*((5*d^2*x^6)/3 + (15*d*e*x^8)/8 + (3*e^2*x^10)/5)) + ((10*d^2*x
^6 + 15*d*e*x^8 + 6*e^2*x^10)*(a + b*Log[c*x^n]))/60
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1433
```
Int[((d_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol]
 :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a,
b, c, d, m}, x] && IGtQ[p, 0] && (EqQ[p, 1] ||  !IntegerQ[(m + 1)/2])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 5.43 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.36

method	result
parallelrisch	$\frac{x^{10}\ln(c\,x^n)b\,e^2}{10}-\frac{b\,e^2 n\,x^{10}}{100}+\frac{a\,e^2x^{10}}{10}+\frac{x^8\ln(c\,x^n)bde}{4}-\frac{bden\,x^8}{32}+\frac{ade\,x^8}{4}+\frac{x^6\ln(c\,x^n)b\,d^2}{6}-\frac{b\,d^2n\,x^6}{36}+\frac{a\,d^2}{6}$
risch	$\frac{b\,x^6(6e^2x^4+15e\,x^2d+10d^2)\ln(x^n)}{60}+\frac{i\pi bde\,x^8\operatorname{csgn}(ic\,x^n)^2\operatorname{csgn}(ic)}{8}+\frac{i\pi b\,e^2x^{10}\operatorname{csgn}(ic\,x^n)^2\operatorname{csgn}(ic)}{20}-\frac{i\pi b\,d^2x^6\operatorname{csgn}(}{12}$

input
```
int(x^5*(e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/10*x^10*ln(c*x^n)*b*e^2-1/100*b*e^2*n*x^10+1/10*a*e^2*x^10+1/4*x^8*ln(c*
x^n)*b*d*e-1/32*b*d*e*n*x^8+1/4*a*d*e*x^8+1/6*x^6*ln(c*x^n)*b*d^2-1/36*b*d
^2*n*x^6+1/6*a*d^2*x^6
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.59

$$\int x^5 (d+ex^2)^2 (a+b\log(cx^n))\,dx = -\frac{1}{100}\left(be^2n-10\,ae^2\right)x^{10} - \frac{1}{32}(bden-8\,ade)x^8 - \frac{1}{36}\left(bd^2n-6\,ad^2\right)x^6 + \frac{1}{60}\left(6\,be^2x^{10}+15\,bdex^8+10\,bd^2x^6\right)\log(c) + \frac{1}{60}\left(6\,be^2nx^{10}+15\,bdenx^8+10\,bd^2nx^6\right)\log(x)$$

input
```
integrate(x^5*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/100*(b*e^2*n - 10*a*e^2)*x^10 - 1/32*(b*d*e*n - 8*a*d*e)*x^8 - 1/36*(b*
d^2*n - 6*a*d^2)*x^6 + 1/60*(6*b*e^2*x^10 + 15*b*d*e*x^8 + 10*b*d^2*x^6)*l
og(c) + 1/60*(6*b*e^2*n*x^10 + 15*b*d*e*n*x^8 + 10*b*d^2*n*x^6)*log(x)
```

Sympy [A] (verification not implemented)

Time = 1.73 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.57

$$\int x^5 (d+ex^2)^2 (a+b\log(cx^n))\,dx = \frac{ad^2x^6}{6} + \frac{adex^8}{4} + \frac{ae^2x^{10}}{10} - \frac{bd^2nx^6}{36} + \frac{bd^2x^6\log(cx^n)}{6} - \frac{bdenx^8}{32} + \frac{bdex^8\log(cx^n)}{4} - \frac{be^2nx^{10}}{100} + \frac{be^2x^{10}\log(cx^n)}{10}$$

input
```
integrate(x**5*(e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x**6/6 + a*d*e*x**8/4 + a*e**2*x**10/10 - b*d**2*n*x**6/36 + b*d**2
*x**6*log(c*x**n)/6 - b*d*e*n*x**8/32 + b*d*e*x**8*log(c*x**n)/4 - b*e**2*
n*x**10/100 + b*e**2*x**10*log(c*x**n)/10
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.35

$$\int x^5 (d+ex^2)^2 (a+b\log(cx^n))\,dx = -\frac{1}{100}be^2nx^{10} + \frac{1}{10}be^2x^{10}\log(cx^n) + \frac{1}{10}ae^2x^{10} - \frac{1}{32}bdenx^8 + \frac{1}{4}bdex^8\log(cx^n) + \frac{1}{4}adex^8 - \frac{1}{36}bd^2nx^6 + \frac{1}{6}bd^2x^6\log(cx^n) + \frac{1}{6}ad^2x^6$$

input
```
integrate(x^5*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/100*b*e^2*n*x^10 + 1/10*b*e^2*x^10*log(c*x^n) + 1/10*a*e^2*x^10 - 1/32*
b*d*e*n*x^8 + 1/4*b*d*e*x^8*log(c*x^n) + 1/4*a*d*e*x^8 - 1/36*b*d^2*n*x^6
+ 1/6*b*d^2*x^6*log(c*x^n) + 1/6*a*d^2*x^6
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.66

$$\int x^5 (d+ex^2)^2 (a+b\log(cx^n))\,dx = \frac{1}{10}be^2nx^{10}\log(x) - \frac{1}{100}be^2nx^{10} + \frac{1}{10}be^2x^{10}\log(c) + \frac{1}{10}ae^2x^{10} + \frac{1}{4}bdenx^8\log(x) - \frac{1}{32}bdenx^8 + \frac{1}{4}bdex^8\log(c) + \frac{1}{4}adex^8 + \frac{1}{6}bd^2nx^6\log(x) - \frac{1}{36}bd^2nx^6 + \frac{1}{6}bd^2x^6\log(c) + \frac{1}{6}ad^2x^6$$

input
```
integrate(x^5*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/10*b*e^2*n*x^10*log(x) - 1/100*b*e^2*n*x^10 + 1/10*b*e^2*x^10*log(c) + 1
/10*a*e^2*x^10 + 1/4*b*d*e*n*x^8*log(x) - 1/32*b*d*e*n*x^8 + 1/4*b*d*e*x^8
*log(c) + 1/4*a*d*e*x^8 + 1/6*b*d^2*n*x^6*log(x) - 1/36*b*d^2*n*x^6 + 1/6*
b*d^2*x^6*log(c) + 1/6*a*d^2*x^6
```

Mupad [B] (verification not implemented)

Time = 25.60 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.11

$$\int x^5 \left(d+ex^2\right)^2 \left(a+b\log\left(cx^n\right)\right)\,dx = \ln\left(c\,x^n\right)\,\left(\frac{b\,d^2\,x^6}{6}+\frac{b\,d\,e\,x^8}{4}+\frac{b\,e^2\,x^{10}}{10}\right) + \frac{d^2\,x^6\,\left(6\,a-b\,n\right)}{36}+\frac{e^2\,x^{10}\,\left(10\,a-b\,n\right)}{100} + \frac{d\,e\,x^8\,\left(8\,a-b\,n\right)}{32}$$

input
```
int(x^5*(d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^2*x^6)/6 + (b*e^2*x^10)/10 + (b*d*e*x^8)/4) + (d^2*x^6*(6
*a - b*n))/36 + (e^2*x^10*(10*a - b*n))/100 + (d*e*x^8*(8*a - b*n))/32
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.30

$$\int x^5 \left(d+ex^2\right)^2 \left(a+b\log\left(cx^n\right)\right)\,dx = \frac{x^6(1200\log(x^n c)\,b\,d^2+1800\log(x^n c)\,bde\,x^2+720\log(x^n c)\,b\,e^2x^4+1200a\,d^2+1800ade\,x^2+720a\,e^2x^4 + \cdots}{7200}$$

input
```
int(x^5*(e*x^2+d)^2*(a+b*log(c*x^n)),x)
```

output
```
(x**6*(1200*log(x**n*c)*b*d**2 + 1800*log(x**n*c)*b*d*e*x**2 + 720*log(x**
n*c)*b*e**2*x**4 + 1200*a*d**2 + 1800*a*d*e*x**2 + 720*a*e**2*x**4 - 200*b
*d**2*n - 225*b*d*e*n*x**2 - 72*b*e**2*n*x**4))/7200
```

3.184 $\int x^3(d+ex^2)^2(a+b\log(cx^n))\,dx$

Optimal result . . . 1477
Mathematica [A] (verified) . . . 1477
Rubi [A] (verified) . . . 1478
Maple [A] (verified) . . . 1479
Fricas [A] (verification not implemented) . . . 1480
Sympy [A] (verification not implemented) . . . 1480
Maxima [A] (verification not implemented) . . . 1481
Giac [A] (verification not implemented) . . . 1481
Mupad [B] (verification not implemented) . . . 1482
Reduce [B] (verification not implemented) . . . 1482

Optimal result

Integrand size = 23, antiderivative size = 74

$$\int x^3(d+ex^2)^2(a+b\log(cx^n))\,dx=-\frac{1}{16}bd^2nx^4-\frac{1}{18}bdenx^6-\frac{1}{64}be^2nx^8+\frac{1}{24}\left(6d^2x^4+8dex^6+3e^2x^8\right)(a+b\log(cx^n))$$

output
```
-1/16*b*d^2*n*x^4-1/18*b*d*e*n*x^6-1/64*b*e^2*n*x^8+1/24*(3*e^2*x^8+8*d*e*
x^6+6*d^2*x^4)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 87, normalized size of antiderivative = 1.18

$$\int x^3(d+ex^2)^2(a+b\log(cx^n))\,dx=\frac{1}{576}x^4\left(24a\left(6d^2+8dex^2+3e^2x^4\right)-bn\left(36d^2+32dex^2+9e^2x^4\right)+24b\left(6d^2+8dex^2+3e^2x^4\right)\log(cx^n)\right)$$

input
```
Integrate[x^3*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^4*(24*a*(6*d^2 + 8*d*e*x^2 + 3*e^2*x^4) - b*n*(36*d^2 + 32*d*e*x^2 + 9*
e^2*x^4) + 24*b*(6*d^2 + 8*d*e*x^2 + 3*e^2*x^4)*Log[c*x^n]))/576
```

Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 75, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2771, 27, 1433, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3 \left(d+ex^2\right)^2 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{24}\left(6d^2x^4+8dex^6+3e^2x^8\right)(a+b\log(cx^n))-bn\int \frac{1}{24}x^3\left(3e^2x^4+8dex^2+6d^2\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{24}\left(6d^2x^4+8dex^6+3e^2x^8\right)(a+b\log(cx^n))-\frac{1}{24}bn\int x^3\left(3e^2x^4+8dex^2+6d^2\right)dx$$

$$\Big\downarrow \text{1433}$$

$$\frac{1}{24}\left(6d^2x^4+8dex^6+3e^2x^8\right)(a+b\log(cx^n))-\frac{1}{24}bn\int \left(3e^2x^7+8dex^5+6d^2x^3\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{24}\left(6d^2x^4+8dex^6+3e^2x^8\right)(a+b\log(cx^n))-\frac{1}{24}bn\left(\frac{3d^2x^4}{2}+\frac{4}{3}dex^6+\frac{3e^2x^8}{8}\right)$$

input
```
Int[x^3*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/24*(b*n*((3*d^2*x^4)/2 + (4*d*e*x^6)/3 + (3*e^2*x^8)/8)) + ((6*d^2*x^4
+ 8*d*e*x^6 + 3*e^2*x^8)*(a + b*Log[c*x^n]))/24
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1433
```
Int[((d_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol]
 :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a,
b, c, d, m}, x] && IGtQ[p, 0] && (EqQ[p, 1] ||  !IntegerQ[(m + 1)/2])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 2.66 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.36

method	result
parallelrisch	$\frac{x^{8}\ln\left(c\,x^{n}\right)b\,e^{2}}{8}-\frac{b\,e^{2}n\,x^{8}}{64}+\frac{a\,e^{2}x^{8}}{8}+\frac{x^{6}\ln\left(c\,x^{n}\right)bde}{3}-\frac{bden\,x^{6}}{18}+\frac{ade\,x^{6}}{3}+\frac{x^{4}\ln\left(c\,x^{n}\right)b\,d^{2}}{4}-\frac{b\,d^{2}n\,x^{4}}{16}+\frac{a\,d^{2}x^{4}}{4}$
risch	$\frac{b\,x^{4}\left(3e^{2}x^{4}+8e\,x^{2}d+6d^{2}\right)\ln\left(x^{n}\right)}{24}+\frac{i\pi b\,e^{2}x^{8}\operatorname{csgn}\left(ic\,x^{n}\right)^{2}\operatorname{csgn}\left(ic\right)}{16}+\frac{i\pi bde\,x^{6}\operatorname{csgn}\left(ic\,x^{n}\right)^{2}\operatorname{csgn}\left(ic\right)}{6}-\frac{i\pi bde\,x^{6}\operatorname{csgn}\left(ix^{n}\right.}{}$

input
```
int(x^3*(e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/8*x^8*ln(c*x^n)*b*e^2-1/64*b*e^2*n*x^8+1/8*a*e^2*x^8+1/3*x^6*ln(c*x^n)*b
*d*e-1/18*b*d*e*n*x^6+1/3*a*d*e*x^6+1/4*x^4*ln(c*x^n)*b*d^2-1/16*b*d^2*n*x
^4+1/4*a*d^2*x^4
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.59

$$\int x^3 (d + ex^2)^2 (a + b \log (cx^n)) \, dx = -\frac{1}{64} (be^2 n - 8 ae^2) x^8 - \frac{1}{18} (bden - 6 ade) x^6 - \frac{1}{16} (bd^2 n - 4 ad^2) x^4 + \frac{1}{24} (3 be^2 x^8 + 8 bdex^6 + 6 bd^2 x^4) \log (c) + \frac{1}{24} (3 be^2 nx^8 + 8 bdenx^6 + 6 bd^2 nx^4) \log (x)$$

input
```
integrate(x^3*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/64*(b*e^2*n - 8*a*e^2)*x^8 - 1/18*(b*d*e*n - 6*a*d*e)*x^6 - 1/16*(b*d^2
*n - 4*a*d^2)*x^4 + 1/24*(3*b*e^2*x^8 + 8*b*d*e*x^6 + 6*b*d^2*x^4)*log(c)
+ 1/24*(3*b*e^2*n*x^8 + 8*b*d*e*n*x^6 + 6*b*d^2*n*x^4)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.93 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.57

$$\int x^3 (d + ex^2)^2 (a + b \log (cx^n)) \, dx = \frac{ad^2x^4}{4} + \frac{adex^6}{3} + \frac{ae^2x^8}{8} - \frac{bd^2nx^4}{16} + \frac{bd^2x^4 \log (cx^n)}{4} - \frac{bdenx^6}{18} + \frac{bdex^6 \log (cx^n)}{3} - \frac{be^2nx^8}{64} + \frac{be^2x^8 \log (cx^n)}{8}$$

input
```
integrate(x**3*(e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x**4/4 + a*d*e*x**6/3 + a*e**2*x**8/8 - b*d**2*n*x**4/16 + b*d**2*x
**4*log(c*x**n)/4 - b*d*e*n*x**6/18 + b*d*e*x**6*log(c*x**n)/3 - b*e**2*n*
x**8/64 + b*e**2*x**8*log(c*x**n)/8
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.35

$$\int x^3(d+ex^2)^2(a+b\log(cx^n))\,dx = -\frac{1}{64}be^2nx^8+\frac{1}{8}be^2x^8\log(cx^n)+\frac{1}{8}ae^2x^8-\frac{1}{18}bdenx^6+\frac{1}{3}bdex^6\log(cx^n)+\frac{1}{3}adex^6-\frac{1}{16}bd^2nx^4+\frac{1}{4}bd^2x^4\log(cx^n)+\frac{1}{4}ad^2x^4$$

input
```
integrate(x^3*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/64*b*e^2*n*x^8 + 1/8*b*e^2*x^8*log(c*x^n) + 1/8*a*e^2*x^8 - 1/18*b*d*e*
n*x^6 + 1/3*b*d*e*x^6*log(c*x^n) + 1/3*a*d*e*x^6 - 1/16*b*d^2*n*x^4 + 1/4*
b*d^2*x^4*log(c*x^n) + 1/4*a*d^2*x^4
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.66

$$\int x^3(d+ex^2)^2(a+b\log(cx^n))\,dx = \frac{1}{8}be^2nx^8\log(x)-\frac{1}{64}be^2nx^8+\frac{1}{8}be^2x^8\log(c)+\frac{1}{8}ae^2x^8+\frac{1}{3}bdenx^6\log(x)-\frac{1}{18}bdenx^6+\frac{1}{3}bdex^6\log(c)+\frac{1}{3}adex^6+\frac{1}{4}bd^2nx^4\log(x)-\frac{1}{16}bd^2nx^4+\frac{1}{4}bd^2x^4\log(c)+\frac{1}{4}ad^2x^4$$

input
```
integrate(x^3*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/8*b*e^2*n*x^8*log(x) - 1/64*b*e^2*n*x^8 + 1/8*b*e^2*x^8*log(c) + 1/8*a*e
^2*x^8 + 1/3*b*d*e*n*x^6*log(x) - 1/18*b*d*e*n*x^6 + 1/3*b*d*e*x^6*log(c)
+ 1/3*a*d*e*x^6 + 1/4*b*d^2*n*x^4*log(x) - 1/16*b*d^2*n*x^4 + 1/4*b*d^2*x^
4*log(c) + 1/4*a*d^2*x^4
```

Mupad [B] (verification not implemented)

Time = 25.47 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.11

$$\int x^3 \left(d+ex^2\right)^2 \left(a+b\log\left(cx^n\right)\right)\,dx=\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2\,x^4}{4}+\frac{b\,d\,e\,x^6}{3}+\frac{b\,e^2\,x^8}{8}\right)+\frac{d^2\,x^4\,\left(4\,a-b\,n\right)}{16}+\frac{e^2\,x^8\,\left(8\,a-b\,n\right)}{64}+\frac{d\,e\,x^6\,\left(6\,a-b\,n\right)}{18}$$

input
```
int(x^3*(d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^2*x^4)/4 + (b*e^2*x^8)/8 + (b*d*e*x^6)/3) + (d^2*x^4*(4*a
 - b*n))/16 + (e^2*x^8*(8*a - b*n))/64 + (d*e*x^6*(6*a - b*n))/18
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.30

$$\int x^3 \left(d+ex^2\right)^2 \left(a+b\log\left(cx^n\right)\right)\,dx=\frac{x^4(144\log(x^nc)\,b\,d^2+192\log(x^nc)\,bde\,x^2+72\log(x^nc)\,b\,e^2x^4+144a\,d^2+192ade\,x^2+72a\,e^2x^4-36b\,d}{576}$$

input
```
int(x^3*(e*x^2+d)^2*(a+b*log(c*x^n)),x)
```

output
```
(x**4*(144*log(x**n*c)*b*d**2 + 192*log(x**n*c)*b*d*e*x**2 + 72*log(x**n*c
)*b*e**2*x**4 + 144*a*d**2 + 192*a*d*e*x**2 + 72*a*e**2*x**4 - 36*b*d**2*n
 - 32*b*d*e*n*x**2 - 9*b*e**2*n*x**4))/576
```

3.185 $\int x(d+ex^2)^2 (a+b\log(cx^n))\,dx$

Optimal result 1483
Mathematica [A] (verified) 1483
Rubi [A] (verified) 1484
Maple [A] (verified) 1485
Fricas [A] (verification not implemented) 1486
Sympy [A] (verification not implemented) 1486
Maxima [A] (verification not implemented) 1487
Giac [A] (verification not implemented) 1487
Mupad [B] (verification not implemented) 1488
Reduce [B] (verification not implemented) 1488

Optimal result

Integrand size = 21, antiderivative size = 76

$$\int x(d+ex^2)^2 (a+b\log(cx^n))\,dx = -\frac{1}{4}bd^2nx^2 - \frac{1}{8}bdenx^4 - \frac{1}{36}be^2nx^6 - \frac{bd^3n\log(x)}{6e} + \frac{(d+ex^2)^3 (a+b\log(cx^n))}{6e}$$

output
```
-1/4*b*d^2*n*x^2-1/8*b*d*e*n*x^4-1/36*b*e^2*n*x^6-1/6*b*d^3*n*ln(x)/e+1/6*
(e*x^2+d)^3*(a+b*ln(c*x^n))/e
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 85, normalized size of antiderivative = 1.12

$$\int x(d+ex^2)^2 (a+b\log(cx^n))\,dx = \frac{1}{72}x^2\left(12a\left(3d^2+3dex^2+e^2x^4\right) - bn\left(18d^2+9dex^2+2e^2x^4\right) + 12b\left(3d^2+3dex^2+e^2x^4\right)\log(cx^n)\right)$$

input
```
Integrate[x*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^2*(12*a*(3*d^2 + 3*d*e*x^2 + e^2*x^4) - b*n*(18*d^2 + 9*d*e*x^2 + 2*e^2
*x^4) + 12*b*(3*d^2 + 3*d*e*x^2 + e^2*x^4)*Log[c*x^n]))/72
```

Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 75, normalized size of antiderivative = 0.99, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238, Rules used = {2771, 27, 243, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex^2)^2(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{(d+ex^2)^3(a+b\log(cx^n))}{6e}-bn\int\frac{(ex^2+d)^3}{6ex}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{(d+ex^2)^3(a+b\log(cx^n))}{6e}-\frac{bn\int\frac{(ex^2+d)^3}{x}dx}{6e}$$

$$\Big\downarrow \text{243}$$

$$\frac{(d+ex^2)^3(a+b\log(cx^n))}{6e}-\frac{bn\int\frac{(ex^2+d)^3}{x^2}dx^2}{12e}$$

$$\Big\downarrow \text{49}$$

$$\frac{(d+ex^2)^3(a+b\log(cx^n))}{6e}-\frac{bn\int\left(e^3x^4+3de^2x^2+3d^2e+\frac{d^3}{x^2}\right)dx^2}{12e}$$

$$\Big\downarrow \text{2009}$$

$$\frac{(d+ex^2)^3(a+b\log(cx^n))}{6e}-\frac{bn\left(d^3\log(x^2)+3d^2ex^2+\frac{3}{2}de^2x^4+\frac{e^3x^6}{3}\right)}{12e}$$

input
```
Int[x*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/12*(b*n*(3*d^2*e*x^2 + (3*d*e^2*x^4)/2 + (e^3*x^6)/3 + d^3*Log[x^2]))/e
 + ((d + e*x^2)^3*(a + b*Log[c*x^n]))/(6*e)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.82 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.33

method	result
parallelrisch	$\frac{x^{6} \ln\left(c \,x^{n}\right) b \,e^{2}}{6}-\frac{b \,e^{2} n \,x^{6}}{36}+\frac{a \,e^{2} x^{6}}{6}+\frac{x^{4} \ln\left(c \,x^{n}\right) b d e}{2}-\frac{b d e n \,x^{4}}{8}+\frac{x^{4} a e d}{2}+\frac{x^{2} b \ln\left(c \,x^{n}\right) d^{2}}{2}-\frac{b \,d^{2} n \,x^{2}}{4}+\frac{x^{2} a \,d^{2}}{2}$
risch	$\frac{\left(e \,x^{2}+d \right)^{3} b \ln\left(x^{n}\right)}{6 e}-\frac{i e \pi b d \,x^{4} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right) \operatorname{csgn}\left(i c \right)}{4}-\frac{i \pi b \,d^{2} x^{2} \operatorname{csgn}\left(i c \,x^{n}\right)^{3}}{4}+\frac{i e^{2} \pi b \,x^{6} \operatorname{csgn}\left(i c \,x^{n}\right)^{2} \operatorname{csgn}\left(i c \right)}{12}$

input
```
int(x*(e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/6*x^6*ln(c*x^n)*b*e^2-1/36*b*e^2*n*x^6+1/6*a*e^2*x^6+1/2*x^4*ln(c*x^n)*b
*d*e-1/8*b*d*e*n*x^4+1/2*x^4*a*e*d+1/2*x^2*b*ln(c*x^n)*d^2-1/4*b*d^2*n*x^2
+1/2*x^2*a*d^2
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.53

$$\int x(d+ex^2)^2(a+b\log(cx^n))\,dx = -\frac{1}{36}\left(be^2n-6\,ae^2\right)x^6 - \frac{1}{8}\left(bden-4\,ade\right)x^4 - \frac{1}{4}\left(bd^2n-2\,ad^2\right)x^2 + \frac{1}{6}\left(be^2x^6+3\,bdex^4+3\,bd^2x^2\right)\log(c) + \frac{1}{6}\left(be^2nx^6+3\,bdenx^4+3\,bd^2nx^2\right)\log(x)$$

input
```
integrate(x*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/36*(b*e^2*n - 6*a*e^2)*x^6 - 1/8*(b*d*e*n - 4*a*d*e)*x^4 - 1/4*(b*d^2*n
 - 2*a*d^2)*x^2 + 1/6*(b*e^2*x^6 + 3*b*d*e*x^4 + 3*b*d^2*x^2)*log(c) + 1/6
*(b*e^2*n*x^6 + 3*b*d*e*n*x^4 + 3*b*d^2*n*x^2)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.48 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.53

$$\int x(d+ex^2)^2(a+b\log(cx^n))\,dx = \frac{ad^2x^2}{2} + \frac{adex^4}{2} + \frac{ae^2x^6}{6} - \frac{bd^2nx^2}{4} + \frac{bd^2x^2\log(cx^n)}{2} - \frac{bdenx^4}{8} + \frac{bdex^4\log(cx^n)}{2} - \frac{be^2nx^6}{36} + \frac{be^2x^6\log(cx^n)}{6}$$

input
```
integrate(x*(e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x**2/2 + a*d*e*x**4/2 + a*e**2*x**6/6 - b*d**2*n*x**2/4 + b*d**2*x*
*2*log(c*x**n)/2 - b*d*e*n*x**4/8 + b*d*e*x**4*log(c*x**n)/2 - b*e**2*n*x*
*6/36 + b*e**2*x**6*log(c*x**n)/6
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.32

$$\int x(d+ex^2)^2(a+b\log(cx^n))\,dx = -\frac{1}{36}be^2nx^6+\frac{1}{6}be^2x^6\log(cx^n)+\frac{1}{6}ae^2x^6-\frac{1}{8}bdenx^4+\frac{1}{2}bdex^4\log(cx^n)+\frac{1}{2}adex^4-\frac{1}{4}bd^2nx^2+\frac{1}{2}bd^2x^2\log(cx^n)+\frac{1}{2}ad^2x^2$$

input
```
integrate(x*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/36*b*e^2*n*x^6 + 1/6*b*e^2*x^6*log(c*x^n) + 1/6*a*e^2*x^6 - 1/8*b*d*e*n
*x^4 + 1/2*b*d*e*x^4*log(c*x^n) + 1/2*a*d*e*x^4 - 1/4*b*d^2*n*x^2 + 1/2*b*
d^2*x^2*log(c*x^n) + 1/2*a*d^2*x^2
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.62

$$\int x(d+ex^2)^2(a+b\log(cx^n))\,dx = \frac{1}{6}be^2nx^6\log(x)-\frac{1}{36}be^2nx^6+\frac{1}{6}be^2x^6\log(c)+\frac{1}{6}ae^2x^6+\frac{1}{2}bdenx^4\log(x)-\frac{1}{8}bdenx^4+\frac{1}{2}bdex^4\log(c)+\frac{1}{2}adex^4+\frac{1}{2}bd^2nx^2\log(x)-\frac{1}{4}bd^2nx^2+\frac{1}{2}bd^2x^2\log(c)+\frac{1}{2}ad^2x^2$$

input
```
integrate(x*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/6*b*e^2*n*x^6*log(x) - 1/36*b*e^2*n*x^6 + 1/6*b*e^2*x^6*log(c) + 1/6*a*e
^2*x^6 + 1/2*b*d*e*n*x^4*log(x) - 1/8*b*d*e*n*x^4 + 1/2*b*d*e*x^4*log(c) +
 1/2*a*d*e*x^4 + 1/2*b*d^2*n*x^2*log(x) - 1/4*b*d^2*n*x^2 + 1/2*b*d^2*x^2*
log(c) + 1/2*a*d^2*x^2
```

Mupad [B] (verification not implemented)

Time = 25.60 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.08

$$\int x\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2\,x^2}{2}+\frac{b\,d\,e\,x^4}{2}+\frac{b\,e^2\,x^6}{6}\right)+\frac{d^2\,x^2\,\left(2\,a-b\,n\right)}{4}+\frac{e^2\,x^6\,\left(6\,a-b\,n\right)}{36}+\frac{d\,e\,x^4\,\left(4\,a-b\,n\right)}{8}$$

input
```
int(x*(d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^2*x^2)/2 + (b*e^2*x^6)/6 + (b*d*e*x^4)/2) + (d^2*x^2*(2*a
 - b*n))/4 + (e^2*x^6*(6*a - b*n))/36 + (d*e*x^4*(4*a - b*n))/8
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.26

$$\int x\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{x^2(36\log(x^nc)\,b\,d^2+36\log(x^nc)\,bde\,x^2+12\log(x^nc)\,b\,e^2x^4+36a\,d^2+36ade\,x^2+12a\,e^2x^4-18b\,d^2n-}{72}$$

input
```
int(x*(e*x^2+d)^2*(a+b*log(c*x^n)),x)
```

output
```
(x**2*(36*log(x**n*c)*b*d**2 + 36*log(x**n*c)*b*d*e*x**2 + 12*log(x**n*c)*
b*e**2*x**4 + 36*a*d**2 + 36*a*d*e*x**2 + 12*a*e**2*x**4 - 18*b*d**2*n - 9
*b*d*e*n*x**2 - 2*b*e**2*n*x**4))/72
```

3.186 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x}\,dx$

Optimal result 1489
Mathematica [A] (verified) 1489
Rubi [A] (verified) 1490
Maple [A] (verified) 1491
Fricas [A] (verification not implemented) 1491
Sympy [A] (verification not implemented) 1492
Maxima [A] (verification not implemented) 1492
Giac [A] (verification not implemented) 1493
Mupad [B] (verification not implemented) 1493
Reduce [B] (verification not implemented) 1494

Optimal result

Integrand size = 23, antiderivative size = 89

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x}\,dx = -\frac{1}{2}bdenx^2 - \frac{1}{16}be^2nx^4 - \frac{1}{2}bd^2n\log^2(x) + dex^2(a+b\log(cx^n)) + \frac{1}{4}e^2x^4(a+b\log(cx^n)) + d^2\log(x)(a+b\log(cx^n))$$

output
```
-1/2*b*d*e*n*x^2-1/16*b*e^2*n*x^4-1/2*b*d^2*n*ln(x)^2+d*e*x^2*(a+b*ln(c*x^
n))+1/4*e^2*x^4*(a+b*ln(c*x^n))+d^2*ln(x)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 82, normalized size of antiderivative = 0.92

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x}\,dx = \frac{1}{16}\left(-8bdenx^2 - be^2nx^4 + 16dex^2(a+b\log(cx^n)) + 4e^2x^4(a+b\log(cx^n)) + \frac{8d^2(a+b\log(cx^n))^2}{bn}\right)$$

input
```
Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x,x]
```

output
```
(-8*b*d*e*n*x^2 - b*e^2*n*x^4 + 16*d*e*x^2*(a + b*Log[c*x^n]) + 4*e^2*x^4*
(a + b*Log[c*x^n]) + (8*d^2*(a + b*Log[c*x^n])^2)/(b*n))/16
```

Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 88, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(\frac{e^2x^3}{4}+dex+\frac{d^2\log(x)}{x}\right)dx+d^2\log(x)(a+b\log(cx^n))+dex^2(a+b\log(cx^n))+\frac{1}{4}e^2x^4(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$d^2\log(x)(a+b\log(cx^n))+dex^2(a+b\log(cx^n))+\frac{1}{4}e^2x^4(a+b\log(cx^n))-bn\left(\frac{1}{2}d^2\log^2(x)+\frac{1}{2}dex^2+\frac{e^2x^4}{16}\right)$$

input
```
Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x,x]
```

output
```
-(b*n*((d*e*x^2)/2 + (e^2*x^4)/16 + (d^2*Log[x]^2)/2)) + d*e*x^2*(a + b*Lo
g[c*x^n]) + (e^2*x^4*(a + b*Log[c*x^n]))/4 + d^2*Log[x]*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.79 (sec) , antiderivative size = 103, normalized size of antiderivative = 1.16

method	result	size
parallelrisch	$\frac{4x^4\ln(c\,x^n)b\,e^2n-x^4b\,e^2n^2+4x^4a\,e^2n+16x^2\ln(c\,x^n)bden-8x^2bde\,n^2+16x^2aden+16\ln(x)a\,d^2n+8b\,d^2\ln(c\,x^n)^2}{16n}$	103
risch	Expression too large to display	3072

input
```
int((e*x^2+d)^2*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/16*(4*x^4*ln(c*x^n)*b*e^2*n-x^4*b*e^2*n^2+4*x^4*a*e^2*n+16*x^2*ln(c*x^n)
*b*d*e*n-8*x^2*b*d*e*n^2+16*x^2*a*d*e*n+16*ln(x)*a*d^2*n+8*b*d^2*ln(c*x^n)
^2)/n
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 104, normalized size of antiderivative = 1.17

$$\int \frac{(d+ex^2)^2\,(a+b\log(cx^n))}{x}\,dx = \frac{1}{2}\,bd^2n\log(x)^2 - \frac{1}{16}\left(be^2n - 4\,ae^2\right)x^4 - \frac{1}{2}\,(bden - 2\,ade)x^2 + \frac{1}{4}\left(be^2x^4 + 4\,bdex^2\right)\log(c) + \frac{1}{4}\left(be^2nx^4 + 4\,bdenx^2 + 4\,bd^2\log(c) + 4\,ad^2\right)\log(x)$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/2*b*d^2*n*log(x)^2 - 1/16*(b*e^2*n - 4*a*e^2)*x^4 - 1/2*(b*d*e*n - 2*a*d
*e)*x^2 + 1/4*(b*e^2*x^4 + 4*b*d*e*x^2)*log(c) + 1/4*(b*e^2*n*x^4 + 4*b*d*
e*n*x^2 + 4*b*d^2*log(c) + 4*a*d^2)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.49 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.49

$$\int \frac{(d+ex^2)^2\,(a+b\log(cx^n))}{x}\,dx = \begin{cases} \frac{ad^2\log(cx^n)}{n} + adex^2 + \frac{ae^2x^4}{4} + \frac{bd^2\log(cx^n)^2}{2n} - \frac{bdenx^2}{2} + bdex^2\log(cx^n) - \frac{be^2nx^4}{16} + \frac{be^2x^4\log(cx^n)}{4} & \text{for } n \neq 0 \\ (a+b\log(c))\left(d^2\log(x) + dex^2 + \frac{e^2x^4}{4}\right) & \text{otherwise} \end{cases}$$

input
```
integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise((a*d**2*log(c*x**n)/n + a*d*e*x**2 + a*e**2*x**4/4 + b*d**2*log(
c*x**n)**2/(2*n) - b*d*e*n*x**2/2 + b*d*e*x**2*log(c*x**n) - b*e**2*n*x**4
/16 + b*e**2*x**4*log(c*x**n)/4, Ne(n, 0)), ((a + b*log(c))*(d**2*log(x) +
 d*e*x**2 + e**2*x**4/4), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 88, normalized size of antiderivative = 0.99

$$\int \frac{(d+ex^2)^2\,(a+b\log(cx^n))}{x}\,dx = -\frac{1}{16}\,be^2nx^4 + \frac{1}{4}\,be^2x^4\log(cx^n) + \frac{1}{4}\,ae^2x^4 - \frac{1}{2}\,bdenx^2 + bdex^2\log(cx^n) + adex^2 + \frac{bd^2\log(cx^n)^2}{2\,n} + ad^2\log(x)$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
-1/16*b*e^2*n*x^4 + 1/4*b*e^2*x^4*log(c*x^n) + 1/4*a*e^2*x^4 - 1/2*b*d*e*n
*x^2 + b*d*e*x^2*log(c*x^n) + a*d*e*x^2 + 1/2*b*d^2*log(c*x^n)^2/n + a*d^2
*log(x)
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.12

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x}\,dx = \frac{1}{2}bd^2n\log(x)^2 - \frac{1}{16}\left(be^2n - 4\,be^2\log(c) - 4\,ae^2\right)x^4 - \frac{1}{2}\left(bden - 2\,bde\log(c) - 2\,ade\right)x^2 + \frac{1}{4}\left(be^2nx^4 + 4\,bdenx^2\right)\log(x) + \left(bd^2\log(c) + ad^2\right)\log(x)$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
1/2*b*d^2*n*log(x)^2 - 1/16*(b*e^2*n - 4*b*e^2*log(c) - 4*a*e^2)*x^4 - 1/2
*(b*d*e*n - 2*b*d*e*log(c) - 2*a*d*e)*x^2 + 1/4*(b*e^2*n*x^4 + 4*b*d*e*n*x
^2)*log(x) + (b*d^2*log(c) + a*d^2)*log(x)
```

Mupad [B] (verification not implemented)

Time = 25.33 (sec) , antiderivative size = 80, normalized size of antiderivative = 0.90

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x}\,dx = \ln(c\,x^n)\left(\frac{b\,e^2\,x^4}{4} + b\,d\,e\,x^2\right) + \frac{e^2\,x^4\,(4\,a - b\,n)}{16} + a\,d^2\,\ln(x) + \frac{b\,d^2\ln(c\,x^n)^2}{2\,n} + \frac{d\,e\,x^2\,(2\,a - b\,n)}{2}$$

input
```
int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x,x)
```

output
```
log(c*x^n)*((b*e^2*x^4)/4 + b*d*e*x^2) + (e^2*x^4*(4*a - b*n))/16 + a*d^2*
log(x) + (b*d^2*log(c*x^n)^2)/(2*n) + (d*e*x^2*(2*a - b*n))/2
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 102, normalized size of antiderivative = 1.15

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x}\,dx$$
$$= \frac{8\log(x^nc)^2 b d^2 + 16\log(x^nc)\, bden\, x^2 + 4\log(x^nc)\, b e^2 n\, x^4 + 16\log(x)\, a d^2 n + 16aden\, x^2 + 4a e^2 n\, x^4 - 8}{16n}$$

input
```
int((e*x^2+d)^2*(a+b*log(c*x^n))/x,x)
```

output
```
(8*log(x**n*c)**2*b*d**2 + 16*log(x**n*c)*b*d*e*n*x**2 + 4*log(x**n*c)*b*e
**2*n*x**4 + 16*log(x)*a*d**2*n + 16*a*d*e*n*x**2 + 4*a*e**2*n*x**4 - 8*b*
d*e*n**2*x**2 - b*e**2*n**2*x**4)/(16*n)
```

3.187 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^3}\,dx$

Optimal result 1495
Mathematica [A] (verified) 1495
Rubi [A] (verified) 1496
Maple [A] (verified) 1497
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Giac [A] (verification not implemented) 1499
Mupad [B] (verification not implemented) 1500
Reduce [B] (verification not implemented) 1500

Optimal result

Integrand size = 23, antiderivative size = 91

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^3}\,dx = -\frac{bd^2n}{4x^2}-\frac{1}{4}be^2nx^2-bden\log^2(x)-\frac{d^2(a+b\log(cx^n))}{2x^2}+\frac{1}{2}e^2x^2(a+b\log(cx^n))+2de\log(x)(a+b\log(cx^n))$$

output
```
-1/4*b*d^2*n/x^2-1/4*b*e^2*n*x^2-b*d*e*n*ln(x)^2-1/2*d^2*(a+b*ln(c*x^n))/x
^2+1/2*e^2*x^2*(a+b*ln(c*x^n))+2*d*e*ln(x)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 83, normalized size of antiderivative = 0.91

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^3}\,dx = \frac{1}{4}\left(-\frac{bd^2n}{x^2}-be^2nx^2-\frac{2d^2(a+b\log(cx^n))}{x^2}+2e^2x^2(a+b\log(cx^n))+\frac{4de(a+b\log(cx^n))^2}{bn}\right)$$

input
```
Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(-((b*d^2*n)/x^2) - b*e^2*n*x^2 - (2*d^2*(a + b*Log[c*x^n]))/x^2 + 2*e^2*x
^2*(a + b*Log[c*x^n]) + (4*d*e*(a + b*Log[c*x^n])^2)/(b*n))/4
```

Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 92, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^3} dx$$

$$\Big\downarrow \; 2772$$

$$-bn\int -\frac{-e^2x^4-4de\log(x)x^2+d^2}{2x^3}dx-\frac{d^2(a+b\log(cx^n))}{2x^2}+2de\log(x)(a+b\log(cx^n))+\frac{1}{2}e^2x^2(a+b\log(cx^n))$$

$$\Big\downarrow \; 27$$

$$\frac{1}{2}bn\int \frac{-e^2x^4-4de\log(x)x^2+d^2}{x^3}dx-\frac{d^2(a+b\log(cx^n))}{2x^2}+2de\log(x)(a+b\log(cx^n))+\frac{1}{2}e^2x^2(a+b\log(cx^n))$$

$$\Big\downarrow \; 2010$$

$$\frac{1}{2}bn\int \left(\frac{d^2-e^2x^4}{x^3}-\frac{4de\log(x)}{x}\right)dx-\frac{d^2(a+b\log(cx^n))}{2x^2}+2de\log(x)(a+b\log(cx^n))+\frac{1}{2}e^2x^2(a+b\log(cx^n))$$

$$\Big\downarrow \; 2009$$

$$-\frac{d^2(a+b\log(cx^n))}{2x^2}+2de\log(x)(a+b\log(cx^n))+\frac{1}{2}e^2x^2(a+b\log(cx^n))+\frac{1}{2}bn\left(-\frac{d^2}{2x^2}-2de\log^2(x)-\frac{e^2x^2}{2}\right)$$

input
```
Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(b*n*(-1/2*d^2/x^2 - (e^2*x^2)/2 - 2*d*e*Log[x]^2))/2 - (d^2*(a + b*Log[c*
x^n]))/(2*x^2) + (e^2*x^2*(a + b*Log[c*x^n]))/2 + 2*d*e*Log[x]*(a + b*Log[
c*x^n])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.60 (sec) , antiderivative size = 104, normalized size of antiderivative = 1.14

method	result
parallelrisch	$\frac{2x^4 \ln(c\,x^n) b\,e^2 n - x^4 b\,e^2 n^2 + 2x^4 a\,e^2 n + 8\ln(x) x^2 aden + 4bde\ln(c\,x^n)^2 x^2 - 2\ln(c\,x^n) b\,d^2 n - b\,d^2 n^2 - 2a\,d^2 n}{4x^2 n}$
risch	$-\frac{b(-e^2 x^4 - 4de\ln(x) x^2 + d^2)\ln(x^n)}{2x^2} - \frac{-i\pi b\,d^2 \operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)\operatorname{csgn}(ic) - i\pi b\,d^2 \operatorname{csgn}(ic\,x^n)^3 - 4i\ln(x)\pi bde\,\operatorname{csgn}(ix^n}{}$

input
```
int((e*x^2+d)^2*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

output
```
1/4/x^2*(2*x^4*ln(c*x^n)*b*e^2*n-x^4*b*e^2*n^2+2*x^4*a*e^2*n+8*ln(x)*x^2*a
*d*e*n+4*b*d*e*ln(c*x^n)^2*x^2-2*ln(c*x^n)*b*d^2*n-b*d^2*n^2-2*a*d^2*n)/n
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 108, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^3}\,dx$$
$$= \frac{4\,bdenx^2\log(x)^2 - (be^2n - 2\,ae^2)x^4 - bd^2n - 2\,ad^2 + 2\,(be^2x^4 - bd^2)\log(c) + 2\,(be^2nx^4 + 4\,bdex^2\log(c}{4\,x^2}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
1/4*(4*b*d*e*n*x^2*log(x)^2 - (b*e^2*n - 2*a*e^2)*x^4 - b*d^2*n - 2*a*d^2
+ 2*(b*e^2*x^4 - b*d^2)*log(c) + 2*(b*e^2*n*x^4 + 4*b*d*e*x^2*log(c) + 4*a
*d*e*x^2 - b*d^2*n)*log(x))/x^2
```

Sympy [A] (verification not implemented)

Time = 0.58 (sec) , antiderivative size = 139, normalized size of antiderivative = 1.53

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^3}\,dx$$
$$= \begin{cases} -\frac{ad^2}{2x^2} + \frac{2ade\log(cx^n)}{n} + \frac{ae^2x^2}{2} - \frac{bd^2n}{4x^2} - \frac{bd^2\log(cx^n)}{2x^2} + \frac{bde\log(cx^n)^2}{n} - \frac{be^2nx^2}{4} + \frac{be^2x^2\log(cx^n)}{2} & \text{for}\ n \neq 0 \\ (a+b\log(c))\left(-\frac{d^2}{2x^2} + 2de\log(x) + \frac{e^2x^2}{2}\right) & \text{otherwise} \end{cases}$$

input
```
integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x**3,x)
```

output
```
Piecewise((-a*d**2/(2*x**2) + 2*a*d*e*log(c*x**n)/n + a*e**2*x**2/2 - b*d*
*2*n/(4*x**2) - b*d**2*log(c*x**n)/(2*x**2) + b*d*e*log(c*x**n)**2/n - b*e
**2*n*x**2/4 + b*e**2*x**2*log(c*x**n)/2, Ne(n, 0)), ((a + b*log(c))*(-d**
2/(2*x**2) + 2*d*e*log(x) + e**2*x**2/2), True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 91, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^3}\,dx = -\frac{1}{4}\,be^2nx^2 + \frac{1}{2}\,be^2x^2\log(cx^n) + \frac{1}{2}\,ae^2x^2 + \frac{bde\log(cx^n)^2}{n} + 2\,ade\log(x) - \frac{bd^2n}{4\,x^2} - \frac{bd^2\log(cx^n)}{2\,x^2} - \frac{ad^2}{2\,x^2}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
-1/4*b*e^2*n*x^2 + 1/2*b*e^2*x^2*log(c*x^n) + 1/2*a*e^2*x^2 + b*d*e*log(c*
x^n)^2/n + 2*a*d*e*log(x) - 1/4*b*d^2*n/x^2 - 1/2*b*d^2*log(c*x^n)/x^2 - 1
/2*a*d^2/x^2
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 106, normalized size of antiderivative = 1.16

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^3}\,dx = \frac{1}{2}\,be^2x^2\log(c) + bden\log(x)^2 + \frac{1}{4}\left(2\,x^2\log(x) - x^2\right)be^2n + \frac{1}{2}\,ae^2x^2 - \frac{1}{4}\,bd^2n\left(\frac{2\,\log(x)}{x^2} + \frac{1}{x^2}\right) + 2\,bde\log(c)\log(|x|) + 2\,ade\log(|x|) - \frac{bd^2\log(c)}{2\,x^2} - \frac{ad^2}{2\,x^2}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
1/2*b*e^2*x^2*log(c) + b*d*e*n*log(x)^2 + 1/4*(2*x^2*log(x) - x^2)*b*e^2*n
 + 1/2*a*e^2*x^2 - 1/4*b*d^2*n*(2*log(x)/x^2 + 1/x^2) + 2*b*d*e*log(c)*log
(abs(x)) + 2*a*d*e*log(abs(x)) - 1/2*b*d^2*log(c)/x^2 - 1/2*a*d^2/x^2
```

Mupad [B] (verification not implemented)

Time = 25.74 (sec) , antiderivative size = 110, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^3}\,dx = \ln(x)\ (2\,a\,d\,e+b\,d\,e\,n) - \frac{\frac{a\,d^2}{2}+\frac{b\,d^2\,n}{4}}{x^2} - \ln(c\,x^n)\left(\frac{\frac{b\,d^2}{2}+b\,d\,e\,x^2+\frac{b\,e^2\,x^4}{2}}{x^2} - b\,e^2\,x^2\right) + \frac{e^2\,x^2\,(2\,a-b\,n)}{4} + \frac{b\,d\,e\ln(c\,x^n)^2}{n}$$

input
```
int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x^3,x)
```

output
```
log(x)*(2*a*d*e + b*d*e*n) - ((a*d^2)/2 + (b*d^2*n)/4)/x^2 - log(c*x^n)*((
(b*d^2)/2 + (b*e^2*x^4)/2 + b*d*e*x^2)/x^2 - b*e^2*x^2) + (e^2*x^2*(2*a -
b*n))/4 + (b*d*e*log(c*x^n)^2)/n
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 103, normalized size of antiderivative = 1.13

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^3}\,dx = \frac{4\log(x^n c)^2\,bde\,x^2 - 2\log(x^n c)\,b\,d^2 n + 2\log(x^n c)\,b\,e^2 n\,x^4 + 8\log(x)\,aden\,x^2 - 2a\,d^2 n + 2a\,e^2 n\,x^4 - b\,d^2 n}{4n\,x^2}$$

input
```
int((e*x^2+d)^2*(a+b*log(c*x^n))/x^3,x)
```

output
```
(4*log(x**n*c)**2*b*d*e*x**2 - 2*log(x**n*c)*b*d**2*n + 2*log(x**n*c)*b*e*
*2*n*x**4 + 8*log(x)*a*d*e*n*x**2 - 2*a*d**2*n + 2*a*e**2*n*x**4 - b*d**2*
n**2 - b*e**2*n**2*x**4)/(4*n*x**2)
```

3.188 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^5} dx$

Optimal result . . . 1501
Mathematica [A] (verified) . . . 1501
Rubi [A] (verified) . . . 1502
Maple [A] (verified) . . . 1503
Fricas [A] (verification not implemented) . . . 1503
Sympy [A] (verification not implemented) . . . 1504
Maxima [A] (verification not implemented) . . . 1504
Giac [A] (verification not implemented) . . . 1505
Mupad [B] (verification not implemented) . . . 1505
Reduce [B] (verification not implemented) . . . 1506

Optimal result

Integrand size = 23, antiderivative size = 86

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^5} dx = -\frac{bn(d+4ex^2)^2}{16x^4} - \frac{1}{2}be^2n\log^2(x) - \frac{d^2(a+b\log(cx^n))}{4x^4} - \frac{de(a+b\log(cx^n))}{x^2} + e^2\log(x)(a+b\log(cx^n))$$

output
```
-1/16*b*n*(4*e*x^2+d)^2/x^4-1/2*b*e^2*n*ln(x)^2-1/4*d^2*(a+b*ln(c*x^n))/x^
4-d*e*(a+b*ln(c*x^n))/x^2+e^2*ln(x)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 82, normalized size of antiderivative = 0.95

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^5} dx = \frac{1}{16}\left(-\frac{bd^2n}{x^4} - \frac{8bden}{x^2} - \frac{4d^2(a+b\log(cx^n))}{x^4} - \frac{16de(a+b\log(cx^n))}{x^2} + \frac{8e^2(a+b\log(cx^n))^2}{bn}\right)$$

input
```
Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(-((b*d^2*n)/x^4) - (8*b*d*e*n)/x^2 - (4*d^2*(a + b*Log[c*x^n]))/x^4 - (16
*d*e*(a + b*Log[c*x^n]))/x^2 + (8*e^2*(a + b*Log[c*x^n])^2)/(b*n))/16
```

Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 89, normalized size of antiderivative = 1.03, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^5} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(\frac{e^2\log(x)}{x}-\frac{d(4ex^2+d)}{4x^5}\right)dx-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{de(a+b\log(cx^n))}{x^2}+e^2\log(x)\,(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{de(a+b\log(cx^n))}{x^2}+e^2\log(x)\,(a+b\log(cx^n))-bn\left(\frac{d^2}{16x^4}+\frac{de}{2x^2}+\frac{1}{2}e^2\log^2(x)\right)$$

input
```
Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
-(b*n*(d^2/(16*x^4) + (d*e)/(2*x^2) + (e^2*Log[x]^2)/2)) - (d^2*(a + b*Log
[c*x^n]))/(4*x^4) - (d*e*(a + b*Log[c*x^n]))/x^2 + e^2*Log[x]*(a + b*Log[c
*x^n])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.56 (sec) , antiderivative size = 103, normalized size of antiderivative = 1.20

method	result
parallelrisch	$\frac{16\ln(x)x^4 a e^2 n+8e^2 b\ln(c x^n)^2 x^4-16x^2\ln(c x^n) bden-8x^2 bde n^2-16x^2 aden-4\ln(c x^n) b d^2 n-b d^2 n^2-4a d^2 n}{16x^4 n}$
risch	$-\frac{b(-4e^2\ln(x)x^4+4e x^2 d+d^2)\ln(x^n)}{4x^4}-\frac{-2i\pi b d^2\operatorname{csgn}(ic x^n)^3+8i\ln(x)\pi b e^2\operatorname{csgn}(ic x^n)^3 x^4-8i\pi bde x^2\operatorname{csgn}(ix^n)\operatorname{csgn}(ic$

input
```
int((e*x^2+d)^2*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

output
```
1/16/x^4*(16*ln(x)*x^4*a*e^2*n+8*e^2*b*ln(c*x^n)^2*x^4-16*x^2*ln(c*x^n)*b*
d*e*n-8*x^2*b*d*e*n^2-16*x^2*a*d*e*n-4*ln(c*x^n)*b*d^2*n-b*d^2*n^2-4*a*d^2
*n)/n
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 108, normalized size of antiderivative = 1.26

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^5}\,dx$$
$$=\frac{8\,be^2nx^4\log(x)^2-bd^2n-4\,ad^2-8\,(bden+2\,ade)x^2-4\,(4\,bdex^2+bd^2)\log(c)+4\,(4\,be^2x^4\log(c)+4\,a}{16\,x^4}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

output
```
1/16*(8*b*e^2*n*x^4*log(x)^2 - b*d^2*n - 4*a*d^2 - 8*(b*d*e*n + 2*a*d*e)*x
^2 - 4*(4*b*d*e*x^2 + b*d^2)*log(c) + 4*(4*b*e^2*x^4*log(c) + 4*a*e^2*x^4
- 4*b*d*e*n*x^2 - b*d^2*n)*log(x))/x^4
```

Sympy [A] (verification not implemented)

Time = 1.78 (sec) , antiderivative size = 105, normalized size of antiderivative = 1.22

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^5}\,dx = -\frac{ad^2}{4x^4}-\frac{ade}{x^2}+ae^2\log(x)+bd^2\left(-\frac{n}{16x^4}-\frac{\log(cx^n)}{4x^4}\right) + 2bde\left(-\frac{n}{4x^2}-\frac{\log(cx^n)}{2x^2}\right) - be^2\left(\begin{cases}-\log(c)\log(x) & \text{for } n=0\\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise}\end{cases}\right)$$

input
```
integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x**5,x)
```

output
```
-a*d**2/(4*x**4) - a*d*e/x**2 + a*e**2*log(x) + b*d**2*(-n/(16*x**4) - log
(c*x**n)/(4*x**4)) + 2*b*d*e*(-n/(4*x**2) - log(c*x**n)/(2*x**2)) - b*e**2
*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 90, normalized size of antiderivative = 1.05

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^5}\,dx = \frac{be^2\log(cx^n)^2}{2\,n}+ae^2\log(x)-\frac{bden}{2\,x^2}-\frac{bde\log(cx^n)}{x^2}-\frac{ade}{x^2}-\frac{bd^2n}{16\,x^4}-\frac{bd^2\log(cx^n)}{4\,x^4}-\frac{ad^2}{4\,x^4}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

output
```
1/2*b*e^2*log(c*x^n)^2/n + a*e^2*log(x) - 1/2*b*d*e*n/x^2 - b*d*e*log(c*x^
n)/x^2 - a*d*e/x^2 - 1/16*b*d^2*n/x^4 - 1/4*b*d^2*log(c*x^n)/x^4 - 1/4*a*d
^2/x^4
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 103, normalized size of antiderivative = 1.20

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^5}\,dx = \frac{1}{2}be^2n\log(x)^2 - \frac{1}{2}bden\left(\frac{2\log(x)}{x^2}+\frac{1}{x^2}\right) - \frac{1}{16}bd^2n\left(\frac{4\log(x)}{x^4}+\frac{1}{x^4}\right) + be^2\log(c)\log(|x|) + ae^2\log(|x|) - \frac{bde\log(c)}{x^2} - \frac{ade}{x^2} - \frac{bd^2\log(c)}{4x^4} - \frac{ad^2}{4x^4}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

output
```
1/2*b*e^2*n*log(x)^2 - 1/2*b*d*e*n*(2*log(x)/x^2 + 1/x^2) - 1/16*b*d^2*n*(
4*log(x)/x^4 + 1/x^4) + b*e^2*log(c)*log(abs(x)) + a*e^2*log(abs(x)) - b*d
*e*log(c)/x^2 - a*d*e/x^2 - 1/4*b*d^2*log(c)/x^4 - 1/4*a*d^2/x^4
```

Mupad [B] (verification not implemented)

Time = 25.58 (sec) , antiderivative size = 102, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^5}\,dx = \ln(x)\left(a\,e^2+\frac{3\,b\,e^2\,n}{4}\right) - \frac{x^2\,(4\,a\,d\,e+2\,b\,d\,e\,n)+a\,d^2+\frac{b\,d^2\,n}{4}}{4\,x^4} - \frac{\ln(c\,x^n)\,\left(\frac{b\,d^2}{4}+b\,d\,e\,x^2+\frac{3\,b\,e^2\,x^4}{4}\right)}{x^4} + \frac{b\,e^2\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x^5,x)
```

output
```
log(x)*(a*e^2 + (3*b*e^2*n)/4) - (x^2*(4*a*d*e + 2*b*d*e*n) + a*d^2 + (b*d
^2*n)/4)/(4*x^4) - (log(c*x^n)*((b*d^2)/4 + (3*b*e^2*x^4)/4 + b*d*e*x^2))/
x^4 + (b*e^2*log(c*x^n)^2)/(2*n)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 102, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^5} dx$$
$$= \frac{8\log(x^nc)^2 b e^2x^4 - 4\log(x^nc) b d^2n - 16\log(x^nc) bden x^2 + 16\log(x) a e^2n x^4 - 4a d^2n - 16aden x^2 - b}{16n x^4}$$

input
```
int((e*x^2+d)^2*(a+b*log(c*x^n))/x^5,x)
```

output
```
(8*log(x**n*c)**2*b*e**2*x**4 - 4*log(x**n*c)*b*d**2*n - 16*log(x**n*c)*b*
d*e*n*x**2 + 16*log(x)*a*e**2*n*x**4 - 4*a*d**2*n - 16*a*d*e*n*x**2 - b*d*
*2*n**2 - 8*b*d*e*n**2*x**2)/(16*n*x**4)
```

3.189 $\int x^4(d+ex^2)^2 (a+b\log(cx^n))\,dx$

Optimal result . . . 1507
Mathematica [A] (verified) . . . 1507
Rubi [A] (verified) . . . 1508
Maple [A] (verified) . . . 1509
Fricas [A] (verification not implemented) . . . 1509
Sympy [A] (verification not implemented) . . . 1510
Maxima [A] (verification not implemented) . . . 1510
Giac [A] (verification not implemented) . . . 1511
Mupad [B] (verification not implemented) . . . 1511
Reduce [B] (verification not implemented) . . . 1512

Optimal result

Integrand size = 23, antiderivative size = 74

$$\int x^4(d+ex^2)^2 (a+b\log(cx^n))\,dx = -\frac{1}{25}bd^2nx^5-\frac{2}{49}bdenx^7-\frac{1}{81}be^2nx^9+\frac{1}{315}\left(63d^2x^5+90dex^7+35e^2x^9\right)(a+b\log(cx^n))$$

output
```
-1/25*b*d^2*n*x^5-2/49*b*d*e*n*x^7-1/81*b*e^2*n*x^9+1/315*(35*e^2*x^9+90*d
*e*x^7+63*d^2*x^5)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 95, normalized size of antiderivative = 1.28

$$\int x^4(d+ex^2)^2 (a+b\log(cx^n))\,dx = -\frac{1}{25}bd^2nx^5-\frac{2}{49}bdenx^7-\frac{1}{81}be^2nx^9+\frac{1}{5}d^2x^5(a+b\log(cx^n))+\frac{2}{7}dex^7(a+b\log(cx^n))+\frac{1}{9}e^2x^9(a+b\log(cx^n))$$

input
```
Integrate[x^4*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/25*(b*d^2*n*x^5) - (2*b*d*e*n*x^7)/49 - (b*e^2*n*x^9)/81 + (d^2*x^5*(a
+ b*Log[c*x^n]))/5 + (2*d*e*x^7*(a + b*Log[c*x^n]))/7 + (e^2*x^9*(a + b*Lo
g[c*x^n]))/9
```

Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 73, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2771, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^4 (d+ex^2)^2 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{315}\left(63d^2x^5+90dex^7+35e^2x^9\right)(a+b\log(cx^n))-bn\int\left(\frac{e^2x^8}{9}+\frac{2}{7}dex^6+\frac{d^2x^4}{5}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{315}\left(63d^2x^5+90dex^7+35e^2x^9\right)(a+b\log(cx^n))-bn\left(\frac{d^2x^5}{25}+\frac{2}{49}dex^7+\frac{e^2x^9}{81}\right)$$

input
```
Int[x^4*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d^2*x^5)/25 + (2*d*e*x^7)/49 + (e^2*x^9)/81)) + ((63*d^2*x^5 + 90*
d*e*x^7 + 35*e^2*x^9)*(a + b*Log[c*x^n]))/315
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 3.30 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.36

method	result
parallelrisch	$\frac{x^9 b \ln(c\,x^n) e^2}{9} - \frac{b\,e^2 n\,x^9}{81} + \frac{x^9 a\,e^2}{9} + \frac{2 x^7 b \ln(c\,x^n) e d}{7} - \frac{2 b d e n\,x^7}{49} + \frac{2 x^7 a e d}{7} + \frac{x^5 b \ln(c\,x^n) d^2}{5} - \frac{b\,d^2 n\,x^5}{25} + \frac{x^5 a}{5}$
risch	$\frac{b\,x^5 (35 e^2 x^4 + 90 e\,x^2 d + 63 d^2) \ln(x^n)}{315} + \frac{i\pi b\,d^2 x^5 \operatorname{csgn}(i x^n) \operatorname{csgn}(i c\,x^n)^2}{10} + \frac{i\pi b\,d^2 x^5 \operatorname{csgn}(i c\,x^n)^2 \operatorname{csgn}(i c)}{10} + \frac{i\pi b\,e^2 x^9 \operatorname{csg}}{}$

input
```
int(x^4*(e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/9*x^9*b*ln(c*x^n)*e^2-1/81*b*e^2*n*x^9+1/9*x^9*a*e^2+2/7*x^7*b*ln(c*x^n)
*e*d-2/49*b*d*e*n*x^7+2/7*x^7*a*e*d+1/5*x^5*b*ln(c*x^n)*d^2-1/25*b*d^2*n*x
^5+1/5*x^5*a*d^2
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.59

$$\int x^4 (d+ex^2)^2 (a+b\log(cx^n))\,dx = -\frac{1}{81}\,(be^2n - 9\,ae^2)x^9 - \frac{2}{49}\,(bden - 7\,ade)x^7 - \frac{1}{25}\,(bd^2n - 5\,ad^2)x^5 + \frac{1}{315}\,(35\,be^2x^9 + 90\,bdex^7 + 63\,bd^2x^5)\log(c) + \frac{1}{315}\,(35\,be^2nx^9 + 90\,bdenx^7 + 63\,bd^2nx^5)\log(x)$$

input
```
integrate(x^4*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/81*(b*e^2*n - 9*a*e^2)*x^9 - 2/49*(b*d*e*n - 7*a*d*e)*x^7 - 1/25*(b*d^2
*n - 5*a*d^2)*x^5 + 1/315*(35*b*e^2*x^9 + 90*b*d*e*x^7 + 63*b*d^2*x^5)*log
(c) + 1/315*(35*b*e^2*n*x^9 + 90*b*d*e*n*x^7 + 63*b*d^2*n*x^5)*log(x)
```

Sympy [A] (verification not implemented)

Time = 1.30 (sec) , antiderivative size = 121, normalized size of antiderivative = 1.64

$$\int x^4(d+ex^2)^2(a+b\log(cx^n))\,dx = \frac{ad^2x^5}{5}+\frac{2adex^7}{7}+\frac{ae^2x^9}{9}-\frac{bd^2nx^5}{25}+\frac{bd^2x^5\log(cx^n)}{5}-\frac{2bdenx^7}{49}+\frac{2bdex^7\log(cx^n)}{7}-\frac{be^2nx^9}{81}+\frac{be^2x^9\log(cx^n)}{9}$$

input
```
integrate(x**4*(e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x**5/5 + 2*a*d*e*x**7/7 + a*e**2*x**9/9 - b*d**2*n*x**5/25 + b*d**2
*x**5*log(c*x**n)/5 - 2*b*d*e*n*x**7/49 + 2*b*d*e*x**7*log(c*x**n)/7 - b*e
**2*n*x**9/81 + b*e**2*x**9*log(c*x**n)/9
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.35

$$\int x^4(d+ex^2)^2(a+b\log(cx^n))\,dx = -\frac{1}{81}be^2nx^9+\frac{1}{9}be^2x^9\log(cx^n)+\frac{1}{9}ae^2x^9-\frac{2}{49}bdenx^7+\frac{2}{7}bdex^7\log(cx^n)+\frac{2}{7}adex^7-\frac{1}{25}bd^2nx^5+\frac{1}{5}bd^2x^5\log(cx^n)+\frac{1}{5}ad^2x^5$$

input
```
integrate(x^4*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/81*b*e^2*n*x^9 + 1/9*b*e^2*x^9*log(c*x^n) + 1/9*a*e^2*x^9 - 2/49*b*d*e*
n*x^7 + 2/7*b*d*e*x^7*log(c*x^n) + 2/7*a*d*e*x^7 - 1/25*b*d^2*n*x^5 + 1/5*
b*d^2*x^5*log(c*x^n) + 1/5*a*d^2*x^5
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.66

$$\int x^4(d+ex^2)^2(a+b\log(cx^n))\,dx = \frac{1}{9}be^2nx^9\log(x) - \frac{1}{81}be^2nx^9 + \frac{1}{9}be^2x^9\log(c) + \frac{1}{9}ae^2x^9 + \frac{2}{7}bdenx^7\log(x) - \frac{2}{49}bdenx^7 + \frac{2}{7}bdex^7\log(c) + \frac{2}{7}adex^7 + \frac{1}{5}bd^2nx^5\log(x) - \frac{1}{25}bd^2nx^5 + \frac{1}{5}bd^2x^5\log(c) + \frac{1}{5}ad^2x^5$$

input
```
integrate(x^4*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/9*b*e^2*n*x^9*log(x) - 1/81*b*e^2*n*x^9 + 1/9*b*e^2*x^9*log(c) + 1/9*a*e
^2*x^9 + 2/7*b*d*e*n*x^7*log(x) - 2/49*b*d*e*n*x^7 + 2/7*b*d*e*x^7*log(c)
+ 2/7*a*d*e*x^7 + 1/5*b*d^2*n*x^5*log(x) - 1/25*b*d^2*n*x^5 + 1/5*b*d^2*x^
5*log(c) + 1/5*a*d^2*x^5
```

Mupad [B] (verification not implemented)

Time = 25.55 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.11

$$\int x^4(d+ex^2)^2(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,d^2\,x^5}{5} + \frac{2\,b\,d\,e\,x^7}{7} + \frac{b\,e^2\,x^9}{9}\right) + \frac{d^2\,x^5\,(5\,a-b\,n)}{25} + \frac{e^2\,x^9\,(9\,a-b\,n)}{81} + \frac{2\,d\,e\,x^7\,(7\,a-b\,n)}{49}$$

input
```
int(x^4*(d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^2*x^5)/5 + (b*e^2*x^9)/9 + (2*b*d*e*x^7)/7) + (d^2*x^5*(5
*a - b*n))/25 + (e^2*x^9*(9*a - b*n))/81 + (2*d*e*x^7*(7*a - b*n))/49
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.30

$$\int x^4 (d + e x^2)^2 (a + b \log (c x^n)) \, dx$$
$$= \frac{x^5 (19845 \log(x^n c) \, b \, d^2 + 28350 \log(x^n c) \, bde \, x^2 + 11025 \log(x^n c) \, b \, e^2 x^4 + 19845 a \, d^2 + 28350 ade \, x^2 + 110}{99225}$$

input
```
int(x^4*(e*x^2+d)^2*(a+b*log(c*x^n)),x)
```

output
```
(x**5*(19845*log(x**n*c)*b*d**2 + 28350*log(x**n*c)*b*d*e*x**2 + 11025*log
(x**n*c)*b*e**2*x**4 + 19845*a*d**2 + 28350*a*d*e*x**2 + 11025*a*e**2*x**4
 - 3969*b*d**2*n - 4050*b*d*e*n*x**2 - 1225*b*e**2*n*x**4))/99225
```

3.190 $\int x^2(d+ex^2)^2 (a+b\log(cx^n))\,dx$

Optimal result 1513
Mathematica [A] (verified) 1513
Rubi [A] (verified) 1514
Maple [A] (verified) 1515
Fricas [A] (verification not implemented) 1515
Sympy [A] (verification not implemented) 1516
Maxima [A] (verification not implemented) 1516
Giac [A] (verification not implemented) 1517
Mupad [B] (verification not implemented) 1517
Reduce [B] (verification not implemented) 1518

Optimal result

Integrand size = 23, antiderivative size = 74

$$\int x^2(d+ex^2)^2 (a+b\log(cx^n))\,dx = -\frac{1}{9}bd^2nx^3 - \frac{2}{25}bdenx^5 - \frac{1}{49}be^2nx^7 + \frac{1}{105}(35d^2x^3+42dex^5+15e^2x^7)(a+b\log(cx^n))$$

output
```
-1/9*b*d^2*n*x^3-2/25*b*d*e*n*x^5-1/49*b*e^2*n*x^7+1/105*(15*e^2*x^7+42*d*
e*x^5+35*d^2*x^3)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 95, normalized size of antiderivative = 1.28

$$\int x^2(d+ex^2)^2 (a+b\log(cx^n))\,dx = -\frac{1}{9}bd^2nx^3 - \frac{2}{25}bdenx^5 - \frac{1}{49}be^2nx^7 + \frac{1}{3}d^2x^3(a+b\log(cx^n)) + \frac{2}{5}dex^5(a+b\log(cx^n)) + \frac{1}{7}e^2x^7(a+b\log(cx^n))$$

input
```
Integrate[x^2*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/9*(b*d^2*n*x^3) - (2*b*d*e*n*x^5)/25 - (b*e^2*n*x^7)/49 + (d^2*x^3*(a +
 b*Log[c*x^n]))/3 + (2*d*e*x^5*(a + b*Log[c*x^n]))/5 + (e^2*x^7*(a + b*Log
[c*x^n]))/7
```

Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 73, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2771, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{105}\left(35d^2x^3+42dex^5+15e^2x^7\right)\left(a+b\log\left(cx^n\right)\right)-bn\int\left(\frac{e^2x^6}{7}+\frac{2}{5}dex^4+\frac{d^2x^2}{3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{105}\left(35d^2x^3+42dex^5+15e^2x^7\right)\left(a+b\log\left(cx^n\right)\right)-bn\left(\frac{d^2x^3}{9}+\frac{2}{25}dex^5+\frac{e^2x^7}{49}\right)$$

input
```
Int[x^2*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d^2*x^3)/9 + (2*d*e*x^5)/25 + (e^2*x^7)/49)) + ((35*d^2*x^3 + 42*d
*e*x^5 + 15*e^2*x^7)*(a + b*Log[c*x^n]))/105
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.94 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.36

method	result
parallelrisch	$\frac{x^7 b\ln(c\,x^n)e^2}{7}-\frac{b\,e^2 n\,x^7}{49}+\frac{x^7 a\,e^2}{7}+\frac{2x^5\ln(c\,x^n)bde}{5}-\frac{2bden\,x^5}{25}+\frac{2ade\,x^5}{5}+\frac{x^3 b\ln(c\,x^n)d^2}{3}-\frac{b\,d^2 n\,x^3}{9}+\frac{d^2 a}{3}$
risch	$\frac{b\,x^3(15e^2x^4+42e\,x^2d+35d^2)\ln(x^n)}{105}+\frac{i\pi b\,d^2x^3\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2}{6}-\frac{i\pi bde\,x^5\,\mathrm{csgn}(ic\,x^n)^3}{5}+\frac{i\pi b\,e^2x^7\,\mathrm{csgn}(ix^n)\,\mathrm{cs}}{14}$

input
```
int(x^2*(e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/7*x^7*b*ln(c*x^n)*e^2-1/49*b*e^2*n*x^7+1/7*x^7*a*e^2+2/5*x^5*ln(c*x^n)*b
*d*e-2/25*b*d*e*n*x^5+2/5*a*d*e*x^5+1/3*x^3*b*ln(c*x^n)*d^2-1/9*b*d^2*n*x^
3+1/3*d^2*a*x^3
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.59

$$\int x^2(d+ex^2)^2(a+b\log(cx^n))\,dx = -\frac{1}{49}\left(be^2n-7\,ae^2\right)x^7 - \frac{2}{25}(bden-5\,ade)x^5 - \frac{1}{9}\left(bd^2n-3\,ad^2\right)x^3 + \frac{1}{105}\left(15\,be^2x^7+42\,bdex^5+35\,bd^2x^3\right)\log(c) + \frac{1}{105}\left(15\,be^2nx^7+42\,bdenx^5+35\,bd^2nx^3\right)\log(x)$$

input
```
integrate(x^2*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/49*(b*e^2*n - 7*a*e^2)*x^7 - 2/25*(b*d*e*n - 5*a*d*e)*x^5 - 1/9*(b*d^2*
n - 3*a*d^2)*x^3 + 1/105*(15*b*e^2*x^7 + 42*b*d*e*x^5 + 35*b*d^2*x^3)*log(
c) + 1/105*(15*b*e^2*n*x^7 + 42*b*d*e*n*x^5 + 35*b*d^2*n*x^3)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.69 (sec) , antiderivative size = 121, normalized size of antiderivative = 1.64

$$\int x^2(d+ex^2)^2(a+b\log(cx^n))\,dx = \frac{ad^2x^3}{3}+\frac{2adex^5}{5}+\frac{ae^2x^7}{7}-\frac{bd^2nx^3}{9}+\frac{bd^2x^3\log(cx^n)}{3}-\frac{2bdenx^5}{25}+\frac{2bdex^5\log(cx^n)}{5}-\frac{be^2nx^7}{49}+\frac{be^2x^7\log(cx^n)}{7}$$

input
```
integrate(x**2*(e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x**3/3 + 2*a*d*e*x**5/5 + a*e**2*x**7/7 - b*d**2*n*x**3/9 + b*d**2*
x**3*log(c*x**n)/3 - 2*b*d*e*n*x**5/25 + 2*b*d*e*x**5*log(c*x**n)/5 - b*e*
*2*n*x**7/49 + b*e**2*x**7*log(c*x**n)/7
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.35

$$\int x^2(d+ex^2)^2(a+b\log(cx^n))\,dx = -\frac{1}{49}be^2nx^7+\frac{1}{7}be^2x^7\log(cx^n)+\frac{1}{7}ae^2x^7-\frac{2}{25}bdenx^5+\frac{2}{5}bdex^5\log(cx^n)+\frac{2}{5}adex^5-\frac{1}{9}bd^2nx^3+\frac{1}{3}bd^2x^3\log(cx^n)+\frac{1}{3}ad^2x^3$$

input
```
integrate(x^2*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/49*b*e^2*n*x^7 + 1/7*b*e^2*x^7*log(c*x^n) + 1/7*a*e^2*x^7 - 2/25*b*d*e*
n*x^5 + 2/5*b*d*e*x^5*log(c*x^n) + 2/5*a*d*e*x^5 - 1/9*b*d^2*n*x^3 + 1/3*b
*d^2*x^3*log(c*x^n) + 1/3*a*d^2*x^3
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.66

$$\int x^2\left(d+ex^2\right)^2(a+b\log(cx^n))\,dx = \frac{1}{7}be^2nx^7\log(x) - \frac{1}{49}be^2nx^7 + \frac{1}{7}be^2x^7\log(c) + \frac{1}{7}ae^2x^7 + \frac{2}{5}bdenx^5\log(x) - \frac{2}{25}bdenx^5 + \frac{2}{5}bdex^5\log(c) + \frac{2}{5}adex^5 + \frac{1}{3}bd^2nx^3\log(x) - \frac{1}{9}bd^2nx^3 + \frac{1}{3}bd^2x^3\log(c) + \frac{1}{3}ad^2x^3$$

input
```
integrate(x^2*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/7*b*e^2*n*x^7*log(x) - 1/49*b*e^2*n*x^7 + 1/7*b*e^2*x^7*log(c) + 1/7*a*e
^2*x^7 + 2/5*b*d*e*n*x^5*log(x) - 2/25*b*d*e*n*x^5 + 2/5*b*d*e*x^5*log(c)
+ 2/5*a*d*e*x^5 + 1/3*b*d^2*n*x^3*log(x) - 1/9*b*d^2*n*x^3 + 1/3*b*d^2*x^3
*log(c) + 1/3*a*d^2*x^3
```

Mupad [B] (verification not implemented)

Time = 25.37 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.11

$$\int x^2\left(d+ex^2\right)^2(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,d^2\,x^3}{3}+\frac{2\,b\,d\,e\,x^5}{5}+\frac{b\,e^2\,x^7}{7}\right) + \frac{d^2\,x^3\,(3\,a-b\,n)}{9} + \frac{e^2\,x^7\,(7\,a-b\,n)}{49} + \frac{2\,d\,e\,x^5\,(5\,a-b\,n)}{25}$$

input
```
int(x^2*(d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^2*x^3)/3 + (b*e^2*x^7)/7 + (2*b*d*e*x^5)/5) + (d^2*x^3*(3
*a - b*n))/9 + (e^2*x^7*(7*a - b*n))/49 + (2*d*e*x^5*(5*a - b*n))/25
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.30

$$\int x^2 (d + ex^2)^2 (a + b\log(cx^n)) \, dx$$
$$= \frac{x^3(3675\log(x^nc)\,b\,d^2 + 4410\log(x^nc)\,bde\,x^2 + 1575\log(x^nc)\,b\,e^2x^4 + 3675a\,d^2 + 4410ade\,x^2 + 1575a\,e^2x}{11025}$$

input
```
int(x^2*(e*x^2+d)^2*(a+b*log(c*x^n)),x)
```

output
```
(x**3*(3675*log(x**n*c)*b*d**2 + 4410*log(x**n*c)*b*d*e*x**2 + 1575*log(x*
*n*c)*b*e**2*x**4 + 3675*a*d**2 + 4410*a*d*e*x**2 + 1575*a*e**2*x**4 - 122
5*b*d**2*n - 882*b*d*e*n*x**2 - 225*b*e**2*n*x**4))/11025
```

3.191 $\int (d+ex^2)^2 (a+b\log(cx^n))\,dx$

Optimal result 1519
Mathematica [A] (verified) 1519
Rubi [A] (verified) 1520
Maple [A] (verified) 1521
Fricas [A] (verification not implemented) 1521
Sympy [A] (verification not implemented) 1522
Maxima [A] (verification not implemented) 1522
Giac [A] (verification not implemented) 1523
Mupad [B] (verification not implemented) 1523
Reduce [B] (verification not implemented) 1524

Optimal result

Integrand size = 20, antiderivative size = 86

$$\int (d+ex^2)^2 (a+b\log(cx^n))\,dx = -bd^2nx - \frac{2}{9}bdenx^3 - \frac{1}{25}be^2nx^5 + d^2x(a+b\log(cx^n)) + \frac{2}{3}dex^3(a+b\log(cx^n)) + \frac{1}{5}e^2x^5(a+b\log(cx^n))$$

output
```
-b*d^2*n*x-2/9*b*d*e*n*x^3-1/25*b*e^2*n*x^5+d^2*x*(a+b*ln(c*x^n))+2/3*d*e*
x^3*(a+b*ln(c*x^n))+1/5*e^2*x^5*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 89, normalized size of antiderivative = 1.03

$$\int (d+ex^2)^2 (a+b\log(cx^n))\,dx = ad^2x - bd^2nx - \frac{2}{9}bdenx^3 - \frac{1}{25}be^2nx^5 + bd^2x\log(cx^n) + \frac{2}{3}dex^3(a+b\log(cx^n)) + \frac{1}{5}e^2x^5(a+b\log(cx^n))$$

input
```
Integrate[(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
a*d^2*x - b*d^2*n*x - (2*b*d*e*n*x^3)/9 - (b*e^2*n*x^5)/25 + b*d^2*x*Log[c
*x^n] + (2*d*e*x^3*(a + b*Log[c*x^n]))/3 + (e^2*x^5*(a + b*Log[c*x^n]))/5
```

Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 84, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {2750, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d+ex^2\right)^2 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \ 2750$$

$$-bn\int \left(\frac{e^2x^4}{5}+\frac{2}{3}dex^2+d^2\right)dx+d^2x(a+b\log(cx^n))+\frac{2}{3}dex^3(a+b\log(cx^n))+\frac{1}{5}e^2x^5(a+b\log(cx^n))$$

$$\Big\downarrow \ 2009$$

$$d^2x(a+b\log(cx^n))+\frac{2}{3}dex^3(a+b\log(cx^n))+\frac{1}{5}e^2x^5(a+b\log(cx^n))-bn\left(d^2x+\frac{2}{9}dex^3+\frac{e^2x^5}{25}\right)$$

input
```
Int[(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*(d^2*x + (2*d*e*x^3)/9 + (e^2*x^5)/25)) + d^2*x*(a + b*Log[c*x^n]) +
 (2*d*e*x^3*(a + b*Log[c*x^n]))/3 + (e^2*x^5*(a + b*Log[c*x^n]))/5
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2750
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Simp[(a + b*Log[c*x^n])
  u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b,
 c, d, e, n, r}, x] && IGtQ[q, 0]
```

Maple [A] (verified)

Time = 0.58 (sec) , antiderivative size = 93, normalized size of antiderivative = 1.08

method	result
parallelrisch	$\frac{x^5 b \ln(c x^n) e^2}{5} - \frac{b e^2 n x^5}{25} + \frac{x^5 a e^2}{5} + \frac{2x^3 b \ln(c x^n) e d}{3} - \frac{2bden x^3}{9} + \frac{2x^3 aed}{3} + xb \ln(c x^n) d^2 - b d^2 n x + c$
risch	$\frac{bx(3e^2x^4+10e x^2 d+15d^2) \ln(x^n)}{15} + \frac{i\pi \operatorname{csgn}(ix^n) \operatorname{csgn}(ic x^n)^2 b d^2 x}{2} + \frac{i\pi \operatorname{csgn}(ix^n) \operatorname{csgn}(ic x^n)^2 b e^2 x^5}{10} - \frac{i\pi \operatorname{csgn}(ic x^n)}{10}$

input
```
int((e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/5*x^5*b*ln(c*x^n)*e^2-1/25*b*e^2*n*x^5+1/5*x^5*a*e^2+2/3*x^3*b*ln(c*x^n)
*e*d-2/9*b*d*e*n*x^3+2/3*x^3*a*e*d+x*b*ln(c*x^n)*d^2-b*d^2*n*x+a*d^2*x
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.30

$$\begin{aligned}\int (d+ex^2)^2 (a+b\log(cx^n))\,dx = &-\frac{1}{25}\left(be^2n-5\,ae^2\right)x^5\\ &-\frac{2}{9}\,(bden-3\,ade)x^3-\left(bd^2n-ad^2\right)x\\ &+\frac{1}{15}\left(3\,be^2x^5+10\,bdex^3+15\,bd^2x\right)\log(c)\\ &+\frac{1}{15}\left(3\,be^2nx^5+10\,bdenx^3+15\,bd^2nx\right)\log(x)\end{aligned}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/25*(b*e^2*n - 5*a*e^2)*x^5 - 2/9*(b*d*e*n - 3*a*d*e)*x^3 - (b*d^2*n - a
*d^2)*x + 1/15*(3*b*e^2*x^5 + 10*b*d*e*x^3 + 15*b*d^2*x)*log(c) + 1/15*(3*
b*e^2*n*x^5 + 10*b*d*e*n*x^3 + 15*b*d^2*n*x)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 110, normalized size of antiderivative = 1.28

$$\int \left(d+ex^2\right)^2 \left(a+b\log\left(cx^n\right)\right)\,dx = ad^2x + \frac{2adex^3}{3} + \frac{ae^2x^5}{5} - bd^2nx + bd^2x\log\left(cx^n\right) - \frac{2bdenx^3}{9} + \frac{2bdex^3\log\left(cx^n\right)}{3} - \frac{be^2nx^5}{25} + \frac{be^2x^5\log\left(cx^n\right)}{5}$$

input
```
integrate((e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x + 2*a*d*e*x**3/3 + a*e**2*x**5/5 - b*d**2*n*x + b*d**2*x*log(c*x*
*n) - 2*b*d*e*n*x**3/9 + 2*b*d*e*x**3*log(c*x**n)/3 - b*e**2*n*x**5/25 + b
*e**2*x**5*log(c*x**n)/5
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 92, normalized size of antiderivative = 1.07

$$\int \left(d+ex^2\right)^2 \left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{25}\,be^2nx^5 + \frac{1}{5}\,be^2x^5\log\left(cx^n\right) + \frac{1}{5}\,ae^2x^5 - \frac{2}{9}\,bdenx^3 + \frac{2}{3}\,bdex^3\log\left(cx^n\right) + \frac{2}{3}\,adex^3 - bd^2nx + bd^2x\log\left(cx^n\right) + ad^2x$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/25*b*e^2*n*x^5 + 1/5*b*e^2*x^5*log(c*x^n) + 1/5*a*e^2*x^5 - 2/9*b*d*e*n
*x^3 + 2/3*b*d*e*x^3*log(c*x^n) + 2/3*a*d*e*x^3 - b*d^2*n*x + b*d^2*x*log(
c*x^n) + a*d^2*x
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.30

$$\int \left(d+ex^2\right)^2 (a+b\log(cx^n))\,dx = \frac{1}{5}be^2nx^5\log(x) - \frac{1}{25}be^2nx^5 + \frac{1}{5}be^2x^5\log(c) + \frac{1}{5}ae^2x^5 + \frac{2}{3}bdenx^3\log(x) - \frac{2}{9}bdenx^3 + \frac{2}{3}bdex^3\log(c) + \frac{2}{3}adex^3 + bd^2nx\log(x) - bd^2nx + bd^2x\log(c) + ad^2x$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/5*b*e^2*n*x^5*log(x) - 1/25*b*e^2*n*x^5 + 1/5*b*e^2*x^5*log(c) + 1/5*a*e
^2*x^5 + 2/3*b*d*e*n*x^3*log(x) - 2/9*b*d*e*n*x^3 + 2/3*b*d*e*x^3*log(c) +
 2/3*a*d*e*x^3 + b*d^2*n*x*log(x) - b*d^2*n*x + b*d^2*x*log(c) + a*d^2*x
```

Mupad [B] (verification not implemented)

Time = 23.99 (sec) , antiderivative size = 74, normalized size of antiderivative = 0.86

$$\int \left(d+ex^2\right)^2 (a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(b\,d^2\,x + \frac{2\,b\,d\,e\,x^3}{3} + \frac{b\,e^2\,x^5}{5}\right) + \frac{e^2\,x^5\,(5\,a-b\,n)}{25} + d^2\,x\,(a-b\,n) + \frac{2\,d\,e\,x^3\,(3\,a-b\,n)}{9}$$

input
```
int((d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*e^2*x^5)/5 + b*d^2*x + (2*b*d*e*x^3)/3) + (e^2*x^5*(5*a - b
*n))/25 + d^2*x*(a - b*n) + (2*d*e*x^3*(3*a - b*n))/9
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 94, normalized size of antiderivative = 1.09

$$\int (d+ex^2)^2 (a+b\log(cx^n))\,dx = \frac{x(225\log(x^nc)\,b\,d^2+150\log(x^nc)\,bde\,x^2+45\log(x^nc)\,b\,e^2x^4+225a\,d^2+150ade\,x^2+45a\,e^2x^4-225b\,d}{225}$$

input
```
int((e*x^2+d)^2*(a+b*log(c*x^n)),x)
```

output
```
(x*(225*log(x**n*c)*b*d**2 + 150*log(x**n*c)*b*d*e*x**2 + 45*log(x**n*c)*b
*e**2*x**4 + 225*a*d**2 + 150*a*d*e*x**2 + 45*a*e**2*x**4 - 225*b*d**2*n -
 50*b*d*e*n*x**2 - 9*b*e**2*n*x**4))/225
```

3.192 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^2}\,dx$

Optimal result 1525
Mathematica [A] (verified) 1525
Rubi [A] (verified) 1526
Maple [A] (verified) 1527
Fricas [A] (verification not implemented) 1527
Sympy [A] (verification not implemented) 1528
Maxima [A] (verification not implemented) 1528
Giac [A] (verification not implemented) 1529
Mupad [B] (verification not implemented) 1529
Reduce [B] (verification not implemented) 1530

Optimal result

Integrand size = 23, antiderivative size = 83

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^2}\,dx = -\frac{bd^2n}{x} - 2bdenx - \frac{1}{9}be^2nx^3 - \frac{d^2(a+b\log(cx^n))}{x} + 2dex(a+b\log(cx^n)) + \frac{1}{3}e^2x^3(a+b\log(cx^n))$$

output
```
-b*d^2*n/x-2*b*d*e*n*x-1/9*b*e^2*n*x^3-d^2*(a+b*ln(c*x^n))/x+2*d*e*x*(a+b*
ln(c*x^n))+1/3*e^2*x^3*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 86, normalized size of antiderivative = 1.04

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^2}\,dx = -\frac{bd^2n}{x} + 2adex - 2bdenx - \frac{1}{9}be^2nx^3 + 2bdex\log(cx^n) - \frac{d^2(a+b\log(cx^n))}{x} + \frac{1}{3}e^2x^3(a+b\log(cx^n))$$

input
```
Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-((b*d^2*n)/x) + 2*a*d*e*x - 2*b*d*e*n*x - (b*e^2*n*x^3)/9 + 2*b*d*e*x*Log
[c*x^n] - (d^2*(a + b*Log[c*x^n]))/x + (e^2*x^3*(a + b*Log[c*x^n]))/3
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 81, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^2} dx$$

$$\Big\downarrow \ 2772$$

$$-bn\int \left(-\frac{d^2}{x^2}+2ed+\frac{e^2x^2}{3}\right)dx-\frac{d^2(a+b\log(cx^n))}{x}+2dex(a+b\log(cx^n))+\frac{1}{3}e^2x^3(a+b\log(cx^n))$$

$$\Big\downarrow \ 2009$$

$$-\frac{d^2(a+b\log(cx^n))}{x}+2dex(a+b\log(cx^n))+\frac{1}{3}e^2x^3(a+b\log(cx^n))-bn\left(\frac{d^2}{x}+2dex+\frac{e^2x^3}{9}\right)$$

input
```
Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-(b*n*(d^2/x + 2*d*e*x + (e^2*x^3)/9)) - (d^2*(a + b*Log[c*x^n]))/x + 2*d*
e*x*(a + b*Log[c*x^n]) + (e^2*x^3*(a + b*Log[c*x^n]))/3
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.56 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.16

method	result
parallelrisch	$-\frac{-3x^4b\ln(c\,x^n)e^2+b\,e^2n\,x^4-3x^4a\,e^2-18b\ln(c\,x^n)e\,x^2d+18bden\,x^2-18ae\,x^2d+9b\ln(c\,x^n)d^2+9b\,d^2n+9a\,d^2}{9x}$
risch	$-\frac{b(-e^2x^4-6e\,x^2d+3d^2)\ln(x^n)}{3x}-\frac{-9i\pi b\,d^2\,\mathrm{csgn}(ic\,x^n)^3-9i\pi b\,d^2\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)\,\mathrm{csgn}(ic)+9i\pi b\,d^2\,\mathrm{csgn}(ic\,x^n)^2\,\mathrm{csg}}{}$

input
```
int((e*x^2+d)^2*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

output
```
-1/9/x*(-3*x^4*b*ln(c*x^n)*e^2+b*e^2*n*x^4-3*x^4*a*e^2-18*b*ln(c*x^n)*e*x^
2*d+18*b*d*e*n*x^2-18*a*e*x^2*d+9*b*ln(c*x^n)*d^2+9*b*d^2*n+9*a*d^2)
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.31

$$\int \frac{(d+ex^2)^2\,(a+b\log{(cx^n)})}{x^2}\,dx =$$
$$-\frac{(be^2n-3\,ae^2)x^4+9\,bd^2n+9\,ad^2+18\,(bden-ade)x^2-3\,(be^2x^4+6\,bdex^2-3\,bd^2)\log{(c)}-3\,(be^2n}{9\,x}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
-1/9*((b*e^2*n - 3*a*e^2)*x^4 + 9*b*d^2*n + 9*a*d^2 + 18*(b*d*e*n - a*d*e)
*x^2 - 3*(b*e^2*x^4 + 6*b*d*e*x^2 - 3*b*d^2)*log(c) - 3*(b*e^2*n*x^4 + 6*b
*d*e*n*x^2 - 3*b*d^2*n)*log(x))/x
```

Sympy [A] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.20

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^2}\,dx = -\frac{ad^2}{x} + 2adex + \frac{ae^2x^3}{3} - \frac{bd^2n}{x} - \frac{bd^2\log(cx^n)}{x} - 2bdenx + 2bdex\log(cx^n) - \frac{be^2nx^3}{9} + \frac{be^2x^3\log(cx^n)}{3}$$

input
```
integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x**2,x)
```

output
```
-a*d**2/x + 2*a*d*e*x + a*e**2*x**3/3 - b*d**2*n/x - b*d**2*log(c*x**n)/x
- 2*b*d*e*n*x + 2*b*d*e*x*log(c*x**n) - b*e**2*n*x**3/9 + b*e**2*x**3*log(
c*x**n)/3
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 94, normalized size of antiderivative = 1.13

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^2}\,dx = -\frac{1}{9}\,be^2nx^3 + \frac{1}{3}\,be^2x^3\log(cx^n) + \frac{1}{3}\,ae^2x^3 - 2\,bdenx + 2\,bdex\log(cx^n) + 2\,adex - \frac{bd^2n}{x} - \frac{bd^2\log(cx^n)}{x} - \frac{ad^2}{x}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
-1/9*b*e^2*n*x^3 + 1/3*b*e^2*x^3*log(c*x^n) + 1/3*a*e^2*x^3 - 2*b*d*e*n*x
+ 2*b*d*e*x*log(c*x^n) + 2*a*d*e*x - b*d^2*n/x - b*d^2*log(c*x^n)/x - a*d^
2/x
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 103, normalized size of antiderivative = 1.24

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^2}\,dx = -\frac{1}{9}\left(be^2n - 3\,be^2\log(c) - 3\,ae^2\right)x^3 - 2\left(bden - bde\log(c) - ade\right)x + \frac{1}{3}\left(be^2nx^3 + 6\,bdenx - \frac{3\,bd^2n}{x}\right)\log(x) - \frac{bd^2n + bd^2\log(c) + ad^2}{x}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
-1/9*(b*e^2*n - 3*b*e^2*log(c) - 3*a*e^2)*x^3 - 2*(b*d*e*n - b*d*e*log(c)
- a*d*e)*x + 1/3*(b*e^2*n*x^3 + 6*b*d*e*n*x - 3*b*d^2*n/x)*log(x) - (b*d^2
*n + b*d^2*log(c) + a*d^2)/x
```

Mupad [B] (verification not implemented)

Time = 20.91 (sec) , antiderivative size = 102, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^2}\,dx = \ln(c\,x^n)\left(\frac{\frac{4\,b\,e^2\,x^4}{3} + 4\,b\,d\,e\,x^2}{x} - \frac{b\,d^2 + 2\,b\,d\,e\,x^2 + b\,e^2\,x^4}{x}\right) - \frac{a\,d^2 + b\,d^2\,n}{x} + \frac{e^2\,x^3\,(3\,a - b\,n)}{9} + 2\,d\,e\,x\,(a - b\,n)$$

input
```
int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x^2,x)
```

output
```
log(c*x^n)*(((4*b*e^2*x^4)/3 + 4*b*d*e*x^2)/x - (b*d^2 + b*e^2*x^4 + 2*b*d
*e*x^2)/x) - (a*d^2 + b*d^2*n)/x + (e^2*x^3*(3*a - b*n))/9 + 2*d*e*x*(a -
b*n)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.16

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^2}\,dx = \frac{-9\log(x^n c)\,b\,d^2+18\log(x^n c)\,bde\,x^2+3\log(x^n c)\,b\,e^2x^4-9a\,d^2+18ade\,x^2+3a\,e^2x^4-9b\,d^2n-18bden}{9x}$$

input
```
int((e*x^2+d)^2*(a+b*log(c*x^n))/x^2,x)
```

output
```
( - 9*log(x**n*c)*b*d**2 + 18*log(x**n*c)*b*d*e*x**2 + 3*log(x**n*c)*b*e**
2*x**4 - 9*a*d**2 + 18*a*d*e*x**2 + 3*a*e**2*x**4 - 9*b*d**2*n - 18*b*d*e*
n*x**2 - b*e**2*n*x**4)/(9*x)
```

3.193 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^4} dx$

Optimal result 1531
Mathematica [A] (verified) 1531
Rubi [A] (verified) 1532
Maple [A] (verified) 1533
Fricas [A] (verification not implemented) 1533
Sympy [A] (verification not implemented) 1534
Maxima [A] (verification not implemented) 1534
Giac [A] (verification not implemented) 1535
Mupad [B] (verification not implemented) 1535
Reduce [B] (verification not implemented) 1536

Optimal result

Integrand size = 23, antiderivative size = 82

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^4} dx = -\frac{bd^2n}{9x^3} - \frac{2bden}{x} - be^2nx - \frac{d^2(a+b\log(cx^n))}{3x^3} - \frac{2de(a+b\log(cx^n))}{x} + e^2x(a+b\log(cx^n))$$

output
```
-1/9*b*d^2*n/x^3-2*b*d*e*n/x-b*e^2*n*x-1/3*d^2*(a+b*ln(c*x^n))/x^3-2*d*e*(
a+b*ln(c*x^n))/x+e^2*x*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 80, normalized size of antiderivative = 0.98

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^4} dx = -\frac{3a(d^2+6dex^2-3e^2x^4)+bn(d^2+18dex^2+9e^2x^4)+3b(d^2+6dex^2-3e^2x^4)\log(cx^n)}{9x^3}$$

input
```
Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-1/9*(3*a*(d^2 + 6*d*e*x^2 - 3*e^2*x^4) + b*n*(d^2 + 18*d*e*x^2 + 9*e^2*x^
4) + 3*b*(d^2 + 6*d*e*x^2 - 3*e^2*x^4)*Log[c*x^n])/x^3
```

Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 80, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^4} \, dx$$

$$\Big\downarrow \text{ 2772}$$

$$-bn\int \left(-\frac{d^2}{3x^4}-\frac{2ed}{x^2}+e^2\right)dx-\frac{d^2(a+b\log(cx^n))}{3x^3}-\frac{2de(a+b\log(cx^n))}{x}+e^2x(a+b\log(cx^n))$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{3x^3}-\frac{2de(a+b\log(cx^n))}{x}+e^2x(a+b\log(cx^n))-bn\left(\frac{d^2}{9x^3}+\frac{2de}{x}+e^2x\right)$$

input
```
Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-(b*n*(d^2/(9*x^3) + (2*d*e)/x + e^2*x)) - (d^2*(a + b*Log[c*x^n]))/(3*x^3
) - (2*d*e*(a + b*Log[c*x^n]))/x + e^2*x*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.55 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.17

method	result
parallelrisch	$-\frac{-9x^4 b\ln(c\,x^n) e^2+9b\,e^2 n\,x^4-9x^4 a\,e^2+18b\ln(c\,x^n) e\,x^2 d+18bden\,x^2+18ae\,x^2 d+3b\ln(c\,x^n) d^2+b\,d^2 n+3a\,d^2}{9x^3}$
risch	$-\frac{b(-3e^2x^4+6e\,x^2d+d^2)\ln(x^n)}{3x^3}-\frac{18i\pi bde\,x^2\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2-9i\pi b\,e^2x^4\operatorname{csgn}(ic\,x^n)^2\operatorname{csgn}(ic)+3i\pi b\,d^2\operatorname{csgn}(ic\,x^n}{}$

input
```
int((e*x^2+d)^2*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/9/x^3*(-9*x^4*b*ln(c*x^n)*e^2+9*b*e^2*n*x^4-9*x^4*a*e^2+18*b*ln(c*x^n)*
e*x^2*d+18*b*d*e*n*x^2+18*a*e*x^2*d+3*b*ln(c*x^n)*d^2+b*d^2*n+3*a*d^2)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 110, normalized size of antiderivative = 1.34

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^4}\,dx = -\frac{9(be^2n-ae^2)x^4+bd^2n+3ad^2+18(bden+ade)x^2-3(3be^2x^4-6bdex^2-bd^2)\log(c)-3(3be^2n}{9x^3}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
-1/9*(9*(b*e^2*n - a*e^2)*x^4 + b*d^2*n + 3*a*d^2 + 18*(b*d*e*n + a*d*e)*x
^2 - 3*(3*b*e^2*x^4 - 6*b*d*e*x^2 - b*d^2)*log(c) - 3*(3*b*e^2*n*x^4 - 6*b
*d*e*n*x^2 - b*d^2*n)*log(x))/x^3
```

Sympy [A] (verification not implemented)

Time = 0.62 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.22

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^4} dx = -\frac{ad^2}{3x^3} - \frac{2ade}{x} + ae^2x - \frac{bd^2n}{9x^3} - \frac{bd^2\log(cx^n)}{3x^3} - \frac{2bden}{x} - \frac{2bde\log(cx^n)}{x} - be^2nx + be^2x\log(cx^n)$$

input
```
integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x**4,x)
```

output
```
-a*d**2/(3*x**3) - 2*a*d*e/x + a*e**2*x - b*d**2*n/(9*x**3) - b*d**2*log(c
*x**n)/(3*x**3) - 2*b*d*e*n/x - 2*b*d*e*log(c*x**n)/x - b*e**2*n*x + b*e**
2*x*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 92, normalized size of antiderivative = 1.12

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^4} dx = -be^2nx + be^2x\log(cx^n) + ae^2x - \frac{2\,bden}{x} - \frac{2\,bde\log(cx^n)}{x} - \frac{2\,ade}{x} - \frac{bd^2n}{9\,x^3} - \frac{bd^2\log(cx^n)}{3\,x^3} - \frac{ad^2}{3\,x^3}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
-b*e^2*n*x + b*e^2*x*log(c*x^n) + a*e^2*x - 2*b*d*e*n/x - 2*b*d*e*log(c*x^
n)/x - 2*a*d*e/x - 1/9*b*d^2*n/x^3 - 1/3*b*d^2*log(c*x^n)/x^3 - 1/3*a*d^2/
x^3
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.37

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^4}\,dx$$
$$= -(be^2n - be^2\log(c) - ae^2)x + \frac{1}{3}\left(3\,be^2nx - \frac{6\,bdenx^2 + bd^2n}{x^3}\right)\log(x)$$
$$- \frac{18\,bdenx^2 + 18\,bdex^2\log(c) + 18\,adex^2 + bd^2n + 3\,bd^2\log(c) + 3\,ad^2}{9\,x^3}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
-(b*e^2*n - b*e^2*log(c) - a*e^2)*x + 1/3*(3*b*e^2*n*x - (6*b*d*e*n*x^2 +
b*d^2*n)/x^3)*log(x) - 1/9*(18*b*d*e*n*x^2 + 18*b*d*e*x^2*log(c) + 18*a*d*
e*x^2 + b*d^2*n + 3*b*d^2*log(c) + 3*a*d^2)/x^3
```

Mupad [B] (verification not implemented)

Time = 26.35 (sec) , antiderivative size = 90, normalized size of antiderivative = 1.10

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^4}\,dx = e^2\,x\,(a-b\,n) - \frac{x^2\,(6\,a\,d\,e + 6\,b\,d\,e\,n) + a\,d^2 + \frac{b\,d^2\,n}{3}}{3\,x^3}$$
$$- \ln(c\,x^n)\left(\frac{\frac{b\,d^2}{3} + 2\,b\,d\,e\,x^2 + \frac{5\,b\,e^2\,x^4}{3}}{x^3} - \frac{8\,b\,e^2\,x}{3}\right)$$

input
```
int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x^4,x)
```

output
```
e^2*x*(a - b*n) - (x^2*(6*a*d*e + 6*b*d*e*n) + a*d^2 + (b*d^2*n)/3)/(3*x^3
) - log(c*x^n)*(((b*d^2)/3 + (5*b*e^2*x^4)/3 + 2*b*d*e*x^2)/x^3 - (8*b*e^2
*x)/3)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.17

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^4}\,dx$$
$$= \frac{-3\log(x^n c)\,b\,d^2 - 18\log(x^n c)\,bde\,x^2 + 9\log(x^n c)\,b\,e^2x^4 - 3a\,d^2 - 18ade\,x^2 + 9a\,e^2x^4 - b\,d^2n - 18bden\,x}{9x^3}$$

input
```
int((e*x^2+d)^2*(a+b*log(c*x^n))/x^4,x)
```

output
```
( - 3*log(x**n*c)*b*d**2 - 18*log(x**n*c)*b*d*e*x**2 + 9*log(x**n*c)*b*e**
2*x**4 - 3*a*d**2 - 18*a*d*e*x**2 + 9*a*e**2*x**4 - b*d**2*n - 18*b*d*e*n*
x**2 - 9*b*e**2*n*x**4)/(9*x**3)
```

3.194 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^6}\,dx$

Optimal result 1537
Mathematica [A] (verified) 1537
Rubi [A] (verified) 1538
Maple [A] (verified) 1539
Fricas [A] (verification not implemented) 1540
Sympy [A] (verification not implemented) 1540
Maxima [A] (verification not implemented) 1541
Giac [A] (verification not implemented) 1541
Mupad [B] (verification not implemented) 1542
Reduce [B] (verification not implemented) 1542

Optimal result

Integrand size = 23, antiderivative size = 91

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^6}\,dx = -\frac{bd^2n}{25x^5}-\frac{2bden}{9x^3}-\frac{be^2n}{x}-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{x}$$

output
```
-1/25*b*d^2*n/x^5-2/9*b*d*e*n/x^3-b*e^2*n/x-1/5*d^2*(a+b*ln(c*x^n))/x^5-2/
3*d*e*(a+b*ln(c*x^n))/x^3-e^2*(a+b*ln(c*x^n))/x
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 86, normalized size of antiderivative = 0.95

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^6}\,dx = -\frac{15a(3d^2+10dex^2+15e^2x^4)+bn(9d^2+50dex^2+225e^2x^4)+15b(3d^2+10dex^2+15e^2x^4)\log(cx^n)}{225x^5}$$

input
```
Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-1/225*(15*a*(3*d^2 + 10*d*e*x^2 + 15*e^2*x^4) + b*n*(9*d^2 + 50*d*e*x^2 +
 225*e^2*x^4) + 15*b*(3*d^2 + 10*d*e*x^2 + 15*e^2*x^4)*Log[c*x^n])/x^5
```

Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 92, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 1433, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^6}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{15e^2x^4+10dex^2+3d^2}{15x^6}dx-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{15}bn\int \frac{15e^2x^4+10dex^2+3d^2}{x^6}dx-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{1433}$$

$$\frac{1}{15}bn\int \left(\frac{3d^2}{x^6}+\frac{10ed}{x^4}+\frac{15e^2}{x^2}\right)dx-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{x}+\frac{1}{15}bn\left(-\frac{3d^2}{5x^5}-\frac{10de}{3x^3}-\frac{15e^2}{x}\right)$$

input
```
Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*((-3*d^2)/(5*x^5) - (10*d*e)/(3*x^3) - (15*e^2)/x))/15 - (d^2*(a + b*
Log[c*x^n]))/(5*x^5) - (2*d*e*(a + b*Log[c*x^n]))/(3*x^3) - (e^2*(a + b*Lo
g[c*x^n]))/x
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1433
```
Int[((d_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol]
 :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a,
b, c, d, m}, x] && IGtQ[p, 0] && (EqQ[p, 1] ||  !IntegerQ[(m + 1)/2])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.51 (sec) , antiderivative size = 97, normalized size of antiderivative = 1.07

method	result
parallelrisch	$-\frac{225x^4 b \ln(c\,x^n) e^2+225b\,e^2 n\,x^4+225x^4 a\,e^2+150b\ln(c\,x^n) e\,x^2 d+50bden\,x^2+150ae\,x^2 d+45b\ln(c\,x^n) d^2+9b\,d^2 n+45a\,d^2}{225x^5}$
risch	$-\frac{b(15e^2x^4+10e\,x^2d+3d^2)\ln(x^n)}{15x^5}-\frac{-45i\pi b\,d^2\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)\operatorname{csgn}(ic)-150i\pi bde\,x^2\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)\operatorname{csgn}(ic)$

input
```
int((e*x^2+d)^2*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

output
```
-1/225/x^5*(225*x^4*b*ln(c*x^n)*e^2+225*b*e^2*n*x^4+225*x^4*a*e^2+150*b*ln
(c*x^n)*e*x^2*d+50*b*d*e*n*x^2+150*a*e*x^2*d+45*b*ln(c*x^n)*d^2+9*b*d^2*n+
45*a*d^2)
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 111, normalized size of antiderivative = 1.22

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^6}\,dx = -\frac{225\,(be^2n+ae^2)x^4+9\,bd^2n+45\,ad^2+50\,(bden+3\,ade)x^2+15\,(15\,be^2x^4+10\,bdex^2+3\,bd^2)\log(c)}{225\,x^5}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
-1/225*(225*(b*e^2*n + a*e^2)*x^4 + 9*b*d^2*n + 45*a*d^2 + 50*(b*d*e*n + 3
*a*d*e)*x^2 + 15*(15*b*e^2*x^4 + 10*b*d*e*x^2 + 3*b*d^2)*log(c) + 15*(15*b
*e^2*n*x^4 + 10*b*d*e*n*x^2 + 3*b*d^2*n)*log(x))/x^5
```

Sympy [A] (verification not implemented)

Time = 0.62 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^6}\,dx = -\frac{ad^2}{5x^5}-\frac{2ade}{3x^3}-\frac{ae^2}{x}-\frac{bd^2n}{25x^5}-\frac{bd^2\log(cx^n)}{5x^5}-\frac{2bden}{9x^3}-\frac{2bde\log(cx^n)}{3x^3}-\frac{be^2n}{x}-\frac{be^2\log(cx^n)}{x}$$

input
```
integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x**6,x)
```

output
```
-a*d**2/(5*x**5) - 2*a*d*e/(3*x**3) - a*e**2/x - b*d**2*n/(25*x**5) - b*d*
*2*log(c*x**n)/(5*x**5) - 2*b*d*e*n/(9*x**3) - 2*b*d*e*log(c*x**n)/(3*x**3
) - b*e**2*n/x - b*e**2*log(c*x**n)/x
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.10

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^6}\,dx = -\frac{be^2n}{x} - \frac{be^2\log(cx^n)}{x} - \frac{ae^2}{x} - \frac{2\,bden}{9\,x^3} - \frac{2\,bde\log(cx^n)}{3\,x^3} - \frac{2\,ade}{3\,x^3} - \frac{bd^2n}{25\,x^5} - \frac{bd^2\log(cx^n)}{5\,x^5} - \frac{ad^2}{5\,x^5}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
-b*e^2*n/x - b*e^2*log(c*x^n)/x - a*e^2/x - 2/9*b*d*e*n/x^3 - 2/3*b*d*e*lo
g(c*x^n)/x^3 - 2/3*a*d*e/x^3 - 1/25*b*d^2*n/x^5 - 1/5*b*d^2*log(c*x^n)/x^5
 - 1/5*a*d^2/x^5
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 119, normalized size of antiderivative = 1.31

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^6}\,dx = -\frac{(15\,be^2nx^4 + 10\,bdenx^2 + 3\,bd^2n)\log(x)}{15\,x^5} - \frac{225\,be^2nx^4 + 225\,be^2x^4\log(c) + 225\,ae^2x^4 + 50\,bdenx^2 + 150\,bdex^2\log(c) + 150\,adex^2 + 9\,bd^2n + 45}{225\,x^5}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
-1/15*(15*b*e^2*n*x^4 + 10*b*d*e*n*x^2 + 3*b*d^2*n)*log(x)/x^5 - 1/225*(22
5*b*e^2*n*x^4 + 225*b*e^2*x^4*log(c) + 225*a*e^2*x^4 + 50*b*d*e*n*x^2 + 15
0*b*d*e*x^2*log(c) + 150*a*d*e*x^2 + 9*b*d^2*n + 45*b*d^2*log(c) + 45*a*d^
2)/x^5
```

Mupad [B] (verification not implemented)

Time = 26.29 (sec) , antiderivative size = 88, normalized size of antiderivative = 0.97

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^6}\,dx = -\frac{x^4\left(15\,a\,e^2+15\,b\,e^2\,n\right)+x^2\left(10\,a\,d\,e+\frac{10\,b\,d\,e\,n}{3}\right)+3\,a\,d^2+\frac{3\,b\,d^2\,n}{5}}{15\,x^5} - \frac{\ln\left(c\,x^n\right)\left(\frac{b\,d^2}{5}+\frac{2\,b\,d\,e\,x^2}{3}+b\,e^2\,x^4\right)}{x^5}$$

input
```
int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x^6,x)
```

output
```
- (x^4*(15*a*e^2 + 15*b*e^2*n) + x^2*(10*a*d*e + (10*b*d*e*n)/3) + 3*a*d^2
 + (3*b*d^2*n)/5)/(15*x^5) - (log(c*x^n)*((b*d^2)/5 + b*e^2*x^4 + (2*b*d*e
*x^2)/3))/x^5
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.05

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^6}\,dx = \frac{-45\log(x^nc)\,b\,d^2-150\log(x^nc)\,bde\,x^2-225\log(x^nc)\,b\,e^2x^4-45a\,d^2-150ade\,x^2-225a\,e^2x^4-9b\,d^2n}{225x^5}$$

input
```
int((e*x^2+d)^2*(a+b*log(c*x^n))/x^6,x)
```

output
```
( - 45*log(x**n*c)*b*d**2 - 150*log(x**n*c)*b*d*e*x**2 - 225*log(x**n*c)*b
*e**2*x**4 - 45*a*d**2 - 150*a*d*e*x**2 - 225*a*e**2*x**4 - 9*b*d**2*n - 5
0*b*d*e*n*x**2 - 225*b*e**2*n*x**4)/(225*x**5)
```

3.195 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^8}\,dx$

Optimal result 1543
Mathematica [A] (verified) 1543
Rubi [A] (verified) 1544
Maple [A] (verified) 1545
Fricas [A] (verification not implemented) 1546
Sympy [A] (verification not implemented) 1546
Maxima [A] (verification not implemented) 1547
Giac [A] (verification not implemented) 1547
Mupad [B] (verification not implemented) 1548
Reduce [B] (verification not implemented) 1548

Optimal result

Integrand size = 23, antiderivative size = 95

$$\int \frac{(d+ex^2)^2\,(a+b\log(cx^n))}{x^8}\,dx = -\frac{bd^2n}{49x^7}-\frac{2bden}{25x^5}-\frac{be^2n}{9x^3}-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2de(a+b\log(cx^n))}{5x^5}-\frac{e^2(a+b\log(cx^n))}{3x^3}$$

output
```
-1/49*b*d^2*n/x^7-2/25*b*d*e*n/x^5-1/9*b*e^2*n/x^3-1/7*d^2*(a+b*ln(c*x^n))
/x^7-2/5*d*e*(a+b*ln(c*x^n))/x^5-1/3*e^2*(a+b*ln(c*x^n))/x^3
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 95, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^2)^2\,(a+b\log(cx^n))}{x^8}\,dx = -\frac{bd^2n}{49x^7}-\frac{2bden}{25x^5}-\frac{be^2n}{9x^3}-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2de(a+b\log(cx^n))}{5x^5}-\frac{e^2(a+b\log(cx^n))}{3x^3}$$

input
```
Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
-1/49*(b*d^2*n)/x^7 - (2*b*d*e*n)/(25*x^5) - (b*e^2*n)/(9*x^3) - (d^2*(a +
 b*Log[c*x^n]))/(7*x^7) - (2*d*e*(a + b*Log[c*x^n]))/(5*x^5) - (e^2*(a + b
*Log[c*x^n]))/(3*x^3)
```

Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 1433, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^8} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{35e^2x^4+42dex^2+15d^2}{105x^8}dx - \frac{d^2(a+b\log(cx^n))}{7x^7} - \frac{2de(a+b\log(cx^n))}{5x^5} - \frac{e^2(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{105}bn\int \frac{35e^2x^4+42dex^2+15d^2}{x^8}dx - \frac{d^2(a+b\log(cx^n))}{7x^7} - \frac{2de(a+b\log(cx^n))}{5x^5} - \frac{e^2(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{1433}$$

$$\frac{1}{105}bn\int \left(\frac{15d^2}{x^8}+\frac{42ed}{x^6}+\frac{35e^2}{x^4}\right)dx - \frac{d^2(a+b\log(cx^n))}{7x^7} - \frac{2de(a+b\log(cx^n))}{5x^5} - \frac{e^2(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{7x^7} - \frac{2de(a+b\log(cx^n))}{5x^5} - \frac{e^2(a+b\log(cx^n))}{3x^3} + \frac{1}{105}bn\left(-\frac{15d^2}{7x^7}-\frac{42de}{5x^5}-\frac{35e^2}{3x^3}\right)$$

input
```
Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
(b*n*((-15*d^2)/(7*x^7) - (42*d*e)/(5*x^5) - (35*e^2)/(3*x^3)))/105 - (d^2
*(a + b*Log[c*x^n]))/(7*x^7) - (2*d*e*(a + b*Log[c*x^n]))/(5*x^5) - (e^2*(
a + b*Log[c*x^n]))/(3*x^3)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1433
```
Int[((d_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol]
 :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a,
b, c, d, m}, x] && IGtQ[p, 0] && (EqQ[p, 1] ||  !IntegerQ[(m + 1)/2])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.52 (sec) , antiderivative size = 97, normalized size of antiderivative = 1.02

method	result
parallelrisch	$-\frac{3675x^4b\ln(c\,x^n)e^2+1225b\,e^2n\,x^4+3675x^4a\,e^2+4410b\ln(c\,x^n)e\,x^2d+882bden\,x^2+4410ae\,x^2d+1575b\ln(c\,x^n)d^2+225b\,d^2}{11025x^7}$
risch	$-\frac{b(35e^2x^4+42e\,x^2d+15d^2)\ln(x^n)}{105x^7}-\frac{4410i\pi bde\,x^2\,\mathrm{csgn}(ic\,x^n)^2\,\mathrm{csgn}(ic)-1575i\pi b\,d^2\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)\,\mathrm{csgn}(ic)+1575}{}$

input
```
int((e*x^2+d)^2*(a+b*ln(c*x^n))/x^8,x,method=_RETURNVERBOSE)
```

output
```
-1/11025/x^7*(3675*x^4*b*ln(c*x^n)*e^2+1225*b*e^2*n*x^4+3675*x^4*a*e^2+441
0*b*ln(c*x^n)*e*x^2*d+882*b*d*e*n*x^2+4410*a*e*x^2*d+1575*b*ln(c*x^n)*d^2+
225*b*d^2*n+1575*a*d^2)
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^8} dx = -\frac{1225 (be^2n+3ae^2)x^4 + 225 bd^2n + 1575 ad^2 + 882 (bden+5ade)x^2 + 105 (35 be^2x^4 + 42 bdex^2 + 15}{11025 x^7}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

output
```
-1/11025*(1225*(b*e^2*n + 3*a*e^2)*x^4 + 225*b*d^2*n + 1575*a*d^2 + 882*(b
*d*e*n + 5*a*d*e)*x^2 + 105*(35*b*e^2*x^4 + 42*b*d*e*x^2 + 15*b*d^2)*log(c
) + 105*(35*b*e^2*n*x^4 + 42*b*d*e*n*x^2 + 15*b*d^2*n)*log(x))/x^7
```

Sympy [A] (verification not implemented)

Time = 1.11 (sec) , antiderivative size = 122, normalized size of antiderivative = 1.28

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^8} dx = -\frac{ad^2}{7x^7} - \frac{2ade}{5x^5} - \frac{ae^2}{3x^3} - \frac{bd^2n}{49x^7} - \frac{bd^2\log(cx^n)}{7x^7} - \frac{2bden}{25x^5} - \frac{2bde\log(cx^n)}{5x^5} - \frac{be^2n}{9x^3} - \frac{be^2\log(cx^n)}{3x^3}$$

input
```
integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x**8,x)
```

output
```
-a*d**2/(7*x**7) - 2*a*d*e/(5*x**5) - a*e**2/(3*x**3) - b*d**2*n/(49*x**7)
 - b*d**2*log(c*x**n)/(7*x**7) - 2*b*d*e*n/(25*x**5) - 2*b*d*e*log(c*x**n)
/(5*x**5) - b*e**2*n/(9*x**3) - b*e**2*log(c*x**n)/(3*x**3)
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.05

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^8}\,dx = -\frac{be^2n}{9\,x^3} - \frac{be^2\log(cx^n)}{3\,x^3} - \frac{ae^2}{3\,x^3} - \frac{2\,bden}{25\,x^5} - \frac{2\,bde\log(cx^n)}{5\,x^5} - \frac{2\,ade}{5\,x^5} - \frac{bd^2n}{49\,x^7} - \frac{bd^2\log(cx^n)}{7\,x^7} - \frac{ad^2}{7\,x^7}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

output
```
-1/9*b*e^2*n/x^3 - 1/3*b*e^2*log(c*x^n)/x^3 - 1/3*a*e^2/x^3 - 2/25*b*d*e*n
/x^5 - 2/5*b*d*e*log(c*x^n)/x^5 - 2/5*a*d*e/x^5 - 1/49*b*d^2*n/x^7 - 1/7*b
*d^2*log(c*x^n)/x^7 - 1/7*a*d^2/x^7
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 119, normalized size of antiderivative = 1.25

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^8}\,dx = -\frac{(35\,be^2nx^4+42\,bdenx^2+15\,bd^2n)\log(x)}{105\,x^7} - \frac{1225\,be^2nx^4+3675\,be^2x^4\log(c)+3675\,ae^2x^4+882\,bdenx^2+4410\,bdex^2\log(c)+4410\,adex^2+225\,b}{11025\,x^7}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
```

output
```
-1/105*(35*b*e^2*n*x^4 + 42*b*d*e*n*x^2 + 15*b*d^2*n)*log(x)/x^7 - 1/11025
*(1225*b*e^2*n*x^4 + 3675*b*e^2*x^4*log(c) + 3675*a*e^2*x^4 + 882*b*d*e*n*
x^2 + 4410*b*d*e*x^2*log(c) + 4410*a*d*e*x^2 + 225*b*d^2*n + 1575*b*d^2*lo
g(c) + 1575*a*d^2)/x^7
```

Mupad [B] (verification not implemented)

Time = 26.27 (sec) , antiderivative size = 89, normalized size of antiderivative = 0.94

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^8} \, dx = -\frac{x^4 \left(35\,a\,e^2+\frac{35\,b\,e^2\,n}{3}\right)+x^2 \left(42\,a\,d\,e+\frac{42\,b\,d\,e\,n}{5}\right)+15\,a\,d^2+\frac{15\,b\,d^2\,n}{7}}{105\,x^7} - \frac{\ln(c\,x^n)\,\left(\frac{b\,d^2}{7}+\frac{2\,b\,d\,e\,x^2}{5}+\frac{b\,e^2\,x^4}{3}\right)}{x^7}$$

input
```
int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x^8,x)
```

output
```
- (x^4*(35*a*e^2 + (35*b*e^2*n)/3) + x^2*(42*a*d*e + (42*b*d*e*n)/5) + 15*
a*d^2 + (15*b*d^2*n)/7)/(105*x^7) - (log(c*x^n)*((b*d^2)/7 + (b*e^2*x^4)/3
 + (2*b*d*e*x^2)/5))/x^7
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.01

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^8} \, dx = \frac{-1575\log(x^n c)\,b\,d^2-4410\log(x^n c)\,bde\,x^2-3675\log(x^n c)\,b\,e^2x^4-1575a\,d^2-4410ade\,x^2-3675a\,e^2x^4}{11025x^7}$$

input
```
int((e*x^2+d)^2*(a+b*log(c*x^n))/x^8,x)
```

output
```
( - 1575*log(x**n*c)*b*d**2 - 4410*log(x**n*c)*b*d*e*x**2 - 3675*log(x**n*
c)*b*e**2*x**4 - 1575*a*d**2 - 4410*a*d*e*x**2 - 3675*a*e**2*x**4 - 225*b*
d**2*n - 882*b*d*e*n*x**2 - 1225*b*e**2*n*x**4)/(11025*x**7)
```

3.196 $\int x^5(d+ex^2)^3 (a+b\log (cx^n))\ dx$

Optimal result 1549
Mathematica [A] (verified) 1549
Rubi [A] (verified) 1550
Maple [A] (verified) 1551
Fricas [A] (verification not implemented) 1552
Sympy [A] (verification not implemented) 1552
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Giac [A] (verification not implemented) 1554
Mupad [B] (verification not implemented) 1554
Reduce [B] (verification not implemented) 1555

Optimal result

Integrand size = 23, antiderivative size = 100

$$\int x^5 \left(d+ex^2\right)^3 (a+b\log (cx^n))\ dx = -\frac{1}{36}bd^3nx^6 - \frac{3}{64}bd^2enx^8 - \frac{3}{100}bde^2nx^{10} - \frac{1}{144}be^3nx^{12} + \frac{1}{120}\left(20d^3x^6 + 45d^2ex^8 + 36de^2x^{10} + 10e^3x^{12}\right)(a+b\log (cx^n))$$

output
```
-1/36*b*d^3*n*x^6-3/64*b*d^2*e*n*x^8-3/100*b*d*e^2*n*x^10-1/144*b*e^3*n*x^
12+1/120*(10*e^3*x^12+36*d*e^2*x^10+45*d^2*e*x^8+20*d^3*x^6)*(a+b*ln(c*x^n
))
```

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 120, normalized size of antiderivative = 1.20

$$\int x^5 \left(d+ex^2\right)^3 (a+b\log (cx^n))\ dx = \frac{x^6(120a(20d^3+45d^2ex^2+36de^2x^4+10e^3x^6) - bn(400d^3+675d^2ex^2+432de^2x^4+100e^3x^6) + 120b(20}{14400}$$

input
```
Integrate[x^5*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
(x^6*(120*a*(20*d^3 + 45*d^2*e*x^2 + 36*d*e^2*x^4 + 10*e^3*x^6) - b*n*(400
*d^3 + 675*d^2*e*x^2 + 432*d*e^2*x^4 + 100*e^3*x^6) + 120*b*(20*d^3 + 45*d
^2*e*x^2 + 36*d*e^2*x^4 + 10*e^3*x^6)*Log[c*x^n]))/14400
```

Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 99, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2771, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^5 \left(d+e x^2\right)^3 (a+b \log (c x^n)) \, dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{120} \left(20 d^3 x^6+45 d^2 e x^8+36 d e^2 x^{10}+10 e^3 x^{12}\right) (a+b \log (c x^n))-bn \int \frac{1}{120} x^5 \left(10 e^3 x^6+36 d e^2 x^4+45 d^2 e x^2+20 d^3\right) dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{120} \left(20 d^3 x^6+45 d^2 e x^8+36 d e^2 x^{10}+10 e^3 x^{12}\right) (a+b \log (c x^n))-\frac{1}{120} bn \int x^5 \left(10 e^3 x^6+36 d e^2 x^4+45 d^2 e x^2+20 d^3\right) dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{120} \left(20 d^3 x^6+45 d^2 e x^8+36 d e^2 x^{10}+10 e^3 x^{12}\right) (a+b \log (c x^n))-\frac{1}{120} bn \int \left(10 e^3 x^{11}+36 d e^2 x^9+45 d^2 e x^7+20 d^3 x^5\right) dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{120} \left(20 d^3 x^6+45 d^2 e x^8+36 d e^2 x^{10}+10 e^3 x^{12}\right) (a+b \log (c x^n))-\frac{1}{120} bn \left(\frac{10 d^3 x^6}{3}+\frac{45}{8} d^2 e x^8+\frac{18}{5} d e^2 x^{10}+\frac{5 e^3 x^{12}}{6}\right)$$

input
```
Int[x^5*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/120*(b*n*((10*d^3*x^6)/3 + (45*d^2*e*x^8)/8 + (18*d*e^2*x^10)/5 + (5*e^
3*x^12)/6)) + ((20*d^3*x^6 + 45*d^2*e*x^8 + 36*d*e^2*x^10 + 10*e^3*x^12)*(
a + b*Log[c*x^n]))/120
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 167.20 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.44

method	result
parallelrisch	$\frac{e^{3} b \ln\left(c\,x^{n}\right) x^{12}}{12}-\frac{b\,e^{3} n\,x^{12}}{144}+\frac{a\,e^{3} x^{12}}{12}+\frac{3 e^{2} d b \ln\left(c\,x^{n}\right) x^{10}}{10}-\frac{3 b d\,e^{2} n\,x^{10}}{100}+\frac{3 a d\,e^{2} x^{10}}{10}+\frac{3 e\,d^{2} b \ln\left(c\,x^{n}\right) x^{8}}{8}-\frac{3 b d}{}$
risch	$\frac{3 i \pi b d\,e^{2} x^{10} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c\,x^{n}\right)^{2}}{20}-\frac{i \pi b\,e^{3} x^{12} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c\,x^{n}\right) \operatorname{csgn}\left(i c\right)}{24}+\frac{3 i \pi b d\,e^{2} x^{10} \operatorname{csgn}\left(i c\,x^{n}\right)^{2} \operatorname{csgn}\left(i c\right)}{20}+3i$

input
```
int(x^5*(e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/12*e^3*b*ln(c*x^n)*x^12-1/144*b*e^3*n*x^12+1/12*a*e^3*x^12+3/10*e^2*d*b*
ln(c*x^n)*x^10-3/100*b*d*e^2*n*x^10+3/10*a*d*e^2*x^10+3/8*e*d^2*b*ln(c*x^n
)*x^8-3/64*b*d^2*e*n*x^8+3/8*a*d^2*e*x^8+1/6*b*d^3*ln(c*x^n)*x^6-1/36*b*d^
3*n*x^6+1/6*a*d^3*x^6
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.67

$$\int x^5(d+ex^2)^3(a+b\log(cx^n))\,dx = -\frac{1}{144}(be^3n-12\,ae^3)x^{12}-\frac{3}{100}(bde^2n-10\,ade^2)x^{10}-\frac{3}{64}(bd^2en-8\,ad^2e)x^8 -\frac{1}{36}(bd^3n-6\,ad^3)x^6+\frac{1}{120}(10\,be^3x^{12}+36\,bde^2x^{10}+45\,bd^2ex^8+20\,bd^3x^6)\log(c) +\frac{1}{120}(10\,be^3nx^{12}+36\,bde^2nx^{10}+45\,bd^2enx^8+20\,bd^3nx^6)\log(x)$$

input
```
integrate(x^5*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/144*(b*e^3*n - 12*a*e^3)*x^12 - 3/100*(b*d*e^2*n - 10*a*d*e^2)*x^10 - 3
/64*(b*d^2*e*n - 8*a*d^2*e)*x^8 - 1/36*(b*d^3*n - 6*a*d^3)*x^6 + 1/120*(10
*b*e^3*x^12 + 36*b*d*e^2*x^10 + 45*b*d^2*e*x^8 + 20*b*d^3*x^6)*log(c) + 1/
120*(10*b*e^3*n*x^12 + 36*b*d*e^2*n*x^10 + 45*b*d^2*e*n*x^8 + 20*b*d^3*n*x
^6)*log(x)
```

Sympy [A] (verification not implemented)

Time = 3.18 (sec) , antiderivative size = 175, normalized size of antiderivative = 1.75

$$\int x^5(d+ex^2)^3(a+b\log(cx^n))\,dx = \frac{ad^3x^6}{6}+\frac{3ad^2ex^8}{8}+\frac{3ade^2x^{10}}{10}+\frac{ae^3x^{12}}{12} -\frac{bd^3nx^6}{36}+\frac{bd^3x^6\log(cx^n)}{6}-\frac{3bd^2enx^8}{64} +\frac{3bd^2ex^8\log(cx^n)}{8}-\frac{3bde^2nx^{10}}{100} +\frac{3bde^2x^{10}\log(cx^n)}{10}-\frac{be^3nx^{12}}{144}+\frac{be^3x^{12}\log(cx^n)}{12}$$

input
```
integrate(x**5*(e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x**6/6 + 3*a*d**2*e*x**8/8 + 3*a*d*e**2*x**10/10 + a*e**3*x**12/12
- b*d**3*n*x**6/36 + b*d**3*x**6*log(c*x**n)/6 - 3*b*d**2*e*n*x**8/64 + 3*
b*d**2*e*x**8*log(c*x**n)/8 - 3*b*d*e**2*n*x**10/100 + 3*b*d*e**2*x**10*lo
g(c*x**n)/10 - b*e**3*n*x**12/144 + b*e**3*x**12*log(c*x**n)/12
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.43

$$\int x^5\left(d+ex^2\right)^3\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{144}\,be^3nx^{12}+\frac{1}{12}\,be^3x^{12}\log\left(cx^n\right) + \frac{1}{12}\,ae^3x^{12}-\frac{3}{100}\,bde^2nx^{10} + \frac{3}{10}\,bde^2x^{10}\log\left(cx^n\right)+\frac{3}{10}\,ade^2x^{10} - \frac{3}{64}\,bd^2enx^8+\frac{3}{8}\,bd^2ex^8\log\left(cx^n\right)+\frac{3}{8}\,ad^2ex^8 - \frac{1}{36}\,bd^3nx^6+\frac{1}{6}\,bd^3x^6\log\left(cx^n\right)+\frac{1}{6}\,ad^3x^6$$

input
```
integrate(x^5*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/144*b*e^3*n*x^12 + 1/12*b*e^3*x^12*log(c*x^n) + 1/12*a*e^3*x^12 - 3/100
*b*d*e^2*n*x^10 + 3/10*b*d*e^2*x^10*log(c*x^n) + 3/10*a*d*e^2*x^10 - 3/64*
b*d^2*e*n*x^8 + 3/8*b*d^2*e*x^8*log(c*x^n) + 3/8*a*d^2*e*x^8 - 1/36*b*d^3*
n*x^6 + 1/6*b*d^3*x^6*log(c*x^n) + 1/6*a*d^3*x^6
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.77

$$\int x^5 (d+ex^2)^3 (a+b\log(cx^n)) \, dx = \frac{1}{12} be^3nx^{12}\log(x) - \frac{1}{144} be^3nx^{12} + \frac{1}{12} be^3x^{12}\log(c) + \frac{1}{12} ae^3x^{12} + \frac{3}{10} bde^2nx^{10}\log(x) - \frac{3}{100} bde^2nx^{10} + \frac{3}{10} bde^2x^{10}\log(c) + \frac{3}{10} ade^2x^{10} + \frac{3}{8} bd^2enx^8\log(x) - \frac{3}{64} bd^2enx^8 + \frac{3}{8} bd^2ex^8\log(c) + \frac{3}{8} ad^2ex^8 + \frac{1}{6} bd^3nx^6\log(x) - \frac{1}{36} bd^3nx^6 + \frac{1}{6} bd^3x^6\log(c) + \frac{1}{6} ad^3x^6$$

input
```
integrate(x^5*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/12*b*e^3*n*x^12*log(x) - 1/144*b*e^3*n*x^12 + 1/12*b*e^3*x^12*log(c) + 1
/12*a*e^3*x^12 + 3/10*b*d*e^2*n*x^10*log(x) - 3/100*b*d*e^2*n*x^10 + 3/10*
b*d*e^2*x^10*log(c) + 3/10*a*d*e^2*x^10 + 3/8*b*d^2*e*n*x^8*log(x) - 3/64*
b*d^2*e*n*x^8 + 3/8*b*d^2*e*x^8*log(c) + 3/8*a*d^2*e*x^8 + 1/6*b*d^3*n*x^6
*log(x) - 1/36*b*d^3*n*x^6 + 1/6*b*d^3*x^6*log(c) + 1/6*a*d^3*x^6
```

Mupad [B] (verification not implemented)

Time = 26.73 (sec) , antiderivative size = 113, normalized size of antiderivative = 1.13

$$\int x^5 (d+ex^2)^3 (a+b\log(cx^n)) \, dx = \ln(c\,x^n) \left(\frac{b\,d^3\,x^6}{6} + \frac{3\,b\,d^2\,e\,x^8}{8} + \frac{3\,b\,d\,e^2\,x^{10}}{10} + \frac{b\,e^3\,x^{12}}{12}\right) + \frac{d^3\,x^6\,(6\,a-b\,n)}{36} + \frac{e^3\,x^{12}\,(12\,a-b\,n)}{144} + \frac{3\,d^2\,e\,x^8\,(8\,a-b\,n)}{64} + \frac{3\,d\,e^2\,x^{10}\,(10\,a-b\,n)}{100}$$

input
```
int(x^5*(d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^3*x^6)/6 + (b*e^3*x^12)/12 + (3*b*d^2*e*x^8)/8 + (3*b*d*e
^2*x^10)/10) + (d^3*x^6*(6*a - b*n))/36 + (e^3*x^12*(12*a - b*n))/144 + (3
*d^2*e*x^8*(8*a - b*n))/64 + (3*d*e^2*x^10*(10*a - b*n))/100
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 139, normalized size of antiderivative = 1.39

$$\int x^5(d+ex^2)^3(a+b\log(cx^n))\,dx = \frac{x^6(2400\log(x^nc)\,b\,d^3+5400\log(x^nc)\,b\,d^2e\,x^2+4320\log(x^nc)\,bd\,e^2x^4+1200\log(x^nc)\,b\,e^3x^6+2400a\,d^3 +}{1440}$$

input
```
int(x^5*(e*x^2+d)^3*(a+b*log(c*x^n)),x)
```

output
```
(x**6*(2400*log(x**n*c)*b*d**3 + 5400*log(x**n*c)*b*d**2*e*x**2 + 4320*log
(x**n*c)*b*d*e**2*x**4 + 1200*log(x**n*c)*b*e**3*x**6 + 2400*a*d**3 + 5400
*a*d**2*e*x**2 + 4320*a*d*e**2*x**4 + 1200*a*e**3*x**6 - 400*b*d**3*n - 67
5*b*d**2*e*n*x**2 - 432*b*d*e**2*n*x**4 - 100*b*e**3*n*x**6))/14400
```

3.197 $\int x^3(d+ex^2)^3(a+b\log(cx^n))\,dx$

Optimal result 1556
Mathematica [A] (verified) 1556
Rubi [A] (verified) 1557
Maple [A] (verified) 1559
Fricas [A] (verification not implemented) 1560
Sympy [A] (verification not implemented) 1560
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Mupad [B] (verification not implemented) 1562
Reduce [B] (verification not implemented) 1563

Optimal result

Integrand size = 23, antiderivative size = 130

$$\int x^3(d+ex^2)^3(a+b\log(cx^n))\,dx=\frac{bd^4nx^2}{20e}+\frac{3}{80}bd^3nx^4+\frac{1}{60}bd^2enx^6+\frac{1}{320}bde^2nx^8-\frac{bn(d+ex^2)^5}{100e^2}+\frac{bd^5n\log(x)}{40e^2}-\frac{1}{40}\left(\frac{5d(d+ex^2)^4}{e^2}-\frac{4(d+ex^2)^5}{e^2}\right)(a+b\log(cx^n))$$

output
```
1/20*b*d^4*n*x^2/e+3/80*b*d^3*n*x^4+1/60*b*d^2*e*n*x^6+1/320*b*d*e^2*n*x^8
-1/100*b*n*(e*x^2+d)^5/e^2+1/40*b*d^5*n*ln(x)/e^2-1/40*(5*d*(e*x^2+d)^4/e^
2-4*(e*x^2+d)^5/e^2)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 120, normalized size of antiderivative = 0.92

$$\int x^3(d+ex^2)^3(a+b\log(cx^n))\,dx$$
$$=\frac{x^4(120a(10d^3+20d^2ex^2+15de^2x^4+4e^3x^6)-bn(300d^3+400d^2ex^2+225de^2x^4+48e^3x^6)+120b(10d^3}{4800}$$

input
```
Integrate[x^3*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
(x^4*(120*a*(10*d^3 + 20*d^2*e*x^2 + 15*d*e^2*x^4 + 4*e^3*x^6) - b*n*(300*
d^3 + 400*d^2*e*x^2 + 225*d*e^2*x^4 + 48*e^3*x^6) + 120*b*(10*d^3 + 20*d^2
*e*x^2 + 15*d*e^2*x^4 + 4*e^3*x^6)*Log[c*x^n]))/4800
```

Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 120, normalized size of antiderivative = 0.92, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2771, 27, 354, 90, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3 (d+ex^2)^3 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$-bn\int -\frac{(d-4ex^2)(ex^2+d)^4}{40e^2x}dx-\frac{1}{40}\left(\frac{5d(d+ex^2)^4}{e^2}-\frac{4(d+ex^2)^5}{e^2}\right)(a+b\log(cx^n))$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(d-4ex^2)(ex^2+d)^4}{x}dx}{40e^2}-\frac{1}{40}\left(\frac{5d(d+ex^2)^4}{e^2}-\frac{4(d+ex^2)^5}{e^2}\right)(a+b\log(cx^n))$$

$$\Big\downarrow \text{354}$$

$$\frac{bn\int \frac{(d-4ex^2)(ex^2+d)^4}{x^2}dx^2}{80e^2}-\frac{1}{40}\left(\frac{5d(d+ex^2)^4}{e^2}-\frac{4(d+ex^2)^5}{e^2}\right)(a+b\log(cx^n))$$

$$\Big\downarrow \text{90}$$

$$\frac{bn\left(d\int \frac{(ex^2+d)^4}{x^2}dx^2-\frac{4}{5}(d+ex^2)^5\right)}{80e^2}-\frac{1}{40}\left(\frac{5d(d+ex^2)^4}{e^2}-\frac{4(d+ex^2)^5}{e^2}\right)(a+b\log(cx^n))$$

$$\Big\downarrow \text{49}$$

$$\frac{bn\left(d\int\left(e^4x^6+4de^3x^4+6d^2e^2x^2+4d^3e+\frac{d^4}{x^2}\right)dx^2-\frac{4}{5}\left(d+ex^2\right)^5\right)}{80e^2}-\frac{1}{40}\left(\frac{5d\left(d+ex^2\right)^4}{e^2}-\frac{4\left(d+ex^2\right)^5}{e^2}\right)\left(a+b\log\left(cx^n\right)\right)$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{bn\left(d\left(d^4\log\left(x^2\right)+4d^3ex^2+3d^2e^2x^4+\frac{4}{3}de^3x^6+\frac{e^4x^8}{4}\right)-\frac{4}{5}\left(d+ex^2\right)^5\right)}{80e^2}-\frac{1}{40}\left(\frac{5d\left(d+ex^2\right)^4}{e^2}-\frac{4\left(d+ex^2\right)^5}{e^2}\right)\left(a+b\log\left(cx^n\right)\right)$$

input
```
Int[x^3*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
(b*n*((-4*(d + e*x^2)^5)/5 + d*(4*d^3*e*x^2 + 3*d^2*e^2*x^4 + (4*d*e^3*x^6
)/3 + (e^4*x^8)/4 + d^4*Log[x^2])))/(80*e^2) - (((5*d*(d + e*x^2)^4)/e^2 -
 (4*(d + e*x^2)^5)/e^2)*(a + b*Log[c*x^n]))/40
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 354
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_S
ymbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(a + b*x)^p*(c + d*x)^q, x], x
, x^2], x] /; FreeQ[{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0] && IntegerQ
[(m - 1)/2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 2.67 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.11

method	result
parallelrisch	$\frac{x^{10}\ln(c\,x^{n}) b\,e^{3}}{10}-\frac{b\,e^{3} n\,x^{10}}{100}+\frac{a\,e^{3} x^{10}}{10}+\frac{3 x^{8} \ln(c\,x^{n}) b d\,e^{2}}{8}-\frac{3 b d\,e^{2} n\,x^{8}}{64}+\frac{3 a d\,e^{2} x^{8}}{8}+\frac{x^{6} \ln(c\,x^{n}) b\,d^{2} e}{2}-\frac{b\,d^{2} e n}{12}$
risch	$\frac{b\,x^{4}\left(4 e^{3} x^{6}+15 e^{2} d\,x^{4}+20 d^{2} e\,x^{2}+10 d^{3}\right) \ln(x^{n})}{40}+\frac{\ln(c) b\,d^{3} x^{4}}{4}-\frac{b\,e^{3} n\,x^{10}}{100}+\frac{a\,d^{2} e\,x^{6}}{2}+\frac{a\,e^{3} x^{10}}{10}+\frac{3 \ln(c) b d\,e^{2} x^{8}}{8}+$

input
```
int(x^3*(e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/10*x^10*ln(c*x^n)*b*e^3-1/100*b*e^3*n*x^10+1/10*a*e^3*x^10+3/8*x^8*ln(c*
x^n)*b*d*e^2-3/64*b*d*e^2*n*x^8+3/8*a*d*e^2*x^8+1/2*x^6*ln(c*x^n)*b*d^2*e-
1/12*b*d^2*e*n*x^6+1/2*a*d^2*e*x^6+1/4*x^4*ln(c*x^n)*b*d^3-1/16*b*d^3*n*x^
4+1/4*a*d^3*x^4
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.28

$$\int x^3 \left(d+ex^2\right)^3 (a+b\log(cx^n))\,dx = -\frac{1}{100}\left(be^3n-10\,ae^3\right)x^{10}-\frac{3}{64}\left(bde^2n-8\,ade^2\right)x^8-\frac{1}{12}\left(bd^2en-6\,ad^2e\right)x^6 -\frac{1}{16}\left(bd^3n-4\,ad^3\right)x^4+\frac{1}{40}\left(4\,be^3x^{10}+15\,bde^2x^8+20\,bd^2ex^6+10\,bd^3x^4\right)\log(c) +\frac{1}{40}\left(4\,be^3nx^{10}+15\,bde^2nx^8+20\,bd^2enx^6+10\,bd^3nx^4\right)\log(x)$$

input
```
integrate(x^3*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/100*(b*e^3*n - 10*a*e^3)*x^10 - 3/64*(b*d*e^2*n - 8*a*d*e^2)*x^8 - 1/12
*(b*d^2*e*n - 6*a*d^2*e)*x^6 - 1/16*(b*d^3*n - 4*a*d^3)*x^4 + 1/40*(4*b*e^
3*x^10 + 15*b*d*e^2*x^8 + 20*b*d^2*e*x^6 + 10*b*d^3*x^4)*log(c) + 1/40*(4*
b*e^3*n*x^10 + 15*b*d*e^2*n*x^8 + 20*b*d^2*e*n*x^6 + 10*b*d^3*n*x^4)*log(x
)
```

Sympy [A] (verification not implemented)

Time = 1.85 (sec) , antiderivative size = 170, normalized size of antiderivative = 1.31

$$\int x^3 \left(d+ex^2\right)^3 (a+b\log(cx^n))\,dx = \frac{ad^3x^4}{4}+\frac{ad^2ex^6}{2}+\frac{3ade^2x^8}{8}+\frac{ae^3x^{10}}{10} -\frac{bd^3nx^4}{16}+\frac{bd^3x^4\log(cx^n)}{4}-\frac{bd^2enx^6}{12} +\frac{bd^2ex^6\log(cx^n)}{2}-\frac{3bde^2nx^8}{64} +\frac{3bde^2x^8\log(cx^n)}{8}-\frac{be^3nx^{10}}{100}+\frac{be^3x^{10}\log(cx^n)}{10}$$

input
```
integrate(x**3*(e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x**4/4 + a*d**2*e*x**6/2 + 3*a*d*e**2*x**8/8 + a*e**3*x**10/10 - b*
d**3*n*x**4/16 + b*d**3*x**4*log(c*x**n)/4 - b*d**2*e*n*x**6/12 + b*d**2*e
*x**6*log(c*x**n)/2 - 3*b*d*e**2*n*x**8/64 + 3*b*d*e**2*x**8*log(c*x**n)/8
 - b*e**3*n*x**10/100 + b*e**3*x**10*log(c*x**n)/10
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.10

$$\int x^3(d+ex^2)^3(a+b\log(cx^n))\,dx = -\frac{1}{100}\,be^3nx^{10} + \frac{1}{10}\,be^3x^{10}\log(cx^n) + \frac{1}{10}\,ae^3x^{10} - \frac{3}{64}\,bde^2nx^8 + \frac{3}{8}\,bde^2x^8\log(cx^n) + \frac{3}{8}\,ade^2x^8 - \frac{1}{12}\,bd^2enx^6 + \frac{1}{2}\,bd^2ex^6\log(cx^n) + \frac{1}{2}\,ad^2ex^6 - \frac{1}{16}\,bd^3nx^4 + \frac{1}{4}\,bd^3x^4\log(cx^n) + \frac{1}{4}\,ad^3x^4$$

input
```
integrate(x^3*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/100*b*e^3*n*x^10 + 1/10*b*e^3*x^10*log(c*x^n) + 1/10*a*e^3*x^10 - 3/64*
b*d*e^2*n*x^8 + 3/8*b*d*e^2*x^8*log(c*x^n) + 3/8*a*d*e^2*x^8 - 1/12*b*d^2*
e*n*x^6 + 1/2*b*d^2*e*x^6*log(c*x^n) + 1/2*a*d^2*e*x^6 - 1/16*b*d^3*n*x^4
+ 1/4*b*d^3*x^4*log(c*x^n) + 1/4*a*d^3*x^4
```

Giac [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.36

$$\int x^3 (d+ex^2)^3 (a+b\log(cx^n))\,dx = \frac{1}{10}be^3nx^{10}\log(x) - \frac{1}{100}be^3nx^{10} + \frac{1}{10}be^3x^{10}\log(c) + \frac{1}{10}ae^3x^{10} + \frac{3}{8}bde^2nx^8\log(x) - \frac{3}{64}bde^2nx^8 + \frac{3}{8}bde^2x^8\log(c) + \frac{3}{8}ade^2x^8 + \frac{1}{2}bd^2enx^6\log(x) - \frac{1}{12}bd^2enx^6 + \frac{1}{2}bd^2ex^6\log(c) + \frac{1}{2}ad^2ex^6 + \frac{1}{4}bd^3nx^4\log(x) - \frac{1}{16}bd^3nx^4 + \frac{1}{4}bd^3x^4\log(c) + \frac{1}{4}ad^3x^4$$

input
```
integrate(x^3*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/10*b*e^3*n*x^10*log(x) - 1/100*b*e^3*n*x^10 + 1/10*b*e^3*x^10*log(c) + 1
/10*a*e^3*x^10 + 3/8*b*d*e^2*n*x^8*log(x) - 3/64*b*d*e^2*n*x^8 + 3/8*b*d*e
^2*x^8*log(c) + 3/8*a*d*e^2*x^8 + 1/2*b*d^2*e*n*x^6*log(x) - 1/12*b*d^2*e*
n*x^6 + 1/2*b*d^2*e*x^6*log(c) + 1/2*a*d^2*e*x^6 + 1/4*b*d^3*n*x^4*log(x)
- 1/16*b*d^3*n*x^4 + 1/4*b*d^3*x^4*log(c) + 1/4*a*d^3*x^4
```

Mupad [B] (verification not implemented)

Time = 26.81 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.87

$$\int x^3 (d+ex^2)^3 (a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,d^3\,x^4}{4} + \frac{b\,d^2\,e\,x^6}{2} + \frac{3\,b\,d\,e^2\,x^8}{8} + \frac{b\,e^3\,x^{10}}{10}\right) + \frac{d^3\,x^4\,(4\,a-b\,n)}{16} + \frac{e^3\,x^{10}\,(10\,a-b\,n)}{100} + \frac{d^2\,e\,x^6\,(6\,a-b\,n)}{12} + \frac{3\,d\,e^2\,x^8\,(8\,a-b\,n)}{64}$$

input
```
int(x^3*(d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^3*x^4)/4 + (b*e^3*x^10)/10 + (b*d^2*e*x^6)/2 + (3*b*d*e^2
*x^8)/8) + (d^3*x^4*(4*a - b*n))/16 + (e^3*x^10*(10*a - b*n))/100 + (d^2*e
*x^6*(6*a - b*n))/12 + (3*d*e^2*x^8*(8*a - b*n))/64
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 139, normalized size of antiderivative = 1.07

$$\int x^3(d+ex^2)^3(a+b\log(cx^n))\,dx = \frac{x^4(1200\log(x^nc)\,b\,d^3+2400\log(x^nc)\,b\,d^2e\,x^2+1800\log(x^nc)\,bd\,e^2x^4+480\log(x^nc)\,b\,e^3x^6+1200a\,d^3+}{4800}$$

input
```
int(x^3*(e*x^2+d)^3*(a+b*log(c*x^n)),x)
```

output
```
(x**4*(1200*log(x**n*c)*b*d**3 + 2400*log(x**n*c)*b*d**2*e*x**2 + 1800*log
(x**n*c)*b*d*e**2*x**4 + 480*log(x**n*c)*b*e**3*x**6 + 1200*a*d**3 + 2400*
a*d**2*e*x**2 + 1800*a*d*e**2*x**4 + 480*a*e**3*x**6 - 300*b*d**3*n - 400*
b*d**2*e*n*x**2 - 225*b*d*e**2*n*x**4 - 48*b*e**3*n*x**6))/4800
```

3.198 $\int x(d+ex^2)^3 (a+b\log(cx^n))\, dx$

Optimal result 1564
Mathematica [A] (verified) 1564
Rubi [A] (verified) 1565
Maple [A] (verified) 1566
Fricas [B] (verification not implemented) 1567
Sympy [A] (verification not implemented) 1567
Maxima [A] (verification not implemented) 1568
Giac [B] (verification not implemented) 1568
Mupad [B] (verification not implemented) 1569
Reduce [B] (verification not implemented) 1570

Optimal result

Integrand size = 21, antiderivative size = 91

$$\int x(d+ex^2)^3 (a+b\log(cx^n))\, dx = -\frac{1}{4}bd^3nx^2 - \frac{3}{16}bd^2enx^4 - \frac{1}{12}bde^2nx^6 - \frac{1}{64}be^3nx^8 - \frac{bd^4n\log(x)}{8e} + \frac{(d+ex^2)^4 (a+b\log(cx^n))}{8e}$$

output
```
-1/4*b*d^3*n*x^2-3/16*b*d^2*e*n*x^4-1/12*b*d*e^2*n*x^6-1/64*b*e^3*n*x^8-1/
8*b*d^4*n*ln(x)/e+1/8*(e*x^2+d)^4*(a+b*ln(c*x^n))/e
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.30

$$\int x(d+ex^2)^3 (a+b\log(cx^n))\, dx = \frac{1}{192}x^2\left(24a(4d^3+6d^2ex^2+4de^2x^4+e^3x^6) - bn(48d^3+36d^2ex^2+16de^2x^4+3e^3x^6) + 24b(4d^3+6d^2ex^2+4de^2x^4+e^3x^6)\log(cx^n)\right)$$

input
```
Integrate[x*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
(x^2*(24*a*(4*d^3 + 6*d^2*e*x^2 + 4*d*e^2*x^4 + e^3*x^6) - b*n*(48*d^3 + 3
6*d^2*e*x^2 + 16*d*e^2*x^4 + 3*e^3*x^6) + 24*b*(4*d^3 + 6*d^2*e*x^2 + 4*d*
e^2*x^4 + e^3*x^6)*Log[c*x^n]))/192
```

Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 86, normalized size of antiderivative = 0.95, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.238$, Rules used = {2771, 27, 243, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex^2)^3(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{(d+ex^2)^4(a+b\log(cx^n))}{8e}-bn\int\frac{(ex^2+d)^4}{8ex}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{(d+ex^2)^4(a+b\log(cx^n))}{8e}-\frac{bn\int\frac{(ex^2+d)^4}{x}dx}{8e}$$

$$\Big\downarrow \text{243}$$

$$\frac{(d+ex^2)^4(a+b\log(cx^n))}{8e}-\frac{bn\int\frac{(ex^2+d)^4}{x^2}dx^2}{16e}$$

$$\Big\downarrow \text{49}$$

$$\frac{(d+ex^2)^4(a+b\log(cx^n))}{8e}-\frac{bn\int\left(e^4x^6+4de^3x^4+6d^2e^2x^2+4d^3e+\frac{d^4}{x^2}\right)dx^2}{16e}$$

$$\Big\downarrow \text{2009}$$

$$\frac{(d+ex^2)^4(a+b\log(cx^n))}{8e}-\frac{bn\left(d^4\log(x^2)+4d^3ex^2+3d^2e^2x^4+\frac{4}{3}de^3x^6+\frac{e^4x^8}{4}\right)}{16e}$$

input
```
Int[x*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/16*(b*n*(4*d^3*e*x^2 + 3*d^2*e^2*x^4 + (4*d*e^3*x^6)/3 + (e^4*x^8)/4 +
d^4*Log[x^2]))/e + ((d + e*x^2)^4*(a + b*Log[c*x^n]))/(8*e)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 1.64 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.58

method	result
parallelrisch	$\frac{x^{8} \ln \left(c \,x^{n}\right) b \,e^{3}}{8}-\frac{b \,e^{3} n \,x^{8}}{64}+\frac{a \,e^{3} x^{8}}{8}+\frac{x^{6} \ln \left(c \,x^{n}\right) b d \,e^{2}}{2}-\frac{b d \,e^{2} n \,x^{6}}{12}+\frac{a d \,e^{2} x^{6}}{2}+\frac{3 x^{4} \ln \left(c \,x^{n}\right) b \,d^{2} e}{4}-\frac{3 b \,d^{2} e n \,x^{4}}{16}-$
risch	$\frac{3 x^{4} a \,d^{2} e}{4}+\frac{a \,d^{3} x^{2}}{2}+\frac{a \,e^{3} x^{8}}{8}+\frac{\ln \left(c \right) b \,d^{3} x^{2}}{2}+\frac{a d \,e^{2} x^{6}}{2}+\frac{\ln \left(c \right) b \,e^{3} x^{8}}{8}+\frac{\left(e \,x^{2}+d \right)^{4} b \ln \left(x^{n}\right)}{8 e}-\frac{i e^{3} \pi b \,x^{8} \operatorname{csgn}\left(i c \,x^{n}\right)^{3}}{16}$

input
```
int(x*(e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/8*x^8*ln(c*x^n)*b*e^3-1/64*b*e^3*n*x^8+1/8*a*e^3*x^8+1/2*x^6*ln(c*x^n)*b
*d*e^2-1/12*b*d*e^2*n*x^6+1/2*a*d*e^2*x^6+3/4*x^4*ln(c*x^n)*b*d^2*e-3/16*b
*d^2*e*n*x^4+3/4*x^4*a*d^2*e+1/2*x^2*ln(c*x^n)*b*d^3-1/4*b*d^3*n*x^2+1/2*a
*d^3*x^2
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 165 vs. $2(79) = 158$.

Time = 0.07 (sec) , antiderivative size = 165, normalized size of antiderivative = 1.81

$$\begin{aligned}\int x(d+ex^2)^3(a+b\log(cx^n))\,dx &= -\frac{1}{64}\left(be^3n-8\,ae^3\right)x^8-\frac{1}{12}\left(bde^2n-6\,ade^2\right)x^6-\frac{3}{16}\left(bd^2en-4\,ad^2e\right)x^4\\&\quad-\frac{1}{4}\left(bd^3n-2\,ad^3\right)x^2+\frac{1}{8}\left(be^3x^8+4\,bde^2x^6+6\,bd^2ex^4+4\,bd^3x^2\right)\log(c)\\&\quad+\frac{1}{8}\left(be^3nx^8+4\,bde^2nx^6+6\,bd^2enx^4+4\,bd^3nx^2\right)\log(x)\end{aligned}$$

input
```
integrate(x*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/64*(b*e^3*n - 8*a*e^3)*x^8 - 1/12*(b*d*e^2*n - 6*a*d*e^2)*x^6 - 3/16*(b
*d^2*e*n - 4*a*d^2*e)*x^4 - 1/4*(b*d^3*n - 2*a*d^3)*x^2 + 1/8*(b*e^3*x^8 +
 4*b*d*e^2*x^6 + 6*b*d^2*e*x^4 + 4*b*d^3*x^2)*log(c) + 1/8*(b*e^3*n*x^8 +
4*b*d*e^2*n*x^6 + 6*b*d^2*e*n*x^4 + 4*b*d^3*n*x^2)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.96 (sec) , antiderivative size = 170, normalized size of antiderivative = 1.87

$$\begin{aligned}\int x(d+ex^2)^3(a+b\log(cx^n))\,dx &= \frac{ad^3x^2}{2}+\frac{3ad^2ex^4}{4}+\frac{ade^2x^6}{2}+\frac{ae^3x^8}{8}\\&\quad-\frac{bd^3nx^2}{4}+\frac{bd^3x^2\log(cx^n)}{2}-\frac{3bd^2enx^4}{16}\\&\quad+\frac{3bd^2ex^4\log(cx^n)}{4}-\frac{bde^2nx^6}{12}\\&\quad+\frac{bde^2x^6\log(cx^n)}{2}-\frac{be^3nx^8}{64}+\frac{be^3x^8\log(cx^n)}{8}\end{aligned}$$

input
```
integrate(x*(e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x**2/2 + 3*a*d**2*e*x**4/4 + a*d*e**2*x**6/2 + a*e**3*x**8/8 - b*d*
*3*n*x**2/4 + b*d**3*x**2*log(c*x**n)/2 - 3*b*d**2*e*n*x**4/16 + 3*b*d**2*
e*x**4*log(c*x**n)/4 - b*d*e**2*n*x**6/12 + b*d*e**2*x**6*log(c*x**n)/2 -
b*e**3*n*x**8/64 + b*e**3*x**8*log(c*x**n)/8
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.57

$$\begin{aligned}\int x\left(d+ex^2\right)^3\left(a+b\log\left(cx^n\right)\right)\,dx = &-\frac{1}{64}\,be^3nx^8+\frac{1}{8}\,be^3x^8\log\left(cx^n\right)+\frac{1}{8}\,ae^3x^8\\&-\frac{1}{12}\,bde^2nx^6+\frac{1}{2}\,bde^2x^6\log\left(cx^n\right)+\frac{1}{2}\,ade^2x^6\\&-\frac{3}{16}\,bd^2enx^4+\frac{3}{4}\,bd^2ex^4\log\left(cx^n\right)+\frac{3}{4}\,ad^2ex^4\\&-\frac{1}{4}\,bd^3nx^2+\frac{1}{2}\,bd^3x^2\log\left(cx^n\right)+\frac{1}{2}\,ad^3x^2\end{aligned}$$

input
```
integrate(x*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/64*b*e^3*n*x^8 + 1/8*b*e^3*x^8*log(c*x^n) + 1/8*a*e^3*x^8 - 1/12*b*d*e^
2*n*x^6 + 1/2*b*d*e^2*x^6*log(c*x^n) + 1/2*a*d*e^2*x^6 - 3/16*b*d^2*e*n*x^
4 + 3/4*b*d^2*e*x^4*log(c*x^n) + 3/4*a*d^2*e*x^4 - 1/4*b*d^3*n*x^2 + 1/2*b
*d^3*x^2*log(c*x^n) + 1/2*a*d^3*x^2
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 177 vs. 2(79) = 158.

Time = 0.13 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.95

$$\int x(d+ex^2)^3(a+b\log(cx^n))\,dx = \frac{1}{8}be^3nx^8\log(x) - \frac{1}{64}be^3nx^8 + \frac{1}{8}be^3x^8\log(c) + \frac{1}{8}ae^3x^8 + \frac{1}{2}bde^2nx^6\log(x) - \frac{1}{12}bde^2nx^6 + \frac{1}{2}bde^2x^6\log(c) + \frac{1}{2}ade^2x^6 + \frac{3}{4}bd^2enx^4\log(x) - \frac{3}{16}bd^2enx^4 + \frac{3}{4}bd^2ex^4\log(c) + \frac{3}{4}ad^2ex^4 + \frac{1}{2}bd^3nx^2\log(x) - \frac{1}{4}bd^3nx^2 + \frac{1}{2}bd^3x^2\log(c) + \frac{1}{2}ad^3x^2$$

input
```
integrate(x*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/8*b*e^3*n*x^8*log(x) - 1/64*b*e^3*n*x^8 + 1/8*b*e^3*x^8*log(c) + 1/8*a*e
^3*x^8 + 1/2*b*d*e^2*n*x^6*log(x) - 1/12*b*d*e^2*n*x^6 + 1/2*b*d*e^2*x^6*l
og(c) + 1/2*a*d*e^2*x^6 + 3/4*b*d^2*e*n*x^4*log(x) - 3/16*b*d^2*e*n*x^4 +
3/4*b*d^2*e*x^4*log(c) + 3/4*a*d^2*e*x^4 + 1/2*b*d^3*n*x^2*log(x) - 1/4*b*
d^3*n*x^2 + 1/2*b*d^3*x^2*log(c) + 1/2*a*d^3*x^2
```

Mupad [B] (verification not implemented)

Time = 26.55 (sec) , antiderivative size = 113, normalized size of antiderivative = 1.24

$$\int x(d+ex^2)^3(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,d^3\,x^2}{2} + \frac{3\,b\,d^2\,e\,x^4}{4} + \frac{b\,d\,e^2\,x^6}{2} + \frac{b\,e^3\,x^8}{8}\right) + \frac{d^3\,x^2\,(2\,a-b\,n)}{4} + \frac{e^3\,x^8\,(8\,a-b\,n)}{64} + \frac{3\,d^2\,e\,x^4\,(4\,a-b\,n)}{16} + \frac{d\,e^2\,x^6\,(6\,a-b\,n)}{12}$$

input
```
int(x*(d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^3*x^2)/2 + (b*e^3*x^8)/8 + (3*b*d^2*e*x^4)/4 + (b*d*e^2*x
^6)/2) + (d^3*x^2*(2*a - b*n))/4 + (e^3*x^8*(8*a - b*n))/64 + (3*d^2*e*x^4
*(4*a - b*n))/16 + (d*e^2*x^6*(6*a - b*n))/12
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 139, normalized size of antiderivative = 1.53

$$\int x(d+ex^2)^3 (a+b\log(cx^n))\,dx = \frac{x^2(96\log(x^nc)\,b\,d^3+144\log(x^nc)\,b\,d^2e\,x^2+96\log(x^nc)\,bd\,e^2x^4+24\log(x^nc)\,b\,e^3x^6+96a\,d^3+144a\,d^2e}{192}$$

input
```
int(x*(e*x^2+d)^3*(a+b*log(c*x^n)),x)
```

output
```
(x**2*(96*log(x**n*c)*b*d**3 + 144*log(x**n*c)*b*d**2*e*x**2 + 96*log(x**n
*c)*b*d*e**2*x**4 + 24*log(x**n*c)*b*e**3*x**6 + 96*a*d**3 + 144*a*d**2*e*
x**2 + 96*a*d*e**2*x**4 + 24*a*e**3*x**6 - 48*b*d**3*n - 36*b*d**2*e*n*x**
2 - 16*b*d*e**2*n*x**4 - 3*b*e**3*n*x**6))/192
```

3.199 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x}\,dx$

Optimal result 1571
Mathematica [A] (verified) 1572
Rubi [A] (verified) 1572
Maple [A] (verified) 1573
Fricas [A] (verification not implemented) 1574
Sympy [A] (verification not implemented) 1574
Maxima [A] (verification not implemented) 1575
Giac [A] (verification not implemented) 1576
Mupad [B] (verification not implemented) 1576
Reduce [B] (verification not implemented) 1577

Optimal result

Integrand size = 23, antiderivative size = 130

$$\int \frac{(d+ex^2)^3\,(a+b\log(cx^n))}{x}\,dx = -\frac{3}{4}bd^2enx^2-\frac{3}{16}bde^2nx^4-\frac{1}{36}be^3nx^6-\frac{1}{2}bd^3n\log^2(x) + \frac{3}{2}d^2ex^2(a+b\log(cx^n))+\frac{3}{4}de^2x^4(a+b\log(cx^n)) + \frac{1}{6}e^3x^6(a+b\log(cx^n))+d^3\log(x)\,(a+b\log(cx^n))$$

output
```
-3/4*b*d^2*e*n*x^2-3/16*b*d*e^2*n*x^4-1/36*b*e^3*n*x^6-1/2*b*d^3*n*ln(x)^2
+3/2*d^2*e*x^2*(a+b*ln(c*x^n))+3/4*d*e^2*x^4*(a+b*ln(c*x^n))+1/6*e^3*x^6*(
a+b*ln(c*x^n))+d^3*ln(x)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 116, normalized size of antiderivative = 0.89

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x} dx = \frac{1}{144}\left(-108bd^2enx^2 - 27bde^2nx^4 - 4be^3nx^6 + 216d^2ex^2(a+b\log(cx^n)) + 108de^2x^4(a+b\log(cx^n)) + 24e^3x^6(a+b\log(cx^n)) + \frac{72d^3(a+b\log(cx^n))^2}{bn}\right)$$

input
```
Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x,x]
```

output
```
(-108*b*d^2*e*n*x^2 - 27*b*d*e^2*n*x^4 - 4*b*e^3*n*x^6 + 216*d^2*e*x^2*(a
+ b*Log[c*x^n]) + 108*d*e^2*x^4*(a + b*Log[c*x^n]) + 24*e^3*x^6*(a + b*Log
[c*x^n]) + (72*d^3*(a + b*Log[c*x^n])^2)/(b*n))/144
```

Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 127, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x} dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(\frac{\log(x)d^3}{x} + \frac{1}{12}ex(2e^2x^4+9dex^2+18d^2)\right)dx + d^3\log(x)(a+b\log(cx^n)) + \frac{3}{2}d^2ex^2(a+b\log(cx^n)) + \frac{3}{4}de^2x^4(a+b\log(cx^n)) + \frac{1}{6}e^3x^6(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$d^3 \log(x) (a + b \log (cx^n)) + \frac{3}{2} d^2 e x^2 (a + b \log (cx^n)) + \frac{3}{4} d e^2 x^4 (a + b \log (cx^n)) + \frac{1}{6} e^3 x^6 (a + b \log (cx^n)) - bn \left(\frac{1}{2} d^3 \log^2(x) + \frac{3}{4} d^2 e x^2 + \frac{3}{16} d e^2 x^4 + \frac{e^3 x^6}{36} \right)$$

input
```
Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x,x]
```

output
```
-(b*n*((3*d^2*e*x^2)/4 + (3*d*e^2*x^4)/16 + (e^3*x^6)/36 + (d^3*Log[x]^2)/
2)) + (3*d^2*e*x^2*(a + b*Log[c*x^n]))/2 + (3*d*e^2*x^4*(a + b*Log[c*x^n])
)/4 + (e^3*x^6*(a + b*Log[c*x^n]))/6 + d^3*Log[x]*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 1.22 (sec) , antiderivative size = 150, normalized size of antiderivative = 1.15

method	result
parallelrisch	$\frac{24x^6 \ln(c\,x^n) b\,e^3 n - 4x^6 b\,e^3 n^2 + 24x^6 a\,e^3 n + 108x^4 \ln(c\,x^n) bd\,e^2 n - 27x^4 bd\,e^2 n^2 + 108x^4 ad\,e^2 n + 216x^2 \ln(c\,x^n) b\,d^2 en - 108x^2}{144n}$
risch	$\frac{x^6 a\,e^3}{6} + \frac{3x^4 a\,e^2 d}{4} + \frac{3a\,d^2 e\,x^2}{2} + \frac{3\ln(c) bd\,e^2 x^4}{4} + \ln(x) \ln(c)\, b\,d^3 + \frac{3\ln(c) b\,d^2 x^2 e}{2} + \left(\frac{x^6 b\,e^3}{6} + \frac{3bd\,e^2 x^4}{4} \right.$

input
```
int((e*x^2+d)^3*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/144*(24*x^6*ln(c*x^n)*b*e^3*n-4*x^6*b*e^3*n^2+24*x^6*a*e^3*n+108*x^4*ln(
c*x^n)*b*d*e^2*n-27*x^4*b*d*e^2*n^2+108*x^4*a*d*e^2*n+216*x^2*ln(c*x^n)*b*
d^2*e*n-108*x^2*b*d^2*e*n^2+216*x^2*a*d^2*e*n+144*ln(x)*a*d^3*n+72*b*d^3*l
n(c*x^n)^2)/n
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x}\,dx = -\frac{1}{36}\left(be^3n-6\,ae^3\right)x^6+\frac{1}{2}\,bd^3n\log(x)^2-\frac{3}{16}\left(bde^2n-4\,ade^2\right)x^4 -\frac{3}{4}\left(bd^2en-2\,ad^2e\right)x^2+\frac{1}{12}\left(2\,be^3x^6+9\,bde^2x^4+18\,bd^2ex^2\right)\log(c) +\frac{1}{12}\left(2\,be^3nx^6+9\,bde^2nx^4+18\,bd^2enx^2+12\,bd^3\log(c)+12\,ad^3\right)\log(x)$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
-1/36*(b*e^3*n - 6*a*e^3)*x^6 + 1/2*b*d^3*n*log(x)^2 - 3/16*(b*d*e^2*n - 4
*a*d*e^2)*x^4 - 3/4*(b*d^2*e*n - 2*a*d^2*e)*x^2 + 1/12*(2*b*e^3*x^6 + 9*b*
d*e^2*x^4 + 18*b*d^2*e*x^2)*log(c) + 1/12*(2*b*e^3*n*x^6 + 9*b*d*e^2*n*x^4
 + 18*b*d^2*e*n*x^2 + 12*b*d^3*log(c) + 12*a*d^3)*log(x)
```

Sympy [A] (verification not implemented)

Time = 1.03 (sec) , antiderivative size = 212, normalized size of antiderivative = 1.63

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x}\,dx = \begin{cases} \frac{ad^3\log(cx^n)}{n}+\frac{3ad^2ex^2}{2}+\frac{3ade^2x^4}{4}+\frac{ae^3x^6}{6}+\frac{bd^3\log(cx^n)^2}{2n}-\frac{3bd^2enx^2}{4}+\frac{3bd^2ex^2\log(cx^n)}{2}-\frac{3bde^2nx^4}{16}+\frac{3bde^2x^4\log(cx^n)}{4} \\ (a+b\log(c))\left(d^3\log(x)+\frac{3d^2ex^2}{2}+\frac{3de^2x^4}{4}+\frac{e^3x^6}{6}\right) \end{cases}$$

input
```
integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise((a*d**3*log(c*x**n)/n + 3*a*d**2*e*x**2/2 + 3*a*d*e**2*x**4/4 +
a*e**3*x**6/6 + b*d**3*log(c*x**n)**2/(2*n) - 3*b*d**2*e*n*x**2/4 + 3*b*d*
*2*e*x**2*log(c*x**n)/2 - 3*b*d*e**2*n*x**4/16 + 3*b*d*e**2*x**4*log(c*x**
n)/4 - b*e**3*n*x**6/36 + b*e**3*x**6*log(c*x**n)/6, Ne(n, 0)), ((a + b*lo
g(c))*(d**3*log(x) + 3*d**2*e*x**2/2 + 3*d*e**2*x**4/4 + e**3*x**6/6), Tru
e))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.02

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x}\,dx = -\frac{1}{36}\,be^3nx^6 + \frac{1}{6}\,be^3x^6\log(cx^n) + \frac{1}{6}\,ae^3x^6 - \frac{3}{16}\,bde^2nx^4 + \frac{3}{4}\,bde^2x^4\log(cx^n) + \frac{3}{4}\,ade^2x^4 - \frac{3}{4}\,bd^2enx^2 + \frac{3}{2}\,bd^2ex^2\log(cx^n) + \frac{3}{2}\,ad^2ex^2 + \frac{bd^3\log(cx^n)^2}{2\,n} + ad^3\log(x)$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
-1/36*b*e^3*n*x^6 + 1/6*b*e^3*x^6*log(c*x^n) + 1/6*a*e^3*x^6 - 3/16*b*d*e^
2*n*x^4 + 3/4*b*d*e^2*x^4*log(c*x^n) + 3/4*a*d*e^2*x^4 - 3/4*b*d^2*e*n*x^2
 + 3/2*b*d^2*e*x^2*log(c*x^n) + 3/2*a*d^2*e*x^2 + 1/2*b*d^3*log(c*x^n)^2/n
 + a*d^3*log(x)
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.15

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x}\,dx = -\frac{1}{36}\left(be^3n - 6\,be^3\log(c) - 6\,ae^3\right)x^6 + \frac{1}{2}\,bd^3n\log(x)^2 - \frac{3}{16}\left(bde^2n - 4\,bde^2\log(c) - 4\,ade^2\right)x^4 - \frac{3}{4}\left(bd^2en - 2\,bd^2e\log(c) - 2\,ad^2e\right)x^2 + \frac{1}{12}\left(2\,be^3nx^6 + 9\,bde^2nx^4 + 18\,bd^2enx^2\right)\log(x) + \left(bd^3\log(c) + ad^3\right)\log(x)$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
-1/36*(b*e^3*n - 6*b*e^3*log(c) - 6*a*e^3)*x^6 + 1/2*b*d^3*n*log(x)^2 - 3/
16*(b*d*e^2*n - 4*b*d*e^2*log(c) - 4*a*d*e^2)*x^4 - 3/4*(b*d^2*e*n - 2*b*d
^2*e*log(c) - 2*a*d^2*e)*x^2 + 1/12*(2*b*e^3*n*x^6 + 9*b*d*e^2*n*x^4 + 18*
b*d^2*e*n*x^2)*log(x) + (b*d^3*log(c) + a*d^3)*log(x)
```

Mupad [B] (verification not implemented)

Time = 26.69 (sec) , antiderivative size = 112, normalized size of antiderivative = 0.86

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x}\,dx = \ln(c\,x^n)\left(\frac{3\,b\,d^2\,e\,x^2}{2} + \frac{3\,b\,d\,e^2\,x^4}{4} + \frac{b\,e^3\,x^6}{6}\right) + \frac{e^3\,x^6\,(6\,a - b\,n)}{36} + a\,d^3\,\ln(x) + \frac{b\,d^3\ln(c\,x^n)^2}{2\,n} + \frac{3\,d^2\,e\,x^2\,(2\,a - b\,n)}{4} + \frac{3\,d\,e^2\,x^4\,(4\,a - b\,n)}{16}$$

input
```
int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x,x)
```

output
```
log(c*x^n)*((b*e^3*x^6)/6 + (3*b*d^2*e*x^2)/2 + (3*b*d*e^2*x^4)/4) + (e^3*
x^6*(6*a - b*n))/36 + a*d^3*log(x) + (b*d^3*log(c*x^n)^2)/(2*n) + (3*d^2*e
*x^2*(2*a - b*n))/4 + (3*d*e^2*x^4*(4*a - b*n))/16
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.15

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x} \, dx$$
$$= \frac{72\log(x^n c)^2 b\, d^3 + 216\log(x^n c)\, b\, d^2 en\, x^2 + 108\log(x^n c)\, bd\, e^2 n\, x^4 + 24\log(x^n c)\, b\, e^3 n\, x^6 + 144\log(x)\, a\, d^3}{144n}$$

input
```
int((e*x^2+d)^3*(a+b*log(c*x^n))/x,x)
```

output
```
(72*log(x**n*c)**2*b*d**3 + 216*log(x**n*c)*b*d**2*e*n*x**2 + 108*log(x**n
*c)*b*d*e**2*n*x**4 + 24*log(x**n*c)*b*e**3*n*x**6 + 144*log(x)*a*d**3*n +
 216*a*d**2*e*n*x**2 + 108*a*d*e**2*n*x**4 + 24*a*e**3*n*x**6 - 108*b*d**2
*e*n**2*x**2 - 27*b*d*e**2*n**2*x**4 - 4*b*e**3*n**2*x**6)/(144*n)
```

3.200 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^3} dx$

Optimal result 1578
Mathematica [A] (verified) 1579
Rubi [A] (verified) 1579
Maple [A] (verified) 1581
Fricas [A] (verification not implemented) 1581
Sympy [A] (verification not implemented) 1582
Maxima [A] (verification not implemented) 1582
Giac [A] (verification not implemented) 1583
Mupad [B] (verification not implemented) 1583
Reduce [B] (verification not implemented) 1584

Optimal result

Integrand size = 23, antiderivative size = 131

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^3} dx = -\frac{bd^3n}{4x^2} - \frac{3}{4}bde^2nx^2 - \frac{1}{16}be^3nx^4 - \frac{3}{2}bd^2en\log^2(x) - \frac{d^3(a+b\log(cx^n))}{2x^2} + \frac{3}{2}de^2x^2(a+b\log(cx^n)) + \frac{1}{4}e^3x^4(a+b\log(cx^n)) + 3d^2e\log(x)(a+b\log(cx^n))$$

output
```
-1/4*b*d^3*n/x^2-3/4*b*d*e^2*n*x^2-1/16*b*e^3*n*x^4-3/2*b*d^2*e*n*ln(x)^2-
1/2*d^3*(a+b*ln(c*x^n))/x^2+3/2*d*e^2*x^2*(a+b*ln(c*x^n))+1/4*e^3*x^4*(a+b
*ln(c*x^n))+3*d^2*e*ln(x)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 115, normalized size of antiderivative = 0.88

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^3} \, dx = \frac{1}{16}\left(-\frac{4bd^3n}{x^2} - 12bde^2nx^2 - be^3nx^4 - \frac{8d^3(a+b\log(cx^n))}{x^2} + 24de^2x^2(a+b\log(cx^n)) + 4e^3x^4(a+b\log(cx^n)) + \frac{24d^2e(a+b\log(cx^n))^2}{bn}\right)$$

input
```
Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
((-4*b*d^3*n)/x^2 - 12*b*d*e^2*n*x^2 - b*e^3*n*x^4 - (8*d^3*(a + b*Log[c*x
^n]))/x^2 + 24*d*e^2*x^2*(a + b*Log[c*x^n]) + 4*e^3*x^4*(a + b*Log[c*x^n])
 + (24*d^2*e*(a + b*Log[c*x^n])^2)/(b*n))/16
```

Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 124, normalized size of antiderivative = 0.95, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^3} \, dx$$

$$\Big\downarrow \; 2772$$

$$-bn\int -\frac{-e^3x^6-6de^2x^4-12d^2e\log(x)x^2+2d^3}{4x^3}dx - \frac{d^3(a+b\log(cx^n))}{2x^2} + 3d^2e\log(x)(a+b\log(cx^n)) + \frac{3}{2}de^2x^2(a+b\log(cx^n)) + \frac{1}{4}e^3x^4(a+b\log(cx^n))$$

$$\Big\downarrow \; 27$$

$$\frac{1}{4}bn\int \frac{-e^3x^6-6de^2x^4-12d^2e\log(x)x^2+2d^3}{x^3}dx-\frac{d^3(a+b\log(cx^n))}{2x^2}+$$
$$3d^2e\log(x)\left(a+b\log(cx^n)\right)+\frac{3}{2}de^2x^2(a+b\log(cx^n))+\frac{1}{4}e^3x^4(a+b\log(cx^n))$$

$$\Big\downarrow \text{ 2010}$$

$$\frac{1}{4}bn\int \left(\frac{-e^3x^6-6de^2x^4+2d^3}{x^3}-\frac{12d^2e\log(x)}{x}\right)dx-\frac{d^3(a+b\log(cx^n))}{2x^2}+$$
$$3d^2e\log(x)\left(a+b\log(cx^n)\right)+\frac{3}{2}de^2x^2(a+b\log(cx^n))+\frac{1}{4}e^3x^4(a+b\log(cx^n))$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{2x^2}+3d^2e\log(x)\left(a+b\log(cx^n)\right)+\frac{3}{2}de^2x^2(a+b\log(cx^n))+$$
$$\frac{1}{4}e^3x^4(a+b\log(cx^n))+\frac{1}{4}bn\left(-\frac{d^3}{x^2}-6d^2e\log^2(x)-3de^2x^2-\frac{1}{4}e^3x^4\right)$$

input
```
Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(b*n*(-(d^3/x^2) - 3*d*e^2*x^2 - (e^3*x^4)/4 - 6*d^2*e*Log[x]^2))/4 - (d^3
*(a + b*Log[c*x^n]))/(2*x^2) + (3*d*e^2*x^2*(a + b*Log[c*x^n]))/2 + (e^3*x
^4*(a + b*Log[c*x^n]))/4 + 3*d^2*e*Log[x]*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 1.35 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.14

method	result
parallelrisch	$\frac{4x^6\ln(c\,x^n)b\,e^3n-x^6b\,e^3n^2+4x^6a\,e^3n+24x^4\ln(c\,x^n)bd\,e^2n-12x^4bd\,e^2n^2+24x^4ad\,e^2n+48\ln(x)x^2a\,d^2en+24e\,d^2b\ln(c\,x^n)^2}{16x^2n}$
risch	Expression too large to display

input
```
int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

output
```
1/16/x^2*(4*x^6*ln(c*x^n)*b*e^3*n-x^6*b*e^3*n^2+4*x^6*a*e^3*n+24*x^4*ln(c*
x^n)*b*d*e^2*n-12*x^4*b*d*e^2*n^2+24*x^4*a*d*e^2*n+48*ln(x)*x^2*a*d^2*e*n+
24*e*d^2*b*ln(c*x^n)^2*x^2-8*ln(c*x^n)*b*d^3*n-4*b*d^3*n^2-8*a*d^3*n)/n
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^3}\,dx$$
$$= \frac{24\,bd^2enx^2\log(x)^2-(be^3n-4\,ae^3)x^6-4\,bd^3n-12\,(bde^2n-2\,ade^2)x^4-8\,ad^3+4\,(be^3x^6+6\,bde^2x^4-}{16\,x^2}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
1/16*(24*b*d^2*e*n*x^2*log(x)^2 - (b*e^3*n - 4*a*e^3)*x^6 - 4*b*d^3*n - 12
*(b*d*e^2*n - 2*a*d*e^2)*x^4 - 8*a*d^3 + 4*(b*e^3*x^6 + 6*b*d*e^2*x^4 - 2*
b*d^3)*log(c) + 4*(b*e^3*n*x^6 + 6*b*d*e^2*n*x^4 + 12*b*d^2*e*x^2*log(c) +
 12*a*d^2*e*x^2 - 2*b*d^3*n)*log(x))/x^2
```

Sympy [A] (verification not implemented)

Time = 1.15 (sec) , antiderivative size = 209, normalized size of antiderivative = 1.60

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^3}\,dx$$
$$= \begin{cases} -\frac{ad^3}{2x^2} + \frac{3ad^2e\log(cx^n)}{n} + \frac{3ade^2x^2}{2} + \frac{ae^3x^4}{4} - \frac{bd^3n}{4x^2} - \frac{bd^3\log(cx^n)}{2x^2} + \frac{3bd^2e\log(cx^n)^2}{2n} - \frac{3bde^2nx^2}{4} + \frac{3bde^2x^2\log(cx^n)}{2} - b \\ (a+b\log(c))\left(-\frac{d^3}{2x^2} + 3d^2e\log(x) + \frac{3de^2x^2}{2} + \frac{e^3x^4}{4}\right) \end{cases}$$

input
```
integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**3,x)
```

output
```
Piecewise((-a*d**3/(2*x**2) + 3*a*d**2*e*log(c*x**n)/n + 3*a*d*e**2*x**2/2
 + a*e**3*x**4/4 - b*d**3*n/(4*x**2) - b*d**3*log(c*x**n)/(2*x**2) + 3*b*d
**2*e*log(c*x**n)**2/(2*n) - 3*b*d*e**2*n*x**2/4 + 3*b*d*e**2*x**2*log(c*x
**n)/2 - b*e**3*n*x**4/16 + b*e**3*x**4*log(c*x**n)/4, Ne(n, 0)), ((a + b*
log(c))*(-d**3/(2*x**2) + 3*d**2*e*log(x) + 3*d*e**2*x**2/2 + e**3*x**4/4)
, True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.02

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^3}\,dx = -\frac{1}{16}be^3nx^4 + \frac{1}{4}be^3x^4\log(cx^n) + \frac{1}{4}ae^3x^4 - \frac{3}{4}bde^2nx^2 + \frac{3}{2}bde^2x^2\log(cx^n) + \frac{3}{2}ade^2x^2 + \frac{3\,bd^2e\log(cx^n)^2}{2\,n} + 3\,ad^2e\log(x) - \frac{bd^3n}{4\,x^2} - \frac{bd^3\log(cx^n)}{2\,x^2} - \frac{ad^3}{2\,x^2}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
-1/16*b*e^3*n*x^4 + 1/4*b*e^3*x^4*log(c*x^n) + 1/4*a*e^3*x^4 - 3/4*b*d*e^2
*n*x^2 + 3/2*b*d*e^2*x^2*log(c*x^n) + 3/2*a*d*e^2*x^2 + 3/2*b*d^2*e*log(c*
x^n)^2/n + 3*a*d^2*e*log(x) - 1/4*b*d^3*n/x^2 - 1/2*b*d^3*log(c*x^n)/x^2 -
 1/2*a*d^3/x^2
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 156, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^3} dx = \frac{1}{4} be^3x^4\log(c) + \frac{1}{4} ae^3x^4 + \frac{3}{2} bde^2x^2\log(c) + \frac{3}{2} bd^2en\log(x)^2 + \frac{3}{4} (2x^2\log(x) - x^2)bde^2n + \frac{1}{16} (4x^4\log(x) - x^4)be^3n + \frac{3}{2} ade^2x^2 - \frac{1}{4} bd^3n\left(\frac{2\log(x)}{x^2} + \frac{1}{x^2}\right) + 3bd^2e\log(c)\log(|x|) + 3ad^2e\log(|x|) - \frac{bd^3\log(c)}{2x^2} - \frac{ad^3}{2x^2}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
1/4*b*e^3*x^4*log(c) + 1/4*a*e^3*x^4 + 3/2*b*d*e^2*x^2*log(c) + 3/2*b*d^2*
e*n*log(x)^2 + 3/4*(2*x^2*log(x) - x^2)*b*d*e^2*n + 1/16*(4*x^4*log(x) - x
^4)*b*e^3*n + 3/2*a*d*e^2*x^2 - 1/4*b*d^3*n*(2*log(x)/x^2 + 1/x^2) + 3*b*d
^2*e*log(c)*log(abs(x)) + 3*a*d^2*e*log(abs(x)) - 1/2*b*d^3*log(c)/x^2 - 1
/2*a*d^3/x^2
```

Mupad [B] (verification not implemented)

Time = 26.39 (sec) , antiderivative size = 163, normalized size of antiderivative = 1.24

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^3} dx = \ln(c\,x^n)\left(\frac{\frac{3\,b\,e^3\,x^6}{4} + 3\,b\,d\,e^2\,x^4}{x^2} - \frac{\frac{b\,d^3}{2} + \frac{3\,b\,d^2\,e\,x^2}{2} + \frac{3\,b\,d\,e^2\,x^4}{2} + \frac{b\,e^3\,x^6}{2}}{x^2}\right) - \frac{\frac{a\,d^3}{2} + \frac{b\,d^3\,n}{4}}{x^2} + \ln(x)\left(3\,a\,d^2\,e + \frac{3\,b\,d^2\,e\,n}{2}\right) + \frac{e^3\,x^4\,(4\,a - b\,n)}{16} + \frac{3\,d\,e^2\,x^2\,(2\,a - b\,n)}{4} + \frac{3\,b\,d^2\,e\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^3,x)
```

output
```
log(c*x^n)*(((3*b*e^3*x^6)/4 + 3*b*d*e^2*x^4)/x^2 - ((b*d^3)/2 + (b*e^3*x^
6)/2 + (3*b*d^2*e*x^2)/2 + (3*b*d*e^2*x^4)/2)/x^2) - ((a*d^3)/2 + (b*d^3*n
)/4)/x^2 + log(x)*(3*a*d^2*e + (3*b*d^2*e*n)/2) + (e^3*x^4*(4*a - b*n))/16
 + (3*d*e^2*x^2*(2*a - b*n))/4 + (3*b*d^2*e*log(c*x^n)^2)/(2*n)
```

Reduce [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 148, normalized size of antiderivative = 1.13

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^3} dx$$
$$= \frac{24\log(x^nc)^2 b d^2 e x^2 - 8\log(x^nc) b d^3 n + 24\log(x^nc) bd e^2 n x^4 + 4\log(x^nc) b e^3 n x^6 + 48\log(x) a d^2 en x^2}{16n x^2}$$

input
```
int((e*x^2+d)^3*(a+b*log(c*x^n))/x^3,x)
```

output
```
(24*log(x**n*c)**2*b*d**2*e*x**2 - 8*log(x**n*c)*b*d**3*n + 24*log(x**n*c)
*b*d*e**2*n*x**4 + 4*log(x**n*c)*b*e**3*n*x**6 + 48*log(x)*a*d**2*e*n*x**2
 - 8*a*d**3*n + 24*a*d*e**2*n*x**4 + 4*a*e**3*n*x**6 - 4*b*d**3*n**2 - 12*
b*d*e**2*n**2*x**4 - b*e**3*n**2*x**6)/(16*n*x**2)
```

3.201 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^5}\,dx$

Optimal result 1585
Mathematica [A] (verified) 1586
Rubi [A] (verified) 1586
Maple [A] (verified) 1588
Fricas [A] (verification not implemented) 1588
Sympy [A] (verification not implemented) 1589
Maxima [A] (verification not implemented) 1589
Giac [A] (verification not implemented) 1590
Mupad [B] (verification not implemented) 1591
Reduce [B] (verification not implemented) 1591

Optimal result

Integrand size = 23, antiderivative size = 126

$$\int \frac{(d+ex^2)^3\,(a+b\log(cx^n))}{x^5}\,dx = -\frac{1}{4}be^3nx^2 - \frac{bdn(d+6ex^2)^2}{16x^4} - \frac{3}{2}bde^2n\log^2(x) - \frac{d^3(a+b\log(cx^n))}{4x^4} - \frac{3d^2e(a+b\log(cx^n))}{2x^2} + \frac{1}{2}e^3x^2(a+b\log(cx^n)) + 3de^2\log(x)\,(a + b\log(cx^n))$$

output
```
-1/4*b*e^3*n*x^2-1/16*b*d*n*(6*e*x^2+d)^2/x^4-3/2*b*d*e^2*n*ln(x)^2-1/4*d^
3*(a+b*ln(c*x^n))/x^4-3/2*d^2*e*(a+b*ln(c*x^n))/x^2+1/2*e^3*x^2*(a+b*ln(c*
x^n))+3*d*e^2*ln(x)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 115, normalized size of antiderivative = 0.91

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^5}\,dx = \frac{1}{16}\left(-\frac{bd^3n}{x^4}-\frac{12bd^2en}{x^2}-4be^3nx^2 -\frac{4d^3(a+b\log(cx^n))}{x^4}-\frac{24d^2e(a+b\log(cx^n))}{x^2} +8e^3x^2(a+b\log(cx^n))+\frac{24de^2(a+b\log(cx^n))^2}{bn}\right)$$

input
```
Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(-((b*d^3*n)/x^4) - (12*b*d^2*e*n)/x^2 - 4*b*e^3*n*x^2 - (4*d^3*(a + b*Log
[c*x^n]))/x^4 - (24*d^2*e*(a + b*Log[c*x^n]))/x^2 + 8*e^3*x^2*(a + b*Log[c
*x^n]) + (24*d*e^2*(a + b*Log[c*x^n])^2)/(b*n))/16
```

Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 124, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^5}\,dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{-2e^3x^6-12de^2\log(x)x^4+6d^2ex^2+d^3}{4x^5}dx-\frac{d^3(a+b\log(cx^n))}{4x^4}- \frac{3d^2e(a+b\log(cx^n))}{2x^2}+3de^2\log(x)(a+b\log(cx^n))+\frac{1}{2}e^3x^2(a+b\log(cx^n))$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}bn\int \frac{-2e^3x^6-12de^2\log(x)x^4+6d^2ex^2+d^3}{x^5}dx-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}+3de^2\log(x)\left(a+b\log(cx^n)\right)+\frac{1}{2}e^3x^2(a+b\log(cx^n))$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{4}bn\int \left(\frac{-2e^3x^6+6d^2ex^2+d^3}{x^5}-\frac{12de^2\log(x)}{x}\right)dx-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}+3de^2\log(x)\left(a+b\log(cx^n)\right)+\frac{1}{2}e^3x^2(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}+3de^2\log(x)\left(a+b\log(cx^n)\right)+\frac{1}{2}e^3x^2(a+b\log(cx^n))+\frac{1}{4}bn\left(-\frac{d^3}{4x^4}-\frac{3d^2e}{x^2}-6de^2\log^2(x)-e^3x^2\right)$$

input
```
Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(b*n*(-1/4*d^3/x^4 - (3*d^2*e)/x^2 - e^3*x^2 - 6*d*e^2*Log[x]^2))/4 - (d^3
*(a + b*Log[c*x^n]))/(4*x^4) - (3*d^2*e*(a + b*Log[c*x^n]))/(2*x^2) + (e^3
*x^2*(a + b*Log[c*x^n]))/2 + 3*d*e^2*Log[x]*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 1.17 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.18

method	result
parallelrisch	$\frac{8x^6\ln(c\,x^n)b\,e^3n-4x^6b\,e^3n^2+8x^6a\,e^3n+48\ln(x)x^4ad\,e^2n+24e^2db\ln(c\,x^n)^2x^4-24x^2\ln(c\,x^n)b\,d^2en-12x^2b\,d^2e\,n^2-24x^2a\,d}{16x^4n}$
risch	$-\frac{b(-2e^3x^6-12e^2d\ln(x)x^4+6d^2e\,x^2+d^3)\ln(x^n)}{4x^4}-\frac{4a\,d^3-48\ln(x)e^2da\,x^4+2i\pi b\,d^3\,\mathrm{csgn}(ic\,x^n)^2\,\mathrm{csgn}(ic)-8x^6a\,e^3+24a\,d}{}$

input
```
int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

output
```
1/16/x^4*(8*x^6*ln(c*x^n)*b*e^3*n-4*x^6*b*e^3*n^2+8*x^6*a*e^3*n+48*ln(x)*x
^4*a*d*e^2*n+24*e^2*d*b*ln(c*x^n)^2*x^4-24*x^2*ln(c*x^n)*b*d^2*e*n-12*x^2*
b*d^2*e*n^2-24*x^2*a*d^2*e*n-4*ln(c*x^n)*b*d^3*n-b*d^3*n^2-4*a*d^3*n)/n
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 157, normalized size of antiderivative = 1.25

$$\int \frac{(d+ex^2)^3\,(a+b\log(cx^n))}{x^5}\,dx$$
$$= \frac{24\,bde^2nx^4\log(x)^2-4\,(be^3n-2\,ae^3)x^6-bd^3n-4\,ad^3-12\,(bd^2en+2\,ad^2e)x^2+4\,(2\,be^3x^6-6\,bd^2ex^2}{16\,x^4}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

output
```
1/16*(24*b*d*e^2*n*x^4*log(x)^2 - 4*(b*e^3*n - 2*a*e^3)*x^6 - b*d^3*n - 4*
a*d^3 - 12*(b*d^2*e*n + 2*a*d^2*e)*x^2 + 4*(2*b*e^3*x^6 - 6*b*d^2*e*x^2 -
b*d^3)*log(c) + 4*(2*b*e^3*n*x^6 + 12*b*d*e^2*x^4*log(c) + 12*a*d*e^2*x^4
- 6*b*d^2*e*n*x^2 - b*d^3*n)*log(x))/x^4
```

Sympy [A] (verification not implemented)

Time = 1.12 (sec) , antiderivative size = 209, normalized size of antiderivative = 1.66

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^5}\,dx = \begin{cases} -\frac{ad^3}{4x^4} - \frac{3ad^2e}{2x^2} + \frac{3ade^2\log(cx^n)}{n} + \frac{ae^3x^2}{2} - \frac{bd^3n}{16x^4} - \frac{bd^3\log(cx^n)}{4x^4} - \frac{3bd^2en}{4x^2} - \frac{3bd^2e\log(cx^n)}{2x^2} + \frac{3bde^2\log(cx^n)^2}{2n} - \frac{be^3nx^2}{4} \\ (a+b\log(c))\left(-\frac{d^3}{4x^4} - \frac{3d^2e}{2x^2} + 3de^2\log(x) + \frac{e^3x^2}{2}\right) \end{cases}$$

input
```
integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**5,x)
```

output
```
Piecewise((-a*d**3/(4*x**4) - 3*a*d**2*e/(2*x**2) + 3*a*d*e**2*log(c*x**n)
/n + a*e**3*x**2/2 - b*d**3*n/(16*x**4) - b*d**3*log(c*x**n)/(4*x**4) - 3*
b*d**2*e*n/(4*x**2) - 3*b*d**2*e*log(c*x**n)/(2*x**2) + 3*b*d*e**2*log(c*x
**n)**2/(2*n) - b*e**3*n*x**2/4 + b*e**3*x**2*log(c*x**n)/2, Ne(n, 0)), ((
a + b*log(c))*(-d**3/(4*x**4) - 3*d**2*e/(2*x**2) + 3*d*e**2*log(x) + e**3
*x**2/2), True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.06

$$\begin{aligned}\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^5}\,dx = &-\frac{1}{4}\,be^3nx^2 + \frac{1}{2}\,be^3x^2\log(cx^n) + \frac{1}{2}\,ae^3x^2 \\ &+ \frac{3\,bde^2\log(cx^n)^2}{2\,n} + 3\,ade^2\log(x) \\ &- \frac{3\,bd^2en}{4\,x^2} - \frac{3\,bd^2e\log(cx^n)}{2\,x^2} - \frac{3\,ad^2e}{2\,x^2} \\ &- \frac{bd^3n}{16\,x^4} - \frac{bd^3\log(cx^n)}{4\,x^4} - \frac{ad^3}{4\,x^4}\end{aligned}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

output
```
-1/4*b*e^3*n*x^2 + 1/2*b*e^3*x^2*log(c*x^n) + 1/2*a*e^3*x^2 + 3/2*b*d*e^2*
log(c*x^n)^2/n + 3*a*d*e^2*log(x) - 3/4*b*d^2*e*n/x^2 - 3/2*b*d^2*e*log(c*
x^n)/x^2 - 3/2*a*d^2*e/x^2 - 1/16*b*d^3*n/x^4 - 1/4*b*d^3*log(c*x^n)/x^4 -
 1/4*a*d^3/x^4
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 154, normalized size of antiderivative = 1.22

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^5} dx = \frac{1}{2} be^3x^2\log(c) + \frac{3}{2} bde^2n\log(x)^2 + \frac{1}{4} (2x^2\log(x) - x^2)be^3n + \frac{1}{2} ae^3x^2 - \frac{3}{4} bd^2en\left(\frac{2\log(x)}{x^2} + \frac{1}{x^2}\right) - \frac{1}{16} bd^3n\left(\frac{4\log(x)}{x^4} + \frac{1}{x^4}\right) + 3bde^2\log(c)\log(|x|) + 3ade^2\log(|x|) - \frac{3bd^2e\log(c)}{2x^2} - \frac{3ad^2e}{2x^2} - \frac{bd^3\log(c)}{4x^4} - \frac{ad^3}{4x^4}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

output
```
1/2*b*e^3*x^2*log(c) + 3/2*b*d*e^2*n*log(x)^2 + 1/4*(2*x^2*log(x) - x^2)*b
*e^3*n + 1/2*a*e^3*x^2 - 3/4*b*d^2*e*n*(2*log(x)/x^2 + 1/x^2) - 1/16*b*d^3
*n*(4*log(x)/x^4 + 1/x^4) + 3*b*d*e^2*log(c)*log(abs(x)) + 3*a*d*e^2*log(a
bs(x)) - 3/2*b*d^2*e*log(c)/x^2 - 3/2*a*d^2*e/x^2 - 1/4*b*d^3*log(c)/x^4 -
 1/4*a*d^3/x^4
```

Mupad [B] (verification not implemented)

Time = 26.42 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^5}\,dx = \ln(x)\left(3\,a\,d\,e^2+\frac{9\,b\,d\,e^2\,n}{4}\right) - \ln(c\,x^n)\left(\frac{\frac{b\,d^3}{4}+\frac{3\,b\,d^2\,e\,x^2}{2}+\frac{9\,b\,d\,e^2\,x^4}{4}+b\,e^3\,x^6}{x^4} - \frac{3\,b\,e^3\,x^2}{2}\right) - \frac{a\,d^3+x^2\,(6\,a\,d^2\,e+3\,b\,d^2\,e\,n)+\frac{b\,d^3\,n}{4}}{4\,x^4} + \frac{e^3\,x^2\,(2\,a-b\,n)}{4} + \frac{3\,b\,d\,e^2\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^5,x)
```

output
```
log(x)*(3*a*d*e^2 + (9*b*d*e^2*n)/4) - log(c*x^n)*(((b*d^3)/4 + b*e^3*x^6
+ (3*b*d^2*e*x^2)/2 + (9*b*d*e^2*x^4)/4)/x^4 - (3*b*e^3*x^2)/2) - (a*d^3 +
 x^2*(6*a*d^2*e + 3*b*d^2*e*n) + (b*d^3*n)/4)/(4*x^4) + (e^3*x^2*(2*a - b*
n))/4 + (3*b*d*e^2*log(c*x^n)^2)/(2*n)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 148, normalized size of antiderivative = 1.17

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^5}\,dx = \frac{24\log(x^nc)^2\,bd\,e^2x^4 - 4\log(x^nc)\,b\,d^3n - 24\log(x^nc)\,b\,d^2en\,x^2 + 8\log(x^nc)\,b\,e^3n\,x^6 + 48\log(x)\,ad\,e^2n\,x^4}{16n\,x^4}$$

input
```
int((e*x^2+d)^3*(a+b*log(c*x^n))/x^5,x)
```

output
```
(24*log(x**n*c)**2*b*d*e**2*x**4 - 4*log(x**n*c)*b*d**3*n - 24*log(x**n*c)
*b*d**2*e*n*x**2 + 8*log(x**n*c)*b*e**3*n*x**6 + 48*log(x)*a*d*e**2*n*x**4
 - 4*a*d**3*n - 24*a*d**2*e*n*x**2 + 8*a*e**3*n*x**6 - b*d**3*n**2 - 12*b*
d**2*e*n**2*x**2 - 4*b*e**3*n**2*x**6)/(16*n*x**4)
```

3.202 $\int x^4(d+ex^2)^3 (a+b\log(cx^n)) \, dx$

Optimal result . . . 1592
Mathematica [A] (verified) . . . 1592
Rubi [A] (verified) . . . 1593
Maple [A] (verified) . . . 1594
Fricas [A] (verification not implemented) . . . 1595
Sympy [A] (verification not implemented) . . . 1595
Maxima [A] (verification not implemented) . . . 1596
Giac [A] (verification not implemented) . . . 1597
Mupad [B] (verification not implemented) . . . 1597
Reduce [B] (verification not implemented) . . . 1598

Optimal result

Integrand size = 23, antiderivative size = 100

$$\int x^4 (d+ex^2)^3 (a+b\log(cx^n)) \, dx = -\frac{1}{25}bd^3nx^5 - \frac{3}{49}bd^2enx^7 - \frac{1}{27}bde^2nx^9 - \frac{1}{121}be^3nx^{11} + \frac{(231d^3x^5 + 495d^2ex^7 + 385de^2x^9 + 105e^3x^{11})(a+b\log(cx^n))}{1155}$$

output
```
-1/25*b*d^3*n*x^5-3/49*b*d^2*e*n*x^7-1/27*b*d*e^2*n*x^9-1/121*b*e^3*n*x^11
+1/1155*(105*e^3*x^11+385*d*e^2*x^9+495*d^2*e*x^7+231*d^3*x^5)*(a+b*ln(c*x
^n))
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.33

$$\int x^4 (d+ex^2)^3 (a+b\log(cx^n)) \, dx = -\frac{1}{25}bd^3nx^5 - \frac{3}{49}bd^2enx^7 - \frac{1}{27}bde^2nx^9 - \frac{1}{121}be^3nx^{11} + \frac{1}{5}d^3x^5(a+b\log(cx^n)) + \frac{3}{7}d^2ex^7(a+b\log(cx^n)) + \frac{1}{3}de^2x^9(a+b\log(cx^n)) + \frac{1}{11}e^3x^{11}(a+b\log(cx^n))$$

input
```
Integrate[x^4*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/25*(b*d^3*n*x^5) - (3*b*d^2*e*n*x^7)/49 - (b*d*e^2*n*x^9)/27 - (b*e^3*n
*x^11)/121 + (d^3*x^5*(a + b*Log[c*x^n]))/5 + (3*d^2*e*x^7*(a + b*Log[c*x^
n]))/7 + (d*e^2*x^9*(a + b*Log[c*x^n]))/3 + (e^3*x^11*(a + b*Log[c*x^n]))/
11
```

Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 97, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2771, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^4 \left(d+ex^2\right)^3 (a+b\log(cx^n)) \, dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{\left(231d^3x^5+495d^2ex^7+385de^2x^9+105e^3x^{11}\right)(a+b\log(cx^n))}{1155}-bn\int \left(\frac{e^3x^{10}}{11}+\frac{1}{3}de^2x^8+\frac{3}{7}d^2ex^6+\frac{d^3x^4}{5}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{\left(231d^3x^5+495d^2ex^7+385de^2x^9+105e^3x^{11}\right)(a+b\log(cx^n))}{1155}-bn\left(\frac{d^3x^5}{25}+\frac{3}{49}d^2ex^7+\frac{1}{27}de^2x^9+\frac{e^3x^{11}}{121}\right)$$

input
```
Int[x^4*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d^3*x^5)/25 + (3*d^2*e*x^7)/49 + (d*e^2*x^9)/27 + (e^3*x^11)/121))
 + ((231*d^3*x^5 + 495*d^2*e*x^7 + 385*d*e^2*x^9 + 105*e^3*x^11)*(a + b*Lo
g[c*x^n]))/1155
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 3.62 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.44

method	result
parallelrisch	$\frac{x^{11} b \ln(c x^n) e^3}{11} - \frac{b e^3 n x^{11}}{121} + \frac{x^{11} a e^3}{11} + \frac{x^9 b \ln(c x^n) e^2 d}{3} - \frac{b d e^2 n x^9}{27} + \frac{x^9 a e^2 d}{3} + \frac{3 x^7 b \ln(c x^n) d^2 e}{7} - \frac{3 b d^2 e n x^7}{49}$
risch	$\frac{\ln(c) b d^3 x^5}{5} + \frac{\ln(c) b e^3 x^{11}}{11} + \frac{x^5 a d^3}{5} + \frac{x^{11} a e^3}{11} + \frac{x^9 a e^2 d}{3} + \frac{3 x^7 a d^2 e}{7} + \frac{b x^5 (105 e^3 x^6 + 385 e^2 d x^4 + 495 d^2 e x^2 + 231}{1155}$

input
```
int(x^4*(e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/11*x^11*b*ln(c*x^n)*e^3-1/121*b*e^3*n*x^11+1/11*x^11*a*e^3+1/3*x^9*b*ln(
c*x^n)*e^2*d-1/27*b*d*e^2*n*x^9+1/3*x^9*a*e^2*d+3/7*x^7*b*ln(c*x^n)*d^2*e-
3/49*b*d^2*e*n*x^7+3/7*x^7*a*d^2*e+1/5*x^5*b*ln(c*x^n)*d^3-1/25*b*d^3*n*x^
5+1/5*x^5*a*d^3
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.67

$$\begin{aligned}
&\int x^4 (d+ex^2)^3 (a+b\log(cx^n))\,dx \\
&= -\frac{1}{121}\left(be^3n-11\,ae^3\right)x^{11}-\frac{1}{27}\left(bde^2n-9\,ade^2\right)x^9 \\
&\quad -\frac{3}{49}\left(bd^2en-7\,ad^2e\right)x^7-\frac{1}{25}\left(bd^3n-5\,ad^3\right)x^5 \\
&\quad +\frac{1}{1155}\left(105\,be^3x^{11}+385\,bde^2x^9+495\,bd^2ex^7+231\,bd^3x^5\right)\log(c) \\
&\quad +\frac{1}{1155}\left(105\,be^3nx^{11}+385\,bde^2nx^9+495\,bd^2enx^7+231\,bd^3nx^5\right)\log(x)
\end{aligned}$$

input
```
integrate(x^4*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/121*(b*e^3*n - 11*a*e^3)*x^11 - 1/27*(b*d*e^2*n - 9*a*d*e^2)*x^9 - 3/49
*(b*d^2*e*n - 7*a*d^2*e)*x^7 - 1/25*(b*d^3*n - 5*a*d^3)*x^5 + 1/1155*(105*
b*e^3*x^11 + 385*b*d*e^2*x^9 + 495*b*d^2*e*x^7 + 231*b*d^3*x^5)*log(c) + 1
/1155*(105*b*e^3*n*x^11 + 385*b*d*e^2*n*x^9 + 495*b*d^2*e*n*x^7 + 231*b*d^
3*n*x^5)*log(x)
```

Sympy [A] (verification not implemented)

Time = 2.40 (sec) , antiderivative size = 170, normalized size of antiderivative = 1.70

$$\begin{aligned}
\int x^4 (d+ex^2)^3 (a+b\log(cx^n))\,dx &= \frac{ad^3x^5}{5}+\frac{3ad^2ex^7}{7}+\frac{ade^2x^9}{3}+\frac{ae^3x^{11}}{11} \\
&\quad -\frac{bd^3nx^5}{25}+\frac{bd^3x^5\log(cx^n)}{5}-\frac{3bd^2enx^7}{49} \\
&\quad +\frac{3bd^2ex^7\log(cx^n)}{7}-\frac{bde^2nx^9}{27} \\
&\quad +\frac{bde^2x^9\log(cx^n)}{3}-\frac{be^3nx^{11}}{121}+\frac{be^3x^{11}\log(cx^n)}{11}
\end{aligned}$$

input
```
integrate(x**4*(e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x**5/5 + 3*a*d**2*e*x**7/7 + a*d*e**2*x**9/3 + a*e**3*x**11/11 - b*
d**3*n*x**5/25 + b*d**3*x**5*log(c*x**n)/5 - 3*b*d**2*e*n*x**7/49 + 3*b*d*
*2*e*x**7*log(c*x**n)/7 - b*d*e**2*n*x**9/27 + b*d*e**2*x**9*log(c*x**n)/3
 - b*e**3*n*x**11/121 + b*e**3*x**11*log(c*x**n)/11
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.43

$$\int x^4(d+ex^2)^3(a+b\log(cx^n))\,dx = -\frac{1}{121}\,be^3nx^{11}+\frac{1}{11}\,be^3x^{11}\log(cx^n)+\frac{1}{11}\,ae^3x^{11} - \frac{1}{27}\,bde^2nx^9+\frac{1}{3}\,bde^2x^9\log(cx^n)+\frac{1}{3}\,ade^2x^9 - \frac{3}{49}\,bd^2enx^7+\frac{3}{7}\,bd^2ex^7\log(cx^n)+\frac{3}{7}\,ad^2ex^7 - \frac{1}{25}\,bd^3nx^5+\frac{1}{5}\,bd^3x^5\log(cx^n)+\frac{1}{5}\,ad^3x^5$$

input
```
integrate(x^4*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/121*b*e^3*n*x^11 + 1/11*b*e^3*x^11*log(c*x^n) + 1/11*a*e^3*x^11 - 1/27*
b*d*e^2*n*x^9 + 1/3*b*d*e^2*x^9*log(c*x^n) + 1/3*a*d*e^2*x^9 - 3/49*b*d^2*
e*n*x^7 + 3/7*b*d^2*e*x^7*log(c*x^n) + 3/7*a*d^2*e*x^7 - 1/25*b*d^3*n*x^5
+ 1/5*b*d^3*x^5*log(c*x^n) + 1/5*a*d^3*x^5
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.77

$$\int x^4(d+ex^2)^3(a+b\log(cx^n))\,dx = \frac{1}{11}be^3nx^{11}\log(x) - \frac{1}{121}be^3nx^{11} + \frac{1}{11}be^3x^{11}\log(c) + \frac{1}{11}ae^3x^{11} + \frac{1}{3}bde^2nx^9\log(x) - \frac{1}{27}bde^2nx^9 + \frac{1}{3}bde^2x^9\log(c) + \frac{1}{3}ade^2x^9 + \frac{3}{7}bd^2enx^7\log(x) - \frac{3}{49}bd^2enx^7 + \frac{3}{7}bd^2ex^7\log(c) + \frac{3}{7}ad^2ex^7 + \frac{1}{5}bd^3nx^5\log(x) - \frac{1}{25}bd^3nx^5 + \frac{1}{5}bd^3x^5\log(c) + \frac{1}{5}ad^3x^5$$

input
```
integrate(x^4*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/11*b*e^3*n*x^11*log(x) - 1/121*b*e^3*n*x^11 + 1/11*b*e^3*x^11*log(c) + 1
/11*a*e^3*x^11 + 1/3*b*d*e^2*n*x^9*log(x) - 1/27*b*d*e^2*n*x^9 + 1/3*b*d*e
^2*x^9*log(c) + 1/3*a*d*e^2*x^9 + 3/7*b*d^2*e*n*x^7*log(x) - 3/49*b*d^2*e*
n*x^7 + 3/7*b*d^2*e*x^7*log(c) + 3/7*a*d^2*e*x^7 + 1/5*b*d^3*n*x^5*log(x)
- 1/25*b*d^3*n*x^5 + 1/5*b*d^3*x^5*log(c) + 1/5*a*d^3*x^5
```

Mupad [B] (verification not implemented)

Time = 25.84 (sec) , antiderivative size = 113, normalized size of antiderivative = 1.13

$$\int x^4(d+ex^2)^3(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,d^3\,x^5}{5} + \frac{3\,b\,d^2\,e\,x^7}{7} + \frac{b\,d\,e^2\,x^9}{3} + \frac{b\,e^3\,x^{11}}{11}\right) + \frac{d^3\,x^5\,(5\,a-b\,n)}{25} + \frac{e^3\,x^{11}\,(11\,a-b\,n)}{121} + \frac{3\,d^2\,e\,x^7\,(7\,a-b\,n)}{49} + \frac{d\,e^2\,x^9\,(9\,a-b\,n)}{27}$$

input
```
int(x^4*(d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^3*x^5)/5 + (b*e^3*x^11)/11 + (3*b*d^2*e*x^7)/7 + (b*d*e^2
*x^9)/3) + (d^3*x^5*(5*a - b*n))/25 + (e^3*x^11*(11*a - b*n))/121 + (3*d^2
*e*x^7*(7*a - b*n))/49 + (d*e^2*x^9*(9*a - b*n))/27
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 139, normalized size of antiderivative = 1.39

$$\int x^4 (d+ex^2)^3 (a+b\log(cx^n))\,dx$$
$$= \frac{x^5(800415\log(x^nc)\,b\,d^3 + 1715175\log(x^nc)\,b\,d^2e\,x^2 + 1334025\log(x^nc)\,bd\,e^2x^4 + 363825\log(x^nc)\,b\,e^3x^6}{}$$

input
```
int(x^4*(e*x^2+d)^3*(a+b*log(c*x^n)),x)
```

output
```
(x**5*(800415*log(x**n*c)*b*d**3 + 1715175*log(x**n*c)*b*d**2*e*x**2 + 133
4025*log(x**n*c)*b*d*e**2*x**4 + 363825*log(x**n*c)*b*e**3*x**6 + 800415*a
*d**3 + 1715175*a*d**2*e*x**2 + 1334025*a*d*e**2*x**4 + 363825*a*e**3*x**6
 - 160083*b*d**3*n - 245025*b*d**2*e*n*x**2 - 148225*b*d*e**2*n*x**4 - 330
75*b*e**3*n*x**6))/4002075
```

3.203 $\int x^2(d+ex^2)^3\,(a+b\log(cx^n))\,dx$

Optimal result 1599
Mathematica [A] (verified) 1599
Rubi [A] (verified) 1600
Maple [A] (verified) 1601
Fricas [A] (verification not implemented) 1601
Sympy [A] (verification not implemented) 1602
Maxima [A] (verification not implemented) 1603
Giac [A] (verification not implemented) 1603
Mupad [B] (verification not implemented) 1604
Reduce [B] (verification not implemented) 1604

Optimal result

Integrand size = 23, antiderivative size = 100

$$\int x^2\left(d+ex^2\right)^3\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{9}bd^3nx^3-\frac{3}{25}bd^2enx^5-\frac{3}{49}bde^2nx^7-\frac{1}{81}be^3nx^9+\frac{1}{315}\left(105d^3x^3+189d^2ex^5+135de^2x^7+35e^3x^9\right)\left(a+b\log\left(cx^n\right)\right)$$

output
```
-1/9*b*d^3*n*x^3-3/25*b*d^2*e*n*x^5-3/49*b*d*e^2*n*x^7-1/81*b*e^3*n*x^9+1/
315*(35*e^3*x^9+135*d*e^2*x^7+189*d^2*e*x^5+105*d^3*x^3)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.33

$$\int x^2\left(d+ex^2\right)^3\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{9}bd^3nx^3-\frac{3}{25}bd^2enx^5-\frac{3}{49}bde^2nx^7-\frac{1}{81}be^3nx^9+\frac{1}{3}d^3x^3(a+b\log\left(cx^n\right))+\frac{3}{5}d^2ex^5(a+b\log\left(cx^n\right))+\frac{3}{7}de^2x^7(a+b\log\left(cx^n\right))+\frac{1}{9}e^3x^9(a+b\log\left(cx^n\right))$$

input
```
Integrate[x^2*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/9*(b*d^3*n*x^3) - (3*b*d^2*e*n*x^5)/25 - (3*b*d*e^2*n*x^7)/49 - (b*e^3*
n*x^9)/81 + (d^3*x^3*(a + b*Log[c*x^n]))/3 + (3*d^2*e*x^5*(a + b*Log[c*x^n
]))/5 + (3*d*e^2*x^7*(a + b*Log[c*x^n]))/7 + (e^3*x^9*(a + b*Log[c*x^n]))/
9
```

Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 97, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2771, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2 \left(d+ex^2\right)^3 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{315}\left(105d^3x^3+189d^2ex^5+135de^2x^7+35e^3x^9\right)(a+b\log(cx^n))-bn\int\left(\frac{e^3x^8}{9}+\frac{3}{7}de^2x^6+\frac{3}{5}d^2ex^4+\frac{d^3x^2}{3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{315}\left(105d^3x^3+189d^2ex^5+135de^2x^7+35e^3x^9\right)(a+b\log(cx^n))-bn\left(\frac{d^3x^3}{9}+\frac{3}{25}d^2ex^5+\frac{3}{49}de^2x^7+\frac{e^3x^9}{81}\right)$$

input
```
Int[x^2*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d^3*x^3)/9 + (3*d^2*e*x^5)/25 + (3*d*e^2*x^7)/49 + (e^3*x^9)/81))
+ ((105*d^3*x^3 + 189*d^2*e*x^5 + 135*d*e^2*x^7 + 35*e^3*x^9)*(a + b*Log[c
*x^n]))/315
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 2.07 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.44

method	result
parallelrisch	$\frac{x^{9} b \ln\left(c\,x^{n}\right) e^{3}}{9}-\frac{b\,e^{3} n\,x^{9}}{81}+\frac{x^{9} a\,e^{3}}{9}+\frac{3 x^{7} b \ln\left(c\,x^{n}\right) e^{2} d}{7}-\frac{3 b d\,e^{2} n\,x^{7}}{49}+\frac{3 x^{7} a\,e^{2} d}{7}+\frac{3 x^{5} b \ln\left(c\,x^{n}\right) d^{2} e}{5}-\frac{3 b\,d^{2} e n\,x^{5}}{25}$
risch	$\frac{b\,x^{3} \left(35 e^{3} x^{6}+135 e^{2} d\,x^{4}+189 d^{2} e\,x^{2}+105 d^{3}\right) \ln\left(x^{n}\right)}{315}+\frac{3 a\,d^{2} e\,x^{5}}{5}+\frac{x^{3} a\,d^{3}}{3}+\frac{\ln\left(c\right) b\,e^{3} x^{9}}{9}+\frac{x^{9} a\,e^{3}}{9}+\frac{3 x^{7} a\,e^{2} d}{7}+$ 3 l

input
```
int(x^2*(e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/9*x^9*b*ln(c*x^n)*e^3-1/81*b*e^3*n*x^9+1/9*x^9*a*e^3+3/7*x^7*b*ln(c*x^n)
*e^2*d-3/49*b*d*e^2*n*x^7+3/7*x^7*a*e^2*d+3/5*x^5*b*ln(c*x^n)*d^2*e-3/25*b
*d^2*e*n*x^5+3/5*a*d^2*e*x^5+1/3*x^3*b*ln(c*x^n)*d^3-1/9*b*d^3*n*x^3+1/3*x
^3*a*d^3
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.67

$$\int x^2 (d+ex^2)^3 (a+b\log(cx^n))\,dx$$
$$= -\frac{1}{81}\left(be^3n-9\,ae^3\right)x^9-\frac{3}{49}\left(bde^2n-7\,ade^2\right)x^7-\frac{3}{25}\left(bd^2en-5\,ad^2e\right)x^5$$
$$-\frac{1}{9}\left(bd^3n-3\,ad^3\right)x^3+\frac{1}{315}\left(35\,be^3x^9+135\,bde^2x^7+189\,bd^2ex^5+105\,bd^3x^3\right)\log(c)$$
$$+\frac{1}{315}\left(35\,be^3nx^9+135\,bde^2nx^7+189\,bd^2enx^5+105\,bd^3nx^3\right)\log(x)$$

input
```
integrate(x^2*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/81*(b*e^3*n - 9*a*e^3)*x^9 - 3/49*(b*d*e^2*n - 7*a*d*e^2)*x^7 - 3/25*(b
*d^2*e*n - 5*a*d^2*e)*x^5 - 1/9*(b*d^3*n - 3*a*d^3)*x^3 + 1/315*(35*b*e^3*
x^9 + 135*b*d*e^2*x^7 + 189*b*d^2*e*x^5 + 105*b*d^3*x^3)*log(c) + 1/315*(3
5*b*e^3*n*x^9 + 135*b*d*e^2*n*x^7 + 189*b*d^2*e*n*x^5 + 105*b*d^3*n*x^3)*l
og(x)
```

Sympy [A] (verification not implemented)

Time = 1.31 (sec) , antiderivative size = 175, normalized size of antiderivative = 1.75

$$\int x^2\left(d+ex^2\right)^3\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{ad^3x^3}{3}+\frac{3ad^2ex^5}{5}+\frac{3ade^2x^7}{7}+\frac{ae^3x^9}{9} - \frac{bd^3nx^3}{9}+\frac{bd^3x^3\log\left(cx^n\right)}{3}-\frac{3bd^2enx^5}{25} + \frac{3bd^2ex^5\log\left(cx^n\right)}{5}-\frac{3bde^2nx^7}{49} + \frac{3bde^2x^7\log\left(cx^n\right)}{7}-\frac{be^3nx^9}{81}+\frac{be^3x^9\log\left(cx^n\right)}{9}$$

input
```
integrate(x**2*(e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x**3/3 + 3*a*d**2*e*x**5/5 + 3*a*d*e**2*x**7/7 + a*e**3*x**9/9 - b*
d**3*n*x**3/9 + b*d**3*x**3*log(c*x**n)/3 - 3*b*d**2*e*n*x**5/25 + 3*b*d**
2*e*x**5*log(c*x**n)/5 - 3*b*d*e**2*n*x**7/49 + 3*b*d*e**2*x**7*log(c*x**n
)/7 - b*e**3*n*x**9/81 + b*e**3*x**9*log(c*x**n)/9
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.43

$$\int x^2(d+ex^2)^3(a+b\log(cx^n))\,dx = -\frac{1}{81}be^3nx^9 + \frac{1}{9}be^3x^9\log(cx^n) + \frac{1}{9}ae^3x^9 - \frac{3}{49}bde^2nx^7 + \frac{3}{7}bde^2x^7\log(cx^n) + \frac{3}{7}ade^2x^7 - \frac{3}{25}bd^2enx^5 + \frac{3}{5}bd^2ex^5\log(cx^n) + \frac{3}{5}ad^2ex^5 - \frac{1}{9}bd^3nx^3 + \frac{1}{3}bd^3x^3\log(cx^n) + \frac{1}{3}ad^3x^3$$

input
```
integrate(x^2*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/81*b*e^3*n*x^9 + 1/9*b*e^3*x^9*log(c*x^n) + 1/9*a*e^3*x^9 - 3/49*b*d*e^
2*n*x^7 + 3/7*b*d*e^2*x^7*log(c*x^n) + 3/7*a*d*e^2*x^7 - 3/25*b*d^2*e*n*x^
5 + 3/5*b*d^2*e*x^5*log(c*x^n) + 3/5*a*d^2*e*x^5 - 1/9*b*d^3*n*x^3 + 1/3*b
*d^3*x^3*log(c*x^n) + 1/3*a*d^3*x^3
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.77

$$\int x^2(d+ex^2)^3(a+b\log(cx^n))\,dx = \frac{1}{9}be^3nx^9\log(x) - \frac{1}{81}be^3nx^9 + \frac{1}{9}be^3x^9\log(c) + \frac{1}{9}ae^3x^9 + \frac{3}{7}bde^2nx^7\log(x) - \frac{3}{49}bde^2nx^7 + \frac{3}{7}bde^2x^7\log(c) + \frac{3}{7}ade^2x^7 + \frac{3}{5}bd^2enx^5\log(x) - \frac{3}{25}bd^2enx^5 + \frac{3}{5}bd^2ex^5\log(c) + \frac{3}{5}ad^2ex^5 + \frac{1}{3}bd^3nx^3\log(x) - \frac{1}{9}bd^3nx^3 + \frac{1}{3}bd^3x^3\log(c) + \frac{1}{3}ad^3x^3$$

input
```
integrate(x^2*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/9*b*e^3*n*x^9*log(x) - 1/81*b*e^3*n*x^9 + 1/9*b*e^3*x^9*log(c) + 1/9*a*e
^3*x^9 + 3/7*b*d*e^2*n*x^7*log(x) - 3/49*b*d*e^2*n*x^7 + 3/7*b*d*e^2*x^7*l
og(c) + 3/7*a*d*e^2*x^7 + 3/5*b*d^2*e*n*x^5*log(x) - 3/25*b*d^2*e*n*x^5 +
3/5*b*d^2*e*x^5*log(c) + 3/5*a*d^2*e*x^5 + 1/3*b*d^3*n*x^3*log(x) - 1/9*b*
d^3*n*x^3 + 1/3*b*d^3*x^3*log(c) + 1/3*a*d^3*x^3
```

Mupad [B] (verification not implemented)

Time = 25.62 (sec) , antiderivative size = 113, normalized size of antiderivative = 1.13

$$\int x^2(d+ex^2)^3(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,d^3\,x^3}{3}+\frac{3\,b\,d^2\,e\,x^5}{5}+\frac{3\,b\,d\,e^2\,x^7}{7}+\frac{b\,e^3\,x^9}{9}\right)+\frac{d^3\,x^3\,(3\,a-b\,n)}{9}+\frac{e^3\,x^9\,(9\,a-b\,n)}{81}+\frac{3\,d^2\,e\,x^5\,(5\,a-b\,n)}{25}+\frac{3\,d\,e^2\,x^7\,(7\,a-b\,n)}{49}$$

input
```
int(x^2*(d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^3*x^3)/3 + (b*e^3*x^9)/9 + (3*b*d^2*e*x^5)/5 + (3*b*d*e^2
*x^7)/7) + (d^3*x^3*(3*a - b*n))/9 + (e^3*x^9*(9*a - b*n))/81 + (3*d^2*e*x
^5*(5*a - b*n))/25 + (3*d*e^2*x^7*(7*a - b*n))/49
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 139, normalized size of antiderivative = 1.39

$$\int x^2(d+ex^2)^3(a+b\log(cx^n))\,dx = \frac{x^3(33075\log(x^nc)\,b\,d^3+59535\log(x^nc)\,b\,d^2e\,x^2+42525\log(x^nc)\,bd\,e^2x^4+11025\log(x^nc)\,b\,e^3x^6+3307}{}$$

input
```
int(x^2*(e*x^2+d)^3*(a+b*log(c*x^n)),x)
```

output
```
(x**3*(33075*log(x**n*c)*b*d**3 + 59535*log(x**n*c)*b*d**2*e*x**2 + 42525*
log(x**n*c)*b*d*e**2*x**4 + 11025*log(x**n*c)*b*e**3*x**6 + 33075*a*d**3 +
 59535*a*d**2*e*x**2 + 42525*a*d*e**2*x**4 + 11025*a*e**3*x**6 - 11025*b*d
**3*n - 11907*b*d**2*e*n*x**2 - 6075*b*d*e**2*n*x**4 - 1225*b*e**3*n*x**6)
)/99225
```

3.204 $\int (d+ex^2)^3 (a+b\log(cx^n))\,dx$

Optimal result 1606
Mathematica [A] (verified) 1606
Rubi [A] (verified) 1607
Maple [A] (verified) 1608
Fricas [A] (verification not implemented) 1608
Sympy [A] (verification not implemented) 1609
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Giac [A] (verification not implemented) 1610
Mupad [B] (verification not implemented) 1611
Reduce [B] (verification not implemented) 1611

Optimal result

Integrand size = 20, antiderivative size = 121

$$\int (d+ex^2)^3 (a+b\log(cx^n))\,dx = -bd^3nx - \frac{1}{3}bd^2enx^3 - \frac{3}{25}bde^2nx^5 - \frac{1}{49}be^3nx^7 + d^3x(a+b\log(cx^n)) + d^2ex^3(a+b\log(cx^n)) + \frac{3}{5}de^2x^5(a+b\log(cx^n)) + \frac{1}{7}e^3x^7(a+b\log(cx^n))$$

output
```
-b*d^3*n*x-1/3*b*d^2*e*n*x^3-3/25*b*d*e^2*n*x^5-1/49*b*e^3*n*x^7+d^3*x*(a+
b*ln(c*x^n))+d^2*e*x^3*(a+b*ln(c*x^n))+3/5*d*e^2*x^5*(a+b*ln(c*x^n))+1/7*e
^3*x^7*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 124, normalized size of antiderivative = 1.02

$$\int (d+ex^2)^3 (a+b\log(cx^n))\,dx = ad^3x - bd^3nx - \frac{1}{3}bd^2enx^3 - \frac{3}{25}bde^2nx^5 - \frac{1}{49}be^3nx^7 + bd^3x\log(cx^n) + d^2ex^3(a+b\log(cx^n)) + \frac{3}{5}de^2x^5(a+b\log(cx^n)) + \frac{1}{7}e^3x^7(a+b\log(cx^n))$$

input
```
Integrate[(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
a*d^3*x - b*d^3*n*x - (b*d^2*e*n*x^3)/3 - (3*b*d*e^2*n*x^5)/25 - (b*e^3*n*
x^7)/49 + b*d^3*x*Log[c*x^n] + d^2*e*x^3*(a + b*Log[c*x^n]) + (3*d*e^2*x^5
*(a + b*Log[c*x^n]))/5 + (e^3*x^7*(a + b*Log[c*x^n]))/7
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 117, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {2750, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex^2)^3 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2750}$$

$$-bn\int \left(\frac{e^3x^6}{7}+\frac{3}{5}de^2x^4+d^2ex^2+d^3\right)dx+d^3x(a+b\log(cx^n))+d^2ex^3(a+b\log(cx^n))+\frac{3}{5}de^2x^5(a+b\log(cx^n))+\frac{1}{7}e^3x^7(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$d^3x(a+b\log(cx^n))+d^2ex^3(a+b\log(cx^n))+\frac{3}{5}de^2x^5(a+b\log(cx^n))+\frac{1}{7}e^3x^7(a+b\log(cx^n))-bn\left(d^3x+\frac{1}{3}d^2ex^3+\frac{3}{25}de^2x^5+\frac{e^3x^7}{49}\right)$$

input
```
Int[(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*(d^3*x + (d^2*e*x^3)/3 + (3*d*e^2*x^5)/25 + (e^3*x^7)/49)) + d^3*x*(
a + b*Log[c*x^n]) + d^2*e*x^3*(a + b*Log[c*x^n]) + (3*d*e^2*x^5*(a + b*Log
[c*x^n]))/5 + (e^3*x^7*(a + b*Log[c*x^n]))/7
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2750
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Simp[(a + b*Log[c*x^n])
  u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b,
 c, d, e, n, r}, x] && IGtQ[q, 0]
```

Maple [A] (verified)

Time = 1.18 (sec) , antiderivative size = 134, normalized size of antiderivative = 1.11

method	result
parallelrisch	$\frac{b\ln(c\,x^n)e^3x^7}{7}-\frac{b\,e^3n\,x^7}{49}+\frac{a\,e^3x^7}{7}+\frac{3b\ln(c\,x^n)e^2d\,x^5}{5}-\frac{3bd\,e^2n\,x^5}{25}+\frac{3x^5a\,e^2d}{5}+b\ln\left(c\,x^n\right)d^2e\,x^3-\frac{b\,d^2e}{3}$
risch	$\frac{3x^5a\,e^2d}{5}+xa\,d^3+\frac{\ln(c)b\,e^3x^7}{7}+x^3a\,d^2e+\ln\left(c\right)b\,d^2e\,x^3+x\ln\left(c\right)b\,d^3+\frac{a\,e^3x^7}{7}+\frac{bx(5e^3x^6+21e^2d}{}$

input
```
int((e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/7*b*ln(c*x^n)*e^3*x^7-1/49*b*e^3*n*x^7+1/7*a*e^3*x^7+3/5*b*ln(c*x^n)*e^2
*d*x^5-3/25*b*d*e^2*n*x^5+3/5*x^5*a*e^2*d+b*ln(c*x^n)*d^2*e*x^3-1/3*b*d^2*
e*n*x^3+x^3*a*d^2*e+x*b*ln(c*x^n)*d^3-b*d^3*n*x+x*a*d^3
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 161, normalized size of antiderivative = 1.33

$$\begin{aligned}\int \left(d+ex^2\right)^3\left(a+b\log\left(cx^n\right)\right)\,dx &= -\frac{1}{49}\left(be^3n-7\,ae^3\right)x^7-\frac{3}{25}\left(bde^2n-5\,ade^2\right)x^5-\frac{1}{3}\left(bd^2en-3\,ad^2e\right)x^3\\&\quad-\left(bd^3n-ad^3\right)x+\frac{1}{35}\left(5\,be^3x^7+21\,bde^2x^5+35\,bd^2ex^3+35\,bd^3x\right)\log\left(c\right)\\&\quad+\frac{1}{35}\left(5\,be^3nx^7+21\,bde^2nx^5+35\,bd^2enx^3+35\,bd^3nx\right)\log\left(x\right)\end{aligned}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/49*(b*e^3*n - 7*a*e^3)*x^7 - 3/25*(b*d*e^2*n - 5*a*d*e^2)*x^5 - 1/3*(b*
d^2*e*n - 3*a*d^2*e)*x^3 - (b*d^3*n - a*d^3)*x + 1/35*(5*b*e^3*x^7 + 21*b*
d*e^2*x^5 + 35*b*d^2*e*x^3 + 35*b*d^3*x)*log(c) + 1/35*(5*b*e^3*n*x^7 + 21
*b*d*e^2*n*x^5 + 35*b*d^2*e*n*x^3 + 35*b*d^3*n*x)*log(x)
```

Sympy [A] (verification not implemented)

Time = 0.75 (sec) , antiderivative size = 156, normalized size of antiderivative = 1.29

$$\int (d+ex^2)^3 (a+b\log(cx^n))\,dx = ad^3x + ad^2ex^3 + \frac{3ade^2x^5}{5} + \frac{ae^3x^7}{7} - bd^3nx + bd^3x\log(cx^n) - \frac{bd^2enx^3}{3} + bd^2ex^3\log(cx^n) - \frac{3bde^2nx^5}{25} + \frac{3bde^2x^5\log(cx^n)}{5} - \frac{be^3nx^7}{49} + \frac{be^3x^7\log(cx^n)}{7}$$

input
```
integrate((e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x + a*d**2*e*x**3 + 3*a*d*e**2*x**5/5 + a*e**3*x**7/7 - b*d**3*n*x
+ b*d**3*x*log(c*x**n) - b*d**2*e*n*x**3/3 + b*d**2*e*x**3*log(c*x**n) - 3
*b*d*e**2*n*x**5/25 + 3*b*d*e**2*x**5*log(c*x**n)/5 - b*e**3*n*x**7/49 + b
*e**3*x**7*log(c*x**n)/7
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.10

$$\int (d+ex^2)^3 (a+b\log(cx^n))\,dx = -\frac{1}{49}be^3nx^7 + \frac{1}{7}be^3x^7\log(cx^n) + \frac{1}{7}ae^3x^7 - \frac{3}{25}bde^2nx^5 + \frac{3}{5}bde^2x^5\log(cx^n) + \frac{3}{5}ade^2x^5 - \frac{1}{3}bd^2enx^3 + bd^2ex^3\log(cx^n) + ad^2ex^3 - bd^3nx + bd^3x\log(cx^n) + ad^3x$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/49*b*e^3*n*x^7 + 1/7*b*e^3*x^7*log(c*x^n) + 1/7*a*e^3*x^7 - 3/25*b*d*e^
2*n*x^5 + 3/5*b*d*e^2*x^5*log(c*x^n) + 3/5*a*d*e^2*x^5 - 1/3*b*d^2*e*n*x^3
 + b*d^2*e*x^3*log(c*x^n) + a*d^2*e*x^3 - b*d^3*n*x + b*d^3*x*log(c*x^n) +
 a*d^3*x
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 163, normalized size of antiderivative = 1.35

$$\int (d+ex^2)^3 (a+b\log(cx^n)) \, dx = \frac{1}{7} be^3nx^7\log(x) - \frac{1}{49} be^3nx^7 + \frac{1}{7} be^3x^7\log(c) + \frac{1}{7} ae^3x^7 + \frac{3}{5} bde^2nx^5\log(x) - \frac{3}{25} bde^2nx^5 + \frac{3}{5} bde^2x^5\log(c) + \frac{3}{5} ade^2x^5 + bd^2enx^3\log(x) - \frac{1}{3} bd^2enx^3 + bd^2ex^3\log(c) + ad^2ex^3 + bd^3nx\log(x) - bd^3nx + bd^3x\log(c) + ad^3x$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/7*b*e^3*n*x^7*log(x) - 1/49*b*e^3*n*x^7 + 1/7*b*e^3*x^7*log(c) + 1/7*a*e
^3*x^7 + 3/5*b*d*e^2*n*x^5*log(x) - 3/25*b*d*e^2*n*x^5 + 3/5*b*d*e^2*x^5*l
og(c) + 3/5*a*d*e^2*x^5 + b*d^2*e*n*x^3*log(x) - 1/3*b*d^2*e*n*x^3 + b*d^2
*e*x^3*log(c) + a*d^2*e*x^3 + b*d^3*n*x*log(x) - b*d^3*n*x + b*d^3*x*log(c
) + a*d^3*x
```

Mupad [B] (verification not implemented)

Time = 25.99 (sec) , antiderivative size = 104, normalized size of antiderivative = 0.86

$$\int (d+ex^2)^3 (a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(b\,d^3\,x+b\,d^2\,e\,x^3+\frac{3\,b\,d\,e^2\,x^5}{5}+\frac{b\,e^3\,x^7}{7}\right) + \frac{e^3\,x^7\,(7\,a-b\,n)}{49}+d^3\,x\,(a-b\,n) + \frac{d^2\,e\,x^3\,(3\,a-b\,n)}{3}+\frac{3\,d\,e^2\,x^5\,(5\,a-b\,n)}{25}$$

input
```
int((d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*e^3*x^7)/7 + b*d^3*x + b*d^2*e*x^3 + (3*b*d*e^2*x^5)/5) + (
e^3*x^7*(7*a - b*n))/49 + d^3*x*(a - b*n) + (d^2*e*x^3*(3*a - b*n))/3 + (3
*d*e^2*x^5*(5*a - b*n))/25
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 137, normalized size of antiderivative = 1.13

$$\int (d+ex^2)^3 (a+b\log(cx^n))\,dx = \frac{x(3675\log(x^n c)\,b\,d^3+3675\log(x^n c)\,b\,d^2e\,x^2+2205\log(x^n c)\,bd\,e^2x^4+525\log(x^n c)\,b\,e^3x^6+3675a\,d^3+}{3675}$$

input
```
int((e*x^2+d)^3*(a+b*log(c*x^n)),x)
```

output
```
(x*(3675*log(x**n*c)*b*d**3 + 3675*log(x**n*c)*b*d**2*e*x**2 + 2205*log(x*
*n*c)*b*d*e**2*x**4 + 525*log(x**n*c)*b*e**3*x**6 + 3675*a*d**3 + 3675*a*d
**2*e*x**2 + 2205*a*d*e**2*x**4 + 525*a*e**3*x**6 - 3675*b*d**3*n - 1225*b
*d**2*e*n*x**2 - 441*b*d*e**2*n*x**4 - 75*b*e**3*n*x**6))/3675
```

3.205 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^2}\,dx$

Optimal result 1612
Mathematica [A] (verified) 1612
Rubi [A] (verified) 1613
Maple [A] (verified) 1614
Fricas [A] (verification not implemented) 1614
Sympy [A] (verification not implemented) 1615
Maxima [A] (verification not implemented) 1615
Giac [A] (verification not implemented) 1616
Mupad [B] (verification not implemented) 1617
Reduce [B] (verification not implemented) 1617

Optimal result

Integrand size = 23, antiderivative size = 118

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^2}\,dx = -\frac{bd^3n}{x}-3bd^2enx-\frac{1}{3}bde^2nx^3-\frac{1}{25}be^3nx^5 -\frac{d^3(a+b\log(cx^n))}{x}+3d^2ex(a+b\log(cx^n)) +de^2x^3(a+b\log(cx^n))+\frac{1}{5}e^3x^5(a+b\log(cx^n))$$

output
```
-b*d^3*n/x-3*b*d^2*e*n*x-1/3*b*d*e^2*n*x^3-1/25*b*e^3*n*x^5-d^3*(a+b*ln(c*
x^n))/x+3*d^2*e*x*(a+b*ln(c*x^n))+d*e^2*x^3*(a+b*ln(c*x^n))+1/5*e^3*x^5*(a
+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.04

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^2}\,dx = -\frac{bd^3n}{x}+3ad^2ex-3bd^2enx-\frac{1}{3}bde^2nx^3 -\frac{1}{25}be^3nx^5+3bd^2ex\log(cx^n)-\frac{d^3(a+b\log(cx^n))}{x} +de^2x^3(a+b\log(cx^n))+\frac{1}{5}e^3x^5(a+b\log(cx^n))$$

input
```
Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-((b*d^3*n)/x) + 3*a*d^2*e*x - 3*b*d^2*e*n*x - (b*d*e^2*n*x^3)/3 - (b*e^3*
n*x^5)/25 + 3*b*d^2*e*x*Log[c*x^n] - (d^3*(a + b*Log[c*x^n]))/x + d*e^2*x^
3*(a + b*Log[c*x^n]) + (e^3*x^5*(a + b*Log[c*x^n]))/5
```

Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 114, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = $\{2772, 2009\}$

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^2} dx$$

$$\Big\downarrow \text{ 2772}$$

$$-bn\int \left(\frac{e^3x^4}{5}+de^2x^2+3d^2e-\frac{d^3}{x^2}\right)dx-\frac{d^3(a+b\log(cx^n))}{x}+3d^2ex(a+b\log(cx^n))+ de^2x^3(a+b\log(cx^n))+\frac{1}{5}e^3x^5(a+b\log(cx^n))$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{x}+3d^2ex(a+b\log(cx^n))+de^2x^3(a+b\log(cx^n))+ \frac{1}{5}e^3x^5(a+b\log(cx^n))-bn\left(\frac{d^3}{x}+3d^2ex+\frac{1}{3}de^2x^3+\frac{e^3x^5}{25}\right)$$

input
```
Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-(b*n*(d^3/x + 3*d^2*e*x + (d*e^2*x^3)/3 + (e^3*x^5)/25)) - (d^3*(a + b*Lo
g[c*x^n]))/x + 3*d^2*e*x*(a + b*Log[c*x^n]) + d*e^2*x^3*(a + b*Log[c*x^n])
 + (e^3*x^5*(a + b*Log[c*x^n]))/5
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 1.14 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.19

method	result
parallelrisch	$-\frac{-15b\ln(c\,x^n)e^3x^6+3b\,e^3n\,x^6-15x^6a\,e^3-75b\ln(c\,x^n)e^2d\,x^4+25bd\,e^2n\,x^4-75x^4a\,e^2d-225b\ln(c\,x^n)d^2e\,x^2+225b\,d^2en\,x^2}{75x}$
risch	$-\frac{b\left(-e^3x^6-5e^2d\,x^4-15d^2e\,x^2+5d^3\right)\ln(x^n)}{5x}-\frac{150a\,d^3+75i\pi b\,d^3\operatorname{csgn}(ic\,x^n)^2\operatorname{csgn}(ic)-30x^6a\,e^3-150x^4a\,e^2d-450a\,d^2e\,x}{}$

input
```
int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

output
```
-1/75/x*(-15*b*ln(c*x^n)*e^3*x^6+3*b*e^3*n*x^6-15*x^6*a*e^3-75*b*ln(c*x^n)
*e^2*d*x^4+25*b*d*e^2*n*x^4-75*x^4*a*e^2*d-225*b*ln(c*x^n)*d^2*e*x^2+225*b
*d^2*e*n*x^2-225*a*d^2*e*x^2+75*b*ln(c*x^n)*d^3+75*b*d^3*n+75*a*d^3)
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 159, normalized size of antiderivative = 1.35

$$\int \frac{(d+ex^2)^3\,(a+b\log(cx^n))}{x^2}\,dx = -\frac{3\,(be^3n-5\,ae^3)x^6+75\,bd^3n+25\,(bde^2n-3\,ade^2)x^4+75\,ad^3+225\,(bd^2en-ad^2e)x^2-15\,(be^3x^6+}{75\,x}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
-1/75*(3*(b*e^3*n - 5*a*e^3)*x^6 + 75*b*d^3*n + 25*(b*d*e^2*n - 3*a*d*e^2)
*x^4 + 75*a*d^3 + 225*(b*d^2*e*n - a*d^2*e)*x^2 - 15*(b*e^3*x^6 + 5*b*d*e^
2*x^4 + 15*b*d^2*e*x^2 - 5*b*d^3)*log(c) - 15*(b*e^3*n*x^6 + 5*b*d*e^2*n*x
^4 + 15*b*d^2*e*n*x^2 - 5*b*d^3*n)*log(x))/x
```

Sympy [A] (verification not implemented)

Time = 0.69 (sec) , antiderivative size = 146, normalized size of antiderivative = 1.24

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^2}\,dx = -\frac{ad^3}{x} + 3ad^2ex + ade^2x^3 + \frac{ae^3x^5}{5} - \frac{bd^3n}{x} - \frac{bd^3\log(cx^n)}{x} - 3bd^2enx + 3bd^2ex\log(cx^n) - \frac{bde^2nx^3}{3} + bde^2x^3\log(cx^n) - \frac{be^3nx^5}{25} + \frac{be^3x^5\log(cx^n)}{5}$$

input
```
integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**2,x)
```

output
```
-a*d**3/x + 3*a*d**2*e*x + a*d*e**2*x**3 + a*e**3*x**5/5 - b*d**3*n/x - b*
d**3*log(c*x**n)/x - 3*b*d**2*e*n*x + 3*b*d**2*e*x*log(c*x**n) - b*d*e**2*
n*x**3/3 + b*d*e**2*x**3*log(c*x**n) - b*e**3*n*x**5/25 + b*e**3*x**5*log(
c*x**n)/5
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.14

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^2}\,dx = -\frac{1}{25}\,be^3nx^5 + \frac{1}{5}\,be^3x^5\log(cx^n) + \frac{1}{5}\,ae^3x^5 - \frac{1}{3}\,bde^2nx^3 + bde^2x^3\log(cx^n) + ade^2x^3 - 3\,bd^2enx + 3\,bd^2ex\log(cx^n) + 3\,ad^2ex - \frac{bd^3n}{x} - \frac{bd^3\log(cx^n)}{x} - \frac{ad^3}{x}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
-1/25*b*e^3*n*x^5 + 1/5*b*e^3*x^5*log(c*x^n) + 1/5*a*e^3*x^5 - 1/3*b*d*e^2
*n*x^3 + b*d*e^2*x^3*log(c*x^n) + a*d*e^2*x^3 - 3*b*d^2*e*n*x + 3*b*d^2*e*
x*log(c*x^n) + 3*a*d^2*e*x - b*d^3*n/x - b*d^3*log(c*x^n)/x - a*d^3/x
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 151, normalized size of antiderivative = 1.28

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^2}\,dx = -\frac{1}{25}\left(be^3n - 5\,be^3\log(c) - 5\,ae^3\right)x^5 - \frac{1}{3}\left(bde^2n - 3\,bde^2\log(c) - 3\,ade^2\right)x^3 - 3\left(bd^2en - bd^2e\log(c) - ad^2e\right)x + \frac{1}{5}\left(be^3nx^5 + 5\,bde^2nx^3 + 15\,bd^2enx - \frac{5\,bd^3n}{x}\right)\log(x) - \frac{bd^3n + bd^3\log(c) + ad^3}{x}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
-1/25*(b*e^3*n - 5*b*e^3*log(c) - 5*a*e^3)*x^5 - 1/3*(b*d*e^2*n - 3*b*d*e^
2*log(c) - 3*a*d*e^2)*x^3 - 3*(b*d^2*e*n - b*d^2*e*log(c) - a*d^2*e)*x + 1
/5*(b*e^3*n*x^5 + 5*b*d*e^2*n*x^3 + 15*b*d^2*e*n*x - 5*b*d^3*n/x)*log(x) -
 (b*d^3*n + b*d^3*log(c) + a*d^3)/x
```

Mupad [B] (verification not implemented)

Time = 25.92 (sec) , antiderivative size = 145, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^2}\,dx = \ln(c\,x^n)\left(\frac{6\,b\,d^2\,e\,x^2+4\,b\,d\,e^2\,x^4+\frac{6\,b\,e^3\,x^6}{5}}{x} - \frac{b\,d^3+3\,b\,d^2\,e\,x^2+3\,b\,d\,e^2\,x^4+b\,e^3\,x^6}{x}\right) - \frac{a\,d^3+b\,d^3\,n}{x} + \frac{e^3\,x^5\,(5\,a-b\,n)}{25} + \frac{d\,e^2\,x^3\,(3\,a-b\,n)}{3} + 3\,d^2\,e\,x\,(a-b\,n)$$

input
```
int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^2,x)
```

output
```
log(c*x^n)*(((6*b*e^3*x^6)/5 + 6*b*d^2*e*x^2 + 4*b*d*e^2*x^4)/x - (b*d^3 +
 b*e^3*x^6 + 3*b*d^2*e*x^2 + 3*b*d*e^2*x^4)/x) - (a*d^3 + b*d^3*n)/x + (e^
3*x^5*(5*a - b*n))/25 + (d*e^2*x^3*(3*a - b*n))/3 + 3*d^2*e*x*(a - b*n)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 139, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^2}\,dx = \frac{-75\log(x^n c)\,b\,d^3+225\log(x^n c)\,b\,d^2 e\,x^2+75\log(x^n c)\,bd\,e^2 x^4+15\log(x^n c)\,b\,e^3 x^6-75a\,d^3+225a\,d^2 e\,x}{75x}$$

input
```
int((e*x^2+d)^3*(a+b*log(c*x^n))/x^2,x)
```

output
```
( - 75*log(x**n*c)*b*d**3 + 225*log(x**n*c)*b*d**2*e*x**2 + 75*log(x**n*c)
*b*d*e**2*x**4 + 15*log(x**n*c)*b*e**3*x**6 - 75*a*d**3 + 225*a*d**2*e*x**
2 + 75*a*d*e**2*x**4 + 15*a*e**3*x**6 - 75*b*d**3*n - 225*b*d**2*e*n*x**2
- 25*b*d*e**2*n*x**4 - 3*b*e**3*n*x**6)/(75*x)
```

3.206 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^4}\,dx$

Optimal result . . . 1618
Mathematica [A] (verified) . . . 1618
Rubi [A] (verified) . . . 1619
Maple [A] (verified) . . . 1620
Fricas [A] (verification not implemented) . . . 1621
Sympy [A] (verification not implemented) . . . 1621
Maxima [A] (verification not implemented) . . . 1622
Giac [A] (verification not implemented) . . . 1622
Mupad [B] (verification not implemented) . . . 1623
Reduce [B] (verification not implemented) . . . 1623

Optimal result

Integrand size = 23, antiderivative size = 121

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^4}\,dx = -\frac{bd^3n}{9x^3}-\frac{3bd^2en}{x}-3bde^2nx-\frac{1}{9}be^3nx^3-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{x}+3de^2x(a+b\log(cx^n))+\frac{1}{3}e^3x^3(a+b\log(cx^n))$$

output
```
-1/9*b*d^3*n/x^3-3*b*d^2*e*n/x-3*b*d*e^2*n*x-1/9*b*e^3*n*x^3-1/3*d^3*(a+b*
ln(c*x^n))/x^3-3*d^2*e*(a+b*ln(c*x^n))/x+3*d*e^2*x*(a+b*ln(c*x^n))+1/3*e^3
*x^3*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 112, normalized size of antiderivative = 0.93

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^4}\,dx = -\frac{3a(d^3+9d^2ex^2-9de^2x^4-e^3x^6)+bn(d^3+27d^2ex^2+27de^2x^4+e^3x^6)+3b(d^3+9d^2ex^2-9de^2x^4-}{9x^3}$$

input
```
Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-1/9*(3*a*(d^3 + 9*d^2*e*x^2 - 9*d*e^2*x^4 - e^3*x^6) + b*n*(d^3 + 27*d^2*
e*x^2 + 27*d*e^2*x^4 + e^3*x^6) + 3*b*(d^3 + 9*d^2*e*x^2 - 9*d*e^2*x^4 - e
^3*x^6)*Log[c*x^n])/x^3
```

Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 120, normalized size of antiderivative = 0.99, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.130$, Rules used = {2772, 27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^4} dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \frac{1}{3}\left(-\frac{d^3}{x^4}-\frac{9ed^2}{x^2}+9e^2d+e^3x^2\right)dx-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{x}+3de^2x(a+b\log(cx^n))+\frac{1}{3}e^3x^3(a+b\log(cx^n))$$

$$\Big\downarrow \text{27}$$

$$-\frac{1}{3}bn\int \left(-\frac{d^3}{x^4}-\frac{9ed^2}{x^2}+9e^2d+e^3x^2\right)dx-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{x}+3de^2x(a+b\log(cx^n))+\frac{1}{3}e^3x^3(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{x}+3de^2x(a+b\log(cx^n))+\frac{1}{3}e^3x^3(a+b\log(cx^n))-\frac{1}{3}bn\left(\frac{d^3}{3x^3}+\frac{9d^2e}{x}+9de^2x+\frac{e^3x^3}{3}\right)$$

input
```
Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-1/3*(b*n*(d^3/(3*x^3) + (9*d^2*e)/x + 9*d*e^2*x + (e^3*x^3)/3)) - (d^3*(a
 + b*Log[c*x^n]))/(3*x^3) - (3*d^2*e*(a + b*Log[c*x^n]))/x + 3*d*e^2*x*(a
+ b*Log[c*x^n]) + (e^3*x^3*(a + b*Log[c*x^n]))/3
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 1.15 (sec) , antiderivative size = 138, normalized size of antiderivative = 1.14

method	result
parallelrisch	$-\frac{-3b\ln(c\,x^n)e^3x^6+b\,e^3n\,x^6-3x^6a\,e^3-27b\ln(c\,x^n)e^2d\,x^4+27bd\,e^2n\,x^4-27x^4a\,e^2d+27b\ln(c\,x^n)d^2e\,x^2+27b\,d^2en\,x^2+27a\,d}{9x^3}$
risch	$-\frac{b(-e^3x^6-9e^2d\,x^4+9d^2e\,x^2+d^3)\ln(x^n)}{3x^3}-\frac{6a\,d^3+3i\pi b\,d^3\operatorname{csgn}(ic\,x^n)^2\operatorname{csgn}(ic)-6x^6a\,e^3-54x^4a\,e^2d+54a\,d^2e\,x^2-54\ln(c}{}$

input
```
int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/9/x^3*(-3*b*ln(c*x^n)*e^3*x^6+b*e^3*n*x^6-3*x^6*a*e^3-27*b*ln(c*x^n)*e^
2*d*x^4+27*b*d*e^2*n*x^4-27*x^4*a*e^2*d+27*b*ln(c*x^n)*d^2*e*x^2+27*b*d^2*
e*n*x^2+27*a*d^2*e*x^2+3*b*ln(c*x^n)*d^3+b*d^3*n+3*a*d^3)
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 156, normalized size of antiderivative = 1.29

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^4}\,dx = -\frac{(be^3n-3\,ae^3)x^6+bd^3n+27\,(bde^2n-ade^2)x^4+3\,ad^3+27\,(bd^2en+ad^2e)x^2-3\,(be^3x^6+9\,bde^2x^4-}{9\,x^3}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
-1/9*((b*e^3*n - 3*a*e^3)*x^6 + b*d^3*n + 27*(b*d*e^2*n - a*d*e^2)*x^4 + 3
*a*d^3 + 27*(b*d^2*e*n + a*d^2*e)*x^2 - 3*(b*e^3*x^6 + 9*b*d*e^2*x^4 - 9*b
*d^2*e*x^2 - b*d^3)*log(c) - 3*(b*e^3*n*x^6 + 9*b*d*e^2*n*x^4 - 9*b*d^2*e*
n*x^2 - b*d^3*n)*log(x))/x^3
```

Sympy [A] (verification not implemented)

Time = 0.77 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.28

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^4}\,dx = -\frac{ad^3}{3x^3} - \frac{3ad^2e}{x} + 3ade^2x + \frac{ae^3x^3}{3} - \frac{bd^3n}{9x^3} - \frac{bd^3\log(cx^n)}{3x^3} - \frac{3bd^2en}{x} - \frac{3bd^2e\log(cx^n)}{x} - 3bde^2nx + 3bde^2x\log(cx^n) - \frac{be^3nx^3}{9} + \frac{be^3x^3\log(cx^n)}{3}$$

input
```
integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**4,x)
```

output
```
-a*d**3/(3*x**3) - 3*a*d**2*e/x + 3*a*d*e**2*x + a*e**3*x**3/3 - b*d**3*n/
(9*x**3) - b*d**3*log(c*x**n)/(3*x**3) - 3*b*d**2*e*n/x - 3*b*d**2*e*log(c
*x**n)/x - 3*b*d*e**2*n*x + 3*b*d*e**2*x*log(c*x**n) - b*e**3*n*x**3/9 + b
*e**3*x**3*log(c*x**n)/3
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 137, normalized size of antiderivative = 1.13

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^4} dx = -\frac{1}{9} be^3nx^3 + \frac{1}{3} be^3x^3\log(cx^n) + \frac{1}{3} ae^3x^3 - 3 bde^2nx + 3 bde^2x\log(cx^n) + 3 ade^2x - \frac{3 bd^2en}{x} - \frac{3 bd^2e\log(cx^n)}{x} - \frac{3 ad^2e}{x} - \frac{bd^3n}{9 x^3} - \frac{bd^3\log(cx^n)}{3 x^3} - \frac{ad^3}{3 x^3}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
-1/9*b*e^3*n*x^3 + 1/3*b*e^3*x^3*log(c*x^n) + 1/3*a*e^3*x^3 - 3*b*d*e^2*n*
x + 3*b*d*e^2*x*log(c*x^n) + 3*a*d*e^2*x - 3*b*d^2*e*n/x - 3*b*d^2*e*log(c
*x^n)/x - 3*a*d^2*e/x - 1/9*b*d^3*n/x^3 - 1/3*b*d^3*log(c*x^n)/x^3 - 1/3*a
*d^3/x^3
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 159, normalized size of antiderivative = 1.31

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^4} dx = -\frac{1}{9} (be^3n - 3 be^3\log(c) - 3 ae^3)x^3 - 3 (bde^2n - bde^2\log(c) - ade^2)x + \frac{1}{3} \left(be^3nx^3 + 9 bde^2nx - \frac{9 bd^2enx^2 + bd^3n}{x^3}\right)\log(x) - \frac{27 bd^2enx^2 + 27 bd^2ex^2\log(c) + 27 ad^2ex^2 + bd^3n + 3 bd^3\log(c) + 3 ad^3}{9 x^3}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
-1/9*(b*e^3*n - 3*b*e^3*log(c) - 3*a*e^3)*x^3 - 3*(b*d*e^2*n - b*d*e^2*log
(c) - a*d*e^2)*x + 1/3*(b*e^3*n*x^3 + 9*b*d*e^2*n*x - (9*b*d^2*e*n*x^2 + b
*d^3*n)/x^3)*log(x) - 1/9*(27*b*d^2*e*n*x^2 + 27*b*d^2*e*x^2*log(c) + 27*a
*d^2*e*x^2 + b*d^3*n + 3*b*d^3*log(c) + 3*a*d^3)/x^3
```

Mupad [B] (verification not implemented)

Time = 25.77 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.17

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^4}\,dx = \ln(c\,x^n)\left(\frac{\frac{8\,b\,e^3\,x^6}{3}+8\,b\,d\,e^2\,x^4}{x^3} - \frac{\frac{b\,d^3}{3}+3\,b\,d^2\,e\,x^2+5\,b\,d\,e^2\,x^4+\frac{7\,b\,e^3\,x^6}{3}}{x^3}\right) - \frac{a\,d^3+x^2\,(9\,a\,d^2\,e+9\,b\,d^2\,e\,n)+\frac{b\,d^3\,n}{3}}{3\,x^3} + \frac{e^3\,x^3\,(3\,a-b\,n)}{9} + 3\,d\,e^2\,x\,(a-b\,n)$$

input
```
int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^4,x)
```

output
```
log(c*x^n)*(((8*b*e^3*x^6)/3 + 8*b*d*e^2*x^4)/x^3 - ((b*d^3)/3 + (7*b*e^3*
x^6)/3 + 3*b*d^2*e*x^2 + 5*b*d*e^2*x^4)/x^3) - (a*d^3 + x^2*(9*a*d^2*e + 9
*b*d^2*e*n) + (b*d^3*n)/3)/(3*x^3) + (e^3*x^3*(3*a - b*n))/9 + 3*d*e^2*x*(
a - b*n)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 139, normalized size of antiderivative = 1.15

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^4}\,dx = \frac{-3\log(x^n c)\,b\,d^3 - 27\log(x^n c)\,b\,d^2 e\,x^2 + 27\log(x^n c)\,bd\,e^2 x^4 + 3\log(x^n c)\,b\,e^3 x^6 - 3a\,d^3 - 27a\,d^2 e\,x^2 + 27}{9x^3}$$

input
```
int((e*x^2+d)^3*(a+b*log(c*x^n))/x^4,x)
```

output
```
( - 3*log(x**n*c)*b*d**3 - 27*log(x**n*c)*b*d**2*e*x**2 + 27*log(x**n*c)*b
*d*e**2*x**4 + 3*log(x**n*c)*b*e**3*x**6 - 3*a*d**3 - 27*a*d**2*e*x**2 + 2
7*a*d*e**2*x**4 + 3*a*e**3*x**6 - b*d**3*n - 27*b*d**2*e*n*x**2 - 27*b*d*e
**2*n*x**4 - b*e**3*n*x**6)/(9*x**3)
```

3.207 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^6}\,dx$

Optimal result 1624
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Optimal result

Integrand size = 23, antiderivative size = 118

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^6}\,dx = -\frac{bd^3n}{25x^5}-\frac{bd^2en}{3x^3}-\frac{3bde^2n}{x}-be^3nx-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{d^2e(a+b\log(cx^n))}{x^3}-\frac{3de^2(a+b\log(cx^n))}{x}+e^3x(a+b\log(cx^n))$$

output
```
-1/25*b*d^3*n/x^5-1/3*b*d^2*e*n/x^3-3*b*d*e^2*n/x-b*e^3*n*x-1/5*d^3*(a+b*l
n(c*x^n))/x^5-d^2*e*(a+b*ln(c*x^n))/x^3-3*d*e^2*(a+b*ln(c*x^n))/x+e^3*x*(a
+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 115, normalized size of antiderivative = 0.97

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^6}\,dx = -\frac{15a(d^3+5d^2ex^2+15de^2x^4-5e^3x^6)+bn(3d^3+25d^2ex^2+225de^2x^4+75e^3x^6)+15b(d^3+5d^2ex^2+}{75x^5}$$

input
```
Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-1/75*(15*a*(d^3 + 5*d^2*e*x^2 + 15*d*e^2*x^4 - 5*e^3*x^6) + b*n*(3*d^3 +
25*d^2*e*x^2 + 225*d*e^2*x^4 + 75*e^3*x^6) + 15*b*(d^3 + 5*d^2*e*x^2 + 15*
d*e^2*x^4 - 5*e^3*x^6)*Log[c*x^n])/x^5
```

Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 114, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(d+ex^2\right)^3 (a+b\log(cx^n))}{x^6} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(-\frac{d^3}{5x^6}-\frac{ed^2}{x^4}-\frac{3e^2d}{x^2}+e^3\right)dx-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{d^2e(a+b\log(cx^n))}{x^3}-\frac{3de^2(a+b\log(cx^n))}{x}+e^3x(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{d^2e(a+b\log(cx^n))}{x^3}-\frac{3de^2(a+b\log(cx^n))}{x}+e^3x(a+b\log(cx^n))-bn\left(\frac{d^3}{25x^5}+\frac{d^2e}{3x^3}+\frac{3de^2}{x}+e^3x\right)$$

input
```
Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-(b*n*(d^3/(25*x^5) + (d^2*e)/(3*x^3) + (3*d*e^2)/x + e^3*x)) - (d^3*(a +
b*Log[c*x^n]))/(5*x^5) - (d^2*e*(a + b*Log[c*x^n]))/x^3 - (3*d*e^2*(a + b*
Log[c*x^n]))/x + e^3*x*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 1.14 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.19

method	result
parallelrisch	$-\frac{-75b\ln(c\,x^n)e^3x^6+75b\,e^3n\,x^6-75x^6a\,e^3+225b\ln(c\,x^n)e^2d\,x^4+225bd\,e^2n\,x^4+225x^4a\,e^2d+75b\ln(c\,x^n)d^2e\,x^2+25b\,d^2en\,x}{75x^5}$
risch	$-\frac{b(-5e^3x^6+15e^2d\,x^4+5d^2e\,x^2+d^3)\ln(x^n)}{5x^5}-\frac{30a\,d^3+15i\pi b\,d^3\,\mathrm{csgn}(ic\,x^n)^2\,\mathrm{csgn}(ic)-150x^6a\,e^3+450x^4a\,e^2d+150a\,d^2e\,x}{}$

input
```
int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

output
```
-1/75/x^5*(-75*b*ln(c*x^n)*e^3*x^6+75*b*e^3*n*x^6-75*x^6*a*e^3+225*b*ln(c*
x^n)*e^2*d*x^4+225*b*d*e^2*n*x^4+225*x^4*a*e^2*d+75*b*ln(c*x^n)*d^2*e*x^2+
25*b*d^2*e*n*x^2+75*a*d^2*e*x^2+15*b*ln(c*x^n)*d^3+3*b*d^3*n+15*a*d^3)
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 160, normalized size of antiderivative = 1.36

$$\int \frac{(d+ex^2)^3\,(a+b\log(cx^n))}{x^6}\,dx = -\frac{75\,(be^3n-ae^3)x^6+3\,bd^3n+225\,(bde^2n+ade^2)x^4+15\,ad^3+25\,(bd^2en+3\,ad^2e)x^2-15\,(5\,be^3x^6-}{75\,x^5}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
-1/75*(75*(b*e^3*n - a*e^3)*x^6 + 3*b*d^3*n + 225*(b*d*e^2*n + a*d*e^2)*x^
4 + 15*a*d^3 + 25*(b*d^2*e*n + 3*a*d^2*e)*x^2 - 15*(5*b*e^3*x^6 - 15*b*d*e
^2*x^4 - 5*b*d^2*e*x^2 - b*d^3)*log(c) - 15*(5*b*e^3*n*x^6 - 15*b*d*e^2*n*
x^4 - 5*b*d^2*e*n*x^2 - b*d^3*n)*log(x))/x^5
```

Sympy [A] (verification not implemented)

Time = 0.79 (sec) , antiderivative size = 146, normalized size of antiderivative = 1.24

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^6}\,dx = -\frac{ad^3}{5x^5} - \frac{ad^2e}{x^3} - \frac{3ade^2}{x} + ae^3x - \frac{bd^3n}{25x^5} - \frac{bd^3\log(cx^n)}{5x^5} - \frac{bd^2en}{3x^3} - \frac{bd^2e\log(cx^n)}{x^3} - \frac{3bde^2n}{x} - \frac{3bde^2\log(cx^n)}{x} - be^3nx + be^3x\log(cx^n)$$

input
```
integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**6,x)
```

output
```
-a*d**3/(5*x**5) - a*d**2*e/x**3 - 3*a*d*e**2/x + a*e**3*x - b*d**3*n/(25*
x**5) - b*d**3*log(c*x**n)/(5*x**5) - b*d**2*e*n/(3*x**3) - b*d**2*e*log(c
*x**n)/x**3 - 3*b*d*e**2*n/x - 3*b*d*e**2*log(c*x**n)/x - b*e**3*n*x + b*e
**3*x*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.14

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^6}\,dx = -be^3nx + be^3x\log(cx^n) + ae^3x - \frac{3\,bde^2n}{x} - \frac{3\,bde^2\log(cx^n)}{x} - \frac{3\,ade^2}{x} - \frac{bd^2en}{3\,x^3} - \frac{bd^2e\log(cx^n)}{x^3} - \frac{ad^2e}{x^3} - \frac{bd^3n}{25\,x^5} - \frac{bd^3\log(cx^n)}{5\,x^5} - \frac{ad^3}{5\,x^5}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
-b*e^3*n*x + b*e^3*x*log(c*x^n) + a*e^3*x - 3*b*d*e^2*n/x - 3*b*d*e^2*log(
c*x^n)/x - 3*a*d*e^2/x - 1/3*b*d^2*e*n/x^3 - b*d^2*e*log(c*x^n)/x^3 - a*d^
2*e/x^3 - 1/25*b*d^3*n/x^5 - 1/5*b*d^3*log(c*x^n)/x^5 - 1/5*a*d^3/x^5
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 165, normalized size of antiderivative = 1.40

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^6}\,dx$$
$$= -\left(be^3n - be^3\log(c) - ae^3\right)x + \frac{1}{5}\left(5\,be^3nx - \frac{15\,bde^2nx^4 + 5\,bd^2enx^2 + bd^3n}{x^5}\right)\log(x)$$
$$- \frac{225\,bde^2nx^4 + 225\,bde^2x^4\log(c) + 225\,ade^2x^4 + 25\,bd^2enx^2 + 75\,bd^2ex^2\log(c) + 75\,ad^2ex^2 + 3\,bd^3n -}{75\,x^5}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
-(b*e^3*n - b*e^3*log(c) - a*e^3)*x + 1/5*(5*b*e^3*n*x - (15*b*d*e^2*n*x^4
 + 5*b*d^2*e*n*x^2 + b*d^3*n)/x^5)*log(x) - 1/75*(225*b*d*e^2*n*x^4 + 225*
b*d*e^2*x^4*log(c) + 225*a*d*e^2*x^4 + 25*b*d^2*e*n*x^2 + 75*b*d^2*e*x^2*l
og(c) + 75*a*d^2*e*x^2 + 3*b*d^3*n + 15*b*d^3*log(c) + 15*a*d^3)/x^5
```

Mupad [B] (verification not implemented)

Time = 25.89 (sec) , antiderivative size = 125, normalized size of antiderivative = 1.06

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^6}\,dx$$
$$= e^3\,x\,(a-b\,n) - \frac{a\,d^3 + x^2\left(5\,a\,d^2\,e + \frac{5\,b\,d^2\,e\,n}{3}\right) + x^4\left(15\,a\,d\,e^2 + 15\,b\,d\,e^2\,n\right) + \frac{b\,d^3\,n}{5}}{5\,x^5}$$
$$- \ln(c\,x^n)\left(\frac{\frac{b\,d^3}{5} + b\,d^2\,e\,x^2 + 3\,b\,d\,e^2\,x^4 + \frac{11\,b\,e^3\,x^6}{5}}{x^5} - \frac{16\,b\,e^3\,x}{5}\right)$$

input
```
int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^6,x)
```

output
```
e^3*x*(a - b*n) - (a*d^3 + x^2*(5*a*d^2*e + (5*b*d^2*e*n)/3) + x^4*(15*a*d
*e^2 + 15*b*d*e^2*n) + (b*d^3*n)/5)/(5*x^5) - log(c*x^n)*(((b*d^3)/5 + (11
*b*e^3*x^6)/5 + b*d^2*e*x^2 + 3*b*d*e^2*x^4)/x^5 - (16*b*e^3*x)/5)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 139, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex^2)^3\,(a+b\log(cx^n))}{x^6}\,dx$$
$$= \frac{-15\log(x^n c)\,b\,d^3 - 75\log(x^n c)\,b\,d^2 e\,x^2 - 225\log(x^n c)\,bd\,e^2x^4 + 75\log(x^n c)\,b\,e^3x^6 - 15a\,d^3 - 75a\,d^2 e\,x^2}{75x^5}$$

input
```
int((e*x^2+d)^3*(a+b*log(c*x^n))/x^6,x)
```

output
```
( - 15*log(x**n*c)*b*d**3 - 75*log(x**n*c)*b*d**2*e*x**2 - 225*log(x**n*c)
*b*d*e**2*x**4 + 75*log(x**n*c)*b*e**3*x**6 - 15*a*d**3 - 75*a*d**2*e*x**2
 - 225*a*d*e**2*x**4 + 75*a*e**3*x**6 - 3*b*d**3*n - 25*b*d**2*e*n*x**2 -
225*b*d*e**2*n*x**4 - 75*b*e**3*n*x**6)/(75*x**5)
```

3.208 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^8}\,dx$

Optimal result 1630
Mathematica [A] (verified) 1630
Rubi [A] (verified) 1631
Maple [A] (verified) 1633
Fricas [A] (verification not implemented) 1633
Sympy [A] (verification not implemented) 1634
Maxima [A] (verification not implemented) 1634
Giac [A] (verification not implemented) 1635
Mupad [B] (verification not implemented) 1635
Reduce [B] (verification not implemented) 1636

Optimal result

Integrand size = 23, antiderivative size = 127

$$\int \frac{(d+ex^2)^3\,(a+b\log(cx^n))}{x^8}\,dx = -\frac{bd^3n}{49x^7}-\frac{3bd^2en}{25x^5}-\frac{bde^2n}{3x^3}-\frac{be^3n}{x} -\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2e(a+b\log(cx^n))}{5x^5} -\frac{de^2(a+b\log(cx^n))}{x^3}-\frac{e^3(a+b\log(cx^n))}{x}$$

output
```
-1/49*b*d^3*n/x^7-3/25*b*d^2*e*n/x^5-1/3*b*d*e^2*n/x^3-b*e^3*n/x-1/7*d^3*(
a+b*ln(c*x^n))/x^7-3/5*d^2*e*(a+b*ln(c*x^n))/x^5-d*e^2*(a+b*ln(c*x^n))/x^3
-e^3*(a+b*ln(c*x^n))/x
```

Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^2)^3\,(a+b\log(cx^n))}{x^8}\,dx = -\frac{bd^3n}{49x^7}-\frac{3bd^2en}{25x^5}-\frac{bde^2n}{3x^3}-\frac{be^3n}{x} -\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2e(a+b\log(cx^n))}{5x^5} -\frac{de^2(a+b\log(cx^n))}{x^3}-\frac{e^3(a+b\log(cx^n))}{x}$$

input
```
Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
-1/49*(b*d^3*n)/x^7 - (3*b*d^2*e*n)/(25*x^5) - (b*d*e^2*n)/(3*x^3) - (b*e^
3*n)/x - (d^3*(a + b*Log[c*x^n]))/(7*x^7) - (3*d^2*e*(a + b*Log[c*x^n]))/(
5*x^5) - (d*e^2*(a + b*Log[c*x^n]))/x^3 - (e^3*(a + b*Log[c*x^n]))/x
```

Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 126, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^8}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{35e^3x^6+35de^2x^4+21d^2ex^2+5d^3}{35x^8}dx-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{de^2(a+b\log(cx^n))}{x^3}-\frac{e^3(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{35}bn\int \frac{35e^3x^6+35de^2x^4+21d^2ex^2+5d^3}{x^8}dx-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{de^2(a+b\log(cx^n))}{x^3}-\frac{e^3(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{35}bn\int \left(\frac{5d^3}{x^8}+\frac{21ed^2}{x^6}+\frac{35e^2d}{x^4}+\frac{35e^3}{x^2}\right)dx-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{de^2(a+b\log(cx^n))}{x^3}-\frac{e^3(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{de^2(a+b\log(cx^n))}{x^3}-\frac{e^3(a+b\log(cx^n))}{x}+\frac{1}{35}bn\left(-\frac{5d^3}{7x^7}-\frac{21d^2e}{5x^5}-\frac{35de^2}{3x^3}-\frac{35e^3}{x}\right)$$

input
```
Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
(b*n*((-5*d^3)/(7*x^7) - (21*d^2*e)/(5*x^5) - (35*d*e^2)/(3*x^3) - (35*e^3
)/x))/35 - (d^3*(a + b*Log[c*x^n]))/(7*x^7) - (3*d^2*e*(a + b*Log[c*x^n]))
/(5*x^5) - (d*e^2*(a + b*Log[c*x^n]))/x^3 - (e^3*(a + b*Log[c*x^n]))/x
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 1.10 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.10

method	result
parallelrisch	$-\frac{3675 b \ln(c\,x^n) e^3 x^6+3675 b\,e^3 n\,x^6+3675 x^6 a\,e^3+3675 b \ln(c\,x^n) e^2 d\,x^4+1225 b d\,e^2 n\,x^4+3675 x^4 a\,e^2 d+2205 b \ln(c\,x^n) d^2 e\,x^2}{3675 x^7}$
risch	$-\frac{b(35e^3x^6+35e^2d\,x^4+21d^2e\,x^2+5d^3)\ln(x^n)}{35x^7}-\frac{1050 a\,d^3+525 i \pi b\,d^3 \operatorname{csgn}(i c\,x^n)^2 \operatorname{csgn}(ic)+7350 x^6 a\,e^3+7350 x^4 a\,e^2 d+44}{}$

input
```
int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^8,x,method=_RETURNVERBOSE)
```

output
```
-1/3675/x^7*(3675*b*ln(c*x^n)*e^3*x^6+3675*b*e^3*n*x^6+3675*x^6*a*e^3+3675
*b*ln(c*x^n)*e^2*d*x^4+1225*b*d*e^2*n*x^4+3675*x^4*a*e^2*d+2205*b*ln(c*x^n
)*d^2*e*x^2+441*b*d^2*e*n*x^2+2205*a*d^2*e*x^2+525*b*ln(c*x^n)*d^3+75*b*d^
3*n+525*a*d^3)
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 160, normalized size of antiderivative = 1.26

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^8}\,dx = -\frac{3675\,(be^3n+ae^3)x^6+75\,bd^3n+1225\,(bde^2n+3\,ade^2)x^4+525\,ad^3+441\,(bd^2en+5\,ad^2e)x^2+105\,(3}{}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

output
```
-1/3675*(3675*(b*e^3*n + a*e^3)*x^6 + 75*b*d^3*n + 1225*(b*d*e^2*n + 3*a*d
*e^2)*x^4 + 525*a*d^3 + 441*(b*d^2*e*n + 5*a*d^2*e)*x^2 + 105*(35*b*e^3*x^
6 + 35*b*d*e^2*x^4 + 21*b*d^2*e*x^2 + 5*b*d^3)*log(c) + 105*(35*b*e^3*n*x^
6 + 35*b*d*e^2*n*x^4 + 21*b*d^2*e*n*x^2 + 5*b*d^3*n)*log(x))/x^7
```

Sympy [A] (verification not implemented)

Time = 1.02 (sec) , antiderivative size = 158, normalized size of antiderivative = 1.24

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^8}\,dx = -\frac{ad^3}{7x^7} - \frac{3ad^2e}{5x^5} - \frac{ade^2}{x^3} - \frac{ae^3}{x} - \frac{bd^3n}{49x^7} - \frac{bd^3\log(cx^n)}{7x^7} - \frac{3bd^2en}{25x^5} - \frac{3bd^2e\log(cx^n)}{5x^5} - \frac{bde^2n}{3x^3} - \frac{bde^2\log(cx^n)}{x^3} - \frac{be^3n}{x} - \frac{be^3\log(cx^n)}{x}$$

input
```
integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**8,x)
```

output
```
-a*d**3/(7*x**7) - 3*a*d**2*e/(5*x**5) - a*d*e**2/x**3 - a*e**3/x - b*d**3
*n/(49*x**7) - b*d**3*log(c*x**n)/(7*x**7) - 3*b*d**2*e*n/(25*x**5) - 3*b*
d**2*e*log(c*x**n)/(5*x**5) - b*d*e**2*n/(3*x**3) - b*d*e**2*log(c*x**n)/x
**3 - b*e**3*n/x - b*e**3*log(c*x**n)/x
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.13

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^8}\,dx = -\frac{be^3n}{x} - \frac{be^3\log(cx^n)}{x} - \frac{ae^3}{x} - \frac{bde^2n}{3\,x^3} - \frac{bde^2\log(cx^n)}{x^3} - \frac{ade^2}{x^3} - \frac{3\,bd^2en}{25\,x^5} - \frac{3\,bd^2e\log(cx^n)}{5\,x^5} - \frac{3\,ad^2e}{5\,x^5} - \frac{bd^3n}{49\,x^7} - \frac{bd^3\log(cx^n)}{7\,x^7} - \frac{ad^3}{7\,x^7}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

output
```
-b*e^3*n/x - b*e^3*log(c*x^n)/x - a*e^3/x - 1/3*b*d*e^2*n/x^3 - b*d*e^2*lo
g(c*x^n)/x^3 - a*d*e^2/x^3 - 3/25*b*d^2*e*n/x^5 - 3/5*b*d^2*e*log(c*x^n)/x
^5 - 3/5*a*d^2*e/x^5 - 1/49*b*d^3*n/x^7 - 1/7*b*d^3*log(c*x^n)/x^7 - 1/7*a
*d^3/x^7
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 171, normalized size of antiderivative = 1.35

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^8}\,dx$$
$$= -\frac{(35\,be^3nx^6 + 35\,bde^2nx^4 + 21\,bd^2enx^2 + 5\,bd^3n)\log(x)}{35\,x^7}$$
$$-\frac{3675\,be^3nx^6 + 3675\,be^3x^6\log(c) + 3675\,ae^3x^6 + 1225\,bde^2nx^4 + 3675\,bde^2x^4\log(c) + 3675\,ade^2x^4 + 4}{3675\,x^7}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
```

output
```
-1/35*(35*b*e^3*n*x^6 + 35*b*d*e^2*n*x^4 + 21*b*d^2*e*n*x^2 + 5*b*d^3*n)*l
og(x)/x^7 - 1/3675*(3675*b*e^3*n*x^6 + 3675*b*e^3*x^6*log(c) + 3675*a*e^3*
x^6 + 1225*b*d*e^2*n*x^4 + 3675*b*d*e^2*x^4*log(c) + 3675*a*d*e^2*x^4 + 44
1*b*d^2*e*n*x^2 + 2205*b*d^2*e*x^2*log(c) + 2205*a*d^2*e*x^2 + 75*b*d^3*n
+ 525*b*d^3*log(c) + 525*a*d^3)/x^7
```

Mupad [B] (verification not implemented)

Time = 25.69 (sec) , antiderivative size = 123, normalized size of antiderivative = 0.97

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^8}\,dx =$$
$$-\frac{x^6\,(35\,a\,e^3 + 35\,b\,e^3\,n) + 5\,a\,d^3 + x^2\left(21\,a\,d^2\,e + \frac{21\,b\,d^2\,e\,n}{5}\right) + x^4\left(35\,a\,d\,e^2 + \frac{35\,b\,d\,e^2\,n}{3}\right) + \frac{5\,b\,d^3\,n}{7}}{35\,x^7}$$
$$-\frac{\ln(c\,x^n)\left(\frac{b\,d^3}{7} + \frac{3\,b\,d^2\,e\,x^2}{5} + b\,d\,e^2\,x^4 + b\,e^3\,x^6\right)}{x^7}$$

input
```
int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^8,x)
```

output
```
- (x^6*(35*a*e^3 + 35*b*e^3*n) + 5*a*d^3 + x^2*(21*a*d^2*e + (21*b*d^2*e*n
)/5) + x^4*(35*a*d*e^2 + (35*b*d*e^2*n)/3) + (5*b*d^3*n)/7)/(35*x^7) - (lo
g(c*x^n)*((b*d^3)/7 + b*e^3*x^6 + (3*b*d^2*e*x^2)/5 + b*d*e^2*x^4))/x^7
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 139, normalized size of antiderivative = 1.09

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^8}\,dx$$
$$= \frac{-525\log(x^n c)\,b\,d^3 - 2205\log(x^n c)\,b\,d^2 e\,x^2 - 3675\log(x^n c)\,bd\,e^2 x^4 - 3675\log(x^n c)\,b\,e^3 x^6 - 525a\,d^3 - 2\cdots}{3675x^7}$$

input
```
int((e*x^2+d)^3*(a+b*log(c*x^n))/x^8,x)
```

output
```
( - 525*log(x**n*c)*b*d**3 - 2205*log(x**n*c)*b*d**2*e*x**2 - 3675*log(x**
n*c)*b*d*e**2*x**4 - 3675*log(x**n*c)*b*e**3*x**6 - 525*a*d**3 - 2205*a*d*
*2*e*x**2 - 3675*a*d*e**2*x**4 - 3675*a*e**3*x**6 - 75*b*d**3*n - 441*b*d*
*2*e*n*x**2 - 1225*b*d*e**2*n*x**4 - 3675*b*e**3*n*x**6)/(3675*x**7)
```

3.209 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^{10}}\,dx$

Optimal result 1637
Mathematica [A] (verified) 1637
Rubi [A] (verified) 1638
Maple [A] (verified) 1640
Fricas [A] (verification not implemented) 1640
Sympy [A] (verification not implemented) 1641
Maxima [A] (verification not implemented) 1641
Giac [A] (verification not implemented) 1642
Mupad [B] (verification not implemented) 1642
Reduce [B] (verification not implemented) 1643

Optimal result

Integrand size = 23, antiderivative size = 133

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^{10}}\,dx = -\frac{bd^3n}{81x^9}-\frac{3bd^2en}{49x^7}-\frac{3bde^2n}{25x^5}-\frac{be^3n}{9x^3}-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2e(a+b\log(cx^n))}{7x^7}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{3x^3}$$

output
```
-1/81*b*d^3*n/x^9-3/49*b*d^2*e*n/x^7-3/25*b*d*e^2*n/x^5-1/9*b*e^3*n/x^3-1/
9*d^3*(a+b*ln(c*x^n))/x^9-3/7*d^2*e*(a+b*ln(c*x^n))/x^7-3/5*d*e^2*(a+b*ln(
c*x^n))/x^5-1/3*e^3*(a+b*ln(c*x^n))/x^3
```

Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^{10}}\,dx = -\frac{bd^3n}{81x^9}-\frac{3bd^2en}{49x^7}-\frac{3bde^2n}{25x^5}-\frac{be^3n}{9x^3}-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2e(a+b\log(cx^n))}{7x^7}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{3x^3}$$

input
```
Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^10,x]
```

output
```
-1/81*(b*d^3*n)/x^9 - (3*b*d^2*e*n)/(49*x^7) - (3*b*d*e^2*n)/(25*x^5) - (b
*e^3*n)/(9*x^3) - (d^3*(a + b*Log[c*x^n]))/(9*x^9) - (3*d^2*e*(a + b*Log[c
*x^n]))/(7*x^7) - (3*d*e^2*(a + b*Log[c*x^n]))/(5*x^5) - (e^3*(a + b*Log[c
*x^n]))/(3*x^3)
```

Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 130, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(d+ex^2\right)^3 \left(a+b\log \left(cx^n\right)\right)}{x^{10}}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{105e^3x^6+189de^2x^4+135d^2ex^2+35d^3}{315x^{10}}dx-\frac{d^3(a+b\log \left(cx^n\right))}{9x^9}-\frac{3d^2e(a+b\log \left(cx^n\right))}{7x^7}-\frac{3de^2(a+b\log \left(cx^n\right))}{5x^5}-\frac{e^3(a+b\log \left(cx^n\right))}{3x^3}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{315}bn\int \frac{105e^3x^6+189de^2x^4+135d^2ex^2+35d^3}{x^{10}}dx-\frac{d^3(a+b\log \left(cx^n\right))}{9x^9}-\frac{3d^2e(a+b\log \left(cx^n\right))}{7x^7}-\frac{3de^2(a+b\log \left(cx^n\right))}{5x^5}-\frac{e^3(a+b\log \left(cx^n\right))}{3x^3}$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{315}bn\int \left(\frac{35d^3}{x^{10}}+\frac{135ed^2}{x^8}+\frac{189e^2d}{x^6}+\frac{105e^3}{x^4}\right)dx-\frac{d^3(a+b\log \left(cx^n\right))}{9x^9}-\frac{3d^2e(a+b\log \left(cx^n\right))}{7x^7}-\frac{3de^2(a+b\log \left(cx^n\right))}{5x^5}-\frac{e^3(a+b\log \left(cx^n\right))}{3x^3}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2e(a+b\log(cx^n))}{7x^7}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{3x^3}+\frac{1}{315}bn\left(-\frac{35d^3}{9x^9}-\frac{135d^2e}{7x^7}-\frac{189de^2}{5x^5}-\frac{35e^3}{x^3}\right)$$

input
```
Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^10,x]
```

output
```
(b*n*((-35*d^3)/(9*x^9) - (135*d^2*e)/(7*x^7) - (189*d*e^2)/(5*x^5) - (35*
e^3)/x^3))/315 - (d^3*(a + b*Log[c*x^n]))/(9*x^9) - (3*d^2*e*(a + b*Log[c*
x^n]))/(7*x^7) - (3*d*e^2*(a + b*Log[c*x^n]))/(5*x^5) - (e^3*(a + b*Log[c*
x^n]))/(3*x^3)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 1.15 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.05

method	result
parallelrisch	$-\frac{33075b\ln(c\,x^{n})e^{3}x^{6}+11025b\,e^{3}n\,x^{6}+33075x^{6}a\,e^{3}+59535b\ln(c\,x^{n})e^{2}d\,x^{4}+11907bd\,e^{2}n\,x^{4}+59535x^{4}a\,e^{2}d+42525b\ln(c\,x^{n}}{99225x^{9}}$
risch	$-\frac{b(105e^{3}x^{6}+189e^{2}d\,x^{4}+135d^{2}e\,x^{2}+35d^{3})\ln(x^{n})}{315x^{9}}-\frac{22050a\,d^{3}+11025i\pi b\,d^{3}\,\mathrm{csgn}(ic\,x^{n})^{2}\,\mathrm{csgn}(ic)+66150x^{6}a\,e^{3}+119070}{}$

input
```
int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^10,x,method=_RETURNVERBOSE)
```

output
```
-1/99225/x^9*(33075*b*ln(c*x^n)*e^3*x^6+11025*b*e^3*n*x^6+33075*x^6*a*e^3+
59535*b*ln(c*x^n)*e^2*d*x^4+11907*b*d*e^2*n*x^4+59535*x^4*a*e^2*d+42525*b*
ln(c*x^n)*d^2*e*x^2+6075*b*d^2*e*n*x^2+42525*a*d^2*e*x^2+11025*b*ln(c*x^n)
*d^3+1225*b*d^3*n+11025*a*d^3)
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 161, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex^2)^3\,(a+b\log(cx^n))}{x^{10}}\,dx = -\frac{11025\,(be^3n+3\,ae^3)x^6+1225\,bd^3n+11907\,(bde^2n+5\,ade^2)x^4+11025\,ad^3+6075\,(bd^2en+7\,ad^2e)x}{}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^10,x, algorithm="fricas")
```

output
```
-1/99225*(11025*(b*e^3*n + 3*a*e^3)*x^6 + 1225*b*d^3*n + 11907*(b*d*e^2*n
+ 5*a*d*e^2)*x^4 + 11025*a*d^3 + 6075*(b*d^2*e*n + 7*a*d^2*e)*x^2 + 315*(1
05*b*e^3*x^6 + 189*b*d*e^2*x^4 + 135*b*d^2*e*x^2 + 35*b*d^3)*log(c) + 315*
(105*b*e^3*n*x^6 + 189*b*d*e^2*n*x^4 + 135*b*d^2*e*n*x^2 + 35*b*d^3*n)*log
(x))/x^9
```

Sympy [A] (verification not implemented)

Time = 1.87 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.33

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^{10}}\,dx = -\frac{ad^3}{9x^9} - \frac{3ad^2e}{7x^7} - \frac{3ade^2}{5x^5} - \frac{ae^3}{3x^3} - \frac{bd^3n}{81x^9} - \frac{bd^3\log(cx^n)}{9x^9} - \frac{3bd^2en}{49x^7} - \frac{3bd^2e\log(cx^n)}{7x^7} - \frac{3bde^2n}{25x^5} - \frac{3bde^2\log(cx^n)}{5x^5} - \frac{be^3n}{9x^3} - \frac{be^3\log(cx^n)}{3x^3}$$

input
```
integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**10,x)
```

output
```
-a*d**3/(9*x**9) - 3*a*d**2*e/(7*x**7) - 3*a*d*e**2/(5*x**5) - a*e**3/(3*x
**3) - b*d**3*n/(81*x**9) - b*d**3*log(c*x**n)/(9*x**9) - 3*b*d**2*e*n/(49
*x**7) - 3*b*d**2*e*log(c*x**n)/(7*x**7) - 3*b*d*e**2*n/(25*x**5) - 3*b*d*
e**2*log(c*x**n)/(5*x**5) - b*e**3*n/(9*x**3) - b*e**3*log(c*x**n)/(3*x**3
)
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.08

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^{10}}\,dx = -\frac{be^3n}{9\,x^3} - \frac{be^3\log(cx^n)}{3\,x^3} - \frac{ae^3}{3\,x^3} - \frac{3\,bde^2n}{25\,x^5} - \frac{3\,bde^2\log(cx^n)}{5\,x^5} - \frac{3\,ade^2}{5\,x^5} - \frac{3\,bd^2en}{49\,x^7} - \frac{3\,bd^2e\log(cx^n)}{7\,x^7} - \frac{3\,ad^2e}{7\,x^7} - \frac{bd^3n}{81\,x^9} - \frac{bd^3\log(cx^n)}{9\,x^9} - \frac{ad^3}{9\,x^9}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^10,x, algorithm="maxima")
```

output
```
-1/9*b*e^3*n/x^3 - 1/3*b*e^3*log(c*x^n)/x^3 - 1/3*a*e^3/x^3 - 3/25*b*d*e^2
*n/x^5 - 3/5*b*d*e^2*log(c*x^n)/x^5 - 3/5*a*d*e^2/x^5 - 3/49*b*d^2*e*n/x^7
 - 3/7*b*d^2*e*log(c*x^n)/x^7 - 3/7*a*d^2*e/x^7 - 1/81*b*d^3*n/x^9 - 1/9*b
*d^3*log(c*x^n)/x^9 - 1/9*a*d^3/x^9
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 171, normalized size of antiderivative = 1.29

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^{10}}\,dx$$
$$= -\frac{(105\,be^3nx^6 + 189\,bde^2nx^4 + 135\,bd^2enx^2 + 35\,bd^3n)\log(x)}{315\,x^9}$$
$$-\frac{11025\,be^3nx^6 + 33075\,be^3x^6\log(c) + 33075\,ae^3x^6 + 11907\,bde^2nx^4 + 59535\,bde^2x^4\log(c) + 59535\,ade}{992}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^10,x, algorithm="giac")
```

output
```
-1/315*(105*b*e^3*n*x^6 + 189*b*d*e^2*n*x^4 + 135*b*d^2*e*n*x^2 + 35*b*d^3
*n)*log(x)/x^9 - 1/99225*(11025*b*e^3*n*x^6 + 33075*b*e^3*x^6*log(c) + 330
75*a*e^3*x^6 + 11907*b*d*e^2*n*x^4 + 59535*b*d*e^2*x^4*log(c) + 59535*a*d*
e^2*x^4 + 6075*b*d^2*e*n*x^2 + 42525*b*d^2*e*x^2*log(c) + 42525*a*d^2*e*x^
2 + 1225*b*d^3*n + 11025*b*d^3*log(c) + 11025*a*d^3)/x^9
```

Mupad [B] (verification not implemented)

Time = 25.82 (sec) , antiderivative size = 125, normalized size of antiderivative = 0.94

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^{10}}\,dx =$$
$$-\frac{x^6\,(105\,a\,e^3 + 35\,b\,e^3\,n) + 35\,a\,d^3 + x^2\left(135\,a\,d^2\,e + \frac{135\,b\,d^2\,e\,n}{7}\right) + x^4\left(189\,a\,d\,e^2 + \frac{189\,b\,d\,e^2\,n}{5}\right) + \frac{35\,b\,d^3\,n}{9}}{315\,x^9}$$
$$-\frac{\ln(c\,x^n)\left(\frac{b\,d^3}{9} + \frac{3\,b\,d^2\,e\,x^2}{7} + \frac{3\,b\,d\,e^2\,x^4}{5} + \frac{b\,e^3\,x^6}{3}\right)}{x^9}$$

input
```
int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^10,x)
```

output
```
- (x^6*(105*a*e^3 + 35*b*e^3*n) + 35*a*d^3 + x^2*(135*a*d^2*e + (135*b*d^2
*e*n)/7) + x^4*(189*a*d*e^2 + (189*b*d*e^2*n)/5) + (35*b*d^3*n)/9)/(315*x^
9) - (log(c*x^n)*((b*d^3)/9 + (b*e^3*x^6)/3 + (3*b*d^2*e*x^2)/7 + (3*b*d*e
^2*x^4)/5))/x^9
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 139, normalized size of antiderivative = 1.05

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^{10}}\,dx$$
$$= \frac{-11025\log(x^nc)\,b\,d^3-42525\log(x^nc)\,b\,d^2e\,x^2-59535\log(x^nc)\,bd\,e^2x^4-33075\log(x^nc)\,b\,e^3x^6-11025}{}$$

input
```
int((e*x^2+d)^3*(a+b*log(c*x^n))/x^10,x)
```

output
```
( - 11025*log(x**n*c)*b*d**3 - 42525*log(x**n*c)*b*d**2*e*x**2 - 59535*log
(x**n*c)*b*d*e**2*x**4 - 33075*log(x**n*c)*b*e**3*x**6 - 11025*a*d**3 - 42
525*a*d**2*e*x**2 - 59535*a*d*e**2*x**4 - 33075*a*e**3*x**6 - 1225*b*d**3*
n - 6075*b*d**2*e*n*x**2 - 11907*b*d*e**2*n*x**4 - 11025*b*e**3*n*x**6)/(9
9225*x**9)
```

3.210 $\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx$

Optimal result 1644
Mathematica [A] (verified) 1644
Rubi [A] (verified) 1645
Maple [C] (warning: unable to verify) 1646
Fricas [F] 1647
Sympy [A] (verification not implemented) 1647
Maxima [F] 1648
Giac [F] 1648
Mupad [F(-1)] 1649
Reduce [F] 1649

Optimal result

Integrand size = 23, antiderivative size = 121

$$\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx = \frac{bdnx^2}{4e^2} - \frac{bnx^4}{16e} - \frac{dx^2(a+b\log(cx^n))}{2e^2} + \frac{x^4(a+b\log(cx^n))}{4e} + \frac{d^2(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e^3} + \frac{bd^2n\,\mathrm{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^3}$$

output
```
1/4*b*d*n*x^2/e^2-1/16*b*n*x^4/e-1/2*d*x^2*(a+b*ln(c*x^n))/e^2+1/4*x^4*(a+
b*ln(c*x^n))/e+1/2*d^2*(a+b*ln(c*x^n))*ln(1+e*x^2/d)/e^3+1/4*b*d^2*n*polyl
og(2,-e*x^2/d)/e^3
```

Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 174, normalized size of antiderivative = 1.44

$$\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx = \frac{4bdenx^2 - be^2nx^4 - 8dex^2(a+b\log(cx^n)) + 4e^2x^4(a+b\log(cx^n)) + 8d^2(a+b\log(cx^n))\log\left(1+\frac{\sqrt{ex}}{\sqrt{-d}}\right.}{16e^3}$$

input
```
Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
(4*b*d*e*n*x^2 - b*e^2*n*x^4 - 8*d*e*x^2*(a + b*Log[c*x^n]) + 4*e^2*x^4*(a
 + b*Log[c*x^n]) + 8*d^2*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]]
+ 8*d^2*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)] + 8*b*d^2*n*P
olyLog[2, (Sqrt[e]*x)/Sqrt[-d]] + 8*b*d^2*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^
(3/2)])/(16*e^3)
```

Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 121, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{d^2x(a+b\log(cx^n))}{e^2(d+ex^2)}-\frac{dx(a+b\log(cx^n))}{e^2}+\frac{x^3(a+b\log(cx^n))}{e}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^2\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{2e^3}-\frac{dx^2(a+b\log(cx^n))}{2e^2}+\frac{x^4(a+b\log(cx^n))}{4e}+\frac{bd^2n\,\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^3}+\frac{bdnx^2}{4e^2}-\frac{bnx^4}{16e}$$

input
```
Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
(b*d*n*x^2)/(4*e^2) - (b*n*x^4)/(16*e) - (d*x^2*(a + b*Log[c*x^n]))/(2*e^2
) + (x^4*(a + b*Log[c*x^n]))/(4*e) + (d^2*(a + b*Log[c*x^n])*Log[1 + (e*x^
2)/d])/(2*e^3) + (b*d^2*n*PolyLog[2, -((e*x^2)/d)])/(4*e^3)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.89 (sec) , antiderivative size = 343, normalized size of antiderivative = 2.83

method	result
risch	$\frac{b\ln(x^n)x^4}{4e} - \frac{b\ln(x^n)d\,x^2}{2e^2} + \frac{b\ln(x^n)d^2\ln(e\,x^2+d)}{2e^3} - \frac{bn\,d^2\ln(x)\ln(e\,x^2+d)}{2e^3} + \frac{bn\,d^2\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e^3} + \frac{bn\,d^2\ln(x)\ln}{2e}$

input
```
int(x^5*(a+b*ln(c*x^n))/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
1/4*b*ln(x^n)/e*x^4-1/2*b*ln(x^n)/e^2*d*x^2+1/2*b*ln(x^n)*d^2/e^3*ln(e*x^2
+d)-1/2*b*n*d^2/e^3*ln(x)*ln(e*x^2+d)+1/2*b*n*d^2/e^3*ln(x)*ln((-e*x+(-d*e
)^(1/2))/(-d*e)^(1/2))+1/2*b*n*d^2/e^3*ln(x)*ln((e*x+(-d*e)^(1/2))/(-d*e)^
(1/2))+1/2*b*n*d^2/e^3*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n*d^2
/e^3*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/16*b*n*x^4/e+1/4*b*d*n*x^2/e
^2-1/4*b/e^3*n*d^2+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn
(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn
(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(1/2/e^2*(1/2*e*x^4-d*x^2)+1/2*d^2/e^3*ln
(e*x^2+d))
```

Fricas [F]

$$\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{ex^2+d}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*x^5*log(c*x^n) + a*x^5)/(e*x^2 + d), x)
```

Sympy [A] (verification not implemented)

Time = 36.25 (sec) , antiderivative size = 257, normalized size of antiderivative = 2.12

$$\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx = \frac{ad^2\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)}{2e^2} - \frac{adx^2}{2e^2} + \frac{ax^4}{4e} - \frac{bd^2n\left(\begin{cases}\frac{x^2}{2d} \\ \frac{\begin{cases}-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1 \wedge |x|< \\ \log(d)\log(x)-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } |x|<1 \\ -\log(d)\log\left(\frac{1}{x}\right)-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{otherwise}\end{cases}}{e}\end{cases}\right)}{2e^2} + \frac{bd^2\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{2e^2} + \frac{bdnx^2}{4e^2} - \frac{bdx^2\log(cx^n)}{2e^2} - \frac{bnx^4}{16e} + \frac{bx^4\log(cx^n)}{4e}$$

input
```
integrate(x**5*(a+b*ln(c*x**n))/(e*x**2+d),x)
```

output
```
a*d**2*Piecewise((x**2/d, Eq(e, 0)), (log(d + e*x**2)/e, True))/(2*e**2) -
 a*d*x**2/(2*e**2) + a*x**4/(4*e) - b*d**2*n*Piecewise((x**2/(2*d), Eq(e,
0)), (Piecewise((-polylog(2, e*x**2*exp_polar(I*pi)/d)/2, (Abs(x) < 1) & (
1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, A
bs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, 1/
Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1
, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x**2*exp_polar(I*pi)/d)/
2, True))/e, True))/(2*e**2) + b*d**2*Piecewise((x**2/d, Eq(e, 0)), (log(d
 + e*x**2)/e, True))*log(c*x**n)/(2*e**2) + b*d*n*x**2/(4*e**2) - b*d*x**2
*log(c*x**n)/(2*e**2) - b*n*x**4/(16*e) + b*x**4*log(c*x**n)/(4*e)
```

Maxima [F]

$$\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{ex^2+d}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

output
```
1/4*a*(2*d^2*log(e*x^2 + d)/e^3 + (e*x^4 - 2*d*x^2)/e^2) + b*integrate((x^
5*log(c) + x^5*log(x^n))/(e*x^2 + d), x)
```

Giac [F]

$$\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{ex^2+d}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^5/(e*x^2 + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx=\int \frac{x^5\,(a+b\,\ln(c\,x^n))}{e\,x^2+d}\,dx$$

input
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2),x)
```

output
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2), x)
```

Reduce [F]

$$\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx$$
$$=\frac{-16\left(\int \frac{\log(x^n c)}{e\,x^3+dx}dx\right)b\,d^3n+8\log(e\,x^2+d)\,a\,d^2n+8\log(x^nc)^2\,b\,d^2-8\log(x^nc)\,bden\,x^2+4\log(x^nc)\,b\,e^2n}{16e^3n}$$

input
```
int(x^5*(a+b*log(c*x^n))/(e*x^2+d),x)
```

output
```
( - 16*int(log(x**n*c)/(d*x + e*x**3),x)*b*d**3*n + 8*log(d + e*x**2)*a*d*
*2*n + 8*log(x**n*c)**2*b*d**2 - 8*log(x**n*c)*b*d*e*n*x**2 + 4*log(x**n*c
)*b*e**2*n*x**4 - 8*a*d*e*n*x**2 + 4*a*e**2*n*x**4 + 4*b*d*e*n**2*x**2 - b
*e**2*n**2*x**4)/(16*e**3*n)
```

3.211 $\int \frac{x^3(a+b\log(cx^n))}{d+ex^2} dx$

Optimal result 1650
Mathematica [A] (verified) 1650
Rubi [A] (verified) 1651
Maple [C] (warning: unable to verify) 1652
Fricas [F] 1653
Sympy [A] (verification not implemented) 1653
Maxima [F] 1654
Giac [F] 1654
Mupad [F(-1)] 1655
Reduce [F] 1655

Optimal result

Integrand size = 23, antiderivative size = 83

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^2} dx = -\frac{bnx^2}{4e} + \frac{x^2(a+b\log(cx^n))}{2e} - \frac{d(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e^2} - \frac{bdn\,\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^2}$$

output
```
-1/4*b*n*x^2/e+1/2*x^2*(a+b*ln(c*x^n))/e-1/2*d*(a+b*ln(c*x^n))*ln(1+e*x^2/
d)/e^2-1/4*b*d*n*polylog(2,-e*x^2/d)/e^2
```

Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.63

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^2} dx = -\frac{benx^2 - 2ex^2(a+b\log(cx^n)) + 2d(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right) + 2d(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}}{(-d)^3}\right.}{4e^2}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
-1/4*(b*e*n*x^2 - 2*e*x^2*(a + b*Log[c*x^n]) + 2*d*(a + b*Log[c*x^n])*Log[
1 + (Sqrt[e]*x)/Sqrt[-d]] + 2*d*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(
-d)^(3/2)] + 2*b*d*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]] + 2*b*d*n*PolyLog[2,
 (d*Sqrt[e]*x)/(-d)^(3/2)])/e^2
```

Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 83, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^2}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{x(a+b\log(cx^n))}{e}-\frac{dx(a+b\log(cx^n))}{e(d+ex^2)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{2e^2}+\frac{x^2(a+b\log(cx^n))}{2e}-\frac{bdn\,\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^2}-\frac{bnx^2}{4e}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
-1/4*(b*n*x^2)/e + (x^2*(a + b*Log[c*x^n]))/(2*e) - (d*(a + b*Log[c*x^n])*
Log[1 + (e*x^2)/d])/(2*e^2) - (b*d*n*PolyLog[2, -((e*x^2)/d)])/(4*e^2)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.54 (sec) , antiderivative size = 284, normalized size of antiderivative = 3.42

method	result
risch	$\frac{b\ln(x^n)x^2}{2e} - \frac{b\ln(x^n)d\ln(e\,x^2+d)}{2e^2} - \frac{bn\,x^2}{4e} + \frac{bnd\ln(x)\ln(e\,x^2+d)}{2e^2} - \frac{bnd\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e^2} - \frac{bnd\ln(x)\ln\left(\frac{ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e^2}$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/e*x^2-1/2*b*ln(x^n)*d/e^2*ln(e*x^2+d)-1/4*b*n*x^2/e+1/2*b*n*
d/e^2*ln(x)*ln(e*x^2+d)-1/2*b*n*d/e^2*ln(x)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^
(1/2))-1/2*b*n*d/e^2*ln(x)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n*d/e
^2*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n*d/e^2*dilog((e*x+(-d*e)
^(1/2))/(-d*e)^(1/2))+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*c
sgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*c
sgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(1/2*x^2/e-1/2*d/e^2*ln(e*x^2+d))
```

Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^2}\,dx=\int \frac{(b\log(cx^n)+a)x^3}{ex^2+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x^n) + a*x^3)/(e*x^2 + d), x)
```

Sympy [A] (verification not implemented)

Time = 18.09 (sec) , antiderivative size = 202, normalized size of antiderivative = 2.43

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^2}\,dx=-\frac{ad\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)}{2e}+\frac{ax^2}{2e}+\frac{bdn\left(\begin{cases}\frac{x^2}{2d} & \\ \frac{\begin{cases}-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{otherwise}\end{cases}}{e} & \end{cases}\right)}{2e}-\frac{bd\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{2e}-\frac{bnx^2}{4e}+\frac{bx^2\log(cx^n)}{2e}$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x**2+d),x)
```

output
```
-a*d*Piecewise((x**2/d, Eq(e, 0)), (log(d + e*x**2)/e, True))/(2*e) + a*x*
*2/(2*e) + b*d*n*Piecewise((x**2/(2*d), Eq(e, 0)), (Piecewise((-polylog(2,
 e*x**2*exp_polar(I*pi)/d)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(
x) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, Abs(x) < 1), (-log(d)*log(1/x
) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, 1/Abs(x) < 1), (-meijerg(((),
(1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*
log(d) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, True))/e, True))/(2*e) -
b*d*Piecewise((x**2/d, Eq(e, 0)), (log(d + e*x**2)/e, True))*log(c*x**n)/(
2*e) - b*n*x**2/(4*e) + b*x**2*log(c*x**n)/(2*e)
```

Maxima [F]

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{ex^2+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

output
```
1/2*a*(x^2/e - d*log(e*x^2 + d)/e^2) + b*integrate((x^3*log(c) + x^3*log(x
^n))/(e*x^2 + d), x)
```

Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{ex^2+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x^2 + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))}{e\,x^2+d}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2), x)
```

Reduce [F]

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^2}\,dx$$
$$= \frac{4\left(\int \frac{\log(x^n c)}{e\,x^3+dx}dx\right) b\,d^2n - 2\log(e\,x^2+d)\,adn - 2\log(x^n c)^2\,bd + 2\log(x^n c)\,ben\,x^2 + 2aen\,x^2 - be\,n^2x^2}{4e^2n}$$

input
```
int(x^3*(a+b*log(c*x^n))/(e*x^2+d),x)
```

output
```
(4*int(log(x**n*c)/(d*x + e*x**3),x)*b*d**2*n - 2*log(d + e*x**2)*a*d*n -
2*log(x**n*c)**2*b*d + 2*log(x**n*c)*b*e*n*x**2 + 2*a*e*n*x**2 - b*e*n**2*
x**2)/(4*e**2*n)
```

3.212 $\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx$

Optimal result . . . 1656
Mathematica [A] (verified) . . . 1656
Rubi [A] (verified) . . . 1657
Maple [C] (warning: unable to verify) . . . 1658
Fricas [F] . . . 1659
Sympy [A] (verification not implemented) . . . 1659
Maxima [F] . . . 1660
Giac [F] . . . 1660
Mupad [F(-1)] . . . 1661
Reduce [F] . . . 1661

Optimal result

Integrand size = 21, antiderivative size = 49

$$\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx=\frac{(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e}+\frac{bn\,\mathrm{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e}$$

output
```
1/2*(a+b*ln(c*x^n))*ln(1+e*x^2/d)/e+1/4*b*n*polylog(2,-e*x^2/d)/e
```

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 94, normalized size of antiderivative = 1.92

$$\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx =\frac{(a+b\log(cx^n))\left(\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)+\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)\right)+bn\,\mathrm{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)+bn\,\mathrm{PolyLog}\left(2,\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{2e}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
((a + b*Log[c*x^n])*(Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + Log[1 + (d*Sqrt[e]*x)
/(-d)^(3/2)]) + b*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]] + b*n*PolyLog[2, (d*S
qrt[e]*x)/(-d)^(3/2)])/(2*e)
```

Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2775, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx$$

$$\Big\downarrow \text{2775}$$

$$\frac{\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{2e}-\frac{bn\int\frac{\log\left(\frac{ex^2}{d}+1\right)}{x}dx}{2e}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{2e}+\frac{bn\,\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
((a + b*Log[c*x^n])*Log[1 + (e*x^2)/d])/(2*e) + (b*n*PolyLog[2, -((e*x^2)/
d)])/(4*e)
```

Defintions of rubi rules used

rule 2775
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.))/((d_)
+ (e_.)*(x_)^(r_)), x_Symbol] :> Simp[f^m*Log[1 + e*(x^r/d)]*((a + b*Log[c*
x^n])^p/(e*r)), x] - Simp[b*f^m*n*(p/(e*r))   Int[Log[1 + e*(x^r/d)]*((a +
b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && NeQ[r, n]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.42 (sec) , antiderivative size = 244, normalized size of antiderivative = 4.98

method	result
risch	$\frac{b\ln(x^n)\ln(e\,x^2+d)}{2e} - \frac{bn\ln(x)\ln(e\,x^2+d)}{2e} + \frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e} + \frac{bn\ln(x)\ln\left(\frac{ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e} + \frac{bn\,\mathrm{dilog}\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e} +$

input
```
int(x*(a+b*ln(c*x^n))/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/e*ln(e*x^2+d)-1/2*b/e*n*ln(x)*ln(e*x^2+d)+1/2*b/e*n*ln(x)*ln
((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b/e*n*ln(x)*ln((e*x+(-d*e)^(1/2))/(
-d*e)^(1/2))+1/2*b/e*n*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b/e*n*d
ilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c
*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c
*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)/e*ln(e*x^2+d)
```

Fricas [F]

$$\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x}{ex^2+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*x*log(c*x^n) + a*x)/(e*x^2 + d), x)
```

Sympy [A] (verification not implemented)

Time = 3.51 (sec) , antiderivative size = 141, normalized size of antiderivative = 2.88

$$\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx = \frac{a\log(d+ex^2)}{2e} - \frac{bn\left(\begin{cases} -\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1 \wedge |x|<1 \\ \log(d)\log(x) - \frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } |x|<1 \\ -\log(d)\log\left(\frac{1}{x}\right) - \frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(d) + G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)\log(d) - \frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{otherwise} \end{cases}\right)}{2e} + \frac{b\log(cx^n)\log(d+ex^2)}{2e}$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x**2+d),x)
```

output
```
a*log(d + e*x**2)/(2*e) - b*n*Piecewise((-polylog(2, e*x**2*exp_polar(I*pi
)/d)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x**2
*exp_polar(I*pi)/d)/2, Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x**2*
exp_polar(I*pi)/d)/2, 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()),
 x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*
x**2*exp_polar(I*pi)/d)/2, True))/(2*e) + b*log(c*x**n)*log(d + e*x**2)/(2
*e)
```

Maxima [F]

$$\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x}{ex^2+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

output
```
b*integrate((x*log(c) + x*log(x^n))/(e*x^2 + d), x) + 1/2*a*log(e*x^2 + d)
/e
```

Giac [F]

$$\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x}{ex^2+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x^2 + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log{(cx^n)})}{d+ex^2}\,dx = \int \frac{x\,(a+b\,\ln{(c\,x^n)})}{e\,x^2+d}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2),x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2), x)
```

Reduce [F]

$$\int \frac{x(a+b\log{(cx^n)})}{d+ex^2}\,dx = \frac{-2\left(\int \frac{\log(x^n c)}{e\,x^3+dx}dx\right)bdn+\log(e\,x^2+d)\,an+\log(x^n c)^2\,b}{2en}$$

input
```
int(x*(a+b*log(c*x^n))/(e*x^2+d),x)
```

output
```
( - 2*int(log(x**n*c)/(d*x + e*x**3),x)*b*d*n + log(d + e*x**2)*a*n + log(
x**n*c)**2*b)/(2*e*n)
```

3.213 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)}\,dx$

Optimal result 1662
Mathematica [B] (verified) 1662
Rubi [A] (verified) 1663
Maple [C] (warning: unable to verify) 1664
Fricas [F] 1665
Sympy [A] (verification not implemented) 1665
Maxima [F] 1666
Giac [F] 1666
Mupad [F(-1)] 1667
Reduce [F] 1667

Optimal result

Integrand size = 23, antiderivative size = 49

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)}\,dx = -\frac{\log\left(1+\frac{d}{ex^2}\right)(a+b\log(cx^n))}{2d}+\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d}$$

output
```
-1/2*ln(1+d/e/x^2)*(a+b*ln(c*x^n))/d+1/4*b*n*polylog(2,-d/e/x^2)/d
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 126 vs. 2(49) = 98.

Time = 0.10 (sec) , antiderivative size = 126, normalized size of antiderivative = 2.57

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)}\,dx = -\frac{-\left((a+b\log(cx^n))\left(a+b\log(cx^n)-bn\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)-bn\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)\right)\right)+b^2n^2\,\text{PolyLog}\left(2,\right.}{2bdn}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^2)),x]
```

output
```
-1/2*(-((a + b*Log[c*x^n])*(a + b*Log[c*x^n] - b*n*Log[1 + (Sqrt[e]*x)/Sqr
t[-d]] - b*n*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])) + b^2*n^2*PolyLog[2, (Sqr
t[e]*x)/Sqrt[-d]] + b^2*n^2*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(b*d*n)
```

Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)}\,dx$$

$$\Big\downarrow \text{2779}$$

$$\frac{bn\int \frac{\log\left(\frac{d}{ex^2}+1\right)}{x}dx}{2d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(a+b\log(cx^n))}{2d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(a+b\log(cx^n))}{2d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^2)),x]
```

output
```
-1/2*(Log[1 + d/(e*x^2)]*(a + b*Log[c*x^n]))/d + (b*n*PolyLog[2, -(d/(e*x^
2))])/(4*d)
```

Defintions of rubi rules used

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.47 (sec) , antiderivative size = 274, normalized size of antiderivative = 5.59

method	result
risch	$-\frac{b\ln(x^n)\ln(e\,x^2+d)}{2d}+\frac{b\ln(x^n)\ln(x)}{d}-\frac{bn\ln(x)^2}{2d}-\frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2d}-\frac{bn\ln(x)\ln\left(\frac{ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2d}+\frac{bn\ln(x)\ln(e\,x^2 \ldots}{2d}$

input
```
int((a+b*ln(c*x^n))/x/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
-1/2*b*ln(x^n)/d*ln(e*x^2+d)+b*ln(x^n)/d*ln(x)-1/2*b*n/d*ln(x)^2-1/2*b*n/d
*ln(x)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n/d*ln(x)*ln((e*x+(-d*e)
^(1/2))/(-d*e)^(1/2))+1/2*b*n/d*ln(x)*ln(e*x^2+d)-1/2*b*n/d*dilog((-e*x+(-
d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n/d*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))
+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x
^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I
*c)+b*ln(c)+a)*(-1/2/d*ln(e*x^2+d)+1/d*ln(x))
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^3 + d*x), x)
```

Sympy [A] (verification not implemented)

Time = 6.06 (sec) , antiderivative size = 144, normalized size of antiderivative = 2.94

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)}\,dx = \frac{a\log(x)}{d} - \frac{a\log(d+ex^2)}{2d} + \frac{bn\left(\begin{cases} \frac{\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{for } \frac{1}{|x|}<1 \wedge |x|<1 \\ \log(e)\log(x)+\frac{\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{for } |x|<1 \\ -\log(e)\log\left(\frac{1}{x}\right)+\frac{\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{for } \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)\log(e)+\frac{\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{otherwise} \end{cases}\right)}{2d} - \frac{b\log(cx^n)\log\left(\frac{d}{x^2}+e\right)}{2d}$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x**2+d),x)
```

output
```
a*log(x)/d - a*log(d + e*x**2)/(2*d) + b*n*Piecewise((polylog(2, d*exp_pol
ar(I*pi)/(e*x**2))/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) + pol
ylog(2, d*exp_polar(I*pi)/(e*x**2))/2, Abs(x) < 1), (-log(e)*log(1/x) + po
lylog(2, d*exp_polar(I*pi)/(e*x**2))/2, 1/Abs(x) < 1), (-meijerg(((), (1,
1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(
e) + polylog(2, d*exp_polar(I*pi)/(e*x**2))/2, True))/(2*d) - b*log(c*x**n
)*log(d/x**2 + e)/(2*d)
```

Maxima [F]

$$\int \frac{a + b\log\left(cx^n\right)}{x\left(d + ex^2\right)}\,dx = \int \frac{b\log\left(cx^n\right) + a}{(ex^2 + d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d),x, algorithm="maxima")
```

output
```
-1/2*a*(log(e*x^2 + d)/d - 2*log(x)/d) + b*integrate((log(c) + log(x^n))/(
e*x^3 + d*x), x)
```

Giac [F]

$$\int \frac{a + b\log\left(cx^n\right)}{x\left(d + ex^2\right)}\,dx = \int \frac{b\log\left(cx^n\right) + a}{(ex^2 + d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(e\,x^2+d\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)), x)
```

Reduce [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)}\,dx=\frac{2\left(\int \frac{\log(x^n c)}{e\,x^3+dx}dx\right)bd-\log(e\,x^2+d)\,a+2\log(x)\,a}{2d}$$

input
```
int((a+b*log(c*x^n))/x/(e*x^2+d),x)
```

output
```
(2*int(log(x**n*c)/(d*x + e*x**3),x)*b*d - log(d + e*x**2)*a + 2*log(x)*a)
/(2*d)
```

3.214 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)}\,dx$

Optimal result 1668
Mathematica [A] (verified) 1668
Rubi [A] (verified) 1669
Maple [C] (warning: unable to verify) 1670
Fricas [F] 1671
Sympy [F(-1)] 1671
Maxima [F] 1672
Giac [F] 1672
Mupad [F(-1)] 1672
Reduce [F] 1673

Optimal result

Integrand size = 23, antiderivative size = 83

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^2\right)}\,dx=-\frac{bn}{4dx^2}-\frac{a+b\log\left(cx^n\right)}{2dx^2}+\frac{e\log\left(1+\frac{d}{ex^2}\right)\left(a+b\log\left(cx^n\right)\right)}{2d^2}-\frac{ben\,\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d^2}$$

output
```
-1/4*b*n/d/x^2-1/2*(a+b*ln(c*x^n))/d/x^2+1/2*e*ln(1+d/e/x^2)*(a+b*ln(c*x^n
))/d^2-1/4*b*e*n*polylog(2,-d/e/x^2)/d^2
```

Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 157, normalized size of antiderivative = 1.89

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^2\right)}\,dx=\frac{-\frac{bdn}{x^2}-\frac{2d(a+b\log(cx^n))}{x^2}-\frac{2e(a+b\log(cx^n))^2}{bn}+2e\left(a+b\log\left(cx^n\right)\right)\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)+2e\left(a+b\log\left(cx^n\right)\right)\log\left(1+\right.}{4d^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)),x]
```

output
```
(-((b*d*n)/x^2) - (2*d*(a + b*Log[c*x^n]))/x^2 - (2*e*(a + b*Log[c*x^n])^2
)/(b*n) + 2*e*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + 2*e*(a +
b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)] + 2*b*e*n*PolyLog[2, (Sqrt
[e]*x)/Sqrt[-d]] + 2*b*e*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(4*d^2)
```

Rubi [A] (verified)

Time = 0.48 (sec) , antiderivative size = 87, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)}dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x^3}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x(ex^2+d)}dx}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x(ex^2+d)}dx}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{bn\int \frac{\log\left(\frac{d}{ex^2}+1\right)}{x}dx}{2d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(a+b\log(cx^n))}{2d}\right)}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(a+b\log(cx^n))}{2d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)),x]
```

output
```
(-1/4*(b*n)/x^2 - (a + b*Log[c*x^n])/(2*x^2))/d - (e*(-1/2*(Log[1 + d/(e*x
^2)]*(a + b*Log[c*x^n]))/d + (b*n*PolyLog[2, -(d/(e*x^2))])/(4*d)))/d
```

Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.65 (sec) , antiderivative size = 317, normalized size of antiderivative = 3.82

method	result
risch	$\frac{b\ln(x^n)e\ln(e\,x^2+d)}{2d^2}-\frac{b\ln(x^n)}{2d\,x^2}-\frac{b\ln(x^n)e\ln(x)}{d^2}-\frac{bne\ln(x)\ln(e\,x^2+d)}{2d^2}+\frac{bne\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2d^2}+\frac{bne\ln(x)\ln\left(\frac{ex+}{\sqrt{}}\right.}{2d^2}$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)*e/d^2*ln(e*x^2+d)-1/2*b*ln(x^n)/d/x^2-b*ln(x^n)*e/d^2*ln(x)-
1/2*b*n*e/d^2*ln(x)*ln(e*x^2+d)+1/2*b*n*e/d^2*ln(x)*ln((-e*x+(-d*e)^(1/2))
/(-d*e)^(1/2))+1/2*b*n*e/d^2*ln(x)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2
*b*n*e/d^2*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n*e/d^2*dilog((e*
x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/4*b*n/d/x^2+1/2*b*n*e/d^2*ln(x)^2+(1/2*I*P
i*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(
I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(
c)+a)*(1/2*e/d^2*ln(e*x^2+d)-1/2/d/x^2-e/d^2*ln(x))
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^5 + d*x^3), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x**2+d),x)
```

output
```
Timed out
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d),x, algorithm="maxima")
```

output
```
1/2*a*(e*log(e*x^2 + d)/d^2 - 2*e*log(x)/d^2 - 1/(d*x^2)) + b*integrate((l
og(c) + log(x^n))/(e*x^5 + d*x^3), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)*x^3), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^3\,(e\,x^2+d)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)), x)
```

Reduce [F]

$$\int \frac{a + b\log(cx^n)}{x^3(d + ex^2)}\,dx = \frac{2\left(\int \frac{\log(x^n c)}{e\,x^5 + d\,x^3}dx\right) b\,d^2x^2 + \log(e\,x^2 + d)\,ae\,x^2 - 2\log(x)\,ae\,x^2 - ad}{2d^2x^2}$$

input

```
int((a+b*log(c*x^n))/x^3/(e*x^2+d),x)
```

output

```
(2*int(log(x**n*c)/(d*x**3 + e*x**5),x)*b*d**2*x**2 + log(d + e*x**2)*a*e*
x**2 - 2*log(x)*a*e*x**2 - a*d)/(2*d**2*x**2)
```

3.215 $\int \frac{a+b\log(cx^n)}{x^5(d+ex^2)}\,dx$

Optimal result 1674
Mathematica [A] (verified) 1674
Rubi [A] (verified) 1675
Maple [C] (warning: unable to verify) 1677
Fricas [F] 1677
Sympy [F(-1)] 1678
Maxima [F] 1678
Giac [F] 1678
Mupad [F(-1)] 1679
Reduce [F] 1679

Optimal result

Integrand size = 23, antiderivative size = 121

$$\int \frac{a+b\log(cx^n)}{x^5(d+ex^2)}\,dx=-\frac{bn}{16dx^4}+\frac{ben}{4d^2x^2}-\frac{a+b\log(cx^n)}{4dx^4}+\frac{e(a+b\log(cx^n))}{2d^2x^2}-\frac{e^2\log\left(1+\frac{d}{ex^2}\right)(a+b\log(cx^n))}{2d^3}+\frac{be^2n\operatorname{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d^3}$$

output
```
-1/16*b*n/d/x^4+1/4*b*e*n/d^2/x^2-1/4*(a+b*ln(c*x^n))/d/x^4+1/2*e*(a+b*ln(
c*x^n))/d^2/x^2-1/2*e^2*ln(1+d/e/x^2)*(a+b*ln(c*x^n))/d^3+1/4*b*e^2*n*poly
log(2,-d/e/x^2)/d^3
```

Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 196, normalized size of antiderivative = 1.62

$$\int \frac{a+b\log(cx^n)}{x^5(d+ex^2)}\,dx=-\frac{\frac{bd^2n}{x^4}-\frac{4bden}{x^2}+\frac{4d^2(a+b\log(cx^n))}{x^4}-\frac{8de(a+b\log(cx^n))}{x^2}-\frac{8e^2(a+b\log(cx^n))^2}{bn}+8e^2(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{16d^3}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^5*(d + e*x^2)),x]
```

output
```
-1/16*((b*d^2*n)/x^4 - (4*b*d*e*n)/x^2 + (4*d^2*(a + b*Log[c*x^n]))/x^4 -
(8*d*e*(a + b*Log[c*x^n]))/x^2 - (8*e^2*(a + b*Log[c*x^n])^2)/(b*n) + 8*e^
2*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + 8*e^2*(a + b*Log[c*x^
n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)] + 8*b*e^2*n*PolyLog[2, (Sqrt[e]*x)/S
qrt[-d]] + 8*b*e^2*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/d^3
```

Rubi [A] (verified)

Time = 0.67 (sec) , antiderivative size = 125, normalized size of antiderivative = 1.03, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2780, 2741, 2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^5(d+ex^2)}dx$$

$$\Big\downarrow \text{ 2780}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x^5}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^3(ex^2+d)}dx}{d}$$

$$\Big\downarrow \text{ 2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{4x^4}-\frac{bn}{16x^4}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^3(ex^2+d)}dx}{d}$$

$$\Big\downarrow \text{ 2780}$$

$$\frac{-\frac{a+b\log(cx^n)}{4x^4}-\frac{bn}{16x^4}}{d}-\frac{e\left(\frac{\int \frac{a+b\log(cx^n)}{x^3}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x\left(ex^2+d\right)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{ 2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{4x^4}-\frac{bn}{16x^4}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x\left(ex^2+d\right)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{ 2779}$$

$$\frac{-\frac{a+b\log(cx^n)}{4x^4}-\frac{bn}{16x^4}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{bn\int\frac{\log\left(\frac{d}{ex^2}+1\right)}{x}dx}{2d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(a+b\log(cx^n))}{2d}\right)}{d}\right)}{d}$$

$\Big\downarrow$ 2838

$$\frac{-\frac{a+b\log(cx^n)}{4x^4}-\frac{bn}{16x^4}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(a+b\log(cx^n))}{2d}\right)}{d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^5*(d + e*x^2)),x]
```

output
```
(-1/16*(b*n)/x^4 - (a + b*Log[c*x^n])/(4*x^4))/d - (e*((-1/4*(b*n)/x^2 - (
a + b*Log[c*x^n])/(2*x^2))/d - (e*(-1/2*(Log[1 + d/(e*x^2)]*(a + b*Log[c*x
^n]))/d + (b*n*PolyLog[2, -(d/(e*x^2))])/(4*d)))/d))/d
```

Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.00 (sec) , antiderivative size = 369, normalized size of antiderivative = 3.05

method	result
risch	$-\frac{b\ln(x^n)e^2\ln(e\,x^2+d)}{2d^3}-\frac{b\ln(x^n)}{4d\,x^4}+\frac{b\ln(x^n)e^2\ln(x)}{d^3}+\frac{b\ln(x^n)e}{2d^2x^2}-\frac{bn}{16d\,x^4}+\frac{ben}{4d^2x^2}-\frac{bn\,e^2\ln(x)^2}{2d^3}+\frac{bn\,e^2\ln(x)\ln(e}{2d^3}$ [illegible]

input
```
int((a+b*ln(c*x^n))/x^5/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
-1/2*b*ln(x^n)*e^2/d^3*ln(e*x^2+d)-1/4*b*ln(x^n)/d/x^4+b*ln(x^n)*e^2/d^3*l
n(x)+1/2*b*ln(x^n)*e/d^2/x^2-1/16*b*n/d/x^4+1/4*b*e*n/d^2/x^2-1/2*b*n*e^2/
d^3*ln(x)^2+1/2*b*n*e^2/d^3*ln(x)*ln(e*x^2+d)-1/2*b*n*e^2/d^3*ln(x)*ln((-e
*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n*e^2/d^3*ln(x)*ln((e*x+(-d*e)^(1/2))
/(-d*e)^(1/2))-1/2*b*n*e^2/d^3*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2
*b*n*e^2/d^3*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+(1/2*I*Pi*b*csgn(I*x^n
)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*
b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(-1/2*e^
2/d^3*ln(e*x^2+d)-1/4/d/x^4+e^2/d^3*ln(x)+1/2*e/d^2/x^2)
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^5\left(d+ex^2\right)}\,dx=\int \frac{b\log\left(cx^n\right)+a}{(ex^2+d)x^5}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^5/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^7 + d*x^5), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^5(d+ex^2)}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**5/(e*x**2+d),x)
```

output
```
Timed out
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^5(d+ex^2)}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)x^5}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^5/(e*x^2+d),x, algorithm="maxima")
```

output
```
-1/4*a*(2*e^2*log(e*x^2 + d)/d^3 - 4*e^2*log(x)/d^3 - (2*e*x^2 - d)/(d^2*x
^4)) + b*integrate((log(c) + log(x^n))/(e*x^7 + d*x^5), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^5(d+ex^2)}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)x^5}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^5/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)*x^5), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log (cx^n)}{x^5 (d+ex^2)}\,dx=\int \frac{a+b\,\ln \left(c\,x^n\right)}{x^5\,\left(e\,x^2+d\right)} \,dx$$

input
```
int((a + b*log(c*x^n))/(x^5*(d + e*x^2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^5*(d + e*x^2)), x)
```

Reduce [F]

$$\int \frac{a+b\log (cx^n)}{x^5 (d+ex^2)}\,dx = \frac{4\left(\int \frac{\log(x^n c)}{e\,x^7+d\,x^5}dx\right) b\,d^3x^4-2\log(e\,x^2+d)\,a\,e^2x^4+4\log(x)\,a\,e^2x^4-a\,d^2+2ade\,x^2}{4d^3x^4}$$

input
```
int((a+b*log(c*x^n))/x^5/(e*x^2+d),x)
```

output
```
(4*int(log(x**n*c)/(d*x**5 + e*x**7),x)*b*d**3*x**4 - 2*log(d + e*x**2)*a*
e**2*x**4 + 4*log(x)*a*e**2*x**4 - a*d**2 + 2*a*d*e*x**2)/(4*d**3*x**4)
```

3.216 $\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx$

Optimal result 1680
Mathematica [A] (verified) 1681
Rubi [C] (verified) 1681
Maple [C] (warning: unable to verify) 1682
Fricas [F] 1683
Sympy [F] 1683
Maxima [F(-2)] 1684
Giac [F] 1684
Mupad [F(-1)] 1684
Reduce [F] 1685

Optimal result

Integrand size = 23, antiderivative size = 166

$$\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx = -\frac{adx}{e^2}+\frac{bdnx}{e^2}-\frac{bnx^3}{9e}-\frac{bdx\log(cx^n)}{e^2}+\frac{x^3(a+b\log(cx^n))}{3e}+\frac{d^{3/2}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{5/2}}-\frac{b(-d)^{3/2}n\operatorname{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2e^{5/2}}+\frac{b(-d)^{3/2}n\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2e^{5/2}}$$

output
```
-a*d*x/e^2+b*d*n*x/e^2-1/9*b*n*x^3/e-b*d*x*ln(c*x^n)/e^2+1/3*x^3*(a+b*ln(c
*x^n))/e+d^(3/2)*arctan(e^(1/2)*x/d^(1/2))*(a+b*ln(c*x^n))/e^(5/2)-1/2*b*(
-d)^(3/2)*n*polylog(2,-e^(1/2)*x/(-d)^(1/2))/e^(5/2)+1/2*b*(-d)^(3/2)*n*po
lylog(2,e^(1/2)*x/(-d)^(1/2))/e^(5/2)
```

Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 208, normalized size of antiderivative = 1.25

$$\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx$$
$$= \frac{-18ad\sqrt{e}x+18bd\sqrt{e}nx-2be^{3/2}nx^3-18bd\sqrt{e}x\log(cx^n)+6e^{3/2}x^3(a+b\log(cx^n))+9\sqrt{-d}d(a+b\log}{}$$

input
```
Integrate[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
(-18*a*d*Sqrt[e]*x + 18*b*d*Sqrt[e]*n*x - 2*b*e^(3/2)*n*x^3 - 18*b*d*Sqrt[
e]*x*Log[c*x^n] + 6*e^(3/2)*x^3*(a + b*Log[c*x^n]) + 9*Sqrt[-d]*d*(a + b*L
og[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + 9*(-d)^(3/2)*(a + b*Log[c*x^n])
*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)] + 9*b*(-d)^(3/2)*n*PolyLog[2, (Sqrt[e]*
x)/Sqrt[-d]] - 9*b*(-d)^(3/2)*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(18*
e^(5/2))
```

Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 0.41 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.01, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{d^2(a+b\log(cx^n))}{e^2(d+ex^2)}-\frac{d(a+b\log(cx^n))}{e^2}+\frac{x^2(a+b\log(cx^n))}{e}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^{3/2}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{5/2}}+\frac{x^3(a+b\log(cx^n))}{3e}-\frac{adx}{e^2}-\frac{bdx\log(cx^n)}{e^2}-\frac{ibd^{3/2}n\operatorname{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{2e^{5/2}}+\frac{ibd^{3/2}n\operatorname{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{2e^{5/2}}+\frac{bdnx}{e^2}-\frac{bnx^3}{9e}$$

input
```
Int[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
-((a*d*x)/e^2) + (b*d*n*x)/e^2 - (b*n*x^3)/(9*e) - (b*d*x*Log[c*x^n])/e^2
+ (x^3*(a + b*Log[c*x^n]))/(3*e) + (d^(3/2)*ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a
 + b*Log[c*x^n]))/e^(5/2) - ((I/2)*b*d^(3/2)*n*PolyLog[2, ((-I)*Sqrt[e]*x)
/Sqrt[d]])/e^(5/2) + ((I/2)*b*d^(3/2)*n*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])
/e^(5/2)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.68 (sec) , antiderivative size = 365, normalized size of antiderivative = 2.20

method	result
risch	$\frac{b\ln(x^n)x^3}{3e}-\frac{b\ln(x^n)dx}{e^2}-\frac{b\,d^2\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{e^2\sqrt{de}}+\frac{b\,d^2\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{e^2\sqrt{de}}-\frac{bn\,x^3}{9e}+\frac{bdnx}{e^2}+\frac{bn\,d^2\ln(x)\ln\left(\frac{-ex+\sqrt{}}{\sqrt{-}}\right.}{2e^2\sqrt{-de}}$

input
```
int(x^4*(a+b*ln(c*x^n))/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
1/3*b*ln(x^n)/e*x^3-b*ln(x^n)/e^2*d*x-b*d^2/e^2/(d*e)^(1/2)*arctan(x*e/(d*
e)^(1/2))*n*ln(x)+b*d^2/e^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln(x^n)-1/
9*b*n*x^3/e+b*d*n*x/e^2+1/2*b*n*d^2/e^2*ln(x)/(-d*e)^(1/2)*ln((-e*x+(-d*e)
^(1/2))/(-d*e)^(1/2))-1/2*b*n*d^2/e^2*ln(x)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1
/2))/(-d*e)^(1/2))+1/2*b*n*d^2/e^2/(-d*e)^(1/2)*dilog((-e*x+(-d*e)^(1/2))/
(-d*e)^(1/2))-1/2*b*n*d^2/e^2/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(1/2))/(-d*e)
^(1/2))+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csg
n(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2
*csgn(I*c)+b*ln(c)+a)*(1/e^2*(1/3*e*x^3-d*x)+d^2/e^2/(d*e)^(1/2)*arctan(x*
e/(d*e)^(1/2)))
```

Fricas [F]

$$\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x^4}{ex^2+d}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*x^4*log(c*x^n) + a*x^4)/(e*x^2 + d), x)
```

Sympy [F]

$$\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx$$

input
```
integrate(x**4*(a+b*ln(c*x**n))/(e*x**2+d),x)
```

output
```
Integral(x**4*(a + b*log(c*x**n))/(d + e*x**2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x^4}{ex^2+d}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^4/(e*x^2 + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{x^4\,(a+b\,\ln(c\,x^n))}{e\,x^2+d}\,dx$$

input
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x^2),x)
```

output
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x^2), x)
```

Reduce [F]

$$\int \frac{x^4(a + b\log(cx^n))}{d + ex^2}\,dx$$
$$= \frac{9\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)ad + 9\left(\int \frac{\log(x^n c)}{e\,x^2+d}dx\right)b\,d^2e - 9\log(x^nc)\,bdex + 3\log(x^nc)\,b\,e^2x^3 - 9adex + 3a\,e^2x^3}{9e^3}$$

input
```
int(x^4*(a+b*log(c*x^n))/(e*x^2+d),x)
```

output
```
(9*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*d + 9*int(log(x**n*c)/(
d + e*x**2),x)*b*d**2*e - 9*log(x**n*c)*b*d*e*x + 3*log(x**n*c)*b*e**2*x**
3 - 9*a*d*e*x + 3*a*e**2*x**3 + 9*b*d*e*n*x - b*e**2*n*x**3)/(9*e**3)
```

3.217 $\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx$

Optimal result 1686
Mathematica [A] (verified) 1686
Rubi [C] (verified) 1687
Maple [C] (warning: unable to verify) 1688
Fricas [F] 1689
Sympy [F] 1689
Maxima [F(-2)] 1689
Giac [F] 1690
Mupad [F(-1)] 1690
Reduce [F] 1690

Optimal result

Integrand size = 23, antiderivative size = 131

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx = \frac{ax}{e}-\frac{bnx}{e}+\frac{bx\log(cx^n)}{e}-\frac{\sqrt{d}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}} - \frac{b\sqrt{-d}n\,\mathrm{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2e^{3/2}}+\frac{b\sqrt{-d}n\,\mathrm{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2e^{3/2}}$$

output
```
a*x/e-b*n*x/e+b*x*ln(c*x^n)/e-d^(1/2)*arctan(e^(1/2)*x/d^(1/2))*(a+b*ln(c*
x^n))/e^(3/2)-1/2*b*(-d)^(1/2)*n*polylog(2,-e^(1/2)*x/(-d)^(1/2))/e^(3/2)+
1/2*b*(-d)^(1/2)*n*polylog(2,e^(1/2)*x/(-d)^(1/2))/e^(3/2)
```

Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 170, normalized size of antiderivative = 1.30

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx = \frac{2a\sqrt{e}x-2b\sqrt{e}nx+2b\sqrt{e}x\log(cx^n)-\sqrt{-d}(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)+\sqrt{-d}(a+b\log(cx^n))\log}{2e^{3/2}}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
(2*a*Sqrt[e]*x - 2*b*Sqrt[e]*n*x + 2*b*Sqrt[e]*x*Log[c*x^n] - Sqrt[-d]*(a
+ b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + Sqrt[-d]*(a + b*Log[c*x^n]
)*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)] + b*Sqrt[-d]*n*PolyLog[2, (Sqrt[e]*x)/
Sqrt[-d]] - b*Sqrt[-d]*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(2*e^(3/2))
```

Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 0.37 (sec) , antiderivative size = 132, normalized size of antiderivative = 1.01, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx$$
$$\Big\downarrow \text{2793}$$
$$\int \left(\frac{a+b\log(cx^n)}{e}-\frac{d(a+b\log(cx^n))}{e(d+ex^2)}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-\frac{\sqrt{d}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}}+\frac{ax}{e}+\frac{bx\log(cx^n)}{e}+\frac{ib\sqrt{d}n\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{2e^{3/2}}-\frac{ib\sqrt{d}n\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{2e^{3/2}}-\frac{bnx}{e}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
(a*x)/e - (b*n*x)/e + (b*x*Log[c*x^n])/e - (Sqrt[d]*ArcTan[(Sqrt[e]*x)/Sqr
t[d]]*(a + b*Log[c*x^n]))/e^(3/2) + ((I/2)*b*Sqrt[d]*n*PolyLog[2, ((-I)*Sq
rt[e]*x)/Sqrt[d]])/e^(3/2) - ((I/2)*b*Sqrt[d]*n*PolyLog[2, (I*Sqrt[e]*x)/S
qrt[d]])/e^(3/2)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.50 (sec) , antiderivative size = 317, normalized size of antiderivative = 2.42

method	result
risch	$\frac{b\ln(x^n)x}{e}+\frac{bd\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{e\sqrt{de}}-\frac{bd\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{e\sqrt{de}}-\frac{bnx}{e}-\frac{bnd\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e\sqrt{-de}}+\frac{bnd\ln(x)\ln\left(\frac{ex+\sqrt{-d}}{\sqrt{-de}}\right)}{2e\sqrt{-de}}$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)/e*x+b*d/e/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*n*ln(x)-b*d/e/(d*e
)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln(x^n)-b*n*x/e-1/2*b*n*d/e*ln(x)/(-d*e)^(
1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n*d/e*ln(x)/(-d*e)^(1/2)*l
n((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n*d/e/(-d*e)^(1/2)*dilog((-e*x+(-
d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n*d/e/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(1/2)
)/(-d*e)^(1/2))+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*
x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*
c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(x/e-d/e/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))
)
```

Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{ex^2+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x^n) + a*x^2)/(e*x^2 + d), x)
```

Sympy [F]

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x**2+d),x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))/(d + e*x**2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{ex^2+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x^2 + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{e\,x^2+d}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2), x)
```

Reduce [F]

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx = \frac{-\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)a-\left(\int \frac{\log(x^n c)}{e\,x^2+d}dx\right)bde+\log(x^n c)\,bex+aex-benx}{e^2}$$

input
```
int(x^2*(a+b*log(c*x^n))/(e*x^2+d),x)
```

output
```
( - sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a - int(log(x**n*c)/(d +
 e*x**2),x)*b*d*e + log(x**n*c)*b*e*x + a*e*x - b*e*n*x)/e**2
```

3.218 $\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx$

Optimal result 1691
Mathematica [A] (verified) 1691
Rubi [C] (verified) 1692
Maple [C] (warning: unable to verify) 1693
Fricas [F] 1694
Sympy [F] 1694
Maxima [F(-2)] 1695
Giac [F] 1695
Mupad [F(-1)] 1695
Reduce [F] 1696

Optimal result

Integrand size = 20, antiderivative size = 104

$$\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx = \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}} - \frac{bn\operatorname{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2\sqrt{-d}\sqrt{e}} + \frac{bn\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2\sqrt{-d}\sqrt{e}}$$

output
```
arctan(e^(1/2)*x/d^(1/2))*(a+b*ln(c*x^n))/d^(1/2)/e^(1/2)-1/2*b*n*polylog(
2,-e^(1/2)*x/(-d)^(1/2))/(-d)^(1/2)/e^(1/2)+1/2*b*n*polylog(2,e^(1/2)*x/(-
d)^(1/2))/(-d)^(1/2)/e^(1/2)
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 107, normalized size of antiderivative = 1.03

$$\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx = \frac{-\left((a+b\log(cx^n))\left(\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)-\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)\right)\right)+bn\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)-bn\operatorname{PolyLog}\left(2,\frac{d\sqrt{}}{(-d}\right.}{2\sqrt{-d}\sqrt{e}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x^2),x]
```

output
```
(-((a + b*Log[c*x^n])*(Log[1 + (Sqrt[e]*x)/Sqrt[-d]] - Log[1 + (d*Sqrt[e]*
x)/(-d)^(3/2)])) + b*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]] - b*n*PolyLog[2, (
d*Sqrt[e]*x)/(-d)^(3/2)])/(2*Sqrt[-d]*Sqrt[e])
```

Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 0.32 (sec) , antiderivative size = 96, normalized size of antiderivative = 0.92, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2761, 27, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx$$

$$\Big\downarrow \text{2761}$$

$$\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{e}x}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}\sqrt{e}}$$

$$\Big\downarrow \text{5355}$$

$$\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\left(\frac{1}{2}i\int \frac{\log\left(1-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{x}dx-\frac{1}{2}i\int \frac{\log\left(\frac{i\sqrt{e}x}{\sqrt{d}}+1\right)}{x}dx\right)}{\sqrt{d}\sqrt{e}}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\left(\frac{1}{2}i\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)\right)}{\sqrt{d}\sqrt{e}}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x^2),x]
```

output
```
(ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(Sqrt[d]*Sqrt[e]) - (b*n*
((I/2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] - (I/2)*PolyLog[2, (I*Sqrt[e]*
x)/Sqrt[d]]))/(Sqrt[d]*Sqrt[e])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.45 (sec) , antiderivative size = 263, normalized size of antiderivative = 2.53

method	result
risch	$-\frac{b\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln\left(x\right)}{\sqrt{de}}+\frac{b\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln\left(x^{n}\right)}{\sqrt{de}}+\frac{bn\ln\left(x\right)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2\sqrt{-de}}-\frac{bn\ln\left(x\right)\ln\left(\frac{ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2\sqrt{-de}}+\frac{bn\,\mathrm{dilog}\left(\frac{-ex+\sqrt{-}}{\sqrt{-de}}\right.}{2\sqrt{-de}}$

input
```
int((a+b*ln(c*x^n))/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
-b/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*n*ln(x)+b/(d*e)^(1/2)*arctan(x*e/(d
*e)^(1/2))*ln(x^n)+1/2*b*n*ln(x)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e
)^(1/2))-1/2*b*n*ln(x)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/
2*b*n/(-d*e)^(1/2)*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n/(-d*e)^
(1/2)*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+(1/2*I*Pi*b*csgn(I*x^n)*csgn(
I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(
I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)/(d*e)^(1/2)*arc
tan(x*e/(d*e)^(1/2))
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx=\int \frac{b\log(cx^n)+a}{ex^2+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^2 + d), x)
```

Sympy [F]

$$\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx=\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(e*x**2+d),x)
```

output
```
Integral((a + b*log(c*x**n))/(d + e*x**2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log\left(cx^n\right)}{d+ex^2}\,dx=\text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{d+ex^2}\,dx=\int \frac{b\log\left(cx^n\right)+a}{ex^2+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^2 + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{d+ex^2}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{e\,x^2+d}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x^2),x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x^2), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx = \frac{\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)a+\left(\int \frac{\log(x^n c)}{e\,x^2+d}dx\right)bde}{de}$$

input
```
int((a+b*log(c*x^n))/(e*x^2+d),x)
```

output
```
(sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a + int(log(x**n*c)/(d + e*
x**2),x)*b*d*e)/(d*e)
```

3.219 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx$

Optimal result 1697
Mathematica [A] (verified) 1697
Rubi [C] (verified) 1698
Maple [C] (warning: unable to verify) 1700
Fricas [F] 1701
Sympy [F] 1701
Maxima [F(-2)] 1702
Giac [F] 1702
Mupad [F(-1)] 1702
Reduce [F] 1703

Optimal result

Integrand size = 23, antiderivative size = 133

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx = -\frac{bn}{dx} - \frac{a+b\log(cx^n)}{dx} - \frac{\sqrt{e}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}} - \frac{b\sqrt{e}n\,\mathrm{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}} + \frac{b\sqrt{e}n\,\mathrm{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}}$$

output
```
-b*n/d/x-(a+b*ln(c*x^n))/d/x-e^(1/2)*arctan(e^(1/2)*x/d^(1/2))*(a+b*ln(c*x
^n))/d^(3/2)-1/2*b*e^(1/2)*n*polylog(2,-e^(1/2)*x/(-d)^(1/2))/(-d)^(3/2)+1
/2*b*e^(1/2)*n*polylog(2,e^(1/2)*x/(-d)^(1/2))/(-d)^(3/2)
```

Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 173, normalized size of antiderivative = 1.30

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx = \frac{d\left(-2b(-d)^{3/2}n+2\sqrt{-d}d(a+b\log(cx^n))-d\sqrt{e}x(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)+d\sqrt{e}x(a+b\log(cx\right.}{2(-d)^{7/2}x}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)),x]
```

output
```
(d*(-2*b*(-d)^(3/2)*n + 2*Sqrt[-d]*d*(a + b*Log[c*x^n]) - d*Sqrt[e]*x*(a +
 b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + d*Sqrt[e]*x*(a + b*Log[c*x^
n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)] + b*d*Sqrt[e]*n*x*PolyLog[2, (Sqrt[e
]*x)/Sqrt[-d]] - b*d*Sqrt[e]*n*x*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)]))/(2
*(-d)^(7/2)*x)
```

Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 0.50 (sec) , antiderivative size = 130, normalized size of antiderivative = 0.98, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2780, 2741, 2761, 27, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x^2}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{ex^2+d}dx}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{ex^2+d}dx}{d}$$

$$\Big\downarrow \text{2761}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{e}x}dx\right)}{d}$$

$$\Big\downarrow \text{27}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\int\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}\sqrt{e}}\right)}{d}$$

$$\Big\downarrow \text{5355}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\left(\frac{1}{2}i\int\frac{\log\left(1-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{x}dx-\frac{1}{2}i\int\frac{\log\left(\frac{i\sqrt{e}x}{\sqrt{d}}+1\right)}{x}dx\right)}{\sqrt{d}\sqrt{e}}\right)}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\left(\frac{1}{2}i\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)\right)}{\sqrt{d}\sqrt{e}}\right)}{d}$$

input

```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)),x]
```

output

```
(-((b*n)/x) - (a + b*Log[c*x^n])/x)/d - (e*((ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(
a + b*Log[c*x^n]))/(Sqrt[d]*Sqrt[e]) - (b*n*((I/2)*PolyLog[2, ((-I)*Sqrt[e
]*x)/Sqrt[d]] - (I/2)*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]]))/(Sqrt[d]*Sqrt[e]
)))/d
```

Defintions of rubi rules used

rule 27

```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2741

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.58 (sec) , antiderivative size = 325, normalized size of antiderivative = 2.44

method	result
risch	$-\frac{b\ln(x^n)}{dx}+\frac{be\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{d\sqrt{de}}-\frac{be\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{d\sqrt{de}}-\frac{bn}{dx}-\frac{bne\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2d\sqrt{-de}}+\frac{bne\ln(x)\ln\left(\frac{ex+\sqrt{-d}\ldots}{\sqrt{-de}}\right)}{2d\sqrt{-de}}$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)/d/x+b*e/d/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*n*ln(x)-b*e/d/(d*
e)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln(x^n)-b*n/d/x-1/2*b*n*e/d*ln(x)/(-d*e)^
(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n*e/d*ln(x)/(-d*e)^(1/2)*
ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n*e/d/(-d*e)^(1/2)*dilog((-e*x+(
-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n*e/d/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(1/2
))/(-d*e)^(1/2))+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I
*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I
*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(-1/d/x-e/d/(d*e)^(1/2)*arctan(x*e/(d*e)^(1
/2)))
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx=\int \frac{b\log(cx^n)+a}{(ex^2+d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^4 + d*x^2), x)
```

Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx=\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x**2+d),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*(d + e*x**2)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log (cx^n)}{x^2 (d + ex^2)}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a + b\log (cx^n)}{x^2 (d + ex^2)}\,dx = \int \frac{b\log (cx^n) + a}{(ex^2 + d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a + b\log (cx^n)}{x^2 (d + ex^2)}\,dx = \int \frac{a + b\,\ln (c\,x^n)}{x^2\,(e\,x^2 + d)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx = \frac{-\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)ax+\left(\int\frac{\log(x^n c)}{e\,x^4+d\,x^2}dx\right)b\,d^2x-ad}{d^2x}$$

input
```
int((a+b*log(c*x^n))/x^2/(e*x^2+d),x)
```

output
```
( - sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*x + int(log(x**n*c)/(d
*x**2 + e*x**4),x)*b*d**2*x - a*d)/(d**2*x)
```

3.220 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx$

Optimal result 1704
Mathematica [A] (verified) 1705
Rubi [C] (verified) 1705
Maple [C] (warning: unable to verify) 1708
Fricas [F] 1709
Sympy [F] 1709
Maxima [F(-2)] 1710
Giac [F] 1710
Mupad [F(-1)] 1710
Reduce [F] 1711

Optimal result

Integrand size = 23, antiderivative size = 164

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx = -\frac{bn}{9dx^3}+\frac{ben}{d^2x}-\frac{a+b\log(cx^n)}{3dx^3}+\frac{e(a+b\log(cx^n))}{d^2x}+\frac{e^{3/2}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{5/2}}-\frac{be^{3/2}n\,\mathrm{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{5/2}}+\frac{be^{3/2}n\,\mathrm{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{5/2}}$$

output
```
-1/9*b*n/d/x^3+b*e*n/d^2/x-1/3*(a+b*ln(c*x^n))/d/x^3+e*(a+b*ln(c*x^n))/d^2
/x+e^(3/2)*arctan(e^(1/2)*x/d^(1/2))*(a+b*ln(c*x^n))/d^(5/2)-1/2*b*e^(3/2)
*n*polylog(2,-e^(1/2)*x/(-d)^(1/2))/(-d)^(5/2)+1/2*b*e^(3/2)*n*polylog(2,e
^(1/2)*x/(-d)^(1/2))/(-d)^(5/2)
```

Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 211, normalized size of antiderivative = 1.29

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx = \frac{1}{18}\left(-\frac{2bn}{dx^3}+\frac{18ben}{d^2x}-\frac{6(a+b\log(cx^n))}{dx^3}+\frac{18e(a+b\log(cx^n))}{d^2x} - \frac{9e^{3/2}(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{5/2}} + \frac{9e^{3/2}(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{5/2}} + \frac{9be^{3/2}n\,\text{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{5/2}} - \frac{9be^{3/2}n\,\text{PolyLog}\left(2,\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{5/2}}\right)$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)),x]
```

output
```
((-2*b*n)/(d*x^3) + (18*b*e*n)/(d^2*x) - (6*(a + b*Log[c*x^n]))/(d*x^3) +
(18*e*(a + b*Log[c*x^n]))/(d^2*x) - (9*e^(3/2)*(a + b*Log[c*x^n])*Log[1 +
(Sqrt[e]*x)/Sqrt[-d]])/(-d)^(5/2) + (9*e^(3/2)*(a + b*Log[c*x^n])*Log[1 +
(d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(5/2) + (9*b*e^(3/2)*n*PolyLog[2, (Sqrt[e]
*x)/Sqrt[-d]])/(-d)^(5/2) - (9*b*e^(3/2)*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(
3/2)])/(-d)^(5/2))/18
```

Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 0.71 (sec) , antiderivative size = 168, normalized size of antiderivative = 1.02, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {2780, 2741, 2780, 2741, 2761, 27, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)}dx$$

$$\Big\downarrow \text{ 2780}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x^4}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^2(ex^2+d)}dx}{d}$$

$$\Big\downarrow \text{ 2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^2(ex^2+d)}dx}{d}$$

$$\Big\downarrow \text{ 2780}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{\int \frac{a+b\log(cx^n)}{x^2}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{ex^2+d}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{ 2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{ex^2+d}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{ 2761}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{e}x}dx\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}\sqrt{e}}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{ 5355}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\left(\frac{1}{2}i\int\frac{\log\left(1-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{x}dx-\frac{1}{2}i\int\frac{\log\left(\frac{i\sqrt{e}x}{\sqrt{d}}+1\right)}{x}dx\right)}{\sqrt{d}\sqrt{e}}\right)}{d}\right)}{d}$$

$\Big\downarrow$ 2838

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\left(\frac{1}{2}i\operatorname{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\operatorname{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)\right)}{\sqrt{d}\sqrt{e}}\right)}{d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)),x]
```

output
```
(-1/9*(b*n)/x^3 - (a + b*Log[c*x^n])/(3*x^3))/d - (e*((-((b*n)/x) - (a + b
*Log[c*x^n])/x)/d - (e*((ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(
Sqrt[d]*Sqrt[e]) - (b*n*((I/2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] - (I/2
)*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]]))/(Sqrt[d]*Sqrt[e])))/d))/d
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.83 (sec) , antiderivative size = 369, normalized size of antiderivative = 2.25

method	result
risch	$-\frac{b\,e^{2}\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln\left(x\right)}{d^{2}\sqrt{de}}+\frac{b\,e^{2}\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln\left(x^{n}\right)}{d^{2}\sqrt{de}}-\frac{b\ln\left(x^{n}\right)}{3d\,x^{3}}+\frac{b\ln\left(x^{n}\right)e}{d^{2}x}+\frac{ben}{d^{2}x}+\frac{bn\,e^{2}\ln\left(x\right)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2d^{2}\sqrt{-de}}-$

input
```
int((a+b*ln(c*x^n))/x^4/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
-b*e^2/d^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*n*ln(x)+b*e^2/d^2/(d*e)^(1/
2)*arctan(x*e/(d*e)^(1/2))*ln(x^n)-1/3*b*ln(x^n)/d/x^3+b*ln(x^n)*e/d^2/x+b
*e*n/d^2/x+1/2*b*n*e^2/d^2*ln(x)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e
)^(1/2))-1/2*b*n*e^2/d^2*ln(x)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(
1/2))+1/2*b*n*e^2/d^2/(-d*e)^(1/2)*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))
-1/2*b*n*e^2/d^2/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/9*b
*n/d/x^3+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*cs
gn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^
2*csgn(I*c)+b*ln(c)+a)*(e^2/d^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))-1/3/d/
x^3+e/d^2/x)
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^6 + d*x^4), x)
```

Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx = \int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**4/(e*x**2+d),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**4*(d + e*x**2)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)*x^4), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^4\,(e\,x^2+d)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx$$
$$=\frac{3\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)ae\,x^3+3\left(\int\frac{\log(x^n c)}{e\,x^6+d\,x^4}dx\right)b\,d^3x^3-a\,d^2+3ade\,x^2}{3d^3x^3}$$

input
```
int((a+b*log(c*x^n))/x^4/(e*x^2+d),x)
```

output
```
(3*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*e*x**3 + 3*int(log(x**n
*c)/(d*x**4 + e*x**6),x)*b*d**3*x**3 - a*d**2 + 3*a*d*e*x**2)/(3*d**3*x**3
)
```

3.221 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$

Optimal result . . . 1712
Mathematica [C] (verified) . . . 1713
Rubi [A] (verified) . . . 1713
Maple [C] (warning: unable to verify) . . . 1714
Fricas [F] . . . 1715
Sympy [A] (verification not implemented) . . . 1716
Maxima [F] . . . 1717
Giac [F] . . . 1717
Mupad [F(-1)] . . . 1718
Reduce [F] . . . 1718

Optimal result

Integrand size = 23, antiderivative size = 129

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = -\frac{bnx^2}{4e^2}+\frac{x^2(a+b\log(cx^n))}{2e^2}+\frac{dx^2(a+b\log(cx^n))}{2e^2(d+ex^2)}-\frac{bdn\log(d+ex^2)}{4e^3}-\frac{d(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{e^3}-\frac{bdn\,\mathrm{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{2e^3}$$

output
```
-1/4*b*n*x^2/e^2+1/2*x^2*(a+b*ln(c*x^n))/e^2+1/2*d*x^2*(a+b*ln(c*x^n))/e^2
/(e*x^2+d)-1/4*b*d*n*ln(e*x^2+d)/e^3-d*(a+b*ln(c*x^n))*ln(1+e*x^2/d)/e^3-1
/2*b*d*n*polylog(2,-e*x^2/d)/e^3
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.61 (sec) , antiderivative size = 287, normalized size of antiderivative = 2.22

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$
$$= \frac{2ex^2(a-bn\log(x)+b\log(cx^n)) - \frac{2d^2(a-bn\log(x)+b\log(cx^n))}{d+ex^2} - 4d(a-bn\log(x)+b\log(cx^n))\log(d+ex^2)}{}$$

input
```
Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
(2*e*x^2*(a - b*n*Log[x] + b*Log[c*x^n]) - (2*d^2*(a - b*n*Log[x] + b*Log[
c*x^n]))/(d + e*x^2) - 4*d*(a - b*n*Log[x] + b*Log[c*x^n])*Log[d + e*x^2]
+ b*n*((d*Sqrt[e]*x*Log[x])/((-I)*Sqrt[d] + Sqrt[e]*x) + (d*Sqrt[e]*x*Log[
x])/(I*Sqrt[d] + Sqrt[e]*x) + e*x^2*(-1 + 2*Log[x]) - d*Log[I*Sqrt[d] - Sq
rt[e]*x] - d*Log[I*Sqrt[d] + Sqrt[e]*x] - 4*d*(Log[x]*Log[1 + (I*Sqrt[e]*x
)/Sqrt[d]] + PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]]) - 4*d*(Log[x]*Log[1 - (
I*Sqrt[e]*x)/Sqrt[d]] + PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])))/(4*e^3)
```

Rubi [A] (verified)

Time = 0.45 (sec) , antiderivative size = 129, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$
$$\Big\downarrow \ 2793$$
$$\int \left(\frac{d^2x(a+b\log(cx^n))}{e^2(d+ex^2)^2} - \frac{2dx(a+b\log(cx^n))}{e^2(d+ex^2)} + \frac{x(a+b\log(cx^n))}{e^2}\right)dx$$
$$\Big\downarrow \ 2009$$

$$-\frac{d\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{e^3}+\frac{dx^2(a+b\log(cx^n))}{2e^2(d+ex^2)}+\frac{x^2(a+b\log(cx^n))}{2e^2}-\frac{bdn\,\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{2e^3}-\frac{bdn\log(d+ex^2)}{4e^3}-\frac{bnx^2}{4e^2}$$

input
```
Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
-1/4*(b*n*x^2)/e^2 + (x^2*(a + b*Log[c*x^n]))/(2*e^2) + (d*x^2*(a + b*Log[
c*x^n]))/(2*e^2*(d + e*x^2)) - (b*d*n*Log[d + e*x^2])/(4*e^3) - (d*(a + b*
Log[c*x^n])*Log[1 + (e*x^2)/d])/e^3 - (b*d*n*PolyLog[2, -((e*x^2)/d)])/(2*
e^3)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.82 (sec) , antiderivative size = 351, normalized size of antiderivative = 2.72

method	result
risch	$\frac{b\ln(x^n)x^2}{2e^2}-\frac{b\ln(x^n)d^2}{2e^3(e\,x^2+d)}-\frac{b\ln(x^n)d\ln(e\,x^2+d)}{e^3}-\frac{bn\,x^2}{4e^2}-\frac{bdn\ln(e\,x^2+d)}{4e^3}+\frac{bnd\ln(x)}{2e^3}+\frac{bnd\ln(x)\ln(e\,x^2+d)}{e^3}-\frac{bnd}{}$

input
```
int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/e^2*x^2-1/2*b*ln(x^n)*d^2/e^3/(e*x^2+d)-b*ln(x^n)*d/e^3*ln(e
*x^2+d)-1/4*b*n*x^2/e^2-1/4*b*d*n*ln(e*x^2+d)/e^3+1/2*b*n/e^3*d*ln(x)+b*n*
d/e^3*ln(x)*ln(e*x^2+d)-b*n*d/e^3*ln(x)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2
))-b*n*d/e^3*ln(x)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-b*n*d/e^3*dilog((-e
*x+(-d*e)^(1/2))/(-d*e)^(1/2))-b*n*d/e^3*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(
1/2))+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(
I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*c
sgn(I*c)+b*ln(c)+a)*(1/2*x^2/e^2-1/2*d/e^2*(d/e/(e*x^2+d)+2*ln(e*x^2+d)/e)
)
```

Fricas [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx=\int \frac{(b\log(cx^n)+a)x^5}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*x^5*log(c*x^n) + a*x^5)/(e^2*x^4 + 2*d*e*x^2 + d^2), x)
```

Sympy [A] (verification not implemented)

Time = 45.28 (sec) , antiderivative size = 316, normalized size of antiderivative = 2.45

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \frac{ad^2\left(\begin{cases}\frac{x^2}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x^2} & \text{otherwise}\end{cases}\right)}{2e^2} - \frac{ad\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)}{e^2} + \frac{ax^2}{2e^2} - \frac{bd^2n\left(\begin{cases}\frac{x^2}{2d^2} & \text{for } e=0\\ -\frac{\log(x)}{de}+\frac{\log\left(\frac{d}{e}+x^2\right)}{2de} & \text{otherwise}\end{cases}\right)}{2e^2} + \frac{bd^2\left(\begin{cases}\frac{x^2}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{2e^2} + \frac{bdn\left(\begin{cases}\frac{x^2}{2d} \\ \frac{\begin{cases}-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(d)\log(x)-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{otherwise}\end{cases}}{e}\end{cases}\right)}{e^2} - \frac{bd\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2} - \frac{bnx^2}{4e^2} + \frac{bx^2\log(cx^n)}{2e^2}$$

input
```
integrate(x**5*(a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

output
```
a*d**2*Piecewise((x**2/d**2, Eq(e, 0)), (-1/(d*e + e**2*x**2), True))/(2*e
**2) - a*d*Piecewise((x**2/d, Eq(e, 0)), (log(d + e*x**2)/e, True))/e**2 +
 a*x**2/(2*e**2) - b*d**2*n*Piecewise((x**2/(2*d**2), Eq(e, 0)), (-log(x)/
(d*e) + log(d/e + x**2)/(2*d*e), True))/(2*e**2) + b*d**2*Piecewise((x**2/
d**2, Eq(e, 0)), (-1/(d*e + e**2*x**2), True))*log(c*x**n)/(2*e**2) + b*d*
n*Piecewise((x**2/(2*d), Eq(e, 0)), (Piecewise((-polylog(2, e*x**2*exp_pol
ar(I*pi)/d)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2,
 e*x**2*exp_polar(I*pi)/d)/2, Abs(x) < 1), (-log(d)*log(1/x) - polylog(2,
e*x**2*exp_polar(I*pi)/d)/2, 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0
), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylo
g(2, e*x**2*exp_polar(I*pi)/d)/2, True))/e, True))/e**2 - b*d*Piecewise((x
**2/d, Eq(e, 0)), (log(d + e*x**2)/e, True))*log(c*x**n)/e**2 - b*n*x**2/(
4*e**2) + b*x**2*log(c*x**n)/(2*e**2)
```

Maxima [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
-1/2*a*(d^2/(e^4*x^2 + d*e^3) - x^2/e^2 + 2*d*log(e*x^2 + d)/e^3) + b*inte
grate((x^5*log(c) + x^5*log(x^n))/(e^2*x^4 + 2*d*e*x^2 + d^2), x)
```

Giac [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^5/(e*x^2 + d)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx=\int \frac{x^5\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^2}\,dx$$

input
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^2,x)
```

output
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^2, x)
```

Reduce [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \frac{8\left(\int \frac{\log(x^n c)}{e^2x^5+2de\,x^3+d^2x}dx\right) b\,d^4n+8\left(\int \frac{\log(x^n c)}{e^2x^5+2de\,x^3+d^2x}dx\right) b\,d^3en\,x^2-4\log(e\,x^2+d)\,a\,d^2n-4\log(e\,x^2+d)\,a}{}$$

input
```
int(x^5*(a+b*log(c*x^n))/(e*x^2+d)^2,x)
```

output
```
(8*int(log(x**n*c)/(d**2*x + 2*d*e*x**3 + e**2*x**5),x)*b*d**4*n + 8*int(l
og(x**n*c)/(d**2*x + 2*d*e*x**3 + e**2*x**5),x)*b*d**3*e*n*x**2 - 4*log(d
+ e*x**2)*a*d**2*n - 4*log(d + e*x**2)*a*d*e*n*x**2 - 3*log(d + e*x**2)*b*
d**2*n**2 - 3*log(d + e*x**2)*b*d*e*n**2*x**2 - 4*log(x**n*c)**2*b*d**2 -
4*log(x**n*c)**2*b*d*e*x**2 + 8*log(x**n*c)*b*d*e*n*x**2 + 2*log(x**n*c)*b
*e**2*n*x**4 + 4*a*d*e*n*x**2 + 2*a*e**2*n*x**4 - b*d*e*n**2*x**2 - b*e**2
*n**2*x**4)/(4*e**3*n*(d + e*x**2))
```

3.222 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$

Optimal result 1719
Mathematica [C] (verified) 1719
Rubi [A] (verified) 1720
Maple [C] (warning: unable to verify) 1721
Fricas [F] 1722
Sympy [F] 1722
Maxima [F] 1722
Giac [F] 1723
Mupad [F(-1)] 1723
Reduce [F] 1723

Optimal result

Integrand size = 23, antiderivative size = 95

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = -\frac{x^2(a+b\log(cx^n))}{2e(d+ex^2)}+\frac{bn\log(d+ex^2)}{4e^2} + \frac{(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e^2}+\frac{bn\,\mathrm{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^2}$$

output
```
-1/2*x^2*(a+b*ln(c*x^n))/e/(e*x^2+d)+1/4*b*n*ln(e*x^2+d)/e^2+1/2*(a+b*ln(c
*x^n))*ln(1+e*x^2/d)/e^2+1/4*b*n*polylog(2,-e*x^2/d)/e^2
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.24 (sec) , antiderivative size = 321, normalized size of antiderivative = 3.38

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$

$$= \frac{\frac{2d(a-bn\log(x)+b\log(cx^n))}{d+ex^2}+2(a-bn\log(x)+b\log(cx^n))\log(d+ex^2)+\frac{bn\left(-2ex^2\log(x)+d\log\left(i\sqrt{d}-\sqrt{e}x\right)+ex^2\log\left(\right.\right.}{}}{}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
((2*d*(a - b*n*Log[x] + b*Log[c*x^n]))/(d + e*x^2) + 2*(a - b*n*Log[x] + b
*Log[c*x^n])*Log[d + e*x^2] + (b*n*(-2*e*x^2*Log[x] + d*Log[I*Sqrt[d] - Sq
rt[e]*x] + e*x^2*Log[I*Sqrt[d] - Sqrt[e]*x] + d*Log[I*Sqrt[d] + Sqrt[e]*x]
 + e*x^2*Log[I*Sqrt[d] + Sqrt[e]*x] + 2*d*Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqr
t[d]] + 2*e*x^2*Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + 2*d*Log[x]*Log[1 +
 (I*Sqrt[e]*x)/Sqrt[d]] + 2*e*x^2*Log[x]*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] +
2*(d + e*x^2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] + 2*(d + e*x^2)*PolyLog
[2, (I*Sqrt[e]*x)/Sqrt[d]]))/(d + e*x^2))/(4*e^2)
```

Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 95, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{x(a+b\log(cx^n))}{e(d+ex^2)}-\frac{dx(a+b\log(cx^n))}{e(d+ex^2)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{2e^2}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex^2)}+\frac{bn\,\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^2}+\frac{bn\log(d+ex^2)}{4e^2}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
-1/2*(x^2*(a + b*Log[c*x^n]))/(e*(d + e*x^2)) + (b*n*Log[d + e*x^2])/(4*e^
2) + ((a + b*Log[c*x^n])*Log[1 + (e*x^2)/d])/(2*e^2) + (b*n*PolyLog[2, -((
e*x^2)/d)])/(4*e^2)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.68 (sec) , antiderivative size = 305, normalized size of antiderivative = 3.21

method	result
risch	$\frac{b\ln(x^n)d}{2e^2(e\,x^2+d)}+\frac{b\ln(x^n)\ln(e\,x^2+d)}{2e^2}+\frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e^2}+\frac{bn\ln(x)\ln\left(\frac{ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e^2}-\frac{bn\ln(x)\ln(e\,x^2+d)}{2e^2}+\frac{bn\,\mathrm{dilog}}{}$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)*d/e^2/(e*x^2+d)+1/2*b*ln(x^n)/e^2*ln(e*x^2+d)+1/2*b*n/e^2*ln
(x)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n/e^2*ln(x)*ln((e*x+(-d*e)^
(1/2))/(-d*e)^(1/2))-1/2*b*n/e^2*ln(x)*ln(e*x^2+d)+1/2*b*n/e^2*dilog((-e*x
+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n/e^2*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(
1/2))+1/4*b*n*ln(e*x^2+d)/e^2-1/2*b*n/e^2*ln(x)+(1/2*I*Pi*b*csgn(I*x^n)*cs
gn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*cs
gn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(1/2*d/e^2/(
e*x^2+d)+1/2/e^2*ln(e*x^2+d))
```

Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x^n) + a*x^3)/(e^2*x^4 + 2*d*e*x^2 + d^2), x)
```

Sympy [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

output
```
Integral(x**3*(a + b*log(c*x**n))/(d + e*x**2)**2, x)
```

Maxima [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
1/2*a*(d/(e^3*x^2 + d*e^2) + log(e*x^2 + d)/e^2) + b*integrate((x^3*log(c)
 + x^3*log(x^n))/(e^2*x^4 + 2*d*e*x^2 + d^2), x)
```

Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x^2 + d)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^2}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^2,x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^2, x)
```

Reduce [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \frac{-2\left(\int \frac{\log(x^n c)}{e^2x^5+2de\,x^3+d^2x}dx\right)b\,d^3n-2\left(\int \frac{\log(x^n c)}{e^2x^5+2de\,x^3+d^2x}dx\right)b\,d^2en\,x^2+\log(e\,x^2+d)\,adn+\log(e\,x^2+d)\,aen}{2e^2n}$$

input
```
int(x^3*(a+b*log(c*x^n))/(e*x^2+d)^2,x)
```

output
```
( - 2*int(log(x**n*c)/(d**2*x + 2*d*e*x**3 + e**2*x**5),x)*b*d**3*n - 2*in
t(log(x**n*c)/(d**2*x + 2*d*e*x**3 + e**2*x**5),x)*b*d**2*e*n*x**2 + log(d
 + e*x**2)*a*d*n + log(d + e*x**2)*a*e*n*x**2 + log(d + e*x**2)*b*d*n**2 +
 log(d + e*x**2)*b*e*n**2*x**2 + log(x**n*c)**2*b*d + log(x**n*c)**2*b*e*x
**2 - 2*log(x**n*c)*b*e*n*x**2 - a*e*n*x**2)/(2*e**2*n*(d + e*x**2))
```

3.223 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$

Optimal result . . . 1725
Mathematica [A] (verified) . . . 1725
Rubi [A] (verified) . . . 1726
Maple [A] (verified) . . . 1727
Fricas [A] (verification not implemented) . . . 1727
Sympy [B] (verification not implemented) . . . 1728
Maxima [A] (verification not implemented) . . . 1728
Giac [A] (verification not implemented) . . . 1729
Mupad [B] (verification not implemented) . . . 1729
Reduce [B] (verification not implemented) . . . 1730

Optimal result

Integrand size = 21, antiderivative size = 50

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \frac{x^2(a+b\log(cx^n))}{2d(d+ex^2)} - \frac{bn\log(d+ex^2)}{4de}$$

output
```
1/2*x^2*(a+b*ln(c*x^n))/d/(e*x^2+d)-1/4*b*n*ln(e*x^2+d)/d/e
```

Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 74, normalized size of antiderivative = 1.48

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = -\frac{2ad-2bn(d+ex^2)\log(x)+2bd\log(cx^n)+bdn\log(d+ex^2)+benx^2\log(d+ex^2)}{4de(d+ex^2)}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
-1/4*(2*a*d - 2*b*n*(d + e*x^2)*Log[x] + 2*b*d*Log[c*x^n] + b*d*n*Log[d +
e*x^2] + b*e*n*x^2*Log[d + e*x^2])/(d*e*(d + e*x^2))
```

Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2773, 240}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}dx$$

$$\Big\downarrow \text{ 2773}$$

$$\frac{x^2(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\int \frac{x}{ex^2+d}dx}{2d}$$

$$\Big\downarrow \text{ 240}$$

$$\frac{x^2(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\log(d+ex^2)}{4de}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
(x^2*(a + b*Log[c*x^n]))/(2*d*(d + e*x^2)) - (b*n*Log[d + e*x^2])/(4*d*e)
```

Defintions of rubi rules used

rule 240
```
Int[(x_)/((a_) + (b_.)*(x_)^2), x_Symbol] :> Simp[Log[RemoveContent[a + b*x
^2, x]]/(2*b), x] /; FreeQ[{a, b}, x]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Maple [A] (verified)

Time = 0.57 (sec) , antiderivative size = 74, normalized size of antiderivative = 1.48

method	result
parallelrisch	$\frac{-\ln(e\,x^2+d)x^2be\,n^2+2x^2\ln(c\,x^n)ben-\ln(e\,x^2+d)bd\,n^2-2adn}{4den(e\,x^2+d)}$
risch	$-\frac{b\ln(x^n)}{2e(e\,x^2+d)}-\frac{i\pi\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2bd-i\pi\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)\,\mathrm{csgn}(ic)bd-i\pi\,\mathrm{csgn}(ic\,x^n)^3bd+i\pi bd\,\mathrm{csgn}(ic\,x^n)^2\,\mathrm{cs}}{4(e\,x^2+d)ed}$

input
```
int(x*(a+b*ln(c*x^n))/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/4*(-ln(e*x^2+d)*x^2*b*e*n^2+2*x^2*ln(c*x^n)*b*e*n-ln(e*x^2+d)*b*d*n^2-2*
a*d*n)/d/e/n/(e*x^2+d)
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.22

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \frac{2\,benx^2\log(x)-2\,bd\log(c)-2\,ad-(benx^2+bdn)\log(ex^2+d)}{4\,(de^2x^2+d^2e)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
1/4*(2*b*e*n*x^2*log(x) - 2*b*d*log(c) - 2*a*d - (b*e*n*x^2 + b*d*n)*log(e
*x^2 + d))/(d*e^2*x^2 + d^2*e)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 292 vs. $2(39) = 78$.

Time = 25.47 (sec) , antiderivative size = 292, normalized size of antiderivative = 5.84

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$
$$= \begin{cases} \tilde{\infty}\left(-\frac{a}{2x^2}-\frac{bn}{4x^2}-\frac{b\log(cx^n)}{2x^2}\right) \\ \frac{\frac{ax^2}{2}-\frac{bnx^2}{4}+\frac{bx^2\log(cx^n)}{2}}{d^2} \\ \frac{-\frac{a}{2x^2}-\frac{bn}{4x^2}-\frac{b\log(cx^n)}{2x^2}}{e^2} \\ -\frac{2ad}{4d^2e+4de^2x^2}-\frac{bdn\log\left(x-\sqrt{-\frac{d}{e}}\right)}{4d^2e+4de^2x^2}-\frac{bdn\log\left(x+\sqrt{-\frac{d}{e}}\right)}{4d^2e+4de^2x^2}-\frac{benx^2\log\left(x-\sqrt{-\frac{d}{e}}\right)}{4d^2e+4de^2x^2}-\frac{benx^2\log\left(x+\sqrt{-\frac{d}{e}}\right)}{4d^2e+4de^2x^2}+\frac{2bex^2\log(cx^n)}{4d^2e+4de^2x^2} \end{cases}$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

output
```
Piecewise((zoo*(-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2)), Eq(d
, 0) & Eq(e, 0)), ((a*x**2/2 - b*n*x**2/4 + b*x**2*log(c*x**n)/2)/d**2, Eq
(e, 0)), ((-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2))/e**2, Eq(d
, 0)), (-2*a*d/(4*d**2*e + 4*d*e**2*x**2) - b*d*n*log(x - sqrt(-d/e))/(4*d
**2*e + 4*d*e**2*x**2) - b*d*n*log(x + sqrt(-d/e))/(4*d**2*e + 4*d*e**2*x*
*2) - b*e*n*x**2*log(x - sqrt(-d/e))/(4*d**2*e + 4*d*e**2*x**2) - b*e*n*x*
*2*log(x + sqrt(-d/e))/(4*d**2*e + 4*d*e**2*x**2) + 2*b*e*x**2*log(c*x**n)
/(4*d**2*e + 4*d*e**2*x**2), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.42

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = -\frac{1}{4}\,bn\left(\frac{\log(ex^2+d)}{de}-\frac{\log(x^2)}{de}\right) - \frac{b\log(cx^n)}{2\,(e^2x^2+de)}-\frac{a}{2\,(e^2x^2+de)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
-1/4*b*n*(log(e*x^2 + d)/(d*e) - log(x^2)/(d*e)) - 1/2*b*log(c*x^n)/(e^2*x
^2 + d*e) - 1/2*a/(e^2*x^2 + d*e)
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.42

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = -\frac{bn\log(x)}{2(e^2x^2+de)} - \frac{bn\log(ex^2+d)}{4de} + \frac{bn\log(x)}{2de} - \frac{b\log(c)+a}{2(e^2x^2+de)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
-1/2*b*n*log(x)/(e^2*x^2 + d*e) - 1/4*b*n*log(e*x^2 + d)/(d*e) + 1/2*b*n*l
og(x)/(d*e) - 1/2*(b*log(c) + a)/(e^2*x^2 + d*e)
```

Mupad [B] (verification not implemented)

Time = 25.95 (sec) , antiderivative size = 73, normalized size of antiderivative = 1.46

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \frac{b\,n\,\ln(x)}{2\,d\,e} - \frac{b\,\ln(c\,x^n)}{2\,(e^2\,x^2+d\,e)} - \frac{b\,n\,\ln(e\,x^2+d)}{4\,d\,e} - \frac{a}{2\,e^2\,x^2+2\,d\,e}$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2)^2,x)
```

output
```
(b*n*log(x))/(2*d*e) - (b*log(c*x^n))/(2*(d*e + e^2*x^2)) - (b*n*log(d + e
*x^2))/(4*d*e) - a/(2*d*e + 2*e^2*x^2)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 67, normalized size of antiderivative = 1.34

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \frac{-\log(e\,x^2+d)\,bdn-\log(e\,x^2+d)\,ben\,x^2+2\log(x^nc)\,be\,x^2+2ae\,x^2}{4de\,(e\,x^2+d)}$$

input
```
int(x*(a+b*log(c*x^n))/(e*x^2+d)^2,x)
```

output
```
( - log(d + e*x**2)*b*d*n - log(d + e*x**2)*b*e*n*x**2 + 2*log(x**n*c)*b*e
*x**2 + 2*a*e*x**2)/(4*d*e*(d + e*x**2))
```

3.224 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}\,dx$

Optimal result 1731
Mathematica [C] (verified) 1731
Rubi [A] (verified) 1732
Maple [C] (warning: unable to verify) 1734
Fricas [F] 1734
Sympy [F(-1)] 1735
Maxima [F] 1735
Giac [F] 1735
Mupad [F(-1)] 1736
Reduce [F] 1736

Optimal result

Integrand size = 23, antiderivative size = 82

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}\,dx = \frac{a+b\log(cx^n)}{2d(d+ex^2)} - \frac{\log\left(1+\frac{d}{ex^2}\right)(2a-bn+2b\log(cx^n))}{4d^2} + \frac{bn\,\mathrm{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d^2}$$

output
```
1/2*(a+b*ln(c*x^n))/d/(e*x^2+d)-1/4*ln(1+d/e/x^2)*(2*a-b*n+2*b*ln(c*x^n))/
d^2+1/4*b*n*polylog(2,-d/e/x^2)/d^2
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.46 (sec) , antiderivative size = 279, normalized size of antiderivative = 3.40

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}\,dx = \frac{a-bn\log(x)+b\log(cx^n)}{2d^2+2dex^2} + \frac{\log(x)(a-bn\log(x)+b\log(cx^n))}{d^2} - \frac{(a-bn\log(x)+b\log(cx^n))\log(d+ex^2)}{2d^2} + \frac{bn\left(\frac{\sqrt{e}x\log(x)}{i\sqrt{d}-\sqrt{e}x} - \frac{\sqrt{e}x\log(x)}{i\sqrt{d}+\sqrt{e}x} + 2\log^2(x) + \log\left(i\sqrt{d}-\sqrt{e}x\right) + \log\left(i\sqrt{d}+\sqrt{e}x\right) - 2\left(\log(x)\log\left(1+\frac{i\sqrt{e}x}{\sqrt{d}}\right.\right.\right.}{4d^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^2)^2),x]
```

output
```
(a - b*n*Log[x] + b*Log[c*x^n])/(2*d^2 + 2*d*e*x^2) + (Log[x]*(a - b*n*Log
[x] + b*Log[c*x^n]))/d^2 - ((a - b*n*Log[x] + b*Log[c*x^n])*Log[d + e*x^2]
)/(2*d^2) + (b*n*((Sqrt[e]*x*Log[x])/(I*Sqrt[d] - Sqrt[e]*x) - (Sqrt[e]*x*
Log[x])/(I*Sqrt[d] + Sqrt[e]*x) + 2*Log[x]^2 + Log[I*Sqrt[d] - Sqrt[e]*x]
+ Log[I*Sqrt[d] + Sqrt[e]*x] - 2*(Log[x]*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] +
PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]]) - 2*(Log[x]*Log[1 - (I*Sqrt[e]*x)/Sq
rt[d]] + PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])))/(4*d^2)
```

Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 90, normalized size of antiderivative = 1.10, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2785, 25, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}dx$$

$$\Big\downarrow \text{2785}$$

$$\frac{a+b\log(cx^n)}{2d(d+ex^2)}-\frac{\int -\frac{2a-bn+2b\log(cx^n)}{x(ex^2+d)}dx}{2d}$$

$$\Big\downarrow \text{25}$$

$$\frac{\int \frac{2a-bn+2b\log(cx^n)}{x(ex^2+d)}dx}{2d}+\frac{a+b\log(cx^n)}{2d(d+ex^2)}$$

$$\Big\downarrow \text{2779}$$

$$\frac{\frac{bn\int \frac{\log\left(\frac{d}{ex^2}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(2a+2b\log(cx^n)-bn)}{2d}}{2d}+\frac{a+b\log(cx^n)}{2d(d+ex^2)}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{2d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(2a+2b\log(cx^n)-bn)}{2d}}{2d}+\frac{a+b\log\left(cx^n\right)}{2d\left(d+ex^2\right)}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^2)^2),x]
```

output
```
(a + b*Log[c*x^n])/(2*d*(d + e*x^2)) + (-1/2*(Log[1 + d/(e*x^2)]*(2*a - b*
n + 2*b*Log[c*x^n]))/d + (b*n*PolyLog[2, -(d/(e*x^2))])/(2*d))/(2*d)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2785
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Simp[1/(2*d*(q + 1))   Int[(f*x)^m*(d
 + e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
 x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.78 (sec) , antiderivative size = 338, normalized size of antiderivative = 4.12

method	result
risch	$\frac{b\ln(x^n)}{2d(e\,x^2+d)}-\frac{b\ln(x^n)\ln(e\,x^2+d)}{2d^2}+\frac{b\ln(x^n)\ln(x)}{d^2}+\frac{bn\ln(e\,x^2+d)}{4d^2}-\frac{bn\ln(x)}{2d^2}-\frac{bn\ln(x)^2}{2d^2}+\frac{bn\ln(x)\ln(e\,x^2+d)}{2d^2}-\frac{bn}{}$

input
```
int((a+b*ln(c*x^n))/x/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/d/(e*x^2+d)-1/2*b*ln(x^n)/d^2*ln(e*x^2+d)+b*ln(x^n)/d^2*ln(x
)+1/4*b*n/d^2*ln(e*x^2+d)-1/2*b*n/d^2*ln(x)-1/2*b*n/d^2*ln(x)^2+1/2*b*n/d^
2*ln(x)*ln(e*x^2+d)-1/2*b*n/d^2*ln(x)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))
-1/2*b*n/d^2*ln(x)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n/d^2*dilog((
-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n/d^2*dilog((e*x+(-d*e)^(1/2))/(-d*
e)^(1/2))+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*c
sgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)
^2*csgn(I*c)+b*ln(c)+a)*(-1/2*e/d^2*(-d/e/(e*x^2+d)+ln(e*x^2+d)/e)+1/d^2*l
n(x))
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x\,(d+ex^2)^2}\,dx=\int \frac{b\log(cx^n)+a}{(ex^2+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^5 + 2*d*e*x^3 + d^2*x), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)^2}\,dx=\text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x**2+d)**2,x)
```

output
```
Timed out
```

Maxima [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)^2}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
1/2*a*(1/(d*e*x^2 + d^2) - log(e*x^2 + d)/d^2 + 2*log(x)/d^2) + b*integrat
e((log(c) + log(x^n))/(e^2*x^5 + 2*d*e*x^3 + d^2*x), x)
```

Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)^2}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^2*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x\,(e\,x^2+d)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^2), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}\,dx = \frac{2\left(\int \frac{\log(x^n c)}{e^2x^5+2de\,x^3+d^2x}dx\right)b\,d^3+2\left(\int \frac{\log(x^n c)}{e^2x^5+2de\,x^3+d^2x}dx\right)b\,d^2e\,x^2-\log(e\,x^2+d)\,ad-\log(e\,x^2+d)\,ae\,x^2+2}{2d^2\,(e\,x^2+d)}$$

input
```
int((a+b*log(c*x^n))/x/(e*x^2+d)^2,x)
```

output
```
(2*int(log(x**n*c)/(d**2*x + 2*d*e*x**3 + e**2*x**5),x)*b*d**3 + 2*int(log
(x**n*c)/(d**2*x + 2*d*e*x**3 + e**2*x**5),x)*b*d**2*e*x**2 - log(d + e*x*
*2)*a*d - log(d + e*x**2)*a*e*x**2 + 2*log(x)*a*d + 2*log(x)*a*e*x**2 - a*
e*x**2)/(2*d**2*(d + e*x**2))
```

3.225 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx$

Optimal result . . . 1737
Mathematica [C] (verified) . . . 1737
Rubi [A] (verified) . . . 1738
Maple [C] (warning: unable to verify) . . . 1741
Fricas [F] . . . 1741
Sympy [A] (verification not implemented) . . . 1742
Maxima [F] . . . 1742
Giac [F] . . . 1743
Mupad [F(-1)] . . . 1743
Reduce [F] . . . 1743

Optimal result

Integrand size = 23, antiderivative size = 126

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx = -\frac{bn}{2d^2x^2}+\frac{a+b\log(cx^n)}{2dx^2(d+ex^2)}-\frac{4a-bn+4b\log(cx^n)}{4d^2x^2}+\frac{e\log\left(1+\frac{d}{ex^2}\right)(4a-bn+4b\log(cx^n))}{4d^3}-\frac{ben\,\mathrm{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{2d^3}$$

output
```
-1/2*b*n/d^2/x^2+1/2*(a+b*ln(c*x^n))/d/x^2/(e*x^2+d)-1/4*(4*a-b*n+4*b*ln(c
*x^n))/d^2/x^2+1/4*e*ln(1+d/e/x^2)*(4*a-b*n+4*b*ln(c*x^n))/d^3-1/2*b*e*n*p
olylog(2,-d/e/x^2)/d^3
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.66 (sec) , antiderivative size = 334, normalized size of antiderivative = 2.65

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx$$
$$= \frac{-\frac{2d(a-bn\log(x)+b\log(cx^n))}{x^2} - \frac{2de(a-bn\log(x)+b\log(cx^n))}{d+ex^2} - 8e\log(x)\left(a-bn\log(x)+b\log(cx^n)\right) + 4e(a-bn\log}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^2),x]
```

output
```
((-2*d*(a - b*n*Log[x] + b*Log[c*x^n]))/x^2 - (2*d*e*(a - b*n*Log[x] + b*L
og[c*x^n]))/(d + e*x^2) - 8*e*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n]) + 4*e
*(a - b*n*Log[x] + b*Log[c*x^n])*Log[d + e*x^2] + b*n*((e^(3/2)*x*Log[x])/
((-I)*Sqrt[d] + Sqrt[e]*x) - 4*e*Log[x]^2 - (d + 2*d*Log[x])/x^2 - e*Log[I
*Sqrt[d] - Sqrt[e]*x] + ((-I)*e^(3/2)*x*Log[x] + e*(-Sqrt[d] + I*Sqrt[e]*x
)*Log[I*Sqrt[d] + Sqrt[e]*x])/(Sqrt[d] - I*Sqrt[e]*x) + 4*e*(Log[x]*Log[1
+ (I*Sqrt[e]*x)/Sqrt[d]] + PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]]) + 4*e*(Lo
g[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])))
/(4*d^3)
```

Rubi [A] (verified)

Time = 0.65 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.06, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2785, 25, 2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx$$
$$\Big\downarrow \; 2785$$
$$\frac{a+b\log(cx^n)}{2dx^2(d+ex^2)} - \frac{\int -\frac{4a-bn+4b\log(cx^n)}{x^3(ex^2+d)}dx}{2d}$$
$$\Big\downarrow \; 25$$

$$\frac{\int \frac{4a-bn+4b\log(cx^n)}{x^3(ex^2+d)}dx}{2d}+\frac{a+b\log(cx^n)}{2dx^2(d+ex^2)}$$

$\Big\downarrow$ 2780

$$\frac{\frac{\int \frac{4a-bn+4b\log(cx^n)}{x^3}dx}{d}-\frac{e\int \frac{4a-bn+4b\log(cx^n)}{x\left(ex^2+d\right)}dx}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx^2(d+ex^2)}$$

$\Big\downarrow$ 2741

$$\frac{\frac{-\frac{4a+4b\log(cx^n)-bn}{2x^2}-\frac{bn}{x^2}}{d}-\frac{e\int \frac{4a-bn+4b\log(cx^n)}{x\left(ex^2+d\right)}dx}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx^2(d+ex^2)}$$

$\Big\downarrow$ 2779

$$\frac{\frac{-\frac{4a+4b\log(cx^n)-bn}{2x^2}-\frac{bn}{x^2}}{d}-\frac{e\left(\frac{2bn\int \frac{\log\left(\frac{d}{ex^2}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(4a+4b\log(cx^n)-bn)}{2d}\right)}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx^2(d+ex^2)}$$

$\Big\downarrow$ 2838

$$\frac{\frac{-\frac{4a+4b\log(cx^n)-bn}{2x^2}-\frac{bn}{x^2}}{d}-\frac{e\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(4a+4b\log(cx^n)-bn)}{2d}\right)}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx^2(d+ex^2)}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^2),x]
```

output
```
(a + b*Log[c*x^n])/(2*d*x^2*(d + e*x^2)) + ((-((b*n)/x^2) - (4*a - b*n + 4
*b*Log[c*x^n])/(2*x^2))/d - (e*(-1/2*(Log[1 + d/(e*x^2)]*(4*a - b*n + 4*b*
Log[c*x^n]))/d + (b*n*PolyLog[2, -(d/(e*x^2))])/d))/d)/(2*d)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2785
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Simp[1/(2*d*(q + 1))   Int[(f*x)^m*(d
 + e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
 x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.42 (sec) , antiderivative size = 380, normalized size of antiderivative = 3.02

method	result
risch	$-\frac{b\ln(x^n)e}{2d^2(e\,x^2+d)}+\frac{b\ln(x^n)e\ln(e\,x^2+d)}{d^3}-\frac{b\ln(x^n)}{2d^2x^2}-\frac{2b\ln(x^n)e\ln(x)}{d^3}+\frac{bne\ln(x)^2}{d^3}-\frac{bne\ln(x)\ln(e\,x^2+d)}{d^3}+\frac{bne\ln(x)\ln}{}$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-1/2*b*ln(x^n)*e/d^2/(e*x^2+d)+b*ln(x^n)*e/d^3*ln(e*x^2+d)-1/2*b*ln(x^n)/d
^2/x^2-2*b*ln(x^n)/d^3*e*ln(x)+b*n/d^3*e*ln(x)^2-b*n/d^3*e*ln(x)*ln(e*x^2+
d)+b*n/d^3*e*ln(x)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+b*n/d^3*e*ln(x)*ln
((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+b*n/d^3*e*dilog((-e*x+(-d*e)^(1/2))/(-d*
e)^(1/2))+b*n/d^3*e*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/4*b*n*e/d^3*l
n(e*x^2+d)-1/4*b*n/d^2/x^2+1/2*b*n/d^3*e*ln(x)+(1/2*I*Pi*b*csgn(I*x^n)*csg
n(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csg
n(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(1/2*e^2/d^3*
(-d/e/(e*x^2+d)+2*ln(e*x^2+d)/e)-1/2/d^2/x^2-2/d^3*e*ln(x))
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^3\,(d+ex^2)^2}\,dx=\int \frac{b\log(cx^n)+a}{(ex^2+d)^2x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^7 + 2*d*e*x^5 + d^2*x^3), x)
```

Sympy [A] (verification not implemented)

Time = 175.26 (sec) , antiderivative size = 364, normalized size of antiderivative = 2.89

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x**2+d)**2,x)
```

output
```
a*e**2*Piecewise((x**2/(2*d**2), Eq(e, 0)), (-1/(2*d*e + 2*e**2*x**2), Tru
e))/d**2 - a/(2*d**2*x**2) - 2*a*e*log(x)/d**3 + a*e*log(d + e*x**2)/d**3
- b*e**2*n*Piecewise((x**2/(2*d**2), Eq(e, 0)), (-log(x)/(d*e) + log(d/e +
 x**2)/(2*d*e), True))/(2*d**2) + b*e**2*Piecewise((x**2/d**2, Eq(e, 0)),
(-1/(d*e + e**2*x**2), True))*log(c*x**n)/(2*d**2) - b*n/(4*d**2*x**2) - b
*log(c*x**n)/(2*d**2*x**2) - b*e**2*n*Piecewise((x**2/(2*d), Eq(e, 0)), (P
iecewise((-polylog(2, e*x**2*exp_polar(I*pi)/d)/2, (Abs(x) < 1) & (1/Abs(x
) < 1)), (log(d)*log(x) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, Abs(x) <
 1), (-log(d)*log(1/x) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, 1/Abs(x)
< 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), (
)), ((), (0, 0)), x)*log(d) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, True
))/e, True))/d**3 + b*e**2*Piecewise((x**2/d, Eq(e, 0)), (log(d + e*x**2)/
e, True))*log(c*x**n)/d**3 + b*e*n*log(x**2)**2/(4*d**3) - b*e*log(x**2)*l
og(c*x**n)/d**3
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^2x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
-1/2*a*((2*e*x^2 + d)/(d^2*e*x^4 + d^3*x^2) - 2*e*log(e*x^2 + d)/d^3 + 4*e
*log(x)/d^3) + b*integrate((log(c) + log(x^n))/(e^2*x^7 + 2*d*e*x^5 + d^2*
x^3), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx=\int \frac{b\log(cx^n)+a}{(ex^2+d)^2x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^2*x^3), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{x^3\,(e\,x^2+d)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^2), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx$$
$$=\frac{2\left(\int \frac{\log(x^nc)}{e^2x^7+2de\,x^5+d^2x^3}dx\right)b\,d^4x^2+2\left(\int \frac{\log(x^nc)}{e^2x^7+2de\,x^5+d^2x^3}dx\right)b\,d^3e\,x^4+2\log(e\,x^2+d)\,ade\,x^2+2\log(e\,x^2+d}{2d^3x^2\,(e\,x^2+d)}$$

input
```
int((a+b*log(c*x^n))/x^3/(e*x^2+d)^2,x)
```

output
```
(2*int(log(x**n*c)/(d**2*x**3 + 2*d*e*x**5 + e**2*x**7),x)*b*d**4*x**2 + 2
*int(log(x**n*c)/(d**2*x**3 + 2*d*e*x**5 + e**2*x**7),x)*b*d**3*e*x**4 + 2
*log(d + e*x**2)*a*d*e*x**2 + 2*log(d + e*x**2)*a*e**2*x**4 - 4*log(x)*a*d
*e*x**2 - 4*log(x)*a*e**2*x**4 - a*d**2 + 2*a*e**2*x**4)/(2*d**3*x**2*(d +
 e*x**2))
```

3.226 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$

Optimal result 1745
Mathematica [A] (verified) 1746
Rubi [C] (verified) 1746
Maple [C] (warning: unable to verify) 1747
Fricas [F] 1748
Sympy [F] 1749
Maxima [F(-2)] 1749
Giac [F] 1749
Mupad [F(-1)] 1750
Reduce [F] 1750

Optimal result

Integrand size = 23, antiderivative size = 190

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \frac{ax}{e^2}-\frac{bnx}{e^2}-\frac{b\sqrt{d}n\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2e^{5/2}}+\frac{bx\log(cx^n)}{e^2}+\frac{dx(a+b\log(cx^n))}{2e^2(d+ex^2)}-\frac{3\sqrt{d}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{5/2}}-\frac{3b\sqrt{-d}n\operatorname{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4e^{5/2}}+\frac{3b\sqrt{-d}n\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4e^{5/2}}$$

output
```
a*x/e^2-b*n*x/e^2-1/2*b*d^(1/2)*n*arctan(e^(1/2)*x/d^(1/2))/e^(5/2)+b*x*ln
(c*x^n)/e^2+1/2*d*x*(a+b*ln(c*x^n))/e^2/(e*x^2+d)-3/2*d^(1/2)*arctan(e^(1/
2)*x/d^(1/2))*(a+b*ln(c*x^n))/e^(5/2)-3/4*b*(-d)^(1/2)*n*polylog(2,-e^(1/2
)*x/(-d)^(1/2))/e^(5/2)+3/4*b*(-d)^(1/2)*n*polylog(2,e^(1/2)*x/(-d)^(1/2))
/e^(5/2)
```

Mathematica [A] (verified)

Time = 0.72 (sec) , antiderivative size = 296, normalized size of antiderivative = 1.56

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$
$$= \frac{4a\sqrt{e}x - 4b\sqrt{e}nx + 4b\sqrt{e}x\log(cx^n) - \frac{d(a+b\log(cx^n))}{\sqrt{-d}-\sqrt{e}x} + \frac{d(a+b\log(cx^n))}{\sqrt{-d}+\sqrt{e}x} + \frac{bdn(\log(x)-\log(\sqrt{-d}-\sqrt{e}x))}{\sqrt{-d}} + b\sqrt{-d}n(}{}$$

input
```
Integrate[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
(4*a*Sqrt[e]*x - 4*b*Sqrt[e]*n*x + 4*b*Sqrt[e]*x*Log[c*x^n] - (d*(a + b*Lo
g[c*x^n]))/(Sqrt[-d] - Sqrt[e]*x) + (d*(a + b*Log[c*x^n]))/(Sqrt[-d] + Sqr
t[e]*x) + (b*d*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/Sqrt[-d] + b*Sqrt[-
d]*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]) - 3*Sqrt[-d]*(a + b*Log[c*x^n])*
Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + 3*Sqrt[-d]*(a + b*Log[c*x^n])*Log[1 + (d*S
qrt[e]*x)/(-d)^(3/2)] + 3*b*Sqrt[-d]*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]] -
3*b*Sqrt[-d]*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(4*e^(5/2))
```

Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 0.52 (sec) , antiderivative size = 191, normalized size of antiderivative = 1.01, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$
$$\Big\downarrow \text{2793}$$
$$\int \left(\frac{d^2(a+b\log(cx^n))}{e^2(d+ex^2)^2} - \frac{2d(a+b\log(cx^n))}{e^2(d+ex^2)} + \frac{a+b\log(cx^n)}{e^2}\right)dx$$
$$\Big\downarrow \text{2009}$$

$$-\frac{3\sqrt{d}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{5/2}}+\frac{dx(a+b\log(cx^n))}{2e^2(d+ex^2)}+\frac{ax}{e^2}-\frac{b\sqrt{d}n\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2e^{5/2}}+\frac{bx\log(cx^n)}{e^2}+\frac{3ib\sqrt{d}n\operatorname{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{4e^{5/2}}-\frac{3ib\sqrt{d}n\operatorname{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{4e^{5/2}}-\frac{bnx}{e^2}$$

input
```
Int[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
(a*x)/e^2 - (b*n*x)/e^2 - (b*Sqrt[d]*n*ArcTan[(Sqrt[e]*x)/Sqrt[d]])/(2*e^(
5/2)) + (b*x*Log[c*x^n])/e^2 + (d*x*(a + b*Log[c*x^n]))/(2*e^2*(d + e*x^2)
) - (3*Sqrt[d]*ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*e^(5/2))
 + (((3*I)/4)*b*Sqrt[d]*n*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]])/e^(5/2) -
(((3*I)/4)*b*Sqrt[d]*n*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])/e^(5/2)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.71 (sec) , antiderivative size = 559, normalized size of antiderivative = 2.94

method	result
risch	$\frac{b\ln(x^n)x}{e^2}+\frac{b\ln(x^n)dx}{2e^2(e\,x^2+d)}+\frac{3bd\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{2e^2\sqrt{de}}-\frac{3bd\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{2e^2\sqrt{de}}-\frac{bnx}{e^2}-\frac{bnd\arctan\left(\frac{xe}{\sqrt{de}}\right)}{2e^2\sqrt{de}}+\frac{bnd\ln(x)}{4e(e}$

input
```
int(x^4*(a+b*ln(c*x^n))/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)/e^2*x+1/2*b*ln(x^n)*d/e^2*x/(e*x^2+d)+3/2*b*d/e^2/(d*e)^(1/2)*ar
ctan(x*e/(d*e)^(1/2))*n*ln(x)-3/2*b*d/e^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/
2))*ln(x^n)-b*n*x/e^2-1/2*b*n*d/e^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))+1/
4*b*n*d/e*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2)
)*x^2-1/4*b*n*d/e*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e
)^(1/2))*x^2+1/4*b*n*d^2/e^2*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^
(1/2))/(-d*e)^(1/2))-1/4*b*n*d^2/e^2*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+
(-d*e)^(1/2))/(-d*e)^(1/2))-3/4*b*n*d/e^2/(-d*e)^(1/2)*dilog((-e*x+(-d*e)^
(1/2))/(-d*e)^(1/2))+3/4*b*n*d/e^2/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(1/2))/(
-d*e)^(1/2))-b*n/e^2*d*ln(x)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1
/2))+b*n/e^2*d*ln(x)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+(1/2
*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*c
sgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b
*ln(c)+a)*(x/e^2-1/e^2*d*(-1/2*x/(e*x^2+d)+3/2/(d*e)^(1/2)*arctan(x*e/(d*e
)^(1/2))))
```

Fricas [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^4}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*x^4*log(c*x^n) + a*x^4)/(e^2*x^4 + 2*d*e*x^2 + d^2), x)
```

Sympy [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$

input
```
integrate(x**4*(a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

output
```
Integral(x**4*(a + b*log(c*x**n))/(d + e*x**2)**2, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^4}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^4/(e*x^2 + d)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{x^4\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^2}\,dx$$

input
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x^2)^2,x)
```

output
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x^2)^2, x)
```

Reduce [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$
$$= \frac{-3\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)ad - 3\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)ae\,x^2 - 4\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)bdn - 4\sqrt{e}\,\sqrt{d}\,atan\left(\frac{e}{\sqrt{e}}\right.}{}$$

input
```
int(x^4*(a+b*log(c*x^n))/(e*x^2+d)^2,x)
```

output
```
( - 3*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*d - 3*sqrt(e)*sqrt(d
)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*e*x**2 - 4*sqrt(e)*sqrt(d)*atan((e*x)/(s
qrt(e)*sqrt(d)))*b*d*n - 4*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*b
*e*n*x**2 - 6*int(log(x**n*c)/(d**2 + 2*d*e*x**2 + e**2*x**4),x)*b*d**3*e
 - 6*int(log(x**n*c)/(d**2 + 2*d*e*x**2 + e**2*x**4),x)*b*d**2*e**2*x**2 +
6*log(x**n*c)*b*d*e*x + 2*log(x**n*c)*b*e**2*x**3 + 3*a*d*e*x + 2*a*e**2*x
**3 - 2*b*d*e*n*x - 2*b*e**2*n*x**3)/(2*e**3*(d + e*x**2))
```

3.227 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$

Optimal result . . . 1751
Mathematica [A] (verified) . . . 1752
Rubi [C] (verified) . . . 1752
Maple [C] (warning: unable to verify) . . . 1753
Fricas [F] . . . 1754
Sympy [F] . . . 1754
Maxima [F(-2)] . . . 1755
Giac [F] . . . 1755
Mupad [F(-1)] . . . 1756
Reduce [F] . . . 1756

Optimal result

Integrand size = 23, antiderivative size = 163

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2\sqrt{d}e^{3/2}} - \frac{x(a+b\log(cx^n))}{2e(d+ex^2)} + \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}e^{3/2}} - \frac{bn\,\mathrm{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4\sqrt{-d}e^{3/2}} + \frac{bn\,\mathrm{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4\sqrt{-d}e^{3/2}}$$

output
```
1/2*b*n*arctan(e^(1/2)*x/d^(1/2))/d^(1/2)/e^(3/2)-1/2*x*(a+b*ln(c*x^n))/e/
(e*x^2+d)+1/2*arctan(e^(1/2)*x/d^(1/2))*(a+b*ln(c*x^n))/d^(1/2)/e^(3/2)-1/
4*b*n*polylog(2,-e^(1/2)*x/(-d)^(1/2))/(-d)^(1/2)/e^(3/2)+1/4*b*n*polylog(
2,e^(1/2)*x/(-d)^(1/2))/(-d)^(1/2)/e^(3/2)
```

Mathematica [A] (verified)

Time = 0.60 (sec) , antiderivative size = 258, normalized size of antiderivative = 1.58

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$

$$= \frac{\frac{a+b\log(cx^n)}{\sqrt{-d}-\sqrt{e}x} - \frac{a+b\log(cx^n)}{\sqrt{-d}+\sqrt{e}x} + \frac{bdn(\log(x)-\log(\sqrt{-d}-\sqrt{e}x))}{(-d)^{3/2}} + \frac{bn(\log(x)-\log(\sqrt{-d}+\sqrt{e}x))}{\sqrt{-d}} + \frac{d(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{3/2}} + \frac{(a+\cdots}{\cdots}}{4e^{3/2}}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
((a + b*Log[c*x^n])/(Sqrt[-d] - Sqrt[e]*x) - (a + b*Log[c*x^n])/(Sqrt[-d]
+ Sqrt[e]*x) + (b*d*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/(-d)^(3/2) + (
b*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/Sqrt[-d] + (d*(a + b*Log[c*x^n])
*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(3/2) + ((a + b*Log[c*x^n])*Log[1 + (
d*Sqrt[e]*x)/(-d)^(3/2)])/Sqrt[-d] + (b*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]]
)/Sqrt[-d] + (b*d*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(3/2))/(4*e
^(3/2))
```

Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 0.48 (sec) , antiderivative size = 164, normalized size of antiderivative = 1.01, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$

$$\Big\downarrow \text{ 2793}$$

$$\int \left(\frac{a+b\log(cx^n)}{e(d+ex^2)} - \frac{d(a+b\log(cx^n))}{e(d+ex^2)^2}\right)dx$$

$$\downarrow \text{2009}$$

$$\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}e^{3/2}} - \frac{x(a+b\log(cx^n))}{2e(d+ex^2)} + \frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2\sqrt{d}e^{3/2}} - \frac{ibn\operatorname{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{4\sqrt{d}e^{3/2}} + \frac{ibn\operatorname{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{4\sqrt{d}e^{3/2}}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
(b*n*ArcTan[(Sqrt[e]*x)/Sqrt[d]])/(2*Sqrt[d]*e^(3/2)) - (x*(a + b*Log[c*x^
n]))/(2*e*(d + e*x^2)) + (ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/
(2*Sqrt[d]*e^(3/2)) - ((I/4)*b*n*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]])/(Sq
rt[d]*e^(3/2)) + ((I/4)*b*n*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])/(Sqrt[d]*e^
(3/2))
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.72 (sec) , antiderivative size = 516, normalized size of antiderivative = 3.17

method	result
risch	$-\frac{b\ln(x^n)x}{2e(e\,x^2+d)} - \frac{b\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{2e\sqrt{de}} + \frac{b\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{2e\sqrt{de}} + \frac{bn\arctan\left(\frac{xe}{\sqrt{de}}\right)}{2e\sqrt{de}} - \frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)x^2}{4(e\,x^2+d)\sqrt{-de}} +$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-1/2*b*ln(x^n)/e*x/(e*x^2+d)-1/2*b/e/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*n
*ln(x)+1/2*b/e/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln(x^n)+1/2*b*n/e/(d*e)
^(1/2)*arctan(x*e/(d*e)^(1/2))-1/4*b*n*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e
*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2+1/4*b*n*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln
((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2-1/4*b*n*d/e*ln(x)/(e*x^2+d)/(-d*e)^(
1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/4*b*n*d/e*ln(x)/(e*x^2+d)/(-d*
e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/4*b*n/e/(-d*e)^(1/2)*dilog(
(-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/4*b*n/e/(-d*e)^(1/2)*dilog((e*x+(-d*e)
^(1/2))/(-d*e)^(1/2))+1/2*b*n/e*ln(x)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/
(-d*e)^(1/2))-1/2*b*n/e*ln(x)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1
/2))+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I
*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*cs
gn(I*c)+b*ln(c)+a)*(-1/2/e*x/(e*x^2+d)+1/2/e/(d*e)^(1/2)*arctan(x*e/(d*e)^
(1/2)))
```

Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x^n) + a*x^2)/(e^2*x^4 + 2*d*e*x^2 + d^2), x)
```

Sympy [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))/(d + e*x**2)**2, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x^2(a+b\log{(cx^n)})}{(d+ex^2)^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x^2(a+b\log{(cx^n)})}{(d+ex^2)^2}\,dx = \int \frac{(b\log{(cx^n)}+a)x^2}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x^2 + d)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^2}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^2,x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^2, x)
```

Reduce [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \frac{\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)ad+\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)ae\,x^2+2\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)bdn+2\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)}{2d\,e^2\,(e\,x^2+}$$

input
```
int(x^2*(a+b*log(c*x^n))/(e*x^2+d)^2,x)
```

output
```
(sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*d + sqrt(e)*sqrt(d)*atan(
(e*x)/(sqrt(e)*sqrt(d)))*a*e*x**2 + 2*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*
sqrt(d)))*b*d*n + 2*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*b*e*n*x*
*2 + 2*int(log(x**n*c)/(d**2 + 2*d*e*x**2 + e**2*x**4),x)*b*d**3*e + 2*int
(log(x**n*c)/(d**2 + 2*d*e*x**2 + e**2*x**4),x)*b*d**2*e**2*x**2 - 2*log(x
**n*c)*b*d*e*x - a*d*e*x)/(2*d*e**2*(d + e*x**2))
```

3.228 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx$

Optimal result . . . 1757
Mathematica [A] (verified) . . . 1758
Rubi [C] (verified) . . . 1759
Maple [C] (warning: unable to verify) . . . 1761
Fricas [F] . . . 1762
Sympy [F] . . . 1762
Maxima [F(-2)] . . . 1762
Giac [F] . . . 1763
Mupad [F(-1)] . . . 1763
Reduce [F] . . . 1763

Optimal result

Integrand size = 20, antiderivative size = 163

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx = -\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)} + \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}\sqrt{e}} + \frac{bn\,\text{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4(-d)^{3/2}\sqrt{e}} - \frac{bn\,\text{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4(-d)^{3/2}\sqrt{e}}$$

output
```
-1/2*b*n*arctan(e^(1/2)*x/d^(1/2))/d^(3/2)/e^(1/2)+1/2*x*(a+b*ln(c*x^n))/d
/(e*x^2+d)+1/2*arctan(e^(1/2)*x/d^(1/2))*(a+b*ln(c*x^n))/d^(3/2)/e^(1/2)+1
/4*b*n*polylog(2,-e^(1/2)*x/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-1/4*b*n*polylog
(2,e^(1/2)*x/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)
```

Mathematica [A] (verified)

Time = 0.63 (sec) , antiderivative size = 289, normalized size of antiderivative = 1.77

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx = \frac{1}{4}\left(\frac{a+b\log(cx^n)}{d\left(\sqrt{-d}\sqrt{e}+ex\right)}+\frac{a+b\log(cx^n)}{(-d)^{3/2}\sqrt{e}+dex}+\frac{bdn\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}x\right)\right)}{(-d)^{5/2}\sqrt{e}}+\frac{bn\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}x\right)\right)}{(-d)^{3/2}\sqrt{e}}+\frac{(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{3/2}\sqrt{e}}+\frac{d(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{5/2}\sqrt{e}}+\frac{bdn\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{5/2}\sqrt{e}}+\frac{bn\operatorname{PolyLog}\left(2,\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{3/2}\sqrt{e}}\right)$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x^2)^2,x]
```

output
```
((a + b*Log[c*x^n])/(d*(Sqrt[-d]*Sqrt[e] + e*x)) + (a + b*Log[c*x^n])/((-d
)^(3/2)*Sqrt[e] + d*e*x) + (b*d*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/((
-d)^(5/2)*Sqrt[e]) + (b*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/((-d)^(3/2
)*Sqrt[e]) + ((a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/((-d)^(3/2
)*Sqrt[e]) + (d*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/((-d
)^(5/2)*Sqrt[e]) + (b*d*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/((-d)^(5/2)*Sq
rt[e]) + (b*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/((-d)^(3/2)*Sqrt[e]))/
4
```

Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 0.43 (sec) , antiderivative size = 160, normalized size of antiderivative = 0.98, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.300$, Rules used = {2760, 218, 2761, 27, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}dx$$

$$\Big\downarrow \text{ 2760}$$

$$\frac{\int \frac{a+b\log(cx^n)}{ex^2+d}dx}{2d}-\frac{bn\int \frac{1}{ex^2+d}dx}{2d}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}$$

$$\Big\downarrow \text{ 218}$$

$$\frac{\int \frac{a+b\log(cx^n)}{ex^2+d}dx}{2d}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}$$

$$\Big\downarrow \text{ 2761}$$

$$\frac{\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{e}x}dx}{2d}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}\sqrt{e}}}{2d}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}$$

$$\Big\downarrow \text{ 5355}$$

$$\frac{\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\left(\frac{1}{2}i\int \frac{\log\left(1-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{x}dx-\frac{1}{2}i\int \frac{\log\left(\frac{i\sqrt{e}x}{\sqrt{d}}+1\right)}{x}dx\right)}{\sqrt{d}\sqrt{e}}}{2d}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}$$

$$\Big\downarrow \text{ 2838}$$

$$\frac{\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\left(\frac{1}{2}i\operatorname{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\operatorname{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)\right)}{\sqrt{d}\sqrt{e}}}{2d}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x^2)^2,x]
```

output
```
-1/2*(b*n*ArcTan[(Sqrt[e]*x)/Sqrt[d]])/(d^(3/2)*Sqrt[e]) + (x*(a + b*Log[c
*x^n]))/(2*d*(d + e*x^2)) + ((ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n
]))/(Sqrt[d]*Sqrt[e]) - (b*n*((I/2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] -
 (I/2)*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]]))/(Sqrt[d]*Sqrt[e]))/(2*d)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 218
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

rule 2760
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_), x_Sym
bol] :> Simp[(-x)*(d + e*x^2)^(q + 1)*((a + b*Log[c*x^n])/(2*d*(q + 1))), x
] + (Simp[(2*q + 3)/(2*d*(q + 1))   Int[(d + e*x^2)^(q + 1)*(a + b*Log[c*x^
n]), x], x] + Simp[b*(n/(2*d*(q + 1)))   Int[(d + e*x^2)^(q + 1), x], x]) /
; FreeQ[{a, b, c, d, e, n}, x] && LtQ[q, -1]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.72 (sec) , antiderivative size = 449, normalized size of antiderivative = 2.75

method	result
risch	$\frac{bx\ln(x^n)}{2d(e\,x^2+d)} - \frac{b\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{2d\sqrt{de}} + \frac{b\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{2d\sqrt{de}} - \frac{bn\arctan\left(\frac{xe}{\sqrt{de}}\right)}{2d\sqrt{de}} + \frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)x^2e}{4d(e\,x^2+d)\sqrt{-de}} - \frac{bn\ln(x}{4c}$

input
```
int((a+b*ln(c*x^n))/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*x/d/(e*x^2+d)*ln(x^n)-1/2*b/d/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*n*
ln(x)+1/2*b/d/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln(x^n)-1/2*b*n/d/(d*e)^
(1/2)*arctan(x*e/(d*e)^(1/2))+1/4*b*n*ln(x)/d/(e*x^2+d)/(-d*e)^(1/2)*ln((-
e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2*e-1/4*b*n*ln(x)/d/(e*x^2+d)/(-d*e)^(1/
2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2*e+1/4*b*n*ln(x)/(e*x^2+d)/(-d*e
)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/4*b*n*ln(x)/(e*x^2+d)/(-d*e
)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/4*b*n/(-d*e)^(1/2)/d*dilog((
-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/4*b*n/(-d*e)^(1/2)/d*dilog((e*x+(-d*e)^
(1/2))/(-d*e)^(1/2))+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*cs
gn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*cs
gn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(1/2*x/d/(e*x^2+d)+1/2/d/(d*e)^(1/2)*ar
ctan(x*e/(d*e)^(1/2)))
```

Fricas [F]

$$\int \frac{a + b\log{(cx^n)}}{(d + ex^2)^2}\,dx = \int \frac{b\log{(cx^n)} + a}{(ex^2 + d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^4 + 2*d*e*x^2 + d^2), x)
```

Sympy [F]

$$\int \frac{a + b\log{(cx^n)}}{(d + ex^2)^2}\,dx = \int \frac{a + b\log{(cx^n)}}{(d + ex^2)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))/(d + e*x**2)**2, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log{(cx^n)}}{(d + ex^2)^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^2\right)^2}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^2 + d)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^2\right)^2}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{\left(e\,x^2+d\right)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x^2)^2,x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x^2)^2, x)
```

Reduce [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^2\right)^2}\,dx$$
$$=\frac{\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)ad+\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)ae\,x^2+2\left(\int\frac{\log(x^n c)}{e^2x^4+2de\,x^2+d^2}dx\right)b\,d^3e+2\left(\int\frac{\log(x^n c)}{e^2x^4+2de\,x^2+d^2}dx\cdots\right.}{2d^2e\left(e\,x^2+d\right)}$$

input
```
int((a+b*log(c*x^n))/(e*x^2+d)^2,x)
```

output
```
(sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*d + sqrt(e)*sqrt(d)*atan(
(e*x)/(sqrt(e)*sqrt(d)))*a*e*x**2 + 2*int(log(x**n*c)/(d**2 + 2*d*e*x**2 +
 e**2*x**4),x)*b*d**3*e + 2*int(log(x**n*c)/(d**2 + 2*d*e*x**2 + e**2*x**4
),x)*b*d**2*e**2*x**2 + a*d*e*x)/(2*d**2*e*(d + e*x**2))
```

3.229 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^2}\,dx$

Optimal result . . . 1764
Mathematica [A] (verified) . . . 1765
Rubi [C] (verified) . . . 1766
Maple [C] (warning: unable to verify) . . . 1768
Fricas [F] . . . 1769
Sympy [F] . . . 1770
Maxima [F(-2)] . . . 1770
Giac [F] . . . 1770
Mupad [F(-1)] . . . 1771
Reduce [F] . . . 1771

Optimal result

Integrand size = 23, antiderivative size = 182

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^2}\,dx = -\frac{3bn}{2d^2x} + \frac{a+b\log(cx^n)}{2dx(d+ex^2)} - \frac{3a-bn+3b\log(cx^n)}{2d^2x} - \frac{\sqrt{e}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(3a-bn+3b\log(cx^n))}{2d^{5/2}} + \frac{3b\sqrt{e}n\,\mathrm{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4(-d)^{5/2}} - \frac{3b\sqrt{e}n\,\mathrm{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4(-d)^{5/2}}$$

output
```
-3/2*b*n/d^2/x+1/2*(a+b*ln(c*x^n))/d/x/(e*x^2+d)-1/2*(3*a-b*n+3*b*ln(c*x^n
))/d^2/x-1/2*e^(1/2)*arctan(e^(1/2)*x/d^(1/2))*(3*a-b*n+3*b*ln(c*x^n))/d^(
5/2)+3/4*b*e^(1/2)*n*polylog(2,-e^(1/2)*x/(-d)^(1/2))/(-d)^(5/2)-3/4*b*e^(
1/2)*n*polylog(2,e^(1/2)*x/(-d)^(1/2))/(-d)^(5/2)
```

Mathematica [A] (verified)

Time = 0.90 (sec) , antiderivative size = 328, normalized size of antiderivative = 1.80

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^2}\,dx = \frac{1}{4}\left(-\frac{4bn}{d^2x}-\frac{4(a+b\log(cx^n))}{d^2x}+\frac{\sqrt{e}(a+b\log(cx^n))}{d^2(\sqrt{-d}-\sqrt{e}x)}-\frac{\sqrt{e}(a+b\log(cx^n))}{d^2(\sqrt{-d}+\sqrt{e}x)}+\frac{b\sqrt{e}n\left(-\log(x)+\log\left(\sqrt{-d}-\sqrt{e}x\right)\right)}{(-d)^{5/2}}+\frac{b\sqrt{e}n\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}x\right)\right)}{(-d)^{5/2}}+\frac{3\sqrt{e}(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{5/2}}-\frac{3\sqrt{e}(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{5/2}}-\frac{3b\sqrt{e}n\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{5/2}}+\frac{3b\sqrt{e}n\operatorname{PolyLog}\left(2,\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{5/2}}\right)$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^2),x]
```

output
```
((-4*b*n)/(d^2*x) - (4*(a + b*Log[c*x^n]))/(d^2*x) + (Sqrt[e]*(a + b*Log[c
*x^n]))/(d^2*(Sqrt[-d] - Sqrt[e]*x)) - (Sqrt[e]*(a + b*Log[c*x^n]))/(d^2*(
Sqrt[-d] + Sqrt[e]*x)) + (b*Sqrt[e]*n*(-Log[x] + Log[Sqrt[-d] - Sqrt[e]*x]
))/(-d)^(5/2) + (b*Sqrt[e]*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/(-d)^(5
/2) + (3*Sqrt[e]*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(5
/2) - (3*Sqrt[e]*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d
)^(5/2) - (3*b*Sqrt[e]*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(5/2) + (3
*b*Sqrt[e]*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(5/2))/4
```

Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 0.70 (sec) , antiderivative size = 181, normalized size of antiderivative = 0.99, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.348, Rules used = {2785, 25, 2780, 2741, 2761, 27, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^2\right)^2}dx$$

$$\Big\downarrow \text{ 2785}$$

$$\frac{a+b\log\left(cx^n\right)}{2dx\left(d+ex^2\right)}-\frac{\int -\frac{3a-bn+3b\log(cx^n)}{x^2(ex^2+d)}dx}{2d}$$

$$\Big\downarrow \text{ 25}$$

$$\frac{\int \frac{3a-bn+3b\log(cx^n)}{x^2(ex^2+d)}dx}{2d}+\frac{a+b\log\left(cx^n\right)}{2dx\left(d+ex^2\right)}$$

$$\Big\downarrow \text{ 2780}$$

$$\frac{\frac{\int \frac{3a-bn+3b\log(cx^n)}{x^2}dx}{d}-\frac{e\int \frac{3a-bn+3b\log(cx^n)}{ex^2+d}dx}{d}}{2d}+\frac{a+b\log\left(cx^n\right)}{2dx\left(d+ex^2\right)}$$

$$\Big\downarrow \text{ 2741}$$

$$\frac{\frac{-\frac{3a+3b\log(cx^n)-bn}{x}-\frac{3bn}{x}}{d}-\frac{e\int \frac{3a-bn+3b\log(cx^n)}{ex^2+d}dx}{d}}{2d}+\frac{a+b\log\left(cx^n\right)}{2dx\left(d+ex^2\right)}$$

$$\Big\downarrow \text{ 2761}$$

$$\frac{\frac{-\frac{3a+3b\log(cx^n)-bn}{x}-\frac{3bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(3a+3b\log(cx^n)-bn)}{\sqrt{d}\sqrt{e}}-3bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{e}x}dx\right)}{d}}{2d}+\frac{a+b\log\left(cx^n\right)}{2dx\left(d+ex^2\right)}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{\frac{-\frac{3a+3b\log(cx^n)-bn}{x}-\frac{3bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(3a+3b\log(cx^n)-bn)}{\sqrt{d}\sqrt{e}}-\frac{3bn\int\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}\sqrt{e}}\right)}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx(d+ex^2)}$$

$$\Big\downarrow \text{5355}$$

$$\frac{a+b\log(cx^n)}{2dx(d+ex^2)}+\frac{\frac{-\frac{3a+3b\log(cx^n)-bn}{x}-\frac{3bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(3a+3b\log(cx^n)-bn)}{\sqrt{d}\sqrt{e}}-\frac{3bn\left(\frac{1}{2}i\int\frac{\log\left(1-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{x}dx-\frac{1}{2}i\int\frac{\log\left(\frac{i\sqrt{e}x}{\sqrt{d}}+1\right)}{x}dx\right)}{\sqrt{d}\sqrt{e}}\right)}{d}}{2d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{a+b\log(cx^n)}{2dx(d+ex^2)}+\frac{\frac{-\frac{3a+3b\log(cx^n)-bn}{x}-\frac{3bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(3a+3b\log(cx^n)-bn)}{\sqrt{d}\sqrt{e}}-\frac{3bn\left(\frac{1}{2}i\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)\right)}{\sqrt{d}\sqrt{e}}\right)}{d}}{2d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^2),x]
```

output
```
(a + b*Log[c*x^n])/(2*d*x*(d + e*x^2)) + (((-3*b*n)/x - (3*a - b*n + 3*b*L
og[c*x^n])/x)/d - (e*((ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(3*a - b*n + 3*b*Log[c*
x^n]))/(Sqrt[d]*Sqrt[e]) - (3*b*n*((I/2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[
d]] - (I/2)*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]]))/(Sqrt[d]*Sqrt[e])))/d)/(2*
d)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2785
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Simp[1/(2*d*(q + 1))   Int[(f*x)^m*(d
 + e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
 x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.05 (sec) , antiderivative size = 568, normalized size of antiderivative = 3.12

method	result
risch	$-\frac{b\ln(x^n)ex}{2d^2(e\,x^2+d)}+\frac{3be\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{2d^2\sqrt{de}}-\frac{3be\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{2d^2\sqrt{de}}-\frac{b\ln(x^n)}{d^2x}-\frac{bn}{d^2x}+\frac{bne\arctan\left(\frac{xe}{\sqrt{de}}\right)}{2d^2\sqrt{de}}-\frac{bn\,e^2\ln(}{4d^2}$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-1/2*b*ln(x^n)/d^2*e*x/(e*x^2+d)+3/2*b*e/d^2/(d*e)^(1/2)*arctan(x*e/(d*e)^
(1/2))*n*ln(x)-3/2*b*e/d^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln(x^n)-b*l
n(x^n)/d^2/x-b*n/d^2/x+1/2*b*n*e/d^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))-1
/4*b*n*e^2/d^2*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^
(1/2))*x^2+1/4*b*n*e^2/d^2*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/
2))/(-d*e)^(1/2))*x^2-1/4*b*n*e/d*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-
d*e)^(1/2))/(-d*e)^(1/2))+1/4*b*n*e/d*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x
+(-d*e)^(1/2))/(-d*e)^(1/2))-3/4*b*n*e/d^2/(-d*e)^(1/2)*dilog((-e*x+(-d*e)
^(1/2))/(-d*e)^(1/2))+3/4*b*n*e/d^2/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(1/2))/
(-d*e)^(1/2))-1/2*b*n*e/d^2*ln(x)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*
e)^(1/2))+1/2*b*n*e/d^2*ln(x)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1
/2))+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I
*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*cs
gn(I*c)+b*ln(c)+a)*(-e/d^2*(1/2*x/(e*x^2+d)+3/2/(d*e)^(1/2)*arctan(x*e/(d*
e)^(1/2)))-1/d^2/x)
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^2\right)^2}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^2x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^6 + 2*d*e*x^4 + d^2*x^2), x)
```

Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^2}\,dx=\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x**2+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*(d + e*x**2)**2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^2}\,dx=\text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^2}\,dx=\int \frac{b\log(cx^n)+a}{(ex^2+d)^2x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^2*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^2}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^2\,(e\,x^2+d)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^2), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^2}\,dx = \frac{-3\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)adx-3\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)ae\,x^3+2\left(\int\frac{\log(x^nc)}{e^2x^6+2de\,x^4+d^2x^2}dx\right)b\,d^4x+2\left(\int\frac{\log(x}{e^2x^6+2de}\right.}{2d^3x\,(e\,x^2+d)}$$

input
```
int((a+b*log(c*x^n))/x^2/(e*x^2+d)^2,x)
```

output
```
( - 3*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*d*x - 3*sqrt(e)*sqrt
(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*e*x**3 + 2*int(log(x**n*c)/(d**2*x**2
+ 2*d*e*x**4 + e**2*x**6),x)*b*d**4*x + 2*int(log(x**n*c)/(d**2*x**2 + 2*d
*e*x**4 + e**2*x**6),x)*b*d**3*e*x**3 - 2*a*d**2 - 3*a*d*e*x**2)/(2*d**3*x
*(d + e*x**2))
```

3.230 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^2}\,dx$

Optimal result . . . 1772
Mathematica [A] (verified) . . . 1773
Rubi [C] (verified) . . . 1774
Maple [C] (warning: unable to verify) . . . 1777
Fricas [F] . . . 1778
Sympy [F] . . . 1778
Maxima [F(-2)] . . . 1779
Giac [F] . . . 1779
Mupad [F(-1)] . . . 1780
Reduce [F] . . . 1780

Optimal result

Integrand size = 23, antiderivative size = 223

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^2}\,dx = &-\frac{5bn}{18d^2x^3}+\frac{5ben}{2d^3x}+\frac{a+b\log(cx^n)}{2dx^3(d+ex^2)} \\ &-\frac{5a-bn+5b\log(cx^n)}{6d^2x^3}+\frac{e(5a-bn+5b\log(cx^n))}{2d^3x} \\ &+\frac{e^{3/2}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(5a-bn+5b\log(cx^n))}{2d^{7/2}} \\ &+\frac{5be^{3/2}n\,\text{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4(-d)^{7/2}}-\frac{5be^{3/2}n\,\text{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4(-d)^{7/2}}\end{aligned}$$

output
```
-5/18*b*n/d^2/x^3+5/2*b*e*n/d^3/x+1/2*(a+b*ln(c*x^n))/d/x^3/(e*x^2+d)-1/6*
(5*a-b*n+5*b*ln(c*x^n))/d^2/x^3+1/2*e*(5*a-b*n+5*b*ln(c*x^n))/d^3/x+1/2*e^
(3/2)*arctan(e^(1/2)*x/d^(1/2))*(5*a-b*n+5*b*ln(c*x^n))/d^(7/2)+5/4*b*e^(3
/2)*n*polylog(2,-e^(1/2)*x/(-d)^(1/2))/(-d)^(7/2)-5/4*b*e^(3/2)*n*polylog(
2,e^(1/2)*x/(-d)^(1/2))/(-d)^(7/2)
```

Mathematica [A] (verified)

Time = 0.82 (sec) , antiderivative size = 361, normalized size of antiderivative = 1.62

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^2}\,dx = \frac{1}{36}\left(-\frac{4bn}{d^2x^3}+\frac{72ben}{d^3x}-\frac{12(a+b\log(cx^n))}{d^2x^3}+\frac{72e(a+b\log(cx^n))}{d^3x}-\frac{9e^{3/2}(a+b\log(cx^n))}{d^3\left(\sqrt{-d}-\sqrt{e}x\right)}+\frac{9e^{3/2}(a+b\log(cx^n))}{d^3\left(\sqrt{-d}+\sqrt{e}x\right)}-\frac{9be^{3/2}n\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}x\right)\right)}{(-d)^{7/2}}+\frac{9be^{3/2}n\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}x\right)\right)}{(-d)^{7/2}}+\frac{45e^{3/2}(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{7/2}}-\frac{45e^{3/2}(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{7/2}}-\frac{45be^{3/2}n\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{7/2}}+\frac{45be^{3/2}n\operatorname{PolyLog}\left(2,\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{7/2}}\right)$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^2),x]
```

output
```
((-4*b*n)/(d^2*x^3) + (72*b*e*n)/(d^3*x) - (12*(a + b*Log[c*x^n]))/(d^2*x^
3) + (72*e*(a + b*Log[c*x^n]))/(d^3*x) - (9*e^(3/2)*(a + b*Log[c*x^n]))/(d
^3*(Sqrt[-d] - Sqrt[e]*x)) + (9*e^(3/2)*(a + b*Log[c*x^n]))/(d^3*(Sqrt[-d]
 + Sqrt[e]*x)) - (9*b*e^(3/2)*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/(-d)
^(7/2) + (9*b*e^(3/2)*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/(-d)^(7/2) +
 (45*e^(3/2)*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(7/2)
- (45*e^(3/2)*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(
7/2) - (45*b*e^(3/2)*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(7/2) + (45*
b*e^(3/2)*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(7/2))/36
```

Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 1.03 (sec) , antiderivative size = 226, normalized size of antiderivative = 1.01, number of steps used = 10, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.435$, Rules used = {2785, 25, 2780, 2741, 2780, 2741, 2761, 27, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^2}dx$$

$$\Big\downarrow \text{2785}$$

$$\frac{a+b\log(cx^n)}{2dx^3(d+ex^2)}-\frac{\int -\frac{5a-bn+5b\log(cx^n)}{x^4(ex^2+d)}dx}{2d}$$

$$\Big\downarrow \text{25}$$

$$\frac{\int \frac{5a-bn+5b\log(cx^n)}{x^4(ex^2+d)}dx}{2d}+\frac{a+b\log(cx^n)}{2dx^3(d+ex^2)}$$

$$\Big\downarrow \text{2780}$$

$$\frac{\frac{\int \frac{5a-bn+5b\log(cx^n)}{x^4}dx}{d}-\frac{e\int \frac{5a-bn+5b\log(cx^n)}{x^2(ex^2+d)}dx}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx^3(d+ex^2)}$$

$$\Big\downarrow \text{2741}$$

$$\frac{\frac{-\frac{5a+5b\log(cx^n)-bn}{3x^3}-\frac{5bn}{9x^3}}{d}-\frac{e\int \frac{5a-bn+5b\log(cx^n)}{x^2(ex^2+d)}dx}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx^3(d+ex^2)}$$

$$\Big\downarrow \text{2780}$$

$$\frac{\frac{-\frac{5a+5b\log(cx^n)-bn}{3x^3}-\frac{5bn}{9x^3}}{d}-\frac{e\left(\frac{\int \frac{5a-bn+5b\log(cx^n)}{x^2}dx}{d}-\frac{e\int \frac{5a-bn+5b\log(cx^n)}{ex^2+d}dx}{d}\right)}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx^3(d+ex^2)}$$

$$\Big\downarrow \text{2741}$$

$$\frac{\frac{-\frac{5a+5b\log(cx^n)-bn}{3x^3}-\frac{5bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{5a+5b\log(cx^n)-bn}{x}-\frac{5bn}{x}}{d}-\frac{e\int\frac{5a-bn+5b\log(cx^n)}{ex^2+d}dx}{d}\right)}{d}}{2d}+\frac{a+b\log\left(cx^n\right)}{2dx^3\left(d+ex^2\right)}$$

$\Big\downarrow$ 2761

$$\frac{\frac{-\frac{5a+5b\log(cx^n)-bn}{3x^3}-\frac{5bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{5a+5b\log(cx^n)-bn}{x}-\frac{5bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(5a+5b\log(cx^n)-bn)}{\sqrt{d}\sqrt{e}}-5bn\int\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{e}x}dx\right)}{d}\right)}{d}}{2d}+\frac{a+b\log\left(cx^n\right)}{2dx^3\left(d+ex^2\right)}$$

$\Big\downarrow$ 27

$$\frac{\frac{-\frac{5a+5b\log(cx^n)-bn}{3x^3}-\frac{5bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{5a+5b\log(cx^n)-bn}{x}-\frac{5bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(5a+5b\log(cx^n)-bn)}{\sqrt{d}\sqrt{e}}-\frac{5bn\int\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}\sqrt{e}}\right)}{d}\right)}{d}}{2d}+\frac{a+b\log\left(cx^n\right)}{2dx^3\left(d+ex^2\right)}$$

$\Big\downarrow$ 5355

$$\frac{a+b\log\left(cx^n\right)}{2dx^3\left(d+ex^2\right)}+\frac{\frac{-\frac{5a+5b\log(cx^n)-bn}{3x^3}-\frac{5bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{5a+5b\log(cx^n)-bn}{x}-\frac{5bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(5a+5b\log(cx^n)-bn)}{\sqrt{d}\sqrt{e}}-\frac{5bn\left(\frac{1}{2}i\int\frac{\log\left(1-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{x}dx-\frac{1}{2}i\int\frac{\log\left(\frac{i\sqrt{e}x}{\sqrt{d}}+1\right)}{x}\right.}{\sqrt{d}\sqrt{e}}\right.}{d}\right.}{d}}{2d}$$

$\Big\downarrow$ 2838

$$\frac{a+b\log\left(cx^n\right)}{2dx^3\left(d+ex^2\right)}+\frac{\frac{-\frac{5a+5b\log\left(cx^n\right)-bn}{3x^3}-\frac{5bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{5a+5b\log\left(cx^n\right)-bn}{x}-\frac{5bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\left(5a+5b\log\left(cx^n\right)-bn\right)}{\sqrt{d}\sqrt{e}}-\frac{5bn\left(\frac{1}{2}i\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)\right)}{\sqrt{d}\sqrt{e}}\right)}{d}\right)}{d}}{2d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^2),x]
```

output
```
(a + b*Log[c*x^n])/(2*d*x^3*(d + e*x^2)) + (((-5*b*n)/(9*x^3) - (5*a - b*n
 + 5*b*Log[c*x^n])/(3*x^3))/d - (e*(((-5*b*n)/x - (5*a - b*n + 5*b*Log[c*x
^n])/x)/d - (e*((ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(5*a - b*n + 5*b*Log[c*x^n]))
/(Sqrt[d]*Sqrt[e]) - (5*b*n*((I/2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] -
(I/2)*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]]))/(Sqrt[d]*Sqrt[e])))/d))/d)/(2*d)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2785
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Simp[1/(2*d*(q + 1))   Int[(f*x)^m*(d
 + e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
 x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.70 (sec) , antiderivative size = 622, normalized size of antiderivative = 2.79

method	result
risch	$\frac{b\ln(x^n)e^2x}{2d^3(e\,x^2+d)}-\frac{5b\,e^2\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{2d^3\sqrt{de}}+\frac{5b\,e^2\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{2d^3\sqrt{de}}-\frac{b\ln(x^n)}{3d^2x^3}+\frac{2b\ln(x^n)e}{d^3x}+\frac{2ben}{d^3x}-\frac{bn\,e^2\arctan\left(\cdots\right.}{2d^3\sqrt{de}}$

input
```
int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)*e^2/d^3*x/(e*x^2+d)-5/2*b*e^2/d^3/(d*e)^(1/2)*arctan(x*e/(d*
e)^(1/2))*n*ln(x)+5/2*b*e^2/d^3/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln(x^n
)-1/3*b*ln(x^n)/d^2/x^3+2*b*ln(x^n)/d^3*e/x+2*b*e*n/d^3/x-1/2*b*n*e^2/d^3/
(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))+1/4*b*n*e^3/d^3*ln(x)/(e*x^2+d)/(-d*e)
^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2-1/4*b*n*e^3/d^3*ln(x)/(e*x
^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2+1/4*b*n*e^2/d^2
*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/4*b*n
*e^2/d^2*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+
5/4*b*n*e^2/d^3/(-d*e)^(1/2)*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-5/4*b
*n*e^2/d^3/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+b*n*e^2/d^3
*ln(x)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-b*n*e^2/d^3*ln(x)
/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/9*b*n/d^2/x^3+(1/2*I*P
i*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(
I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(
c)+a)*(e^2/d^3*(1/2*x/(e*x^2+d)+5/2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2)))-1
/3/d^2/x^3+2/d^3*e/x)
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^2}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^2x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^8 + 2*d*e*x^6 + d^2*x^4), x)
```

Sympy [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^2}\,dx=\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**4/(e*x**2+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))/(x**4*(d + e*x**2)**2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log(cx^n)}{x^4 (d + ex^2)^2} dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a + b\log(cx^n)}{x^4 (d + ex^2)^2} dx = \int \frac{b\log(cx^n) + a}{(ex^2 + d)^2 x^4} dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^2*x^4), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^2}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^4\,(e\,x^2+d)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^2), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^2}\,dx = \frac{15\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)ade\,x^3+15\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)a\,e^2x^5+6\left(\int\frac{\log(x^nc)}{e^2x^8+2de\,x^6+d^2x^4}dx\right)b\,d^5x^3+6\left(\int \frac{}{e^2x}\right.}{6d^4x^3\,(e\,x^2+d)}$$

input
```
int((a+b*log(c*x^n))/x^4/(e*x^2+d)^2,x)
```

output
```
(15*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*d*e*x**3 + 15*sqrt(e)*
sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*e**2*x**5 + 6*int(log(x**n*c)/(d**
2*x**4 + 2*d*e*x**6 + e**2*x**8),x)*b*d**5*x**3 + 6*int(log(x**n*c)/(d**2*
x**4 + 2*d*e*x**6 + e**2*x**8),x)*b*d**4*e*x**5 - 2*a*d**3 + 10*a*d**2*e*x
**2 + 15*a*d*e**2*x**4)/(6*d**4*x**3*(d + e*x**2))
```

3.231 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$

Optimal result 1781
Mathematica [C] (verified) 1782
Rubi [A] (verified) 1782
Maple [C] (warning: unable to verify) 1784
Fricas [F] 1784
Sympy [A] (verification not implemented) 1785
Maxima [F] 1785
Giac [F] 1786
Mupad [F(-1)] 1786
Reduce [F] 1786

Optimal result

Integrand size = 23, antiderivative size = 152

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \frac{bdn}{8e^3(d+ex^2)} + \frac{bn\log(x)}{4e^3} - \frac{d^2(a+b\log(cx^n))}{4e^3(d+ex^2)^2} - \frac{x^2(a+b\log(cx^n))}{e^2(d+ex^2)} + \frac{3bn\log(d+ex^2)}{8e^3} + \frac{(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e^3} + \frac{bn\,\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^3}$$

output
```
1/8*b*d*n/e^3/(e*x^2+d)+1/4*b*n*ln(x)/e^3-1/4*d^2*(a+b*ln(c*x^n))/e^3/(e*x
^2+d)^2-x^2*(a+b*ln(c*x^n))/e^2/(e*x^2+d)+3/8*b*n*ln(e*x^2+d)/e^3+1/2*(a+b
*ln(c*x^n))*ln(1+e*x^2/d)/e^3+1/4*b*n*polylog(2,-e*x^2/d)/e^3
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.62 (sec) , antiderivative size = 498, normalized size of antiderivative = 3.28

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$$
$$= \frac{-2d^2(a-bn\log(x)+b\log(cx^n))+8d(d+ex^2)(a-bn\log(x)+b\log(cx^n))+4(d+ex^2)^2(a-bn\log(}{}$$

input
```
Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
(-2*d^2*(a - b*n*Log[x] + b*Log[c*x^n]) + 8*d*(d + e*x^2)*(a - b*n*Log[x]
+ b*Log[c*x^n]) + 4*(d + e*x^2)^2*(a - b*n*Log[x] + b*Log[c*x^n])*Log[d +
e*x^2] + b*n*(d^2 + d*e*x^2 - 4*d*e*x^2*Log[x] - 6*e^2*x^4*Log[x] + 3*d^2*
Log[I*Sqrt[d] - Sqrt[e]*x] + 6*d*e*x^2*Log[I*Sqrt[d] - Sqrt[e]*x] + 3*e^2*
x^4*Log[I*Sqrt[d] - Sqrt[e]*x] + 3*d^2*Log[I*Sqrt[d] + Sqrt[e]*x] + 6*d*e*
x^2*Log[I*Sqrt[d] + Sqrt[e]*x] + 3*e^2*x^4*Log[I*Sqrt[d] + Sqrt[e]*x] + 4*
d^2*Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + 8*d*e*x^2*Log[x]*Log[1 - (I*Sq
rt[e]*x)/Sqrt[d]] + 4*e^2*x^4*Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + 4*d^
2*Log[x]*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] + 8*d*e*x^2*Log[x]*Log[1 + (I*Sqrt
[e]*x)/Sqrt[d]] + 4*e^2*x^4*Log[x]*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] + 4*(d +
 e*x^2)^2*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] + 4*(d + e*x^2)^2*PolyLog[2
, (I*Sqrt[e]*x)/Sqrt[d]]))/(8*e^3*(d + e*x^2)^2)
```

Rubi [A] (verified)

Time = 0.56 (sec) , antiderivative size = 152, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{d^2 x(a+b\log(cx^n))}{e^2(d+ex^2)^3} - \frac{2dx(a+b\log(cx^n))}{e^2(d+ex^2)^2} + \frac{x(a+b\log(cx^n))}{e^2(d+ex^2)} \right) dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{4e^3(d+ex^2)^2} + \frac{\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{2e^3} - \frac{x^2(a+b\log(cx^n))}{e^2(d+ex^2)} + \frac{bn\,\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^3} + \frac{bdn}{8e^3(d+ex^2)} + \frac{3bn\log(d+ex^2)}{8e^3} + \frac{bn\log(x)}{4e^3}$$

input

```
Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output

```
(b*d*n)/(8*e^3*(d + e*x^2)) + (b*n*Log[x])/(4*e^3) - (d^2*(a + b*Log[c*x^n
]))/(4*e^3*(d + e*x^2)^2) - (x^2*(a + b*Log[c*x^n]))/(e^2*(d + e*x^2)) + (
3*b*n*Log[d + e*x^2])/(8*e^3) + ((a + b*Log[c*x^n])*Log[1 + (e*x^2)/d])/(2
*e^3) + (b*n*PolyLog[2, -((e*x^2)/d)])/(4*e^3)
```

Defintions of rubi rules used

rule 2009

```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.33 (sec) , antiderivative size = 359, normalized size of antiderivative = 2.36

method	result
risch	$\frac{b\ln(x^n)d}{e^3(e\,x^2+d)}+\frac{b\ln(x^n)\ln(e\,x^2+d)}{2e^3}-\frac{b\ln(x^n)d^2}{4e^3(e\,x^2+d)^2}+\frac{bdn}{8e^3(e\,x^2+d)}+\frac{3bn\ln(e\,x^2+d)}{8e^3}-\frac{3bn\ln(x)}{4e^3}-\frac{bn\ln(x)\ln(e\,x^2+d)}{2e^3}$

input
```
int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)*d/e^3/(e*x^2+d)+1/2*b*ln(x^n)/e^3*ln(e*x^2+d)-1/4*b*ln(x^n)*d^2/
e^3/(e*x^2+d)^2+1/8*b*d*n/e^3/(e*x^2+d)+3/8*b*n*ln(e*x^2+d)/e^3-3/4*b*n*ln
(x)/e^3-1/2*b*n/e^3*ln(x)*ln(e*x^2+d)+1/2*b*n/e^3*ln(x)*ln((-e*x+(-d*e)^(1
/2))/(-d*e)^(1/2))+1/2*b*n/e^3*ln(x)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1
/2*b*n/e^3*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n/e^3*dilog((e*x+
(-d*e)^(1/2))/(-d*e)^(1/2))+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*
Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*
Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(d/e^3/(e*x^2+d)+1/2/e^3*ln(e*x^
2+d)-1/4*d^2/e^3/(e*x^2+d)^2)
```

Fricas [F]

$$\int \frac{x^5(a+b\log{(cx^n)})}{(d+ex^2)^3}\,dx=\int \frac{(b\log{(cx^n)}+a)x^5}{(ex^2+d)^3}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
integral((b*x^5*log(c*x^n) + a*x^5)/(e^3*x^6 + 3*d*e^2*x^4 + 3*d^2*e*x^2 +
 d^3), x)
```

Sympy [A] (verification not implemented)

Time = 69.82 (sec) , antiderivative size = 403, normalized size of antiderivative = 2.65

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \text{Too large to display}$$

input
```
integrate(x**5*(a+b*ln(c*x**n))/(e*x**2+d)**3,x)
```

output
```
a*d**2*Piecewise((x**2/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x**2)**2), True))/
(2*e**2) - a*d*Piecewise((x**2/d**2, Eq(e, 0)), (-1/(d*e + e**2*x**2), Tru
e))/e**2 + a*Piecewise((x**2/d, Eq(e, 0)), (log(d + e*x**2)/e, True))/(2*e
**2) - b*d**2*n*Piecewise((x**2/(2*d**3), Eq(e, 0)), (-1/(4*d**2*e + 4*d*e
**2*x**2) - log(x)/(2*d**2*e) + log(d/e + x**2)/(4*d**2*e), True))/(2*e**2
) + b*d**2*Piecewise((x**2/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x**2)**2), Tru
e))*log(c*x**n)/(2*e**2) + b*d*n*Piecewise((x**2/(2*d**2), Eq(e, 0)), (-lo
g(x)/(d*e) + log(d/e + x**2)/(2*d*e), True))/e**2 - b*d*Piecewise((x**2/d*
*2, Eq(e, 0)), (-1/(d*e + e**2*x**2), True))*log(c*x**n)/e**2 - b*n*Piecew
ise((x**2/(2*d), Eq(e, 0)), (Piecewise((-polylog(2, e*x**2*exp_polar(I*pi)
/d)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x**2*
exp_polar(I*pi)/d)/2, Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x**2*e
xp_polar(I*pi)/d)/2, 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()),
x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x
**2*exp_polar(I*pi)/d)/2, True))/e, True))/(2*e**2) + b*Piecewise((x**2/d,
 Eq(e, 0)), (log(d + e*x**2)/e, True))*log(c*x**n)/(2*e**2)
```

Maxima [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{(ex^2+d)^3}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
1/4*a*((4*d*e*x^2 + 3*d^2)/(e^5*x^4 + 2*d*e^4*x^2 + d^2*e^3) + 2*log(e*x^2
 + d)/e^3) + b*integrate((x^5*log(c) + x^5*log(x^n))/(e^3*x^6 + 3*d*e^2*x^
4 + 3*d^2*e*x^2 + d^3), x)
```

Giac [F]

$$\int \frac{x^5(a + b\log(cx^n))}{(d + ex^2)^3}\,dx = \int \frac{(b\log(cx^n) + a)x^5}{(ex^2 + d)^3}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^5/(e*x^2 + d)^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^5(a + b\log(cx^n))}{(d + ex^2)^3}\,dx = \int \frac{x^5\,(a + b\,\ln(c\,x^n))}{(e\,x^2 + d)^3}\,dx$$

input
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^3,x)
```

output
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^3, x)
```

Reduce [F]

$$\int \frac{x^5(a + b\log(cx^n))}{(d + ex^2)^3}\,dx$$
$$= \frac{-4\left(\int \frac{\log(x^n c)}{e^3x^7+3d\,e^2x^5+3d^2e\,x^3+d^3x}dx\right) b\,d^5n - 8\left(\int \frac{\log(x^n c)}{e^3x^7+3d\,e^2x^5+3d^2e\,x^3+d^3x}dx\right) b\,d^4en\,x^2 - 4\left(\int \frac{\log(x^n c)}{e^3x^7+3d\,e^2x^5+3d^2e\,x}\right.}{}$$

input
```
int(x^5*(a+b*log(c*x^n))/(e*x^2+d)^3,x)
```

output
```
( - 4*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**3 + 3*d*e**2*x**5 + e**3*x**7)
,x)*b*d**5*n - 8*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**3 + 3*d*e**2*x**5 +
 e**3*x**7),x)*b*d**4*e*n*x**2 - 4*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**3
 + 3*d*e**2*x**5 + e**3*x**7),x)*b*d**3*e**2*n*x**4 + 2*log(d + e*x**2)*a*
d**2*n + 4*log(d + e*x**2)*a*d*e*n*x**2 + 2*log(d + e*x**2)*a*e**2*n*x**4
+ 3*log(d + e*x**2)*b*d**2*n**2 + 6*log(d + e*x**2)*b*d*e*n**2*x**2 + 3*lo
g(d + e*x**2)*b*e**2*n**2*x**4 + 2*log(x**n*c)**2*b*d**2 + 4*log(x**n*c)**
2*b*d*e*x**2 + 2*log(x**n*c)**2*b*e**2*x**4 + 3*log(x**n*c)*b*d**2*n - 3*l
og(x**n*c)*b*e**2*n*x**4 - 3*log(x)*b*d**2*n**2 - 6*log(x)*b*d*e*n**2*x**2
 - 3*log(x)*b*e**2*n**2*x**4 + a*d**2*n - 2*a*e**2*n*x**4)/(4*e**3*n*(d**2
 + 2*d*e*x**2 + e**2*x**4))
```

3.232 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$

Optimal result 1788
Mathematica [A] (verified) 1788
Rubi [A] (verified) 1789
Maple [B] (verified) 1790
Fricas [B] (verification not implemented) 1791
Sympy [F(-1)] 1791
Maxima [B] (verification not implemented) 1792
Giac [B] (verification not implemented) 1792
Mupad [B] (verification not implemented) 1793
Reduce [B] (verification not implemented) 1793

Optimal result

Integrand size = 23, antiderivative size = 68

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = -\frac{bn}{8e^2(d+ex^2)} + \frac{x^4(a+b\log(cx^n))}{4d(d+ex^2)^2} - \frac{bn\log(d+ex^2)}{8de^2}$$

output
```
-1/8*b*n/e^2/(e*x^2+d)+1/4*x^4*(a+b*ln(c*x^n))/d/(e*x^2+d)^2-1/8*b*n*ln(e*
x^2+d)/d/e^2
```

Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 129, normalized size of antiderivative = 1.90

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = -\frac{2ad^2+bd^2n+4adex^2+bdenx^2-2bn(d+ex^2)^2\log(x)+2bd(d+2ex^2)\log(cx^n)+bd^2n\log(d+ex^2}{8de^2(d+ex^2)^2}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
-1/8*(2*a*d^2 + b*d^2*n + 4*a*d*e*x^2 + b*d*e*n*x^2 - 2*b*n*(d + e*x^2)^2*
Log[x] + 2*b*d*(d + 2*e*x^2)*Log[c*x^n] + b*d^2*n*Log[d + e*x^2] + 2*b*d*e
*n*x^2*Log[d + e*x^2] + b*e^2*n*x^4*Log[d + e*x^2])/(d*e^2*(d + e*x^2)^2)
```

Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 66, normalized size of antiderivative = 0.97, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2773, 243, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$$

$$\Big\downarrow \text{2773}$$

$$\frac{x^4(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\int \frac{x^3}{(ex^2+d)^2}dx}{4d}$$

$$\Big\downarrow \text{243}$$

$$\frac{x^4(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\int \frac{x^2}{(ex^2+d)^2}dx^2}{8d}$$

$$\Big\downarrow \text{49}$$

$$\frac{x^4(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\int \left(\frac{1}{e(ex^2+d)}-\frac{d}{e(ex^2+d)^2}\right)dx^2}{8d}$$

$$\Big\downarrow \text{2009}$$

$$\frac{x^4(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\left(\frac{d}{e^2(d+ex^2)}+\frac{\log(d+ex^2)}{e^2}\right)}{8d}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
(x^4*(a + b*Log[c*x^n]))/(4*d*(d + e*x^2)^2) - (b*n*(d/(e^2*(d + e*x^2)) +
 Log[d + e*x^2]/e^2))/(8*d)
```

Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 129 vs. $2(62) = 124$.

Time = 1.08 (sec) , antiderivative size = 130, normalized size of antiderivative = 1.91

method	result
parallelrisch	$\frac{-\ln\left(e\,x^{2}+d\right)x^{4}b\,e^{2}n^{2}+2x^{4}\ln\left(c\,x^{n}\right)b\,e^{2}n-2\ln\left(e\,x^{2}+d\right)x^{2}bde\,n^{2}-x^{2}bde\,n^{2}-\ln\left(e\,x^{2}+d\right)b\,d^{2}n^{2}-4x^{2}aden-b\,d^{2}n^{2}-2a\,d^{2}n}{8e^{2}dn\left(e\,x^{2}+d\right)^{2}}$
risch	$-\frac{b\left(2e\,x^{2}+d\right)\ln\left(x^{n}\right)}{4\left(e\,x^{2}+d\right)^{2}e^{2}}-\frac{-i\pi b\,d^{2}\,\mathrm{csgn}\left(ix^{n}\right)\mathrm{csgn}\left(ic\,x^{n}\right)\mathrm{csgn}\left(ic\right)+2i\pi bde\,x^{2}\,\mathrm{csgn}\left(ic\,x^{n}\right)^{2}\mathrm{csgn}\left(ic\right)-i\pi b\,d^{2}\,\mathrm{csgn}\left(ic\,x^{n}\right)^{3}+2i\pi b}{}$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
1/8*(-ln(e*x^2+d)*x^4*b*e^2*n^2+2*x^4*ln(c*x^n)*b*e^2*n-2*ln(e*x^2+d)*x^2*
b*d*e*n^2-x^2*b*d*e*n^2-ln(e*x^2+d)*b*d^2*n^2-4*x^2*a*d*e*n-b*d^2*n^2-2*a*
d^2*n)/e^2/d/n/(e*x^2+d)^2
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 126 vs. $2(62) = 124$.

Time = 0.09 (sec) , antiderivative size = 126, normalized size of antiderivative = 1.85

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \frac{2\,be^2nx^4\log(x) - bd^2n - 2\,ad^2 - (bden + 4\,ade)x^2 - (be^2nx^4 + 2\,bdenx^2 + bd^2n)\log(ex^2+d) - 2\,(2\,bd}{8\,(de^4x^4 + 2\,d^2e^3x^2 + d^3e^2)}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
1/8*(2*b*e^2*n*x^4*log(x) - b*d^2*n - 2*a*d^2 - (b*d*e*n + 4*a*d*e)*x^2 -
(b*e^2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*log(e*x^2 + d) - 2*(2*b*d*e*x^2 +
b*d^2)*log(c))/(d*e^4*x^4 + 2*d^2*e^3*x^2 + d^3*e^2)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \text{Timed out}$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x**2+d)**3,x)
```

output
```
Timed out
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 128 vs. $2(62) = 124$.

Time = 0.04 (sec) , antiderivative size = 128, normalized size of antiderivative = 1.88

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = -\frac{1}{8}\,bn\left(\frac{1}{e^3x^2+de^2}+\frac{\log(ex^2+d)}{de^2}-\frac{\log(x^2)}{de^2}\right) - \frac{(2\,ex^2+d)b\log(cx^n)}{4\,(e^4x^4+2\,de^3x^2+d^2e^2)} - \frac{(2\,ex^2+d)a}{4\,(e^4x^4+2\,de^3x^2+d^2e^2)}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
-1/8*b*n*(1/(e^3*x^2 + d*e^2) + log(e*x^2 + d)/(d*e^2) - log(x^2)/(d*e^2))
 - 1/4*(2*e*x^2 + d)*b*log(c*x^n)/(e^4*x^4 + 2*d*e^3*x^2 + d^2*e^2) - 1/4*
(2*e*x^2 + d)*a/(e^4*x^4 + 2*d*e^3*x^2 + d^2*e^2)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 140 vs. $2(62) = 124$.

Time = 0.12 (sec) , antiderivative size = 140, normalized size of antiderivative = 2.06

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = -\frac{(2\,benx^2+bdn)\log(x)}{4\,(e^4x^4+2\,de^3x^2+d^2e^2)} - \frac{benx^2+4\,bex^2\log(c)+4\,aex^2+bdn+2\,bd\log(c)+2\,ad}{8\,(e^4x^4+2\,de^3x^2+d^2e^2)} - \frac{bn\log(ex^2+d)}{8\,de^2} + \frac{bn\log(x)}{4\,de^2}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
-1/4*(2*b*e*n*x^2 + b*d*n)*log(x)/(e^4*x^4 + 2*d*e^3*x^2 + d^2*e^2) - 1/8*
(b*e*n*x^2 + 4*b*e*x^2*log(c) + 4*a*e*x^2 + b*d*n + 2*b*d*log(c) + 2*a*d)/
(e^4*x^4 + 2*d*e^3*x^2 + d^2*e^2) - 1/8*b*n*log(e*x^2 + d)/(d*e^2) + 1/4*b
*n*log(x)/(d*e^2)
```

Mupad [B] (verification not implemented)

Time = 26.65 (sec) , antiderivative size = 129, normalized size of antiderivative = 1.90

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \frac{b\,n\,\ln(x)}{4\,d\,e^2} - \frac{\ln(c\,x^n)\,\left(\frac{b\,x^2}{2\,e}+\frac{b\,d}{4\,e^2}\right)}{d^2+2\,d\,e\,x^2+e^2\,x^4} - \frac{b\,n\,\ln(e\,x^2+d)}{8\,d\,e^2} - \frac{\left(2\,a\,e+\frac{b\,e\,n}{2}\right)\,x^2+a\,d+\frac{b\,d\,n}{2}}{4\,d^2\,e^2+8\,d\,e^3\,x^2+4\,e^4\,x^4}$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^3,x)
```

output
```
(b*n*log(x))/(4*d*e^2) - (log(c*x^n)*((b*x^2)/(2*e) + (b*d)/(4*e^2)))/(d^2
 + e^2*x^4 + 2*d*e*x^2) - (b*n*log(d + e*x^2))/(8*d*e^2) - (a*d + x^2*(2*a
*e + (b*e*n)/2) + (b*d*n)/2)/(4*d^2*e^2 + 4*e^4*x^4 + 8*d*e^3*x^2)
```

Reduce [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 119, normalized size of antiderivative = 1.75

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \frac{-2\log(e\,x^2+d)\,b\,d^2n-4\log(e\,x^2+d)\,bden\,x^2-2\log(e\,x^2+d)\,b\,e^2n\,x^4+4\log(x^nc)\,b\,e^2x^4+4a\,e^2x^4-}{16d\,e^2\,(e^2x^4+2de\,x^2+d^2)}$$

input
```
int(x^3*(a+b*log(c*x^n))/(e*x^2+d)^3,x)
```

output
```
( - 2*log(d + e*x**2)*b*d**2*n - 4*log(d + e*x**2)*b*d*e*n*x**2 - 2*log(d
+ e*x**2)*b*e**2*n*x**4 + 4*log(x**n*c)*b*e**2*x**4 + 4*a*e**2*x**4 - b*d*
*2*n + b*e**2*n*x**4)/(16*d*e**2*(d**2 + 2*d*e*x**2 + e**2*x**4))
```

3.233 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$

Optimal result 1794
Mathematica [A] (verified) 1794
Rubi [A] (verified) 1795
Maple [A] (verified) 1796
Fricas [A] (verification not implemented) 1797
Sympy [F(-1)] 1797
Maxima [A] (verification not implemented) 1798
Giac [A] (verification not implemented) 1798
Mupad [B] (verification not implemented) 1799
Reduce [B] (verification not implemented) 1799

Optimal result

Integrand size = 21, antiderivative size = 82

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \frac{bn}{8de(d+ex^2)} + \frac{bn\log(x)}{4d^2e} - \frac{a+b\log(cx^n)}{4e(d+ex^2)^2} - \frac{bn\log(d+ex^2)}{8d^2e}$$

output
```
1/8*b*n/d/e/(e*x^2+d)+1/4*b*n*ln(x)/d^2/e-1/4*(a+b*ln(c*x^n))/e/(e*x^2+d)^
2-1/8*b*n*ln(e*x^2+d)/d^2/e
```

Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 111, normalized size of antiderivative = 1.35

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \frac{bn}{8de(d+ex^2)} + \frac{bn\log(x)}{4d^2e} - \frac{bn\log(x)}{4e(d+ex^2)^2} + \frac{-a-b(-n\log(x)+\log(cx^n))}{4e(d+ex^2)^2} - \frac{bn\log(d+ex^2)}{8d^2e}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
(b*n)/(8*d*e*(d + e*x^2)) + (b*n*Log[x])/(4*d^2*e) - (b*n*Log[x])/(4*e*(d
+ e*x^2)^2) + (-a - b*(-(n*Log[x]) + Log[c*x^n]))/(4*e*(d + e*x^2)^2) - (b
*n*Log[d + e*x^2])/(8*d^2*e)
```

Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 71, normalized size of antiderivative = 0.87, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2776, 243, 54, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}dx$$

$$\Big\downarrow \text{ 2776}$$

$$\frac{bn\int \frac{1}{x(ex^2+d)^2}dx}{4e}-\frac{a+b\log(cx^n)}{4e(d+ex^2)^2}$$

$$\Big\downarrow \text{ 243}$$

$$\frac{bn\int \frac{1}{x^2(ex^2+d)^2}dx^2}{8e}-\frac{a+b\log(cx^n)}{4e(d+ex^2)^2}$$

$$\Big\downarrow \text{ 54}$$

$$\frac{bn\int \left(-\frac{e}{d^2(ex^2+d)}-\frac{e}{d(ex^2+d)^2}+\frac{1}{d^2x^2}\right)dx^2}{8e}-\frac{a+b\log(cx^n)}{4e(d+ex^2)^2}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{bn\left(-\frac{\log(d+ex^2)}{d^2}+\frac{\log(x^2)}{d^2}+\frac{1}{d(d+ex^2)}\right)}{8e}-\frac{a+b\log(cx^n)}{4e(d+ex^2)^2}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
-1/4*(a + b*Log[c*x^n])/(e*(d + e*x^2)^2) + (b*n*(1/(d*(d + e*x^2)) + Log[
x^2]/d^2 - Log[d + e*x^2]/d^2))/(8*e)
```

Defintions of rubi rules used

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Maple [A] (verified)

Time = 1.05 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.74

method	result
parallelrisch	$\frac{-\ln(e x^2+d) x^4 b e^3 n^2+2x^4 \ln(c x^n) b e^3 n-2\ln(e x^2+d) x^2 b d e^2 n^2+4x^2 \ln(c x^n) b d e^2 n+x^2 b d e^2 n^2-\ln(e x^2+d) b d^2 e n^2+b d^2}{8e^2 d^2 n (e x^2+d)^2}$
risch	$-\frac{b\ln(x^n)}{4e(e x^2+d)^2}-\frac{-2\ln(x) b e^2 n x^4+\ln(e x^2+d) b e^2 n x^4+i\pi b d^2 \operatorname{csgn}(ix^n)\operatorname{csgn}(icx^n)^2-i\pi b d^2 \operatorname{csgn}(ix^n)\operatorname{csgn}(icx^n)\operatorname{csgn}(}{}$

input
```
int(x*(a+b*ln(c*x^n))/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
1/8*(-ln(e*x^2+d)*x^4*b*e^3*n^2+2*x^4*ln(c*x^n)*b*e^3*n-2*ln(e*x^2+d)*x^2*
b*d*e^2*n^2+4*x^2*ln(c*x^n)*b*d*e^2*n+x^2*b*d*e^2*n^2-ln(e*x^2+d)*b*d^2*e*
n^2+b*d^2*e*n^2-2*a*d^2*e*n)/e^2/d^2/n/(e*x^2+d)^2
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.44

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \frac{bdenx^2 + bd^2n - 2\,bd^2\log(c) - 2\,ad^2 - (be^2nx^4 + 2\,bdenx^2 + bd^2n)\log(ex^2+d) + 2\,(be^2nx^4 + 2\,bdenx}{8\,(d^2e^3x^4 + 2\,d^3e^2x^2 + d^4e)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
1/8*(b*d*e*n*x^2 + b*d^2*n - 2*b*d^2*log(c) - 2*a*d^2 - (b*e^2*n*x^4 + 2*b
*d*e*n*x^2 + b*d^2*n)*log(e*x^2 + d) + 2*(b*e^2*n*x^4 + 2*b*d*e*n*x^2)*log
(x))/(d^2*e^3*x^4 + 2*d^3*e^2*x^2 + d^4*e)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \text{Timed out}$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x**2+d)**3,x)
```

output
```
Timed out
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.33

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \frac{1}{8}\,bn\left(\frac{1}{de^2x^2+d^2e}-\frac{\log(ex^2+d)}{d^2e}+\frac{\log(x^2)}{d^2e}\right) - \frac{b\log(cx^n)}{4\,(e^3x^4+2\,de^2x^2+d^2e)} - \frac{a}{4\,(e^3x^4+2\,de^2x^2+d^2e)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
1/8*b*n*(1/(d*e^2*x^2 + d^2*e) - log(e*x^2 + d)/(d^2*e) + log(x^2)/(d^2*e)
) - 1/4*b*log(c*x^n)/(e^3*x^4 + 2*d*e^2*x^2 + d^2*e) - 1/4*a/(e^3*x^4 + 2*
d*e^2*x^2 + d^2*e)
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.41

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = -\frac{bdn\log(x)}{4\,(de^3x^4+2\,d^2e^2x^2+d^3e)} + \frac{benx^2+bdn-2\,bd\log(c)-2\,ad}{8\,(de^3x^4+2\,d^2e^2x^2+d^3e)} - \frac{bn\log(ex^2+d)}{8\,d^2e} + \frac{bn\log(x)}{4\,d^2e}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
-1/4*b*d*n*log(x)/(d*e^3*x^4 + 2*d^2*e^2*x^2 + d^3*e) + 1/8*(b*e*n*x^2 + b
*d*n - 2*b*d*log(c) - 2*a*d)/(d*e^3*x^4 + 2*d^2*e^2*x^2 + d^3*e) - 1/8*b*n
*log(e*x^2 + d)/(d^2*e) + 1/4*b*n*log(x)/(d^2*e)
```

Mupad [B] (verification not implemented)

Time = 26.36 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.33

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \frac{\frac{b\,n}{2}-a+\frac{b\,e\,n\,x^2}{2\,d}}{4\,d^2\,e+8\,d\,e^2\,x^2+4\,e^3\,x^4}-\frac{b\,\ln(c\,x^n)}{4\,e\,(d^2+2\,d\,e\,x^2+e^2\,x^4)} - \frac{b\,n\,\ln(e\,x^2+d)}{8\,d^2\,e}+\frac{b\,n\,\ln(x)}{4\,d^2\,e}$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2)^3,x)
```

output
```
((b*n)/2 - a + (b*e*n*x^2)/(2*d))/(4*d^2*e + 4*e^3*x^4 + 8*d*e^2*x^2) - (b
*log(c*x^n))/(4*e*(d^2 + e^2*x^4 + 2*d*e*x^2)) - (b*n*log(d + e*x^2))/(8*d
^2*e) + (b*n*log(x))/(4*d^2*e)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 130, normalized size of antiderivative = 1.59

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \frac{-2\log(e\,x^2+d)\,b\,d^2n-4\log(e\,x^2+d)\,bden\,x^2-2\log(e\,x^2+d)\,b\,e^2n\,x^4+8\log(x^nc)\,bde\,x^2+4\log(x^nc}{16d^2e\,(e^2x^4+2de\,x^2+d^2)}$$

input
```
int(x*(a+b*log(c*x^n))/(e*x^2+d)^3,x)
```

output
```
( - 2*log(d + e*x**2)*b*d**2*n - 4*log(d + e*x**2)*b*d*e*n*x**2 - 2*log(d
+ e*x**2)*b*e**2*n*x**4 + 8*log(x**n*c)*b*d*e*x**2 + 4*log(x**n*c)*b*e**2*
x**4 - 4*a*d**2 + b*d**2*n - b*e**2*n*x**4)/(16*d**2*e*(d**2 + 2*d*e*x**2
+ e**2*x**4))
```

3.234 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^3}\,dx$

Optimal result . . . 1800
Mathematica [C] (verified) . . . 1800
Rubi [A] (verified) . . . 1801
Maple [C] (warning: unable to verify) . . . 1803
Fricas [F] . . . 1804
Sympy [A] (verification not implemented) . . . 1804
Maxima [F] . . . 1805
Giac [F] . . . 1805
Mupad [F(-1)] . . . 1805
Reduce [F] . . . 1806

Optimal result

Integrand size = 23, antiderivative size = 115

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^3}\,dx = \frac{a+b\log(cx^n)}{4d(d+ex^2)^2} - \frac{\log\left(1+\frac{d}{ex^2}\right)(4a-3bn+4b\log(cx^n))}{8d^3} + \frac{4a-bn+4b\log(cx^n)}{8d^2(d+ex^2)} + \frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d^3}$$

output
```
1/4*(a+b*ln(c*x^n))/d/(e*x^2+d)^2-1/8*ln(1+d/e/x^2)*(4*a-3*b*n+4*b*ln(c*x^
n))/d^3+1/8*(4*a-b*n+4*b*ln(c*x^n))/d^2/(e*x^2+d)+1/4*b*n*polylog(2,-d/e/x
^2)/d^3
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 1.12 (sec) , antiderivative size = 396, normalized size of antiderivative = 3.44

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^3}\,dx$$

$$= \frac{\frac{4d^2(a-bn\log(x)+b\log(cx^n))}{(d+ex^2)^2} + \frac{8d(a-bn\log(x)+b\log(cx^n))}{d+ex^2} + 16\log(x)\,(a-bn\log(x)+b\log(cx^n)) - 8(a-bn\log(x

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^2)^3),x]
```

output
```
((4*d^2*(a - b*n*Log[x] + b*Log[c*x^n]))/(d + e*x^2)^2 + (8*d*(a - b*n*Log
[x] + b*Log[c*x^n]))/(d + e*x^2) + 16*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n
]) - 8*(a - b*n*Log[x] + b*Log[c*x^n])*Log[d + e*x^2] - b*n*(d/(d - I*Sqrt
[d]*Sqrt[e]*x) + d/(d + I*Sqrt[d]*Sqrt[e]*x) + 2*Log[x] - (d*Log[x])/(Sqrt
[d] - I*Sqrt[e]*x)^2 - (d*Log[x])/(Sqrt[d] + I*Sqrt[e]*x)^2 + (5*Sqrt[e]*x
*Log[x])/((-I)*Sqrt[d] + Sqrt[e]*x) + (5*Sqrt[e]*x*Log[x])/(I*Sqrt[d] + Sq
rt[e]*x) - 8*Log[x]^2 - 6*Log[I*Sqrt[d] - Sqrt[e]*x] - 6*Log[I*Sqrt[d] + S
qrt[e]*x] + 8*Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + 8*Log[x]*Log[1 + (I*
Sqrt[e]*x)/Sqrt[d]] + 8*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] + 8*PolyLog[2
, (I*Sqrt[e]*x)/Sqrt[d]]))/(16*d^3)
```

Rubi [A] (verified)

Time = 0.55 (sec) , antiderivative size = 125, normalized size of antiderivative = 1.09, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2785, 25, 2785, 27, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^3}\,dx$$

$$\Big\downarrow \text{ 2785}$$

$$\frac{a+b\log(cx^n)}{4d(d+ex^2)^2}-\frac{\int -\frac{4a-bn+4b\log(cx^n)}{x(ex^2+d)^2}dx}{4d}$$

$$\Big\downarrow \text{ 25}$$

$$\frac{\int \frac{4a-bn+4b\log(cx^n)}{x(ex^2+d)^2}dx}{4d}+\frac{a+b\log(cx^n)}{4d(d+ex^2)^2}$$

$$\Big\downarrow \text{ 2785}$$

$$\frac{\frac{4a+4b\log(cx^n)-bn}{2d(d+ex^2)}-\frac{\int -\frac{2(4a-3bn+4b\log(cx^n))}{x(ex^2+d)}dx}{2d}}{4d}+\frac{a+b\log(cx^n)}{4d(d+ex^2)^2}$$

$$\Big\downarrow \ 27$$

$$\frac{\frac{\int \frac{4a-3bn+4b\log(cx^n)}{x(ex^2+d)}dx}{d}+\frac{4a+4b\log(cx^n)-bn}{2d(d+ex^2)}}{4d}+\frac{a+b\log(cx^n)}{4d(d+ex^2)^2}$$

$$\Big\downarrow \ 2779$$

$$\frac{\frac{\frac{2bn\int \frac{\log\left(\frac{d}{ex^2}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(4a+4b\log(cx^n)-3bn)}{2d}}{d}+\frac{4a+4b\log(cx^n)-bn}{2d(d+ex^2)}}{4d}+\frac{a+b\log(cx^n)}{4d(d+ex^2)^2}$$

$$\Big\downarrow \ 2838$$

$$\frac{\frac{\frac{bn\operatorname{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(4a+4b\log(cx^n)-3bn)}{2d}}{d}+\frac{4a+4b\log(cx^n)-bn}{2d(d+ex^2)}}{4d}+\frac{a+b\log(cx^n)}{4d(d+ex^2)^2}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^2)^3),x]
```

output
```
(a + b*Log[c*x^n])/(4*d*(d + e*x^2)^2) + ((4*a - b*n + 4*b*Log[c*x^n])/(2*
d*(d + e*x^2)) + (-1/2*(Log[1 + d/(e*x^2)]*(4*a - 3*b*n + 4*b*Log[c*x^n]))
/d + (b*n*PolyLog[2, -(d/(e*x^2))])/d)/d)/(4*d)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2785
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Simp[1/(2*d*(q + 1))   Int[(f*x)^m*(d
 + e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
 x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.74 (sec) , antiderivative size = 390, normalized size of antiderivative = 3.39

method	result
risch	$\frac{b\ln(x^n)}{2d^2(e\,x^2+d)} - \frac{b\ln(x^n)\ln(e\,x^2+d)}{2d^3} + \frac{b\ln(x^n)}{4d(e\,x^2+d)^2} + \frac{b\ln(x^n)\ln(x)}{d^3} - \frac{bn\ln(x)^2}{2d^3} + \frac{bn\ln(x)\ln(e\,x^2+d)}{2d^3} - \frac{bn\ln(x)\ln\left(\frac{-ex}{\cdots}\right)}{2d^3}$

input
```
int((a+b*ln(c*x^n))/x/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/d^2/(e*x^2+d)-1/2*b*ln(x^n)/d^3*ln(e*x^2+d)+1/4*b*ln(x^n)/d/
(e*x^2+d)^2+b*ln(x^n)/d^3*ln(x)-1/2*b*n/d^3*ln(x)^2+1/2*b*n/d^3*ln(x)*ln(e
*x^2+d)-1/2*b*n/d^3*ln(x)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n/d^3
*ln(x)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n/d^3*dilog((-e*x+(-d*e)^
(1/2))/(-d*e)^(1/2))-1/2*b*n/d^3*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/
8*b*n/d^2/(e*x^2+d)+3/8*b*n/d^3*ln(e*x^2+d)-3/4*b*n*ln(x)/d^3+(1/2*I*Pi*b*
csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)
-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a
)*(-1/2*e/d^3*(-d/e/(e*x^2+d)+ln(e*x^2+d)/e-1/2*d^2/e/(e*x^2+d)^2)+1/d^3*l
n(x))
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)^3}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^3*x^7 + 3*d*e^2*x^5 + 3*d^2*e*x^3 + d^3*x),
 x)
```

Sympy [A] (verification not implemented)

Time = 138.29 (sec) , antiderivative size = 403, normalized size of antiderivative = 3.50

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)^3}\,dx=\text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x**2+d)**3,x)
```

output
```
-a*e*Piecewise((x**2/(2*d**3), Eq(e, 0)), (-1/(4*e*(d + e*x**2)**2), True)
)/d - a*e*Piecewise((x**2/(2*d**2), Eq(e, 0)), (-1/(2*d*e + 2*e**2*x**2),
True))/d**2 + a*log(x)/d**3 - a*log(d + e*x**2)/(2*d**3) + b*e**2*n*Piecew
ise((-1/(2*e**3*x**2), Eq(d, 0)), (-1/(4*d*e**2 + 4*e**3*x**2) - log(d + e
*x**2)/(4*d*e**2), True))/(2*d**2) - b*e**2*Piecewise((1/(e**3*x**2), Eq(d
, 0)), (-1/(2*d*(d/x**2 + e)**2), True))*log(c*x**n)/(2*d**2) - b*e*n*Piec
ewise((-1/(2*e**2*x**2), Eq(d, 0)), (-log(d + e*x**2)/(2*d*e), True))/d**2
 + b*e*Piecewise((1/(e**2*x**2), Eq(d, 0)), (-1/(d**2/x**2 + d*e), True))*
log(c*x**n)/d**2 + b*n*Piecewise((-1/(2*e*x**2), Eq(d, 0)), (Piecewise((po
lylog(2, d*exp_polar(I*pi)/(e*x**2))/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (l
og(e)*log(x) + polylog(2, d*exp_polar(I*pi)/(e*x**2))/2, Abs(x) < 1), (-lo
g(e)*log(1/x) + polylog(2, d*exp_polar(I*pi)/(e*x**2))/2, 1/Abs(x) < 1), (
-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1), ()), (()
, (0, 0)), x)*log(e) + polylog(2, d*exp_polar(I*pi)/(e*x**2))/2, True))/d,
 True))/(2*d**2) - b*Piecewise((1/(e*x**2), Eq(d, 0)), (log(d/x**2 + e)/d,
 True))*log(c*x**n)/(2*d**2)
```

Maxima [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)^3}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
1/4*a*((2*e*x^2 + 3*d)/(d^2*e^2*x^4 + 2*d^3*e*x^2 + d^4) - 2*log(e*x^2 + d
)/d^3 + 4*log(x)/d^3) + b*integrate((log(c) + log(x^n))/(e^3*x^7 + 3*d*e^2
*x^5 + 3*d^2*e*x^3 + d^3*x), x)
```

Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)^3}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^3*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)^3}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(e\,x^2+d\right)^3}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^3),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^3), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^3}\,dx = \frac{4\left(\int \frac{\log(x^n c)}{e^3x^7+3d\,e^2x^5+3d^2e\,x^3+d^3x}dx\right)b\,d^5+8\left(\int \frac{\log(x^n c)}{e^3x^7+3d\,e^2x^5+3d^2e\,x^3+d^3x}dx\right)b\,d^4e\,x^2+4\left(\int \frac{\log(x^n c)}{e^3x^7+3d\,e^2x^5+3d^2e\,x^3+d^3x}\right.}{}$$

input
```
int((a+b*log(c*x^n))/x/(e*x^2+d)^3,x)
```

output
```
(4*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**3 + 3*d*e**2*x**5 + e**3*x**7),x)
*b*d**5 + 8*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**3 + 3*d*e**2*x**5 + e**3
*x**7),x)*b*d**4*e*x**2 + 4*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**3 + 3*d*
e**2*x**5 + e**3*x**7),x)*b*d**3*e**2*x**4 - 2*log(d + e*x**2)*a*d**2 - 4*
log(d + e*x**2)*a*d*e*x**2 - 2*log(d + e*x**2)*a*e**2*x**4 + 4*log(x)*a*d*
*2 + 8*log(x)*a*d*e*x**2 + 4*log(x)*a*e**2*x**4 + 2*a*d**2 - a*e**2*x**4)/
(4*d**3*(d**2 + 2*d*e*x**2 + e**2*x**4))
```

3.235 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^3}\,dx$

Optimal result . . . 1807
Mathematica [C] (verified) . . . 1808
Rubi [A] (verified) . . . 1808
Maple [C] (warning: unable to verify) . . . 1811
Fricas [F] . . . 1812
Sympy [F(-1)] . . . 1812
Maxima [F] . . . 1813
Giac [F] . . . 1813
Mupad [F(-1)] . . . 1813
Reduce [F] . . . 1814

Optimal result

Integrand size = 23, antiderivative size = 162

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^3}\,dx = -\frac{3bn}{4d^3x^2}+\frac{a+b\log(cx^n)}{4dx^2(d+ex^2)^2}+\frac{6a-bn+6b\log(cx^n)}{8d^2x^2(d+ex^2)} - \frac{12a-5bn+12b\log(cx^n)}{8d^3x^2} + \frac{e\log\left(1+\frac{d}{ex^2}\right)(12a-5bn+12b\log(cx^n))}{8d^4} - \frac{3ben\,\mathrm{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d^4}$$

output
```
-3/4*b*n/d^3/x^2+1/4*(a+b*ln(c*x^n))/d/x^2/(e*x^2+d)^2+1/8*(6*a-b*n+6*b*ln
(c*x^n))/d^2/x^2/(e*x^2+d)-1/8*(12*a-5*b*n+12*b*ln(c*x^n))/d^3/x^2+1/8*e*l
n(1+d/e/x^2)*(12*a-5*b*n+12*b*ln(c*x^n))/d^4-3/4*b*e*n*polylog(2,-d/e/x^2)
/d^4
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 1.40 (sec) , antiderivative size = 507, normalized size of antiderivative = 3.13

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^3}\,dx$$

$$= \frac{-\frac{8d(a-bn\log(x)+b\log(cx^n))}{x^2} - \frac{4d^2e(a-bn\log(x)+b\log(cx^n))}{(d+ex^2)^2} - \frac{16de(a-bn\log(x)+b\log(cx^n))}{d+ex^2} - 48e\log(x)\left(a-bn\log(x)+\right.}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^3),x]
```

output
```
((-8*d*(a - b*n*Log[x] + b*Log[c*x^n]))/x^2 - (4*d^2*e*(a - b*n*Log[x] + b
*Log[c*x^n]))/(d + e*x^2)^2 - (16*d*e*(a - b*n*Log[x] + b*Log[c*x^n]))/(d
+ e*x^2) - 48*e*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n]) + 24*e*(a - b*n*Log
[x] + b*Log[c*x^n])*Log[d + e*x^2] + b*n*((9*e^(3/2)*x*Log[x])/((-I)*Sqrt[
d] + Sqrt[e]*x) - 24*e*Log[x]^2 - (4*d*(1 + 2*Log[x]))/x^2 + e*(d/(d + I*S
qrt[d]*Sqrt[e]*x) + Log[x] - (d*Log[x])/(Sqrt[d] + I*Sqrt[e]*x)^2 - Log[I*
Sqrt[d] - Sqrt[e]*x]) - 9*e*Log[I*Sqrt[d] - Sqrt[e]*x] + e*(d/(d - I*Sqrt[
d]*Sqrt[e]*x) + Log[x] - (d*Log[x])/(Sqrt[d] - I*Sqrt[e]*x)^2 - Log[I*Sqrt
[d] + Sqrt[e]*x]) + ((-9*I)*e^(3/2)*x*Log[x] + (9*I)*e*(I*Sqrt[d] + Sqrt[e
]*x)*Log[I*Sqrt[d] + Sqrt[e]*x])/(Sqrt[d] - I*Sqrt[e]*x) + 24*e*(Log[x]*Lo
g[1 + (I*Sqrt[e]*x)/Sqrt[d]] + PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]]) + 24*
e*(Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d
]])))/(16*d^4)
```

Rubi [A] (verified)

Time = 0.85 (sec) , antiderivative size = 175, normalized size of antiderivative = 1.08, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {2785, 25, 2785, 27, 2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^2\right)^3}dx$$

$$\Big\downarrow \text{ 2785}$$

$$\frac{a+b\log\left(cx^n\right)}{4dx^2\left(d+ex^2\right)^2}-\frac{\int -\frac{6a-bn+6b\log(cx^n)}{x^3(ex^2+d)^2}dx}{4d}$$

$$\Big\downarrow \text{ 25}$$

$$\frac{\int \frac{6a-bn+6b\log(cx^n)}{x^3(ex^2+d)^2}dx}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^2\left(d+ex^2\right)^2}$$

$$\Big\downarrow \text{ 2785}$$

$$\frac{\frac{6a+6b\log(cx^n)-bn}{2dx^2(d+ex^2)}-\frac{\int -\frac{2(12a-5bn+12b\log(cx^n))}{x^3\left(ex^2+d\right)}dx}{2d}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^2\left(d+ex^2\right)^2}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{\frac{\int \frac{12a-5bn+12b\log(cx^n)}{x^3\left(ex^2+d\right)}dx}{d}+\frac{6a+6b\log(cx^n)-bn}{2dx^2(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^2\left(d+ex^2\right)^2}$$

$$\Big\downarrow \text{ 2780}$$

$$\frac{\frac{\frac{\int \frac{12a-5bn+12b\log(cx^n)}{x^3}dx}{d}-\frac{e\int \frac{12a-5bn+12b\log(cx^n)}{x\left(ex^2+d\right)}dx}{d}}{d}+\frac{6a+6b\log(cx^n)-bn}{2dx^2(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^2\left(d+ex^2\right)^2}$$

$$\Big\downarrow \text{ 2741}$$

$$\frac{\frac{\frac{-\frac{12a+12b\log(cx^n)-5bn}{2x^2}-\frac{3bn}{x^2}}{d}-\frac{e\int \frac{12a-5bn+12b\log(cx^n)}{x\left(ex^2+d\right)}dx}{d}}{d}+\frac{6a+6b\log(cx^n)-bn}{2dx^2(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^2\left(d+ex^2\right)^2}$$

$$\Big\downarrow \text{ 2779}$$

$$\frac{\frac{\frac{-\frac{12a+12b\log(cx^n)-5bn}{2x^2}-\frac{3bn}{x^2}}{d}-\frac{e\left(\frac{6bn\int \frac{\log\left(\frac{d}{ex^2}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(12a+12b\log(cx^n)-5bn)}{2d}\right)}{d}}{d}+\frac{6a+6b\log(cx^n)-bn}{2dx^2(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^2\left(d+ex^2\right)^2}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\frac{-\frac{12a+12b\log(cx^n)-5bn}{2x^2}-\frac{3bn}{x^2}}{d}-\frac{e\left(\frac{3bn\operatorname{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(12a+12b\log(cx^n)-5bn)}{2d}\right)}{d}}{d}+\frac{6a+6b\log(cx^n)-bn}{2dx^2(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^2\left(d+ex^2\right)^2}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^3),x]
```

output
```
(a + b*Log[c*x^n])/(4*d*x^2*(d + e*x^2)^2) + ((6*a - b*n + 6*b*Log[c*x^n])
/(2*d*x^2*(d + e*x^2)) + (((-3*b*n)/x^2 - (12*a - 5*b*n + 12*b*Log[c*x^n])
/(2*x^2))/d - (e*(-1/2*(Log[1 + d/(e*x^2)]*(12*a - 5*b*n + 12*b*Log[c*x^n]
))/d + (3*b*n*PolyLog[2, -(d/(e*x^2))])/d))/d)/d)/(4*d)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2785
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Simp[1/(2*d*(q + 1))   Int[(f*x)^m*(d
 + e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
 x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 2.94 (sec) , antiderivative size = 440, normalized size of antiderivative = 2.72

method	result
risch	$-\frac{b\ln(x^n)e}{d^3(e\,x^2+d)}+\frac{3b\ln(x^n)e\ln(e\,x^2+d)}{2d^4}-\frac{b\ln(x^n)e}{4d^2(e\,x^2+d)^2}-\frac{b\ln(x^n)}{2d^3x^2}-\frac{3b\ln(x^n)e\ln(x)}{d^4}+\frac{3bne\ln(x)^2}{2d^4}-\frac{3bne\ln(x)\ln(e\,x^2}{2d^4}$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)*e/d^3/(e*x^2+d)+3/2*b*ln(x^n)*e/d^4*ln(e*x^2+d)-1/4*b*ln(x^n)*e
/d^2/(e*x^2+d)^2-1/2*b*ln(x^n)/d^3/x^2-3*b*ln(x^n)/d^4*e*ln(x)+3/2*b*n/d^4
*e*ln(x)^2-3/2*b*n/d^4*e*ln(x)*ln(e*x^2+d)+3/2*b*n/d^4*e*ln(x)*ln((-e*x+(-
d*e)^(1/2))/(-d*e)^(1/2))+3/2*b*n/d^4*e*ln(x)*ln((e*x+(-d*e)^(1/2))/(-d*e)
^(1/2))+3/2*b*n/d^4*e*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+3/2*b*n/d^4*
e*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/8*b*n*e/d^3/(e*x^2+d)-5/8*b*n*e
/d^4*ln(e*x^2+d)-1/4*b*n/d^3/x^2+5/4*b*e*n*ln(x)/d^4+(1/2*I*Pi*b*csgn(I*x^
n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi
*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(1/2*e^
2/d^4*(-2*d/e/(e*x^2+d)+3*ln(e*x^2+d)/e-1/2*d^2/e/(e*x^2+d)^2)-1/2/d^3/x^2
-3/d^4*e*ln(x))
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^2\right)^3}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^3x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^3*x^9 + 3*d*e^2*x^7 + 3*d^2*e*x^5 + d^3*x^3
), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^2\right)^3}\,dx=\text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x**2+d)**3,x)
```

output
```
Timed out
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^3}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^3x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
-1/4*a*((6*e^2*x^4 + 9*d*e*x^2 + 2*d^2)/(d^3*e^2*x^6 + 2*d^4*e*x^4 + d^5*x
^2) - 6*e*log(e*x^2 + d)/d^4 + 12*e*log(x)/d^4) + b*integrate((log(c) + lo
g(x^n))/(e^3*x^9 + 3*d*e^2*x^7 + 3*d^2*e*x^5 + d^3*x^3), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^3}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^3x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^3*x^3), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^3}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^3\,(e\,x^2+d)^3}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^3),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^3), x)
```

Reduce [F]

$$\int \frac{a + b\log(cx^n)}{x^3(d+ex^2)^3}\,dx$$
$$= \frac{4\left(\int \frac{\log(x^n c)}{e^3x^9+3d\,e^2x^7+3d^2e\,x^5+d^3x^3}dx\right)b\,d^6x^2 + 8\left(\int \frac{\log(x^n c)}{e^3x^9+3d\,e^2x^7+3d^2e\,x^5+d^3x^3}dx\right)b\,d^5e\,x^4 + 4\left(\int \frac{\log(x^n c)}{e^3x^9+3d\,e^2x^7+3d^2e\,x^5}\right.}{}$$

input
```
int((a+b*log(c*x^n))/x^3/(e*x^2+d)^3,x)
```

output
```
(4*int(log(x**n*c)/(d**3*x**3 + 3*d**2*e*x**5 + 3*d*e**2*x**7 + e**3*x**9)
,x)*b*d**6*x**2 + 8*int(log(x**n*c)/(d**3*x**3 + 3*d**2*e*x**5 + 3*d*e**2*
x**7 + e**3*x**9),x)*b*d**5*e*x**4 + 4*int(log(x**n*c)/(d**3*x**3 + 3*d**2
*e*x**5 + 3*d*e**2*x**7 + e**3*x**9),x)*b*d**4*e**2*x**6 + 6*log(d + e*x**
2)*a*d**2*e*x**2 + 12*log(d + e*x**2)*a*d*e**2*x**4 + 6*log(d + e*x**2)*a*
e**3*x**6 - 12*log(x)*a*d**2*e*x**2 - 24*log(x)*a*d*e**2*x**4 - 12*log(x)*
a*e**3*x**6 - 2*a*d**3 - 6*a*d**2*e*x**2 + 3*a*e**3*x**6)/(4*d**4*x**2*(d*
*2 + 2*d*e*x**2 + e**2*x**4))
```

3.236 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$

Optimal result . . . 1815
Mathematica [B] (verified) . . . 1816
Rubi [C] (verified) . . . 1816
Maple [C] (warning: unable to verify) . . . 1818
Fricas [F] . . . 1819
Sympy [F] . . . 1819
Maxima [F(-2)] . . . 1819
Giac [F] . . . 1820
Mupad [F(-1)] . . . 1820
Reduce [F] . . . 1820

Optimal result

Integrand size = 23, antiderivative size = 210

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = -\frac{bnx}{8e^2(d+ex^2)}+\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2\sqrt{d}e^{5/2}}+\frac{dx(a+b\log(cx^n))}{4e^2(d+ex^2)^2}-\frac{5x(a+b\log(cx^n))}{8e^2(d+ex^2)}+\frac{3\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{8\sqrt{d}e^{5/2}}-\frac{3bn\,\mathrm{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{16\sqrt{-d}e^{5/2}}+\frac{3bn\,\mathrm{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{16\sqrt{-d}e^{5/2}}$$

output
```
-1/8*b*n*x/e^2/(e*x^2+d)+1/2*b*n*arctan(e^(1/2)*x/d^(1/2))/d^(1/2)/e^(5/2)
+1/4*d*x*(a+b*ln(c*x^n))/e^2/(e*x^2+d)^2-5/8*x*(a+b*ln(c*x^n))/e^2/(e*x^2+
d)+3/8*arctan(e^(1/2)*x/d^(1/2))*(a+b*ln(c*x^n))/d^(1/2)/e^(5/2)-3/16*b*n*
polylog(2,-e^(1/2)*x/(-d)^(1/2))/(-d)^(1/2)/e^(5/2)+3/16*b*n*polylog(2,e^(
1/2)*x/(-d)^(1/2))/(-d)^(1/2)/e^(5/2)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 495 vs. $2(210) = 420$.

Time = 1.49 (sec) , antiderivative size = 495, normalized size of antiderivative = 2.36

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$$

$$= \frac{-\frac{\sqrt{-d}(a+b\log(cx^n))}{(\sqrt{-d}-\sqrt{e}x)^2}+\frac{5(a+b\log(cx^n))}{\sqrt{-d}-\sqrt{e}x}+\frac{\sqrt{-d}(a+b\log(cx^n))}{(\sqrt{-d}+\sqrt{e}x)^2}-\frac{5(a+b\log(cx^n))}{\sqrt{-d}+\sqrt{e}x}-\frac{5bn(\log(x)-\log(\sqrt{-d}-\sqrt{e}x))}{\sqrt{-d}}+\frac{5bn(\log(x)-\mathrm{lc}}{\sqrt{}}}{}$$

input
```
Integrate[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
(-((Sqrt[-d]*(a + b*Log[c*x^n]))/(Sqrt[-d] - Sqrt[e]*x)^2) + (5*(a + b*Log
[c*x^n]))/(Sqrt[-d] - Sqrt[e]*x) + (Sqrt[-d]*(a + b*Log[c*x^n]))/(Sqrt[-d]
 + Sqrt[e]*x)^2 - (5*(a + b*Log[c*x^n]))/(Sqrt[-d] + Sqrt[e]*x) - (5*b*n*(
Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/Sqrt[-d] + (5*b*n*(Log[x] - Log[Sqrt[
-d] + Sqrt[e]*x]))/Sqrt[-d] - (b*n*(d + (d - Sqrt[-d]*Sqrt[e]*x)*Log[x] +
(-d + Sqrt[-d]*Sqrt[e]*x)*Log[Sqrt[-d] + Sqrt[e]*x]))/(d*(Sqrt[-d] + Sqrt[
e]*x)) - (3*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/Sqrt[-d] + (
b*n*(d + (d + Sqrt[-d]*Sqrt[e]*x)*Log[x] - (d + Sqrt[-d]*Sqrt[e]*x)*Log[(-
d)^(3/2) + d*Sqrt[e]*x]))/(d*(Sqrt[-d] - Sqrt[e]*x)) + (3*(a + b*Log[c*x^n
])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/Sqrt[-d] + (3*b*n*PolyLog[2, (Sqrt[e
]*x)/Sqrt[-d]])/Sqrt[-d] - (3*b*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/Sq
rt[-d])/(16*e^(5/2))
```

Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 0.63 (sec) , antiderivative size = 211, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{d^2(a+b\log(cx^n))}{e^2(d+ex^2)^3}-\frac{2d(a+b\log(cx^n))}{e^2(d+ex^2)^2}+\frac{a+b\log(cx^n)}{e^2(d+ex^2)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{3\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{8\sqrt{d}e^{5/2}}-\frac{5x(a+b\log(cx^n))}{8e^2(d+ex^2)}+\frac{dx(a+b\log(cx^n))}{4e^2(d+ex^2)^2}+\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2\sqrt{d}e^{5/2}}-\frac{3ibn\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{16\sqrt{d}e^{5/2}}+\frac{3ibn\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{16\sqrt{d}e^{5/2}}-\frac{bnx}{8e^2(d+ex^2)}$$

input
```
Int[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
-1/8*(b*n*x)/(e^2*(d + e*x^2)) + (b*n*ArcTan[(Sqrt[e]*x)/Sqrt[d]])/(2*Sqrt
[d]*e^(5/2)) + (d*x*(a + b*Log[c*x^n]))/(4*e^2*(d + e*x^2)^2) - (5*x*(a +
b*Log[c*x^n]))/(8*e^2*(d + e*x^2)) + (3*ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b
*Log[c*x^n]))/(8*Sqrt[d]*e^(5/2)) - (((3*I)/16)*b*n*PolyLog[2, ((-I)*Sqrt[
e]*x)/Sqrt[d]])/(Sqrt[d]*e^(5/2)) + (((3*I)/16)*b*n*PolyLog[2, (I*Sqrt[e]*
x)/Sqrt[d]])/(Sqrt[d]*e^(5/2))
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.51 (sec) , antiderivative size = 900, normalized size of antiderivative = 4.29

method	result	size
risch	Expression too large to display	900

input
```
int(x^4*(a+b*ln(c*x^n))/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
3/8*b*n*d/e*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(
1/2))*x^2-3/8*b*n*d/e*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))
/(-d*e)^(1/2))*x^2+1/2*b*n/e^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))+3/16*b*
n/e^2/(-d*e)^(1/2)*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-3/16*b*n/e^2/(-
d*e)^(1/2)*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/8*b*n*x/e^2/(e*x^2+d)-
5/8*b/(e*x^2+d)^2/e*x^3*ln(x^n)-b*n/e^2*ln(x)*x/(e*x^2+d)+1/2*b*n/e^2*ln(x
)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n/e^2*ln(x)/(-d*
e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+b*n/e*ln(x)/(e*x^2+d)^2*x^3-1
/2*b*n/e*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))
*x^2+1/2*b*n/e*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(
1/2))*x^2-1/2*b*n*d/e^2*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2)
)/(-d*e)^(1/2))+1/2*b*n*d/e^2*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^
(1/2))/(-d*e)^(1/2))+3/16*b*n*d^2/e^2*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-
e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-3/16*b*n*d^2/e^2*ln(x)/(e*x^2+d)^2/(-d*e)^
(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+3/16*b*n*ln(x)/(e*x^2+d)^2/(-d*e
)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^4-3/16*b*n*ln(x)/(e*x^2+d)^
2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^4+b*n*d/e^2*ln(x)/(e*
x^2+d)^2*x+3/8*b/e^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln(x^n)-3/8*b*ln(
x^n)*d/e^2/(e*x^2+d)^2*x-3/8*b/e^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*n*l
n(x)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csg...
```

Fricas [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^4}{(ex^2+d)^3}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
integral((b*x^4*log(c*x^n) + a*x^4)/(e^3*x^6 + 3*d*e^2*x^4 + 3*d^2*e*x^2 +
 d^3), x)
```

Sympy [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$$

input
```
integrate(x**4*(a+b*ln(c*x**n))/(e*x**2+d)**3,x)
```

output
```
Integral(x**4*(a + b*log(c*x**n))/(d + e*x**2)**3, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx=\int \frac{(b\log(cx^n)+a)x^4}{(ex^2+d)^3}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^4/(e*x^2 + d)^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx=\int \frac{x^4\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^3}\,dx$$

input
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x^2)^3,x)
```

output
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x^2)^3, x)
```

Reduce [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$$
$$=\frac{3\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)a\,d^2+6\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)ade\,x^2+3\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)a\,e^2x^4+8\sqrt{e}\,\sqrt{d}\,atan\left(\right.}{}$$

input
```
int(x^4*(a+b*log(c*x^n))/(e*x^2+d)^3,x)
```

output
```
(3*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*d**2 + 6*sqrt(e)*sqrt(d
)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*d*e*x**2 + 3*sqrt(e)*sqrt(d)*atan((e*x)/
(sqrt(e)*sqrt(d)))*a*e**2*x**4 + 8*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqr
t(d)))*b*d**2*n + 16*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*b*d*e*n
*x**2 + 8*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*b*e**2*n*x**4 + 8*
int(log(x**n*c)/(d**3 + 3*d**2*e*x**2 + 3*d*e**2*x**4 + e**3*x**6),x)*b*d*
*5*e + 16*int(log(x**n*c)/(d**3 + 3*d**2*e*x**2 + 3*d*e**2*x**4 + e**3*x**
6),x)*b*d**4*e**2*x**2 + 8*int(log(x**n*c)/(d**3 + 3*d**2*e*x**2 + 3*d*e**
2*x**4 + e**3*x**6),x)*b*d**3*e**3*x**4 - 8*log(x**n*c)*b*d**2*e*x - 8*log
(x**n*c)*b*d*e**2*x**3 - 3*a*d**2*e*x - 5*a*d*e**2*x**3)/(8*d*e**3*(d**2 +
 2*d*e*x**2 + e**2*x**4))
```

3.237 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$

Optimal result 1822
Mathematica [B] (verified) 1823
Rubi [C] (verified) 1823
Maple [C] (warning: unable to verify) 1825
Fricas [F] 1826
Sympy [F] 1826
Maxima [F(-2)] 1826
Giac [F] 1827
Mupad [F(-1)] 1827
Reduce [F] 1827

Optimal result

Integrand size = 23, antiderivative size = 186

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \frac{bnx}{8de(d+ex^2)} - \frac{x(a+b\log(cx^n))}{4e(d+ex^2)^2} + \frac{x(a+b\log(cx^n))}{8de(d+ex^2)} + \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{8d^{3/2}e^{3/2}} + \frac{bn\,\text{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{16(-d)^{3/2}e^{3/2}} - \frac{bn\,\text{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{16(-d)^{3/2}e^{3/2}}$$

output

```
1/8*b*n*x/d/e/(e*x^2+d)-1/4*x*(a+b*ln(c*x^n))/e/(e*x^2+d)^2+1/8*x*(a+b*ln(
c*x^n))/d/e/(e*x^2+d)+1/8*arctan(e^(1/2)*x/d^(1/2))*(a+b*ln(c*x^n))/d^(3/2
)/e^(3/2)+1/16*b*n*polylog(2,-e^(1/2)*x/(-d)^(1/2))/(-d)^(3/2)/e^(3/2)-1/1
6*b*n*polylog(2,e^(1/2)*x/(-d)^(1/2))/(-d)^(3/2)/e^(3/2)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 497 vs. $2(186) = 372$.

Time = 1.18 (sec) , antiderivative size = 497, normalized size of antiderivative = 2.67

$$\int \frac{x^2(a + b\log(cx^n))}{(d + ex^2)^3} dx$$

$$= \frac{\frac{d(a+b\log(cx^n))}{(-d)^{3/2}(\sqrt{-d}-\sqrt{e}x)^2} + \frac{a+b\log(cx^n)}{\sqrt{-d}(\sqrt{-d}+\sqrt{e}x)^2} - \frac{a+b\log(cx^n)}{\sqrt{-d}d-d\sqrt{e}x} + \frac{a+b\log(cx^n)}{\sqrt{-d}d+d\sqrt{e}x} + \frac{bdn(\log(x)-\log(\sqrt{-d}-\sqrt{e}x))}{(-d)^{5/2}} + \frac{bn(\log(x)-\log(\sqrt{-}}{(-d)^{3/2}}}{}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
((d*(a + b*Log[c*x^n]))/((-d)^(3/2)*(Sqrt[-d] - Sqrt[e]*x)^2) + (a + b*Log
[c*x^n])/(Sqrt[-d]*(Sqrt[-d] + Sqrt[e]*x)^2) - (a + b*Log[c*x^n])/(Sqrt[-d
]*d - d*Sqrt[e]*x) + (a + b*Log[c*x^n])/(Sqrt[-d]*d + d*Sqrt[e]*x) + (b*d*
n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/(-d)^(5/2) + (b*n*(Log[x] - Log[Sq
rt[-d] + Sqrt[e]*x]))/(-d)^(3/2) + (b*n*(d + (d - Sqrt[-d]*Sqrt[e]*x)*Log[
x] + (-d + Sqrt[-d]*Sqrt[e]*x)*Log[Sqrt[-d] + Sqrt[e]*x]))/(d^2*(Sqrt[-d]
+ Sqrt[e]*x)) + ((a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(3
/2) - (b*n*(d + (d + Sqrt[-d]*Sqrt[e]*x)*Log[x] - (d + Sqrt[-d]*Sqrt[e]*x)
*Log[(-d)^(3/2) + d*Sqrt[e]*x]))/(d^2*(Sqrt[-d] - Sqrt[e]*x)) + (d*(a + b*
Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(5/2) + (b*d*n*PolyLog
[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(5/2) + (b*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)
^(3/2)])/(-d)^(3/2))/(16*e^(3/2))
```

Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 0.57 (sec) , antiderivative size = 187, normalized size of antiderivative = 1.01, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a + b\log(cx^n))}{(d + ex^2)^3} dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{a + b\log(cx^n)}{e(d + ex^2)^2} - \frac{d(a + b\log(cx^n))}{e(d + ex^2)^3}\right) dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a + b\log(cx^n))}{8d^{3/2}e^{3/2}} + \frac{x(a + b\log(cx^n))}{8de(d + ex^2)} - \frac{x(a + b\log(cx^n))}{4e(d + ex^2)^2} - \frac{ibn\,\text{PolyLog}\left(2, -\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{16d^{3/2}e^{3/2}} + \frac{ibn\,\text{PolyLog}\left(2, \frac{i\sqrt{e}x}{\sqrt{d}}\right)}{16d^{3/2}e^{3/2}} + \frac{bnx}{8de(d + ex^2)}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
(b*n*x)/(8*d*e*(d + e*x^2)) - (x*(a + b*Log[c*x^n]))/(4*e*(d + e*x^2)^2) +
 (x*(a + b*Log[c*x^n]))/(8*d*e*(d + e*x^2)) + (ArcTan[(Sqrt[e]*x)/Sqrt[d]]
*(a + b*Log[c*x^n]))/(8*d^(3/2)*e^(3/2)) - ((I/16)*b*n*PolyLog[2, ((-I)*Sq
rt[e]*x)/Sqrt[d]])/(d^(3/2)*e^(3/2)) + ((I/16)*b*n*PolyLog[2, (I*Sqrt[e]*x
)/Sqrt[d]])/(d^(3/2)*e^(3/2))
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.49 (sec) , antiderivative size = 826, normalized size of antiderivative = 4.44

method	result
risch	$-\frac{bn\ln(x)x^3}{2d(e\,x^2+d)^2}+\frac{b\,x^3\ln(x^n)}{8(e\,x^2+d)^2d}-\frac{bn\ln(x)x}{2e(e\,x^2+d)^2}-\frac{bx\ln(x^n)}{8(e\,x^2+d)^2e}-\frac{b\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{8ed\sqrt{de}}+\frac{b\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{8ed\sqrt{de}}+\frac{bn\ln(}{4}$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-1/2*b*n/d*ln(x)/(e*x^2+d)^2*x^3+1/8*b/(e*x^2+d)^2/d*x^3*ln(x^n)-1/2*b*n/e
*ln(x)/(e*x^2+d)^2*x-1/8*b/(e*x^2+d)^2*x/e*ln(x^n)-1/8*b/e/d/(d*e)^(1/2)*a
rctan(x*e/(d*e)^(1/2))*n*ln(x)+1/8*b/e/d/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2
))*ln(x^n)+1/4*b*n*ln(x)/d/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(
-d*e)^(1/2))*x^2-1/4*b*n*ln(x)/d/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/
2))/(-d*e)^(1/2))*x^2+1/2*b*n/e*ln(x)/d/(e*x^2+d)*x+1/4*b*n/e*ln(x)/(e*x^2
+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/4*b*n/e*ln(x)/(e*x
^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/16*b*n/e/d/(-d*e)
^(1/2)*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/16*b*n/e/d/(-d*e)^(1/2)*d
ilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/8*b*n*x/d/e/(e*x^2+d)-3/16*b*n/d*e
*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^4+3
/16*b*n/d*e*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1
/2))*x^4-3/8*b*n*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d
*e)^(1/2))*x^2+3/8*b*n*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2)
)/(-d*e)^(1/2))*x^2-3/16*b*n*d/e*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e*x+(
-d*e)^(1/2))/(-d*e)^(1/2))+3/16*b*n*d/e*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln(
(e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1
/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1
/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*((1/8/d*x^3-1/8*x/e)/(e*x^2
+d)^2+1/8/e/d/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2)))
```

Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex^2+d)^3}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x^n) + a*x^2)/(e^3*x^6 + 3*d*e^2*x^4 + 3*d^2*e*x^2 +
 d^3), x)
```

Sympy [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x**2+d)**3,x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))/(d + e*x**2)**3, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx=\int \frac{(b\log(cx^n)+a)x^2}{(ex^2+d)^3}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x^2 + d)^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx=\int \frac{x^2\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^3}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^3,x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^3, x)
```

Reduce [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$$
$$=\frac{3\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)a\,d^2+6\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)ade\,x^2+3\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)a\,e^2x^4+4\sqrt{e}\,\sqrt{d}\,atan\left(\right.}{}$$

input
```
int(x^2*(a+b*log(c*x^n))/(e*x^2+d)^3,x)
```

output
```
(3*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*d**2 + 6*sqrt(e)*sqrt(d
)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*d*e*x**2 + 3*sqrt(e)*sqrt(d)*atan((e*x)/
(sqrt(e)*sqrt(d)))*a*e**2*x**4 + 4*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqr
t(d)))*b*d**2*n + 8*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*b*d*e*n*
x**2 + 4*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*b*e**2*n*x**4 + 8*i
nt(log(x**n*c)/(d**3 + 3*d**2*e*x**2 + 3*d*e**2*x**4 + e**3*x**6),x)*b*d**
5*e + 16*int(log(x**n*c)/(d**3 + 3*d**2*e*x**2 + 3*d*e**2*x**4 + e**3*x**6
),x)*b*d**4*e**2*x**2 + 8*int(log(x**n*c)/(d**3 + 3*d**2*e*x**2 + 3*d*e**2
*x**4 + e**3*x**6),x)*b*d**3*e**3*x**4 - 8*log(x**n*c)*b*d**2*e*x - 3*a*d*
*2*e*x + 3*a*d*e**2*x**3 + 4*b*d**2*e*n*x + 4*b*d*e**2*n*x**3)/(24*d**2*e*
*2*(d**2 + 2*d*e*x**2 + e**2*x**4))
```

3.238 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx$

Optimal result 1829
Mathematica [B] (verified) 1830
Rubi [C] (verified) 1831
Maple [C] (warning: unable to verify) 1835
Fricas [F] 1836
Sympy [F] 1836
Maxima [F(-2)] 1836
Giac [F] 1837
Mupad [F(-1)] 1837
Reduce [F] 1837

Optimal result

Integrand size = 20, antiderivative size = 209

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx = -\frac{bnx}{8d^2(d+ex^2)} - \frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{5/2}\sqrt{e}} + \frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2} + \frac{3x(a+b\log(cx^n))}{8d^2(d+ex^2)} + \frac{3\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{8d^{5/2}\sqrt{e}} - \frac{3bn\,\text{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{16(-d)^{5/2}\sqrt{e}} + \frac{3bn\,\text{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{16(-d)^{5/2}\sqrt{e}}$$

output
```
-1/8*b*n*x/d^2/(e*x^2+d)-1/2*b*n*arctan(e^(1/2)*x/d^(1/2))/d^(5/2)/e^(1/2)
+1/4*x*(a+b*ln(c*x^n))/d/(e*x^2+d)^2+3/8*x*(a+b*ln(c*x^n))/d^2/(e*x^2+d)+3
/8*arctan(e^(1/2)*x/d^(1/2))*(a+b*ln(c*x^n))/d^(5/2)/e^(1/2)-3/16*b*n*poly
log(2,-e^(1/2)*x/(-d)^(1/2))/(-d)^(5/2)/e^(1/2)+3/16*b*n*polylog(2,e^(1/2)
*x/(-d)^(1/2))/(-d)^(5/2)/e^(1/2)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 544 vs. $2(209) = 418$.

Time = 1.15 (sec) , antiderivative size = 544, normalized size of antiderivative = 2.60

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx$$
$$= \frac{1}{16}\left(\frac{d(a+b\log(cx^n))}{(-d)^{5/2}\sqrt{e}\left(\sqrt{-d}-\sqrt{e}x\right)^2}+\frac{a+b\log(cx^n)}{(-d)^{3/2}\sqrt{e}\left(\sqrt{-d}+\sqrt{e}x\right)^2}+\frac{3(a+b\log(cx^n))}{(-d)^{5/2}\sqrt{e}+d^2ex}\right.$$
$$+\frac{3(a+b\log(cx^n))}{(-d)^{3/2}d\sqrt{e}+d^2ex}+\frac{3bn\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}x\right)\right)}{(-d)^{5/2}\sqrt{e}}$$
$$-\frac{3bn\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}x\right)\right)}{(-d)^{5/2}\sqrt{e}}$$
$$-\frac{bn\left(d+\left(d-\sqrt{-d}\sqrt{e}x\right)\log(x)+\left(-d+\sqrt{-d}\sqrt{e}x\right)\log\left(\sqrt{-d}+\sqrt{e}x\right)\right)}{d^3\left(\sqrt{-d}\sqrt{e}+ex\right)}$$
$$-\frac{3(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{5/2}\sqrt{e}}$$
$$-\frac{bn\left(d+\left(d+\sqrt{-d}\sqrt{e}x\right)\log(x)-\left(d+\sqrt{-d}\sqrt{e}x\right)\log\left((-d)^{3/2}+d\sqrt{e}x\right)\right)}{(-d)^{7/2}\sqrt{e}+d^3ex}$$
$$+\frac{3(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{5/2}\sqrt{e}}+\frac{3bn\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{5/2}\sqrt{e}}$$
$$\left.-\frac{3bn\operatorname{PolyLog}\left(2,\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{5/2}\sqrt{e}}\right)$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x^2)^3,x]
```

output
```
((d*(a + b*Log[c*x^n]))/((-d)^(5/2)*Sqrt[e]*(Sqrt[-d] - Sqrt[e]*x)^2) + (a
 + b*Log[c*x^n])/((-d)^(3/2)*Sqrt[e]*(Sqrt[-d] + Sqrt[e]*x)^2) + (3*(a + b
*Log[c*x^n]))/((-d)^(5/2)*Sqrt[e] + d^2*e*x) + (3*(a + b*Log[c*x^n]))/((-d
)^(3/2)*d*Sqrt[e] + d^2*e*x) + (3*b*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x])
)/((-d)^(5/2)*Sqrt[e]) - (3*b*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/((-d
)^(5/2)*Sqrt[e]) - (b*n*(d + (d - Sqrt[-d]*Sqrt[e]*x)*Log[x] + (-d + Sqrt[
-d]*Sqrt[e]*x)*Log[Sqrt[-d] + Sqrt[e]*x]))/(d^3*(Sqrt[-d]*Sqrt[e] + e*x))
- (3*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/((-d)^(5/2)*Sqrt[e]
) - (b*n*(d + (d + Sqrt[-d]*Sqrt[e]*x)*Log[x] - (d + Sqrt[-d]*Sqrt[e]*x)*L
og[(-d)^(3/2) + d*Sqrt[e]*x]))/((-d)^(7/2)*Sqrt[e] + d^3*e*x) + (3*(a + b*
Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/((-d)^(5/2)*Sqrt[e]) + (3*b
*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/((-d)^(5/2)*Sqrt[e]) - (3*b*n*PolyLog
[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/((-d)^(5/2)*Sqrt[e]))/16
```

Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 0.61 (sec) , antiderivative size = 249, normalized size of antiderivative = 1.19, number of steps used = 9, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.450, Rules used = {2760, 215, 218, 2760, 218, 2761, 27, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}dx$$

$$\Big\downarrow \text{2760}$$

$$\frac{3\int \frac{a+b\log(cx^n)}{(ex^2+d)^2}dx}{4d}-\frac{bn\int \frac{1}{(ex^2+d)^2}dx}{4d}+\frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2}$$

$$\Big\downarrow \text{215}$$

$$\frac{3\int \frac{a+b\log(cx^n)}{(ex^2+d)^2}dx}{4d}-\frac{bn\left(\frac{\int \frac{1}{ex^2+d}dx}{2d}+\frac{x}{2d(d+ex^2)}\right)}{4d}+\frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2}$$

$$\Big\downarrow \text{218}$$

$$\frac{3\int \frac{a+b\log(cx^n)}{(ex^2+d)^2}dx}{4d}+\frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}+\frac{x}{2d(d+ex^2)}\right)}{4d}$$

$\Big\downarrow$ 2760

$$\frac{3\left(\frac{\int \frac{a+b\log(cx^n)}{ex^2+d}dx}{2d}-\frac{bn\int \frac{1}{ex^2+d}dx}{2d}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}\right)}{4d}+\frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}+\frac{x}{2d(d+ex^2)}\right)}{4d}$$

$\Big\downarrow$ 218

$$\frac{3\left(\frac{\int \frac{a+b\log(cx^n)}{ex^2+d}dx}{2d}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}\right)}{4d}+\frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}+\frac{x}{2d(d+ex^2)}\right)}{4d}$$

$\Big\downarrow$ 2761

$$\frac{3\left(\frac{\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{e}x}dx}{2d}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}\right)}{4d}+\frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}+\frac{x}{2d(d+ex^2)}\right)}{4d}$$

$\Big\downarrow$ 27

$$\frac{3\left(\frac{\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}\sqrt{e}}}{2d}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}\right)}{4d}+\frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}+\frac{x}{2d(d+ex^2)}\right)}{4d}$$

$\Big\downarrow$ 5355

$$\frac{3\left(\frac{\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\left(\frac{1}{2}i\int\frac{\log\left(1-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{x}dx-\frac{1}{2}i\int\frac{\log\left(\frac{i\sqrt{e}x}{\sqrt{d}}+1\right)}{x}dx\right)}{\sqrt{d}\sqrt{e}}}{2d}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}\right)}{4d}+\frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}+\frac{x}{2d(d+ex^2)}\right)}{4d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{3\left(\frac{\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\left(\frac{1}{2}i\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)\right)}{\sqrt{d}\sqrt{e}}}{2d}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}\right)}{4d}+\frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}+\frac{x}{2d(d+ex^2)}\right)}{4d}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x^2)^3,x]
```

output
```
-1/4*(b*n*(x/(2*d*(d + e*x^2)) + ArcTan[(Sqrt[e]*x)/Sqrt[d]]/(2*d^(3/2)*Sq
rt[e])))/d + (x*(a + b*Log[c*x^n]))/(4*d*(d + e*x^2)^2) + (3*(-1/2*(b*n*Ar
cTan[(Sqrt[e]*x)/Sqrt[d]])/(d^(3/2)*Sqrt[e]) + (x*(a + b*Log[c*x^n]))/(2*d
*(d + e*x^2)) + ((ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(Sqrt[d]
*Sqrt[e]) - (b*n*((I/2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] - (I/2)*PolyL
og[2, (I*Sqrt[e]*x)/Sqrt[d]]))/(Sqrt[d]*Sqrt[e]))/(2*d)))/(4*d)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 215
```
Int[((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(-x)*((a + b*x^2)^(p + 1)
/(2*a*(p + 1))), x] + Simp[(2*p + 3)/(2*a*(p + 1))   Int[(a + b*x^2)^(p + 1
), x], x] /; FreeQ[{a, b}, x] && LtQ[p, -1] && (IntegerQ[4*p] || IntegerQ[6
*p])
```

rule 218
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

rule 2760
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_), x_Sym
bol] :> Simp[(-x)*(d + e*x^2)^(q + 1)*((a + b*Log[c*x^n])/(2*d*(q + 1))), x
] + (Simp[(2*q + 3)/(2*d*(q + 1))   Int[(d + e*x^2)^(q + 1)*(a + b*Log[c*x^
n]), x], x] + Simp[b*(n/(2*d*(q + 1)))   Int[(d + e*x^2)^(q + 1), x], x]) /
; FreeQ[{a, b, c, d, e, n}, x] && LtQ[q, -1]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.48 (sec) , antiderivative size = 664, normalized size of antiderivative = 3.18

method	result
risch	$\frac{3bn\ln(x)x}{8d(e\,x^2+d)^2}+\frac{bx\ln(x^n)}{4d(e\,x^2+d)^2}-\frac{3bxn\ln(x)}{8d^2(e\,x^2+d)}+\frac{3bx\ln(x^n)}{8d^2(e\,x^2+d)}-\frac{3b\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{8d^2\sqrt{de}}+\frac{3b\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{8d^2\sqrt{de}}-$

input
```
int((a+b*ln(c*x^n))/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
3/8*b*n*ln(x)/d/(e*x^2+d)^2*x+1/4*b*x/d/(e*x^2+d)^2*ln(x^n)-3/8*b/d^2*x/(e
*x^2+d)*n*ln(x)+3/8*b/d^2*x/(e*x^2+d)*ln(x^n)-3/8*b/d^2/(d*e)^(1/2)*arctan
(x*e/(d*e)^(1/2))*n*ln(x)+3/8*b/d^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln
(x^n)-1/8*b*n*x/d^2/(e*x^2+d)-1/2*b*n/d^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/
2))-3/16*b*n*ln(x)/d^2/(e*x^2+d)^2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*
e)^(1/2))*x^4*e^2+3/16*b*n*ln(x)/d^2/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e*x+(-d
*e)^(1/2))/(-d*e)^(1/2))*x^4*e^2+3/8*b*n*ln(x)/d^2/(e*x^2+d)^2*x^3*e-3/8*b
*n*ln(x)/d/(e*x^2+d)^2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^
2*e+3/8*b*n*ln(x)/d/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)
^(1/2))*x^2*e-3/16*b*n*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2)
)/(-d*e)^(1/2))+3/16*b*n*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1
/2))/(-d*e)^(1/2))+3/16*b*n/(-d*e)^(1/2)/d^2*dilog((-e*x+(-d*e)^(1/2))/(-d
*e)^(1/2))-3/16*b*n/(-d*e)^(1/2)/d^2*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2)
)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*
x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(
I*c)+b*ln(c)+a)*(1/4*x/d/(e*x^2+d)^2+3/4/d*(1/2*x/d/(e*x^2+d)+1/2/d/(d*e)^
(1/2)*arctan(x*e/(d*e)^(1/2))))
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{\left(d+ex^{2}\right)^{3}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\left(ex^{2}+d\right)^{3}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^3*x^6 + 3*d*e^2*x^4 + 3*d^2*e*x^2 + d^3), x
)
```

Sympy [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{\left(d+ex^{2}\right)^{3}}\,dx=\int \frac{a+b\log\left(cx^{n}\right)}{\left(d+ex^{2}\right)^{3}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(e*x**2+d)**3,x)
```

output
```
Integral((a + b*log(c*x**n))/(d + e*x**2)**3, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log\left(cx^{n}\right)}{\left(d+ex^{2}\right)^{3}}\,dx=\text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx=\int \frac{b\log(cx^n)+a}{(ex^2+d)^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^2 + d)^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{(e\,x^2+d)^3}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x^2)^3,x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x^2)^3, x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx$$
$$=\frac{3\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)a\,d^2+6\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)ade\,x^2+3\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)a\,e^2x^4+8\left(\int \frac{\log}{e^3x^6+3d\,e^2x}\right.}{8d}$$

input
```
int((a+b*log(c*x^n))/(e*x^2+d)^3,x)
```

output
```
(3*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*d**2 + 6*sqrt(e)*sqrt(d
)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*d*e*x**2 + 3*sqrt(e)*sqrt(d)*atan((e*x)/
(sqrt(e)*sqrt(d)))*a*e**2*x**4 + 8*int(log(x**n*c)/(d**3 + 3*d**2*e*x**2 +
 3*d*e**2*x**4 + e**3*x**6),x)*b*d**5*e + 16*int(log(x**n*c)/(d**3 + 3*d**
2*e*x**2 + 3*d*e**2*x**4 + e**3*x**6),x)*b*d**4*e**2*x**2 + 8*int(log(x**n
*c)/(d**3 + 3*d**2*e*x**2 + 3*d*e**2*x**4 + e**3*x**6),x)*b*d**3*e**3*x**4
 + 5*a*d**2*e*x + 3*a*d*e**2*x**3)/(8*d**3*e*(d**2 + 2*d*e*x**2 + e**2*x**
4))
```

3.239 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx$

Optimal result 1839
Mathematica [B] (verified) 1840
Rubi [C] (verified) 1841
Maple [C] (warning: unable to verify) 1844
Fricas [F] 1845
Sympy [F(-1)] 1846
Maxima [F(-2)] 1846
Giac [F] 1846
Mupad [F(-1)] 1847
Reduce [F] 1847

Optimal result

Integrand size = 23, antiderivative size = 218

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx = &-\frac{15bn}{8d^3x}+\frac{a+b\log(cx^n)}{4dx(d+ex^2)^2}+\frac{5a-bn+5b\log(cx^n)}{8d^2x(d+ex^2)} \\ &-\frac{15a-8bn+15b\log(cx^n)}{8d^3x} \\ &-\frac{\sqrt{e}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(15a-8bn+15b\log(cx^n))}{8d^{7/2}} \\ &-\frac{15b\sqrt{e}n\operatorname{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{16(-d)^{7/2}}+\frac{15b\sqrt{e}n\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{16(-d)^{7/2}}\end{aligned}$$

output
```
-15/8*b*n/d^3/x+1/4*(a+b*ln(c*x^n))/d/x/(e*x^2+d)^2+1/8*(5*a-b*n+5*b*ln(c*
x^n))/d^2/x/(e*x^2+d)-1/8*(15*a-8*b*n+15*b*ln(c*x^n))/d^3/x-1/8*e^(1/2)*ar
ctan(e^(1/2)*x/d^(1/2))*(15*a-8*b*n+15*b*ln(c*x^n))/d^(7/2)-15/16*b*e^(1/2
)*n*polylog(2,-e^(1/2)*x/(-d)^(1/2))/(-d)^(7/2)+15/16*b*e^(1/2)*n*polylog(
2,e^(1/2)*x/(-d)^(1/2))/(-d)^(7/2)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 552 vs. $2(218) = 436$.

Time = 1.85 (sec) , antiderivative size = 552, normalized size of antiderivative = 2.53

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx = \frac{1}{16}\left(-\frac{16bn}{d^3x}-\frac{16(a+b\log(cx^n))}{d^3x}+\frac{d\sqrt{e}(a+b\log(cx^n))}{(-d)^{7/2}\left(\sqrt{-d}-\sqrt{e}x\right)^2}+\frac{7\sqrt{e}(a+b\log(cx^n))}{d^3\left(\sqrt{-d}-\sqrt{e}x\right)}+\frac{\sqrt{e}(a+b\log(cx^n))}{(-d)^{5/2}\left(\sqrt{-d}+\sqrt{e}x\right)^2}-\frac{7\sqrt{e}(a+b\log(cx^n))}{d^3\left(\sqrt{-d}+\sqrt{e}x\right)}+\frac{7b\sqrt{e}n\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}x\right)\right)}{(-d)^{7/2}}-\frac{7b\sqrt{e}n\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}x\right)\right)}{(-d)^{7/2}}+\frac{bd\sqrt{e}n\left(\frac{1}{\sqrt{-d}(\sqrt{-d}+\sqrt{e}x)}-\frac{\log(x)}{d}+\frac{\log(\sqrt{-d}+\sqrt{e}x)}{d}\right)}{(-d)^{7/2}}-\frac{15\sqrt{e}(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{7/2}}+\frac{b\sqrt{e}n\left(\frac{1}{\sqrt{-d}(\sqrt{-d}-\sqrt{e}x)}-\frac{\log(x)}{d}+\frac{\log((-d)^{3/2}+d\sqrt{e}x)}{d}\right)}{(-d)^{5/2}}+\frac{15\sqrt{e}(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{7/2}}+\frac{15b\sqrt{e}n\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{7/2}}-\frac{15b\sqrt{e}n\operatorname{PolyLog}\left(2,\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{7/2}}\right)$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^3),x]
```

output
```
((-16*b*n)/(d^3*x) - (16*(a + b*Log[c*x^n]))/(d^3*x) + (d*Sqrt[e]*(a + b*L
og[c*x^n]))/((-d)^(7/2)*(Sqrt[-d] - Sqrt[e]*x)^2) + (7*Sqrt[e]*(a + b*Log[
c*x^n]))/(d^3*(Sqrt[-d] - Sqrt[e]*x)) + (Sqrt[e]*(a + b*Log[c*x^n]))/((-d)
^(5/2)*(Sqrt[-d] + Sqrt[e]*x)^2) - (7*Sqrt[e]*(a + b*Log[c*x^n]))/(d^3*(Sq
rt[-d] + Sqrt[e]*x)) + (7*b*Sqrt[e]*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x])
)/(-d)^(7/2) - (7*b*Sqrt[e]*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/(-d)^(
7/2) + (b*d*Sqrt[e]*n*(1/(Sqrt[-d]*(Sqrt[-d] + Sqrt[e]*x)) - Log[x]/d + Lo
g[Sqrt[-d] + Sqrt[e]*x]/d))/(-d)^(7/2) - (15*Sqrt[e]*(a + b*Log[c*x^n])*Lo
g[1 + (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(7/2) + (b*Sqrt[e]*n*(1/(Sqrt[-d]*(Sqrt[
-d] - Sqrt[e]*x)) - Log[x]/d + Log[(-d)^(3/2) + d*Sqrt[e]*x]/d))/(-d)^(5/2
) + (15*Sqrt[e]*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)
^(7/2) + (15*b*Sqrt[e]*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(7/2) - (1
5*b*Sqrt[e]*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(7/2))/16
```

Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 0.90 (sec) , antiderivative size = 225, normalized size of antiderivative = 1.03, number of steps used = 10, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.435$, Rules used = {2785, 25, 2785, 25, 2780, 2741, 2761, 27, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}dx$$

$$\Big\downarrow \text{2785}$$

$$\frac{a+b\log(cx^n)}{4dx(d+ex^2)^2}-\frac{\int -\frac{5a-bn+5b\log(cx^n)}{x^2(ex^2+d)^2}dx}{4d}$$

$$\Big\downarrow \text{25}$$

$$\frac{\int \frac{5a-bn+5b\log(cx^n)}{x^2(ex^2+d)^2}dx}{4d}+\frac{a+b\log(cx^n)}{4dx(d+ex^2)^2}$$

$$\Big\downarrow \text{2785}$$

$$\frac{\frac{5a+5b\log(cx^n)-bn}{2dx(d+ex^2)}-\frac{\int -\frac{15a-8bn+15b\log(cx^n)}{x^2\left(ex^2+d\right)}dx}{2d}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx\left(d+ex^2\right)^2}$$

$$\Big\downarrow \; 25$$

$$\frac{\frac{\int \frac{15a-8bn+15b\log(cx^n)}{x^2\left(ex^2+d\right)}dx}{2d}+\frac{5a+5b\log(cx^n)-bn}{2dx(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx\left(d+ex^2\right)^2}$$

$$\Big\downarrow \; 2780$$

$$\frac{\frac{\frac{\int \frac{15a-8bn+15b\log(cx^n)}{x^2}dx}{d}-\frac{e\int \frac{15a-8bn+15b\log(cx^n)}{ex^2+d}dx}{d}}{2d}+\frac{5a+5b\log(cx^n)-bn}{2dx(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx\left(d+ex^2\right)^2}$$

$$\Big\downarrow \; 2741$$

$$\frac{\frac{\frac{-\frac{15a+15b\log(cx^n)-8bn}{x}-\frac{15bn}{x}}{d}-\frac{e\int \frac{15a-8bn+15b\log(cx^n)}{ex^2+d}dx}{d}}{2d}+\frac{5a+5b\log(cx^n)-bn}{2dx(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx\left(d+ex^2\right)^2}$$

$$\Big\downarrow \; 2761$$

$$\frac{\frac{\frac{-\frac{15a+15b\log(cx^n)-8bn}{x}-\frac{15bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(15a+15b\log(cx^n)-8bn)}{\sqrt{d}\sqrt{e}}-15bn\int\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{e}x}dx\right)}{d}}{2d}+\frac{5a+5b\log(cx^n)-bn}{2dx(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx\left(d+ex^2\right)^2}$$

$$\Big\downarrow \; 27$$

$$\frac{\frac{\frac{-\frac{15a+15b\log(cx^n)-8bn}{x}-\frac{15bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(15a+15b\log(cx^n)-8bn)}{\sqrt{d}\sqrt{e}}-\frac{15bn\int\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}\sqrt{e}}\right)}{d}}{2d}+\frac{5a+5b\log(cx^n)-bn}{2dx(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx\left(d+ex^2\right)^2}$$

$$\Big\downarrow \; 5355$$

$$\frac{\frac{a+b\log(cx^n)}{4dx(d+ex^2)^2}+\frac{\frac{5a+5b\log(cx^n)-bn}{2dx(d+ex^2)}+\frac{-\frac{\frac{15a+15b\log(cx^n)-8bn}{x}}{d}-\frac{15bn}{x}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(15a+15b\log(cx^n)-8bn)}{\sqrt{d}\sqrt{e}}-\frac{15bn\left(\frac{1}{2}i\int\frac{\log\left(1-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{x}dx-\frac{1}{2}i\int\frac{\log\left(\frac{i\sqrt{e}x}{\sqrt{d}}+1\right)}{x}\right.}{\sqrt{d}\sqrt{e}}}{d}}{2d}}{4d}$$

$\downarrow$ 2838

$$\frac{\frac{a+b\log(cx^n)}{4dx(d+ex^2)^2}+\frac{\frac{5a+5b\log(cx^n)-bn}{2dx(d+ex^2)}+\frac{-\frac{\frac{15a+15b\log(cx^n)-8bn}{x}}{d}-\frac{15bn}{x}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(15a+15b\log(cx^n)-8bn)}{\sqrt{d}\sqrt{e}}-\frac{15bn\left(\frac{1}{2}i\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right.\right.}{\sqrt{d}\sqrt{e}}}{d}}{2d}}{4d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^3),x]
```

output
```
(a + b*Log[c*x^n])/(4*d*x*(d + e*x^2)^2) + ((5*a - b*n + 5*b*Log[c*x^n])/(
2*d*x*(d + e*x^2)) + (((-15*b*n)/x - (15*a - 8*b*n + 15*b*Log[c*x^n])/x)/d
 - (e*((ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(15*a - 8*b*n + 15*b*Log[c*x^n]))/(Sqr
t[d]*Sqrt[e]) - (15*b*n*((I/2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] - (I/2
)*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]]))/(Sqrt[d]*Sqrt[e])))/d)/(2*d))/(4*d)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2785
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Simp[1/(2*d*(q + 1))   Int[(f*x)^m*(d
 + e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
 x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 2.22 (sec) , antiderivative size = 964, normalized size of antiderivative = 4.42

method	result	size
risch	Expression too large to display	964

input
```
int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output

```
(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^
n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*
c)+b*ln(c)+a)*(-1/d^3*e*((7/8*e*x^3+9/8*d*x)/(e*x^2+d)^2+15/8/(d*e)^(1/2)*
arctan(x*e/(d*e)^(1/2)))-1/d^3/x)+b*n*e/d^3/(d*e)^(1/2)*arctan(x*e/(d*e)^(
1/2))-15/16*b*n*e/d^3/(-d*e)^(1/2)*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))
+15/16*b*n*e/d^3/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-7/8*b
/d^3*e^2/(e*x^2+d)^2*x^3*ln(x^n)-15/8*b*e/d^3/(d*e)^(1/2)*arctan(x*e/(d*e)
^(1/2))*ln(x^n)-1/2*b*n/d^3*e*ln(x)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-
d*e)^(1/2))+1/2*b*n/d^3*e*ln(x)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^
(1/2))+1/4*b*n*e/d^2*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-
d*e)^(1/2))-1/4*b*n*e/d^2*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/
2))/(-d*e)^(1/2))+3/16*b*n*e/d*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((e*x+(-d*
e)^(1/2))/(-d*e)^(1/2))-3/16*b*n*e/d*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e
*x+(-d*e)^(1/2))/(-d*e)^(1/2))+15/8*b*e/d^3/(d*e)^(1/2)*arctan(x*e/(d*e)^(
1/2))*n*ln(x)+1/2*b*n*e^2/d^3*ln(x)/(e*x^2+d)^2*x^3+1/2*b*n*e/d^2*ln(x)/(e
*x^2+d)^2*x+1/8*b*n/d^3*e*x/(e*x^2+d)-1/2*b*n/d^3*ln(x)*e*x/(e*x^2+d)-9/8*
b*ln(x^n)/d^2/(e*x^2+d)^2*e*x-3/16*b*n*e^3/d^3*ln(x)/(e*x^2+d)^2/(-d*e)^(1
/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^4+3/16*b*n*e^3/d^3*ln(x)/(e*x^2
+d)^2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^4-3/8*b*n*e^2/d^2
*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^...
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^2\right)^3}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^3x^2}\,dx$$

input

```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^3,x, algorithm="fricas")
```

output

```
integral((b*log(c*x^n) + a)/(e^3*x^8 + 3*d*e^2*x^6 + 3*d^2*e*x^4 + d^3*x^2
), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a + b\log(cx^n)}{x^2 (d + ex^2)^3} \, dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x**2+d)**3,x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log(cx^n)}{x^2 (d + ex^2)^3} \, dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a + b\log(cx^n)}{x^2 (d + ex^2)^3} \, dx = \int \frac{b\log(cx^n) + a}{(ex^2 + d)^3 x^2} \, dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^3*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx = \int \frac{a+b\ln(c\,x^n)}{x^2\,(e\,x^2+d)^3}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^3),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^3), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx = \frac{-15\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)a\,d^2x-30\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)ade\,x^3-15\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)a\,e^2x^5+8\left(\int \frac{}{e^3x}\right.}{}$$

input
```
int((a+b*log(c*x^n))/x^2/(e*x^2+d)^3,x)
```

output
```
( - 15*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*d**2*x - 30*sqrt(e)
*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*d*e*x**3 - 15*sqrt(e)*sqrt(d)*ata
n((e*x)/(sqrt(e)*sqrt(d)))*a*e**2*x**5 + 8*int(log(x**n*c)/(d**3*x**2 + 3*
d**2*e*x**4 + 3*d*e**2*x**6 + e**3*x**8),x)*b*d**6*x + 16*int(log(x**n*c)/
(d**3*x**2 + 3*d**2*e*x**4 + 3*d*e**2*x**6 + e**3*x**8),x)*b*d**5*e*x**3 +
 8*int(log(x**n*c)/(d**3*x**2 + 3*d**2*e*x**4 + 3*d*e**2*x**6 + e**3*x**8)
,x)*b*d**4*e**2*x**5 - 8*a*d**3 - 25*a*d**2*e*x**2 - 15*a*d*e**2*x**4)/(8*
d**4*x*(d**2 + 2*d*e*x**2 + e**2*x**4))
```

3.240 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}\,dx$

Optimal result . . . 1848
Mathematica [B] (verified) . . . 1849
Rubi [C] (verified) . . . 1850
Maple [C] (warning: unable to verify) . . . 1854
Fricas [F] . . . 1855
Sympy [F(-1)] . . . 1856
Maxima [F(-2)] . . . 1856
Giac [F] . . . 1856
Mupad [F(-1)] . . . 1857
Reduce [F] . . . 1857

Optimal result

Integrand size = 23, antiderivative size = 259

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}\,dx = -\frac{35bn}{72d^3x^3}+\frac{35ben}{8d^4x}+\frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2}+\frac{7a-bn+7b\log(cx^n)}{8d^2x^3(d+ex^2)} - \frac{35a-12bn+35b\log(cx^n)}{24d^3x^3}+\frac{e(35a-12bn+35b\log(cx^n))}{8d^4x} + \frac{e^{3/2}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(35a-12bn+35b\log(cx^n))}{8d^{9/2}} - \frac{35be^{3/2}n\,\text{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{16(-d)^{9/2}}+\frac{35be^{3/2}n\,\text{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{16(-d)^{9/2}}$$

output
```
-35/72*b*n/d^3/x^3+35/8*b*e*n/d^4/x+1/4*(a+b*ln(c*x^n))/d/x^3/(e*x^2+d)^2+
1/8*(7*a-b*n+7*b*ln(c*x^n))/d^2/x^3/(e*x^2+d)-1/24*(35*a-12*b*n+35*b*ln(c*
x^n))/d^3/x^3+1/8*e*(35*a-12*b*n+35*b*ln(c*x^n))/d^4/x+1/8*e^(3/2)*arctan(
e^(1/2)*x/d^(1/2))*(35*a-12*b*n+35*b*ln(c*x^n))/d^(9/2)-35/16*b*e^(3/2)*n*
polylog(2,-e^(1/2)*x/(-d)^(1/2))/(-d)^(9/2)+35/16*b*e^(3/2)*n*polylog(2,e^
(1/2)*x/(-d)^(1/2))/(-d)^(9/2)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 584 vs. $2(259) = 518$.

Time = 1.95 (sec) , antiderivative size = 584, normalized size of antiderivative = 2.25

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}\,dx = \frac{1}{144}\left(-\frac{16bn}{d^3x^3}+\frac{432ben}{d^4x}-\frac{48(a+b\log(cx^n))}{d^3x^3}+\frac{432e(a+b\log(cx^n))}{d^4x}-\frac{9e^{3/2}(a+b\log(cx^n))}{(-d)^{7/2}\left(\sqrt{-d}-\sqrt{e}x\right)^2}-\frac{99e^{3/2}(a+b\log(cx^n))}{d^4\left(\sqrt{-d}-\sqrt{e}x\right)}+\frac{9e^{3/2}(a+b\log(cx^n))}{(-d)^{7/2}\left(\sqrt{-d}+\sqrt{e}x\right)^2}+\frac{99e^{3/2}(a+b\log(cx^n))}{d^4\left(\sqrt{-d}+\sqrt{e}x\right)}+\frac{99be^{3/2}n\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}x\right)\right)}{(-d)^{9/2}}-\frac{99be^{3/2}n\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}x\right)\right)}{(-d)^{9/2}}-\frac{9be^{3/2}n\left(\frac{1}{\sqrt{-d}\left(\sqrt{-d}+\sqrt{e}x\right)}-\frac{\log(x)}{d}+\frac{\log\left(\sqrt{-d}+\sqrt{e}x\right)}{d}\right)}{(-d)^{7/2}}-\frac{315e^{3/2}(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{9/2}}+\frac{9be^{3/2}n\left(\frac{1}{\sqrt{-d}\left(\sqrt{-d}-\sqrt{e}x\right)}-\frac{\log(x)}{d}+\frac{\log\left((-d)^{3/2}+d\sqrt{e}x\right)}{d}\right)}{(-d)^{7/2}}+\frac{315e^{3/2}(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{9/2}}+\frac{315be^{3/2}n\,\text{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{9/2}}-\frac{315be^{3/2}n\,\text{PolyLog}\left(2,\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{9/2}}\right)$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^3),x]
```

output
```
((-16*b*n)/(d^3*x^3) + (432*b*e*n)/(d^4*x) - (48*(a + b*Log[c*x^n]))/(d^3*
x^3) + (432*e*(a + b*Log[c*x^n]))/(d^4*x) - (9*e^(3/2)*(a + b*Log[c*x^n]))
/((-d)^(7/2)*(Sqrt[-d] - Sqrt[e]*x)^2) - (99*e^(3/2)*(a + b*Log[c*x^n]))/(
d^4*(Sqrt[-d] - Sqrt[e]*x)) + (9*e^(3/2)*(a + b*Log[c*x^n]))/((-d)^(7/2)*(
Sqrt[-d] + Sqrt[e]*x)^2) + (99*e^(3/2)*(a + b*Log[c*x^n]))/(d^4*(Sqrt[-d]
+ Sqrt[e]*x)) + (99*b*e^(3/2)*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/(-d)
^(9/2) - (99*b*e^(3/2)*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/(-d)^(9/2)
- (9*b*e^(3/2)*n*(1/(Sqrt[-d]*(Sqrt[-d] + Sqrt[e]*x)) - Log[x]/d + Log[Sqr
t[-d] + Sqrt[e]*x]/d))/(-d)^(7/2) - (315*e^(3/2)*(a + b*Log[c*x^n])*Log[1
+ (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(9/2) + (9*b*e^(3/2)*n*(1/(Sqrt[-d]*(Sqrt[-d
] - Sqrt[e]*x)) - Log[x]/d + Log[(-d)^(3/2) + d*Sqrt[e]*x]/d))/(-d)^(7/2)
+ (315*e^(3/2)*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^
(9/2) + (315*b*e^(3/2)*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(9/2) - (3
15*b*e^(3/2)*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(9/2))/144
```

Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 1.21 (sec) , antiderivative size = 270, normalized size of antiderivative = 1.04, number of steps used = 12, number of rules used = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.522, Rules used = {2785, 25, 2785, 25, 2780, 2741, 2780, 2741, 2761, 27, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}dx$$
$$\Big\downarrow \text{2785}$$
$$\frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2}-\frac{\int -\frac{7a-bn+7b\log(cx^n)}{x^4(ex^2+d)^2}dx}{4d}$$
$$\Big\downarrow \text{25}$$
$$\frac{\int \frac{7a-bn+7b\log(cx^n)}{x^4(ex^2+d)^2}dx}{4d}+\frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2}$$
$$\Big\downarrow \text{2785}$$

$$\frac{\frac{7a+7b\log(cx^n)-bn}{2dx^3(d+ex^2)}-\frac{\int -\frac{35a-12bn+35b\log(cx^n)}{x^4\left(ex^2+d\right)}dx}{2d}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^3\left(d+ex^2\right)^2}$$

$$\Big\downarrow \; 25$$

$$\frac{\frac{\int \frac{35a-12bn+35b\log(cx^n)}{x^4\left(ex^2+d\right)}dx}{2d}+\frac{7a+7b\log(cx^n)-bn}{2dx^3(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^3\left(d+ex^2\right)^2}$$

$$\Big\downarrow \; 2780$$

$$\frac{\frac{\frac{\int \frac{35a-12bn+35b\log(cx^n)}{x^4}dx}{d}-\frac{e\int \frac{35a-12bn+35b\log(cx^n)}{x^2\left(ex^2+d\right)}dx}{d}}{2d}+\frac{7a+7b\log(cx^n)-bn}{2dx^3(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^3\left(d+ex^2\right)^2}$$

$$\Big\downarrow \; 2741$$

$$\frac{\frac{\frac{-\frac{35a+35b\log(cx^n)-12bn}{3x^3}-\frac{35bn}{9x^3}}{d}-\frac{e\int \frac{35a-12bn+35b\log(cx^n)}{x^2\left(ex^2+d\right)}dx}{d}}{2d}+\frac{7a+7b\log(cx^n)-bn}{2dx^3(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^3\left(d+ex^2\right)^2}$$

$$\Big\downarrow \; 2780$$

$$\frac{\frac{\frac{-\frac{35a+35b\log(cx^n)-12bn}{3x^3}-\frac{35bn}{9x^3}}{d}-\frac{e\left(\frac{\int \frac{35a-12bn+35b\log(cx^n)}{x^2}dx}{d}-\frac{e\int \frac{35a-12bn+35b\log(cx^n)}{ex^2+d}dx}{d}\right)}{d}}{2d}+\frac{7a+7b\log(cx^n)-bn}{2dx^3(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^3\left(d+ex^2\right)^2}$$

$$\Big\downarrow \; 2741$$

$$\frac{\frac{\frac{-\frac{35a+35b\log(cx^n)-12bn}{3x^3}-\frac{35bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{35a+35b\log(cx^n)-12bn}{x}-\frac{35bn}{x}}{d}-\frac{e\int \frac{35a-12bn+35b\log(cx^n)}{ex^2+d}dx}{d}\right)}{d}}{2d}+\frac{7a+7b\log(cx^n)-bn}{2dx^3(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^3\left(d+ex^2\right)^2}$$

$$\Big\downarrow \; 2761$$

$$\frac{\frac{\frac{-\frac{35a+35b\log(cx^n)-12bn}{3x^3}}{d}-\frac{35bn}{9x^3}-\frac{e\left(\frac{-\frac{35a+35b\log(cx^n)-12bn}{x}}{d}-\frac{35bn}{x}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(35a+35b\log(cx^n)-12bn)}{\sqrt{d}\sqrt{e}}-35bn\int\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{e}x}dx\right)}{d}\right)}{d}}{2d}+\frac{7a\cdots}{\cdots}}{4d}$$

$$\frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2}$$

$\downarrow$ 27

$$\frac{\frac{\frac{-\frac{35a+35b\log(cx^n)-12bn}{3x^3}}{d}-\frac{35bn}{9x^3}-\frac{e\left(\frac{-\frac{35a+35b\log(cx^n)-12bn}{x}}{d}-\frac{35bn}{x}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(35a+35b\log(cx^n)-12bn)}{\sqrt{d}\sqrt{e}}-\frac{35bn\int\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}\sqrt{e}}\right)}{d}\right)}{d}}{2d}+\frac{7a\cdots}{\cdots}}{4d}$$

$$\frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2}$$

$\downarrow$ 5355

$$\frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2}+$$

$$\frac{\frac{7a+7b\log(cx^n)-bn}{2dx^3(d+ex^2)}+\frac{\frac{-\frac{35a+35b\log(cx^n)-12bn}{3x^3}}{d}-\frac{35bn}{9x^3}-\frac{e\left(\frac{-\frac{35a+35b\log(cx^n)-12bn}{x}}{d}-\frac{35bn}{x}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(35a+35b\log(cx^n)-12bn)}{\sqrt{d}\sqrt{e}}-\frac{35bn\left(\frac{1}{2}i\cdots\right)}{\cdots}\right)}{d}\right)}{d}}{2d}}{4d}$$

$\downarrow$ 2838

$$\frac{a+b\log\left(cx^n\right)}{4dx^3\left(d+ex^2\right)^2}+\frac{\frac{7a+7b\log(cx^n)-bn}{2dx^3(d+ex^2)}+\frac{\frac{-\frac{35a+35b\log(cx^n)-12bn}{3x^3}-\frac{35bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{35a+35b\log(cx^n)-12bn}{x}-\frac{35bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(35a+35b\log(cx^n)-12bn)}{\sqrt{d}\sqrt{e}}-\frac{35bn\left(\frac{1}{2}i\,\mathrm{P}\ldots\right.}{\ldots}\right.}{d}\ldots\right.}{d}}{2d}}{4d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^3),x]
```

output
```
(a + b*Log[c*x^n])/(4*d*x^3*(d + e*x^2)^2) + ((7*a - b*n + 7*b*Log[c*x^n])
/(2*d*x^3*(d + e*x^2)) + (((-35*b*n)/(9*x^3) - (35*a - 12*b*n + 35*b*Log[c
*x^n])/(3*x^3))/d - (e*(((-35*b*n)/x - (35*a - 12*b*n + 35*b*Log[c*x^n])/x
)/d - (e*((ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(35*a - 12*b*n + 35*b*Log[c*x^n]))/
(Sqrt[d]*Sqrt[e]) - (35*b*n*((I/2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] -
(I/2)*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]]))/(Sqrt[d]*Sqrt[e])))/d))/d)/(2*d)
)/(4*d)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2785
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Simp[1/(2*d*(q + 1))   Int[(f*x)^m*(d
 + e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
 x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 3.90 (sec) , antiderivative size = 1029, normalized size of antiderivative = 3.97

method	result	size
risch	Expression too large to display	1029

input
```
int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-1/8*b*n*e^2/d^4*x/(e*x^2+d)+3/16*b*n*e^2/d^2*ln(x)/(e*x^2+d)^2/(-d*e)^(1/
2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-3/16*b*n*e^2/d^2*ln(x)/(e*x^2+d)^2
/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n*e^2/d^3*ln(x)/(e
*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n*e^2/d^3*
ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+11/8*b/d^
4*e^3/(e*x^2+d)^2*x^3*ln(x^n)+35/8*b*e^2/d^4/(d*e)^(1/2)*arctan(x*e/(d*e)^
(1/2))*ln(x^n)-3/2*b*n*e^2/d^4/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))+35/16*b
*n*e^2/d^4/(-d*e)^(1/2)*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-35/16*b*n*
e^2/d^4/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+(1/2*I*Pi*b*cs
gn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1
/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*
(1/d^4*e^2*((11/8*e*x^3+13/8*d*x)/(e*x^2+d)^2+35/8/(d*e)^(1/2)*arctan(x*e/
(d*e)^(1/2)))-1/3/d^3/x^3+3/d^4*e/x)+3*b*ln(x^n)/d^4*e/x-35/8*b*e^2/d^4/(d
*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*n*ln(x)+3/2*b*n/d^4*e^2*ln(x)/(-d*e)^(1/
2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-3/2*b*n/d^4*e^2*ln(x)/(-d*e)^(1/2)
*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-b*n*e^2/d^3*ln(x)/(e*x^2+d)^2*x-b*n*e
^3/d^4*ln(x)/(e*x^2+d)^2*x^3+13/8*b*ln(x^n)*e^2/d^3/(e*x^2+d)^2*x-3/8*b*n*
e^3/d^3*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))
*x^2+1/2*b*n*e^3/d^4*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(
-d*e)^(1/2))*x^2-1/2*b*n*e^3/d^4*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(...
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^3}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^3x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^3*x^10 + 3*d*e^2*x^8 + 3*d^2*e*x^6 + d^3*x^
4), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^3}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**4/(e*x**2+d)**3,x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^3}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^3}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^3x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^3*x^4), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^4\,(e\,x^2+d)^3}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^3),x)
```

output
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^3), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}\,dx = \frac{105\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)a\,d^2e\,x^3+210\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)ad\,e^2x^5+105\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)a\,e^3x^7+24}{}$$

input
```
int((a+b*log(c*x^n))/x^4/(e*x^2+d)^3,x)
```

output
```
(105*sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*d**2*e*x**3 + 210*sqr
t(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*d*e**2*x**5 + 105*sqrt(e)*sqr
t(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a*e**3*x**7 + 24*int(log(x**n*c)/(d**3*
x**4 + 3*d**2*e*x**6 + 3*d*e**2*x**8 + e**3*x**10),x)*b*d**7*x**3 + 48*int
(log(x**n*c)/(d**3*x**4 + 3*d**2*e*x**6 + 3*d*e**2*x**8 + e**3*x**10),x)*b
*d**6*e*x**5 + 24*int(log(x**n*c)/(d**3*x**4 + 3*d**2*e*x**6 + 3*d*e**2*x*
*8 + e**3*x**10),x)*b*d**5*e**2*x**7 - 8*a*d**4 + 56*a*d**3*e*x**2 + 175*a
*d**2*e**2*x**4 + 105*a*d*e**3*x**6)/(24*d**5*x**3*(d**2 + 2*d*e*x**2 + e*
*2*x**4))
```

3.241 $\int \frac{x\log(cx^2)}{1-cx^2}\,dx$

Optimal result 1858
Mathematica [A] (verified) 1858
Rubi [A] (verified) 1859
Maple [A] (verified) 1860
Fricas [A] (verification not implemented) 1860
Sympy [C] (verification not implemented) 1860
Maxima [B] (verification not implemented) 1861
Giac [F] 1862
Mupad [B] (verification not implemented) 1862
Reduce [F] 1862

Optimal result

Integrand size = 18, antiderivative size = 17

$$\int \frac{x\log(cx^2)}{1-cx^2}\,dx = \frac{\text{PolyLog}(2,1-cx^2)}{2c}$$

output
```
1/2*polylog(2,-c*x^2+1)/c
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{x\log(cx^2)}{1-cx^2}\,dx = \frac{\text{PolyLog}(2,1-cx^2)}{2c}$$

input
```
Integrate[(x*Log[c*x^2])/(1 - c*x^2),x]
```

output
```
PolyLog[2, 1 - c*x^2]/(2*c)
```

Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2774, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x \log\left(cx^2\right)}{1-cx^2} \, dx$$

$$\Big\downarrow \text{2774}$$

$$\frac{1}{2} \int \frac{\log\left(cx^2\right)}{1-cx^2} dx^2$$

$$\Big\downarrow \text{2752}$$

$$\frac{\text{PolyLog}\left(2,1-cx^2\right)}{2c}$$

input
```
Int[(x*Log[c*x^2])/(1 - c*x^2),x]
```

output
```
PolyLog[2, 1 - c*x^2]/(2*c)
```

Defintions of rubi rules used

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2774
```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m/n   Subst[Int[(d + e*x)^q*(a +
 b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
 && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

Maple [A] (verified)

Time = 0.30 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.71

method	result	size
derivativedivides	$\frac{\operatorname{dilog}(c\,x^2)}{2c}$	12
default	$\frac{\operatorname{dilog}(c\,x^2)}{2c}$	12
risch	$\frac{\operatorname{dilog}(c\,x^2)}{2c}$	12
parts	$-\frac{\ln(c\,x^2)\ln(c\,x^2-1)}{2c}+\frac{\ln(x)\ln(c\,x^2-1)-2c\left(\frac{\ln(x)(\ln(1-x\sqrt{c})+\ln(1+x\sqrt{c}))}{2c}+\frac{\operatorname{dilog}(1-x\sqrt{c})+\operatorname{dilog}(1+x\sqrt{c})}{2c}\right)}{c}$	89

input
```
int(x*ln(c*x^2)/(-c*x^2+1),x,method=_RETURNVERBOSE)
```

output
```
1/2/c*dilog(c*x^2)
```

Fricas [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{x\log(cx^2)}{1-cx^2}\,dx=\frac{\mathrm{Li}_2(-cx^2+1)}{2\,c}$$

input
```
integrate(x*log(c*x^2)/(-c*x^2+1),x, algorithm="fricas")
```

output
```
1/2*dilog(-c*x^2 + 1)/c
```

Sympy [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 5.10 (sec) , antiderivative size = 94, normalized size of antiderivative = 5.53

$$\int \frac{x\log(cx^2)}{1-cx^2}\,dx = \frac{\begin{cases} -\frac{\operatorname{Li}_2(cx^2)}{2} & \text{for } \frac{1}{|x|}<1 \wedge |x|<1 \\ i\pi\log(x)-\frac{\operatorname{Li}_2(cx^2)}{2} & \text{for } |x|<1 \\ -i\pi\log\left(\frac{1}{x}\right)-\frac{\operatorname{Li}_2(cx^2)}{2} & \text{for } \frac{1}{|x|}<1 \\ -i\pi G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)+i\pi G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)-\frac{\operatorname{Li}_2(cx^2)}{2} & \text{otherwise} \end{cases}}{c} - \frac{\log(cx^2)\log(cx^2-1)}{2c}$$

input
```
integrate(x*ln(c*x**2)/(-c*x**2+1),x)
```

output
```
Piecewise((-polylog(2, c*x**2)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (I*pi*lo
g(x) - polylog(2, c*x**2)/2, Abs(x) < 1), (-I*pi*log(1/x) - polylog(2, c*x
**2)/2, 1/Abs(x) < 1), (-I*pi*meijerg(((), (1, 1)), ((0, 0), ()), x) + I*p
i*meijerg(((1, 1), ()), ((), (0, 0)), x) - polylog(2, c*x**2)/2, True))/c
- log(c*x**2)*log(c*x**2 - 1)/(2*c)
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 76 vs. $2(14) = 28$.

Time = 0.03 (sec) , antiderivative size = 76, normalized size of antiderivative = 4.47

$$\int \frac{x\log(cx^2)}{1-cx^2}\,dx = -\frac{\log(cx^2-1)\log(cx^2)}{2\,c} + \frac{\log(cx^2-1)\log(x)}{c} + \frac{\log(cx^2-1)\log(cx^2)-2\,\log(cx^2-1)\log(x)+\operatorname{Li}_2(-cx^2+1)}{2\,c}$$

input
```
integrate(x*log(c*x^2)/(-c*x^2+1),x, algorithm="maxima")
```

output
```
-1/2*log(c*x^2 - 1)*log(c*x^2)/c + log(c*x^2 - 1)*log(x)/c + 1/2*(log(c*x^
2 - 1)*log(c*x^2) - 2*log(c*x^2 - 1)*log(x) + dilog(-c*x^2 + 1))/c
```

Giac [F]

$$\int \frac{x\log(cx^2)}{1-cx^2}\,dx = \int -\frac{x\log(cx^2)}{cx^2-1}\,dx$$

input
```
integrate(x*log(c*x^2)/(-c*x^2+1),x, algorithm="giac")
```

output
```
integrate(-x*log(c*x^2)/(c*x^2 - 1), x)
```

Mupad [B] (verification not implemented)

Time = 25.40 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.65

$$\int \frac{x\log(cx^2)}{1-cx^2}\,dx = \frac{\mathrm{Li}_2(c\,x^2)}{2\,c}$$

input
```
int(-(x*log(c*x^2))/(c*x^2 - 1),x)
```

output
```
dilog(c*x^2)/(2*c)
```

Reduce [F]

$$\int \frac{x\log(cx^2)}{1-cx^2}\,dx = \frac{-4\left(\int \frac{\log(c\,x^2)}{c\,x^3-x}dx\right)-\log(c\,x^2)^2}{4c}$$

input
```
int(x*log(c*x^2)/(-c*x^2+1),x)
```

output
```
( - 4*int(log(c*x**2)/(c*x**3 - x),x) - log(c*x**2)**2)/(4*c)
```

3.242 $\int \frac{x \log\left(\frac{x^2}{c}\right)}{c-x^2} \, dx$

Optimal result . . . 1863
Mathematica [A] (verified) . . . 1863
Rubi [A] (verified) . . . 1864
Maple [C] (verified) . . . 1865
Fricas [A] (verification not implemented) . . . 1865
Sympy [A] (verification not implemented) . . . 1866
Maxima [B] (verification not implemented) . . . 1866
Giac [F] . . . 1867
Mupad [B] (verification not implemented) . . . 1867
Reduce [F] . . . 1868

Optimal result

Integrand size = 19, antiderivative size = 16

$$\int \frac{x \log\left(\frac{x^2}{c}\right)}{c-x^2} \, dx = \frac{1}{2} \operatorname{PolyLog}\left(2, 1 - \frac{x^2}{c}\right)$$

output
```
1/2*polylog(2,1-x^2/c)
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.06

$$\int \frac{x \log\left(\frac{x^2}{c}\right)}{c-x^2} \, dx = \frac{1}{2} \operatorname{PolyLog}\left(2, \frac{c-x^2}{c}\right)$$

input
```
Integrate[(x*Log[x^2/c])/(c - x^2),x]
```

output
```
PolyLog[2, (c - x^2)/c]/2
```

Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {2774, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x \log \left(\frac{x^2}{c}\right)}{c-x^2} \, dx$$

$$\Big\downarrow \text{2774}$$

$$\frac{1}{2} \int \frac{\log \left(\frac{x^2}{c}\right)}{c-x^2}dx^2$$

$$\Big\downarrow \text{2752}$$

$$\frac{1}{2} \text{PolyLog}\left(2,1-\frac{x^2}{c}\right)$$

input
```
Int[(x*Log[x^2/c])/(c - x^2),x]
```

output
```
PolyLog[2, 1 - x^2/c]/2
```

Defintions of rubi rules used

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2774
```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m/n   Subst[Int[(d + e*x)^q*(a +
 b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
 && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

Maple [C] (verified)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.43 (sec) , antiderivative size = 53, normalized size of antiderivative = 3.31

method	result
default	$\frac{\left(\sum_{\_\alpha=\mathrm{RootOf}\left(\_Z^{2}-c\right)}\left(-\ln\left(x-\_\alpha\right)\ln\left(\frac{x^{2}}{c}\right)+2\,\mathrm{dilog}\left(\frac{x}{\_\alpha}\right)+2\ln\left(x-\_\alpha\right)\ln\left(\frac{x}{\_\alpha}\right)\right)\right)}{2}$
risch	$\frac{\left(\sum_{\_\alpha=\mathrm{RootOf}\left(\_Z^{2}-c\right)}\left(-\ln\left(x-\_\alpha\right)\ln\left(\frac{x^{2}}{c}\right)+2\,\mathrm{dilog}\left(\frac{x}{\_\alpha}\right)+2\ln\left(x-\_\alpha\right)\ln\left(\frac{x}{\_\alpha}\right)\right)\right)}{2}$
parts	$-\frac{\ln\left(\frac{x^{2}}{c}\right)\ln\left(-x^{2}+c\right)}{2}+\ln\left(x\right)\ln\left(-x^{2}+c\right)-\ln\left(x\right)\ln\left(\frac{\sqrt{c}-x}{\sqrt{c}}\right)-\ln\left(x\right)\ln\left(\frac{\sqrt{c}+x}{\sqrt{c}}\right)-\mathrm{dilog}\left(\frac{\sqrt{c}-x}{\sqrt{c}}\right)-$

input
```
int(x*ln(x^2/c)/(-x^2+c),x,method=_RETURNVERBOSE)
```

output
```
1/2*sum(-ln(x-_alpha)*ln(x^2/c)+2*dilog(x/_alpha)+2*ln(x-_alpha)*ln(x/_alp
ha),_alpha=RootOf(_Z^2-c))
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{x\log\left(\frac{x^2}{c}\right)}{c-x^2}\,dx=\frac{1}{2}\,\mathrm{Li}_2\left(-\frac{x^2}{c}+1\right)$$

input
```
integrate(x*log(x^2/c)/(-x^2+c),x, algorithm="fricas")
```

output
```
1/2*dilog(-x^2/c + 1)
```

Sympy [A] (verification not implemented)

Time = 3.50 (sec) , antiderivative size = 117, normalized size of antiderivative = 7.31

$$\int \frac{x\log\left(\frac{x^2}{c}\right)}{c-x^2}\,dx = \begin{cases} -\frac{\operatorname{Li}_2\left(\frac{x^2}{c}\right)}{2} \\ \log(c)\log(x) + i\pi\log(x) - \frac{\operatorname{Li}_2\left(\frac{x^2}{c}\right)}{2} \\ -\log(c)\log\left(\frac{1}{x}\right) - i\pi\log\left(\frac{1}{x}\right) - \frac{\operatorname{Li}_2\left(\frac{x^2}{c}\right)}{2} \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(c) - i\pi G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right) + G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)\log(c) + i\pi G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| \right. \end{cases}$$

$$- \frac{\log\left(\frac{x^2}{c}\right)\log\left(-c+x^2\right)}{2}$$

input
```
integrate(x*ln(x**2/c)/(-x**2+c),x)
```

output
```
Piecewise((-polylog(2, x**2/c)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(c)*
log(x) + I*pi*log(x) - polylog(2, x**2/c)/2, Abs(x) < 1), (-log(c)*log(1/x
) - I*pi*log(1/x) - polylog(2, x**2/c)/2, 1/Abs(x) < 1), (-meijerg(((), (1
, 1)), ((0, 0), ()), x)*log(c) - I*pi*meijerg(((), (1, 1)), ((0, 0), ()),
x) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(c) + I*pi*meijerg(((1, 1),
 ()), ((), (0, 0)), x) - polylog(2, x**2/c)/2, True)) - log(x**2/c)*log(-c
 + x**2)/2
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. 2(13) = 26.

Time = 0.03 (sec) , antiderivative size = 58, normalized size of antiderivative = 3.62

$$\int \frac{x\log\left(\frac{x^2}{c}\right)}{c-x^2}\,dx = -\frac{1}{2}\log\left(x^2-c\right)\log\left(\frac{x^2}{c}\right) + \frac{1}{2}\log\left(x^2-c\right)\log\left(\frac{x^2-c}{c}+1\right) + \frac{1}{2}\operatorname{Li}_2\left(-\frac{x^2-c}{c}\right)$$

input
```
integrate(x*log(x^2/c)/(-x^2+c),x, algorithm="maxima")
```

output
```
-1/2*log(x^2 - c)*log(x^2/c) + 1/2*log(x^2 - c)*log((x^2 - c)/c + 1) + 1/2
*dilog(-(x^2 - c)/c)
```

Giac [F]

$$\int \frac{x\log\left(\frac{x^2}{c}\right)}{c-x^2}\,dx = \int -\frac{x\log\left(\frac{x^2}{c}\right)}{x^2-c}\,dx$$

input
```
integrate(x*log(x^2/c)/(-x^2+c),x, algorithm="giac")
```

output
```
integrate(-x*log(x^2/c)/(x^2 - c), x)
```

Mupad [B] (verification not implemented)

Time = 25.25 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.62

$$\int \frac{x\log\left(\frac{x^2}{c}\right)}{c-x^2}\,dx = \frac{\mathrm{Li}_2\left(\frac{x^2}{c}\right)}{2}$$

input
```
int((x*log(x^2/c))/(c - x^2),x)
```

output
```
dilog(x^2/c)/2
```

Reduce [F]

$$\int \frac{x \log\left(\frac{x^2}{c}\right)}{c - x^2}\, dx = \left(\int \frac{\log\left(\frac{x^2}{c}\right)}{-x^3 + cx} dx\right) c - \frac{\log\left(\frac{x^2}{c}\right)^2}{4}$$

input
```
int(x*log(x^2/c)/(-x^2+c),x)
```

output
```
(4*int(log(x**2/c)/(c*x - x**3),x)*c - log(x**2/c)**2)/4
```

3.243 $\int \frac{\log(x)}{1-x^2} \, dx$

Optimal result . . . 1869
Mathematica [A] (verified) . . . 1869
Rubi [A] (verified) . . . 1870
Maple [A] (verified) . . . 1871
Fricas [F] . . . 1871
Sympy [C] (verification not implemented) . . . 1871
Maxima [B] (verification not implemented) . . . 1872
Giac [F] . . . 1873
Mupad [B] (verification not implemented) . . . 1873
Reduce [F] . . . 1873

Optimal result

Integrand size = 12, antiderivative size = 22

$$\int \frac{\log(x)}{1-x^2} \, dx = \operatorname{arctanh}(x)\log(x) + \frac{\operatorname{PolyLog}(2,-x)}{2} - \frac{\operatorname{PolyLog}(2,x)}{2}$$

output
```
arctanh(x)*ln(x)+1/2*polylog(2,-x)-1/2*polylog(2,x)
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.41

$$\int \frac{\log(x)}{1-x^2} \, dx = \frac{1}{2}\log(x)\log(1+x) + \frac{\operatorname{PolyLog}(2,1-x)}{2} + \frac{\operatorname{PolyLog}(2,-x)}{2}$$

input
```
Integrate[Log[x]/(1 - x^2),x]
```

output
```
(Log[x]*Log[1 + x])/2 + PolyLog[2, 1 - x]/2 + PolyLog[2, -x]/2
```

Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {2761, 6446}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log(x)}{1-x^2} \, dx$$

$$\Big\downarrow \text{2761}$$

$$\text{arctanh}(x)\log(x) - \int \frac{\text{arctanh}(x)}{x}dx$$

$$\Big\downarrow \text{6446}$$

$$\text{arctanh}(x)\log(x) + \frac{\text{PolyLog}(2,-x)}{2} - \frac{\text{PolyLog}(2,x)}{2}$$

input
```
Int[Log[x]/(1 - x^2),x]
```

output
```
ArcTanh[x]*Log[x] + PolyLog[2, -x]/2 - PolyLog[2, x]/2
```

Defintions of rubi rules used

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 6446
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x
] + (-Simp[(b/2)*PolyLog[2, (-c)*x], x] + Simp[(b/2)*PolyLog[2, c*x], x]) /
; FreeQ[{a, b, c}, x]
```

Maple [A] (verified)

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

method	result	size
default	$\frac{\operatorname{dilog}(1+x)}{2}+\frac{\ln(x)\ln(1+x)}{2}+\frac{\operatorname{dilog}(x)}{2}$	20
risch	$\frac{\operatorname{dilog}(1+x)}{2}+\frac{\ln(x)\ln(1+x)}{2}+\frac{\operatorname{dilog}(x)}{2}$	20
parts	$\frac{\operatorname{dilog}(1+x)}{2}+\frac{\ln(x)\ln(1+x)}{2}+\frac{\operatorname{dilog}(x)}{2}$	20
meijerg	$\left(\frac{\ln(x)\operatorname{LerchPhi}\left(x^2,1,\frac{1}{2}\right)}{2}-\frac{\operatorname{LerchPhi}\left(x^2,2,\frac{1}{2}\right)}{4}\right)x$	22

input
```
int(ln(x)/(-x^2+1),x,method=_RETURNVERBOSE)
```

output
```
1/2*dilog(1+x)+1/2*ln(x)*ln(1+x)+1/2*dilog(x)
```

Fricas [F]

$$\int \frac{\log(x)}{1-x^2}\,dx=\int -\frac{\log(x)}{x^2-1}\,dx$$

input
```
integrate(log(x)/(-x^2+1),x, algorithm="fricas")
```

output
```
integral(-log(x)/(x^2 - 1), x)
```

Sympy [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 6.73 (sec) , antiderivative size = 85, normalized size of antiderivative = 3.86

$$\int \frac{\log(x)}{1-x^2}\,dx = \frac{\begin{cases} -\operatorname{Li}_2(x) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1 \\ i\pi\log(x)-\operatorname{Li}_2(x) & \text{for } |x|<1 \\ -i\pi\log\left(\frac{1}{x}\right)-\operatorname{Li}_2(x) & \text{for } \frac{1}{|x|}<1 \\ -i\pi G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)+i\pi G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)-\operatorname{Li}_2(x) & \text{otherwise} \end{cases}}{2} - \frac{\log(x)\log(x-1)}{2}+\frac{\log(x)\log(x+1)}{2}+\frac{\operatorname{Li}_2(xe^{i\pi})}{2}$$

input
```
integrate(ln(x)/(-x**2+1),x)
```

output
```
Piecewise((-polylog(2, x), (Abs(x) < 1) & (1/Abs(x) < 1)), (I*pi*log(x) -
polylog(2, x), Abs(x) < 1), (-I*pi*log(1/x) - polylog(2, x), 1/Abs(x) < 1)
, (-I*pi*meijerg(((), (1, 1)), ((0, 0), ()), x) + I*pi*meijerg(((1, 1), ()
), ((), (0, 0)), x) - polylog(2, x), True))/2 - log(x)*log(x - 1)/2 + log(
x)*log(x + 1)/2 + polylog(2, x*exp_polar(I*pi))/2
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. $2(16) = 32$.

Time = 0.04 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.18

$$\int \frac{\log(x)}{1-x^2}\,dx = -\frac{1}{2}\log(-x)\log(x+1)+\frac{1}{2}(\log(x+1)-\log(x-1))\log(x) + \frac{1}{2}\log(x-1)\log(x)-\frac{1}{2}\operatorname{Li}_2(x+1)+\frac{1}{2}\operatorname{Li}_2(-x+1)$$

input
```
integrate(log(x)/(-x^2+1),x, algorithm="maxima")
```

output
```
-1/2*log(-x)*log(x + 1) + 1/2*(log(x + 1) - log(x - 1))*log(x) + 1/2*log(x
 - 1)*log(x) - 1/2*dilog(x + 1) + 1/2*dilog(-x + 1)
```

Giac [F]

$$\int \frac{\log(x)}{1-x^2}\,dx = \int -\frac{\log(x)}{x^2-1}\,dx$$

input
```
integrate(log(x)/(-x^2+1),x, algorithm="giac")
```

output
```
integrate(-log(x)/(x^2 - 1), x)
```

Mupad [B] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{\log(x)}{1-x^2}\,dx = \operatorname{atanh}(x)\ln(x) + \frac{\operatorname{polylog}(2,-x)}{2} - \frac{\operatorname{polylog}(2,x)}{2}$$

input
```
int(-log(x)/(x^2 - 1),x)
```

output
```
atanh(x)*log(x) + polylog(2, -x)/2 - polylog(2, x)/2
```

Reduce [F]

$$\int \frac{\log(x)}{1-x^2}\,dx = -\left(\int \frac{\log(x)}{x^2-1}dx\right)$$

input
```
int(log(x)/(-x^2+1),x)
```

output
```
- int(log(x)/(x**2 - 1),x)
```

3.244 $\int \frac{\log(x)}{1+x^2} dx$

Optimal result . . . 1874
Mathematica [B] (verified) . . . 1874
Rubi [A] (verified) . . . 1875
Maple [C] (verified) . . . 1876
Fricas [F] . . . 1877
Sympy [F] . . . 1877
Maxima [A] (verification not implemented) . . . 1877
Giac [F] . . . 1878
Mupad [B] (verification not implemented) . . . 1878
Reduce [F] . . . 1878

Optimal result

Integrand size = 10, antiderivative size = 32

$$\int \frac{\log(x)}{1+x^2} dx = \arctan(x)\log(x) - \frac{1}{2}i\,\text{PolyLog}(2,-ix) + \frac{1}{2}i\,\text{PolyLog}(2,ix)$$

output
```
arctan(x)*ln(x)-1/2*I*polylog(2,-I*x)+1/2*I*polylog(2,I*x)
```

Mathematica [B] (verified)

Both result and optimal contain complex but leaf count is larger than twice the leaf count of optimal. 65 vs. 2(32) = 64.

Time = 0.01 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.03

$$\int \frac{\log(x)}{1+x^2} dx = -\frac{1}{2}i\log(-i(i-x))\log(x) + \frac{1}{2}i\log(x)\log(-i(i+x)) - \frac{1}{2}i\,\text{PolyLog}(2,-ix) + \frac{1}{2}i\,\text{PolyLog}(2,ix)$$

input
```
Integrate[Log[x]/(1 + x^2),x]
```

output
```
(-1/2*I)*Log[(-I)*(I - x)]*Log[x] + (I/2)*Log[x]*Log[(-I)*(I + x)] - (I/2)
*PolyLog[2, (-I)*x] + (I/2)*PolyLog[2, I*x]
```

Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.300, Rules used = {2761, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log(x)}{x^2+1}dx$$

$$\Big\downarrow \text{2761}$$

$$\arctan(x)\log(x)-\int \frac{\arctan(x)}{x}dx$$

$$\Big\downarrow \text{5355}$$

$$-\frac{1}{2}i\int \frac{\log(1-ix)}{x}dx+\frac{1}{2}i\int \frac{\log(ix+1)}{x}dx+\arctan(x)\log(x)$$

$$\Big\downarrow \text{2838}$$

$$\arctan(x)\log(x)-\frac{1}{2}i\,\text{PolyLog}(2,-ix)+\frac{1}{2}i\,\text{PolyLog}(2,ix)$$

input
```
Int[Log[x]/(1 + x^2),x]
```

output
```
ArcTan[x]*Log[x] - (I/2)*PolyLog[2, (-I)*x] + (I/2)*PolyLog[2, I*x]
```

Defintions of rubi rules used

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Maple [C] (verified)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.45 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.81

method	result	size
meijerg	$\left(\frac{\ln\left(x\right) \operatorname{LerchPhi}\left(-x^{2},1,\frac{1}{2}\right)}{2}-\frac{\operatorname{LerchPhi}\left(-x^{2},2,\frac{1}{2}\right)}{4}\right) x$	26
default	$-\frac{i \ln\left(x\right) \ln\left(i x +1\right)}{2}+\frac{i \ln\left(x\right) \ln\left(-i x +1\right)}{2}-\frac{i \operatorname{dilog}\left(i x +1\right)}{2}+\frac{i \operatorname{dilog}\left(-i x +1\right)}{2}$	46
risch	$-\frac{i \ln\left(x\right) \ln\left(i x +1\right)}{2}+\frac{i \ln\left(x\right) \ln\left(-i x +1\right)}{2}-\frac{i \operatorname{dilog}\left(i x +1\right)}{2}+\frac{i \operatorname{dilog}\left(-i x +1\right)}{2}$	46
parts	$-\frac{i \ln\left(x\right) \ln\left(i x +1\right)}{2}+\frac{i \ln\left(x\right) \ln\left(-i x +1\right)}{2}-\frac{i \operatorname{dilog}\left(i x +1\right)}{2}+\frac{i \operatorname{dilog}\left(-i x +1\right)}{2}$	46

input
```
int(ln(x)/(x^2+1),x,method=_RETURNVERBOSE)
```

output
```
(1/2*ln(x)*LerchPhi(-x^2,1,1/2)-1/4*LerchPhi(-x^2,2,1/2))*x
```

Fricas [F]

$$\int \frac{\log(x)}{1+x^2}\,dx = \int \frac{\log(x)}{x^2+1}\,dx$$

input
```
integrate(log(x)/(x^2+1),x, algorithm="fricas")
```

output
```
integral(log(x)/(x^2 + 1), x)
```

Sympy [F]

$$\int \frac{\log(x)}{1+x^2}\,dx = \int \frac{\log(x)}{x^2+1}\,dx$$

input
```
integrate(ln(x)/(x**2+1),x)
```

output
```
Integral(log(x)/(x**2 + 1), x)
```

Maxima [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.81

$$\int \frac{\log(x)}{1+x^2}\,dx = \frac{1}{4}\pi\log\left(x^2+1\right) + \frac{1}{2}i\,\mathrm{Li}_2(i\,x+1) - \frac{1}{2}i\,\mathrm{Li}_2(-i\,x+1)$$

input
```
integrate(log(x)/(x^2+1),x, algorithm="maxima")
```

output
```
1/4*pi*log(x^2 + 1) + 1/2*I*dilog(I*x + 1) - 1/2*I*dilog(-I*x + 1)
```

Giac [F]

$$\int \frac{\log(x)}{1+x^2}\,dx = \int \frac{\log(x)}{x^2+1}\,dx$$

input
```
integrate(log(x)/(x^2+1),x, algorithm="giac")
```

output
```
integrate(log(x)/(x^2 + 1), x)
```

Mupad [B] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.75

$$\int \frac{\log(x)}{1+x^2}\,dx = \operatorname{atan}(x)\,\ln(x) - \frac{\operatorname{polylog}(2,-x\,1\mathrm{i})\,1\mathrm{i}}{2} + \frac{\operatorname{polylog}(2,x\,1\mathrm{i})\,1\mathrm{i}}{2}$$

input
```
int(log(x)/(x^2 + 1),x)
```

output
```
atan(x)*log(x) - (polylog(2, -x*1i)*1i)/2 + (polylog(2, x*1i)*1i)/2
```

Reduce [F]

$$\int \frac{\log(x)}{1+x^2}\,dx = \int \frac{\log(x)}{x^2+1}dx$$

input
```
int(log(x)/(x^2+1),x)
```

output
```
int(log(x)/(x**2 + 1),x)
```

3.245 $\int \frac{a+b\log(cx)}{1-ex^2}\,dx$

Optimal result 1879
Mathematica [A] (verified) 1879
Rubi [A] (verified) 1880
Maple [C] (verified) 1881
Fricas [F] 1882
Sympy [F] 1882
Maxima [F(-2)] 1882
Giac [F] 1883
Mupad [F(-1)] 1883
Reduce [F] 1883

Optimal result

Integrand size = 19, antiderivative size = 62

$$\int \frac{a+b\log(cx)}{1-ex^2}\,dx=\frac{\operatorname{arctanh}\left(\sqrt{e}x\right)(a+b\log(cx))}{\sqrt{e}}+\frac{b\,\operatorname{PolyLog}\left(2,-\sqrt{e}x\right)}{2\sqrt{e}}-\frac{b\,\operatorname{PolyLog}\left(2,\sqrt{e}x\right)}{2\sqrt{e}}$$

output
```
arctanh(e^(1/2)*x)*(a+b*ln(c*x))/e^(1/2)+1/2*b*polylog(2,-e^(1/2)*x)/e^(1/
2)-1/2*b*polylog(2,e^(1/2)*x)/e^(1/2)
```

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log(cx)}{1-ex^2}\,dx=\frac{-\left((a+b\log(cx))\left(\log\left(1-\sqrt{e}x\right)-\log\left(1+\sqrt{e}x\right)\right)\right)+b\,\operatorname{PolyLog}\left(2,-\sqrt{e}x\right)-b\,\operatorname{PolyLog}\left(2,\sqrt{e}x\right)}{2\sqrt{e}}$$

input
```
Integrate[(a + b*Log[c*x])/(1 - e*x^2),x]
```

output
```
(-((a + b*Log[c*x])*(Log[1 - Sqrt[e]*x] - Log[1 + Sqrt[e]*x])) + b*PolyLog
[2, -(Sqrt[e]*x)] - b*PolyLog[2, Sqrt[e]*x])/(2*Sqrt[e])
```

Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 59, normalized size of antiderivative = 0.95, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {2761, 27, 6446}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx)}{1-ex^2}\,dx$$

$$\Big\downarrow \text{ 2761}$$

$$\frac{\operatorname{arctanh}\left(\sqrt{e}x\right)(a+b\log(cx))}{\sqrt{e}}-b\int \frac{\operatorname{arctanh}\left(\sqrt{e}x\right)}{\sqrt{e}x}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{\operatorname{arctanh}\left(\sqrt{e}x\right)(a+b\log(cx))}{\sqrt{e}}-\frac{b\int \frac{\operatorname{arctanh}\left(\sqrt{e}x\right)}{x}dx}{\sqrt{e}}$$

$$\Big\downarrow \text{ 6446}$$

$$\frac{\operatorname{arctanh}\left(\sqrt{e}x\right)(a+b\log(cx))}{\sqrt{e}}-\frac{b\left(\frac{\operatorname{PolyLog}(2,\sqrt{e}x)}{2}-\frac{1}{2}\operatorname{PolyLog}\left(2,-\sqrt{e}x\right)\right)}{\sqrt{e}}$$

input
```
Int[(a + b*Log[c*x])/(1 - e*x^2),x]
```

output
```
(ArcTanh[Sqrt[e]*x]*(a + b*Log[c*x]))/Sqrt[e] - (b*(-1/2*PolyLog[2, -(Sqrt
[e]*x)] + PolyLog[2, Sqrt[e]*x]/2))/Sqrt[e]
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 6446
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x
] + (-Simp[(b/2)*PolyLog[2, (-c)*x], x] + Simp[(b/2)*PolyLog[2, c*x], x]) /
; FreeQ[{a, b, c}, x]
```

Maple [C] (verified)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.32 (sec) , antiderivative size = 53, normalized size of antiderivative = 0.85

method	result
meijerg	$\frac{a\,\operatorname{arctanh}\left(\sqrt{e}\,x\right)}{\sqrt{e}}+\left(\frac{b\ln\left(x\right)\operatorname{LerchPhi}\left(e\,x^{2},1,\frac{1}{2}\right)}{2}-\frac{b\operatorname{LerchPhi}\left(e\,x^{2},2,\frac{1}{2}\right)}{4}\right)x+\frac{b\ln\left(c\right)\operatorname{arctanh}\left(\sqrt{e}\,x\right)}{\sqrt{e}}$
parts	$\frac{a\,\operatorname{arctanh}\left(\sqrt{e}\,x\right)}{\sqrt{e}}-bc\left(\frac{\ln\left(xc\right)\left(\ln\left(-\frac{\sqrt{e}\,xc-c}{c}\right)-\ln\left(\frac{\sqrt{e}\,xc+c}{c}\right)\right)}{2\sqrt{e}\,c}+\frac{\operatorname{dilog}\left(-\frac{\sqrt{e}\,xc-c}{c}\right)-\operatorname{dilog}\left(\frac{\sqrt{e}\,xc+c}{c}\right)}{2\sqrt{e}\,c}\right)$
risch	$\frac{a\,\operatorname{arctanh}\left(\sqrt{e}\,x\right)}{\sqrt{e}}-\frac{b\ln\left(xc\right)\ln\left(-\frac{\sqrt{e}\,xc-c}{c}\right)}{2\sqrt{e}}+\frac{b\ln\left(xc\right)\ln\left(\frac{\sqrt{e}\,xc+c}{c}\right)}{2\sqrt{e}}-\frac{b\operatorname{dilog}\left(-\frac{\sqrt{e}\,xc-c}{c}\right)}{2\sqrt{e}}+\frac{b\operatorname{dilog}\left(\frac{\sqrt{e}\,xc+c}{c}\right)}{2\sqrt{e}}$
derivativedivides	$\frac{\frac{ca\,\operatorname{arctanh}\left(\sqrt{e}\,x\right)}{\sqrt{e}}+c^{2}b\left(-\frac{\ln\left(xc\right)\left(\ln\left(-\frac{\sqrt{e}\,xc-c}{c}\right)-\ln\left(\frac{\sqrt{e}\,xc+c}{c}\right)\right)}{2\sqrt{e}\,c}-\frac{\operatorname{dilog}\left(-\frac{\sqrt{e}\,xc-c}{c}\right)-\operatorname{dilog}\left(\frac{\sqrt{e}\,xc+c}{c}\right)}{2\sqrt{e}\,c}\right)}{c}$
default	$\frac{\frac{ca\,\operatorname{arctanh}\left(\sqrt{e}\,x\right)}{\sqrt{e}}+c^{2}b\left(-\frac{\ln\left(xc\right)\left(\ln\left(-\frac{\sqrt{e}\,xc-c}{c}\right)-\ln\left(\frac{\sqrt{e}\,xc+c}{c}\right)\right)}{2\sqrt{e}\,c}-\frac{\operatorname{dilog}\left(-\frac{\sqrt{e}\,xc-c}{c}\right)-\operatorname{dilog}\left(\frac{\sqrt{e}\,xc+c}{c}\right)}{2\sqrt{e}\,c}\right)}{c}$

input
```
int((a+b*ln(x*c))/(-e*x^2+1),x,method=_RETURNVERBOSE)
```

output
```
a/e^(1/2)*arctanh(e^(1/2)*x)+(1/2*b*ln(x)*LerchPhi(e*x^2,1,1/2)-1/4*b*Lerc
hPhi(e*x^2,2,1/2))*x+b*ln(c)/e^(1/2)*arctanh(e^(1/2)*x)
```

Fricas [F]

$$\int \frac{a+b\log(cx)}{1-ex^2}\,dx = \int -\frac{b\log{(cx)}+a}{ex^2-1}\,dx$$

input
```
integrate((a+b*log(c*x))/(-e*x^2+1),x, algorithm="fricas")
```

output
```
integral(-(b*log(c*x) + a)/(e*x^2 - 1), x)
```

Sympy [F]

$$\int \frac{a+b\log(cx)}{1-ex^2}\,dx = -\int \frac{a}{ex^2-1}\,dx - \int \frac{b\log{(cx)}}{ex^2-1}\,dx$$

input
```
integrate((a+b*ln(c*x))/(-e*x**2+1),x)
```

output
```
-Integral(a/(e*x**2 - 1), x) - Integral(b*log(c*x)/(e*x**2 - 1), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx)}{1-ex^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x))/(-e*x^2+1),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log(cx)}{1-ex^2}\,dx=\int -\frac{b\log{(cx)}+a}{ex^2-1}\,dx$$

input
```
integrate((a+b*log(c*x))/(-e*x^2+1),x, algorithm="giac")
```

output
```
integrate(-(b*log(c*x) + a)/(e*x^2 - 1), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx)}{1-ex^2}\,dx=\int -\frac{a+b\,\ln{(c\,x)}}{e\,x^2-1}\,dx$$

input
```
int(-(a + b*log(c*x))/(e*x^2 - 1),x)
```

output
```
int(-(a + b*log(c*x))/(e*x^2 - 1), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx)}{1-ex^2}\,dx=\frac{-\sqrt{e}\log\left(-\sqrt{e}+ex\right)a+\sqrt{e}\log\left(\sqrt{e}+ex\right)a-2\left(\int \frac{\log(cx)}{e\,x^2-1}dx\right)be}{2e}$$

input
```
int((a+b*log(c*x))/(-e*x^2+1),x)
```

output
```
( - sqrt(e)*log( - sqrt(e) + e*x)*a + sqrt(e)*log(sqrt(e) + e*x)*a - 2*int
(log(c*x)/(e*x**2 - 1),x)*b*e)/(2*e)
```

3.246 $\int \frac{a+b\log(cx^n)}{1-ex^2}\,dx$

Optimal result . . . 1885
Mathematica [A] (verified) . . . 1885
Rubi [A] (verified) . . . 1886
Maple [C] (verified) . . . 1887
Fricas [F] . . . 1888
Sympy [F] . . . 1888
Maxima [F(-2)] . . . 1888
Giac [F] . . . 1889
Mupad [F(-1)] . . . 1889
Reduce [F] . . . 1889

Optimal result

Integrand size = 21, antiderivative size = 66

$$\int \frac{a+b\log(cx^n)}{1-ex^2}\,dx=\frac{\operatorname{arctanh}\left(\sqrt{e}x\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{bn\,\operatorname{PolyLog}\left(2,-\sqrt{e}x\right)}{2\sqrt{e}}-\frac{bn\,\operatorname{PolyLog}\left(2,\sqrt{e}x\right)}{2\sqrt{e}}$$

output
```
arctanh(e^(1/2)*x)*(a+b*ln(c*x^n))/e^(1/2)+1/2*b*n*polylog(2,-e^(1/2)*x)/e
^(1/2)-1/2*b*n*polylog(2,e^(1/2)*x)/e^(1/2)
```

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 72, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log(cx^n)}{1-ex^2}\,dx=\frac{-\left((a+b\log(cx^n))\left(\log\left(1-\sqrt{e}x\right)-\log\left(1+\sqrt{e}x\right)\right)\right)+bn\,\operatorname{PolyLog}\left(2,-\sqrt{e}x\right)-bn\,\operatorname{PolyLog}\left(2,\sqrt{e}x\right)}{2\sqrt{e}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(1 - e*x^2),x]
```

output
```
(-((a + b*Log[c*x^n])*(Log[1 - Sqrt[e]*x] - Log[1 + Sqrt[e]*x])) + b*n*Pol
yLog[2, -(Sqrt[e]*x)] - b*n*PolyLog[2, Sqrt[e]*x])/(2*Sqrt[e])
```

Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 62, normalized size of antiderivative = 0.94, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {2761, 27, 6446}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{1-ex^2}\,dx$$

$$\Big\downarrow \; 2761$$

$$\frac{\operatorname{arctanh}(\sqrt{e}x)(a+b\log(cx^n))}{\sqrt{e}}-bn\int \frac{\operatorname{arctanh}(\sqrt{e}x)}{\sqrt{e}x}dx$$

$$\Big\downarrow \; 27$$

$$\frac{\operatorname{arctanh}(\sqrt{e}x)(a+b\log(cx^n))}{\sqrt{e}}-\frac{bn\int \frac{\operatorname{arctanh}(\sqrt{e}x)}{x}dx}{\sqrt{e}}$$

$$\Big\downarrow \; 6446$$

$$\frac{\operatorname{arctanh}(\sqrt{e}x)(a+b\log(cx^n))}{\sqrt{e}}-\frac{bn\left(\frac{\operatorname{PolyLog}(2,\sqrt{e}x)}{2}-\frac{1}{2}\operatorname{PolyLog}(2,-\sqrt{e}x)\right)}{\sqrt{e}}$$

input
```
Int[(a + b*Log[c*x^n])/(1 - e*x^2),x]
```

output
```
(ArcTanh[Sqrt[e]*x]*(a + b*Log[c*x^n]))/Sqrt[e] - (b*n*(-1/2*PolyLog[2, -(
Sqrt[e]*x)] + PolyLog[2, Sqrt[e]*x]/2))/Sqrt[e]
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 6446
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x
] + (-Simp[(b/2)*PolyLog[2, (-c)*x], x] + Simp[(b/2)*PolyLog[2, c*x], x]) /
; FreeQ[{a, b, c}, x]
```

Maple [C] (verified)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.39 (sec) , antiderivative size = 55, normalized size of antiderivative = 0.83

method	result
meijerg	$\frac{a\,\operatorname{arctanh}\left(\sqrt{e}\,x\right)}{\sqrt{e}}+\frac{b\ln\left(c\right)\operatorname{arctanh}\left(\sqrt{e}\,x\right)}{\sqrt{e}}+\left(\frac{bn\ln\left(x\right)\operatorname{LerchPhi}\left(e\,x^{2},1,\frac{1}{2}\right)}{2}-\frac{bn\operatorname{LerchPhi}\left(e\,x^{2},2,\frac{1}{2}\right)}{4}\right)x$
risch	$-\frac{\left(-\frac{ib\pi\ \operatorname{csgn}\left(ix^{n}\right)\operatorname{csgn}\left(ic\,x^{n}\right)^{2}}{2}+\frac{ib\pi\ \operatorname{csgn}\left(ix^{n}\right)\operatorname{csgn}\left(ic\,x^{n}\right)\operatorname{csgn}\left(ic\right)}{2}+\frac{ib\pi\operatorname{csgn}\left(ic\,x^{n}\right)^{3}}{2}-\frac{ib\pi\operatorname{csgn}\left(ic\,x^{n}\right)^{2}\operatorname{csgn}\left(ic\right)}{2}-b\ln\left(c\right)-a\right)\operatorname{arctanh}\left(\sqrt{\ }\right.}{\sqrt{e}}$

input
```
int((a+b*ln(c*x^n))/(-e*x^2+1),x,method=_RETURNVERBOSE)
```

output
```
a/e^(1/2)*arctanh(e^(1/2)*x)+b*ln(c)/e^(1/2)*arctanh(e^(1/2)*x)+(1/2*b*n*l
n(x)*LerchPhi(e*x^2,1,1/2)-1/4*b*n*LerchPhi(e*x^2,2,1/2))*x
```

Fricas [F]

$$\int \frac{a + b\log (cx^n)}{1 - ex^2} \, dx = \int -\frac{b\log (cx^n) + a}{ex^2 - 1} \, dx$$

input
```
integrate((a+b*log(c*x^n))/(-e*x^2+1),x, algorithm="fricas")
```

output
```
integral(-(b*log(c*x^n) + a)/(e*x^2 - 1), x)
```

Sympy [F]

$$\int \frac{a + b\log (cx^n)}{1 - ex^2} \, dx = -\int \frac{a}{ex^2 - 1} \, dx - \int \frac{b\log (cx^n)}{ex^2 - 1} \, dx$$

input
```
integrate((a+b*ln(c*x**n))/(-e*x**2+1),x)
```

output
```
-Integral(a/(e*x**2 - 1), x) - Integral(b*log(c*x**n)/(e*x**2 - 1), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log (cx^n)}{1 - ex^2} \, dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/(-e*x^2+1),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{1-ex^2}\,dx = \int -\frac{b\log(cx^n)+a}{ex^2-1}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(-e*x^2+1),x, algorithm="giac")
```

output
```
integrate(-(b*log(c*x^n) + a)/(e*x^2 - 1), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{1-ex^2}\,dx = \int -\frac{a+b\,\ln(c\,x^n)}{e\,x^2-1}\,dx$$

input
```
int(-(a + b*log(c*x^n))/(e*x^2 - 1),x)
```

output
```
int(-(a + b*log(c*x^n))/(e*x^2 - 1), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{1-ex^2}\,dx = \frac{-\sqrt{e}\log\left(-\sqrt{e}+ex\right)a+\sqrt{e}\log\left(\sqrt{e}+ex\right)a-2\left(\int \frac{\log(x^n c)}{e\,x^2-1}dx\right)be}{2e}$$

input
```
int((a+b*log(c*x^n))/(-e*x^2+1),x)
```

output
```
( - sqrt(e)*log( - sqrt(e) + e*x)*a + sqrt(e)*log(sqrt(e) + e*x)*a - 2*int
(log(x**n*c)/(e*x**2 - 1),x)*b*e)/(2*e)
```

3.247 $\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx$

Optimal result 1891
Mathematica [A] (verified) 1892
Rubi [A] (verified) 1892
Maple [F] 1894
Fricas [F] 1894
Sympy [F] 1895
Maxima [F(-2)] 1895
Giac [F] 1895
Mupad [F(-1)] 1896
Reduce [F] 1896

Optimal result

Integrand size = 22, antiderivative size = 457

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx = \frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}x\right)} + \frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}x\right)} + \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))^2}{2d^{3/2}\sqrt{e}} + \frac{bn(a+b\log(cx^n))\log\left(1-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}} - \frac{bn(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}} - \frac{b^2n^2\operatorname{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}} + \frac{bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}} + \frac{b^2n^2\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}} - \frac{bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}} - \frac{b^2n^2\operatorname{PolyLog}\left(3,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}} + \frac{b^2n^2\operatorname{PolyLog}\left(3,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}$$

output
```
1/4*x*(a+b*ln(c*x^n))^2/(-d)^(3/2)/((-d)^(1/2)-e^(1/2)*x)+1/4*x*(a+b*ln(c*
x^n))^2/(-d)^(3/2)/((-d)^(1/2)+e^(1/2)*x)+1/2*arctan(e^(1/2)*x/d^(1/2))*(a
+b*ln(c*x^n))^2/d^(3/2)/e^(1/2)+1/2*b*n*(a+b*ln(c*x^n))*ln(1-e^(1/2)*x/(-d
)^(1/2))/(-d)^(3/2)/e^(1/2)-1/2*b*n*(a+b*ln(c*x^n))*ln(1+e^(1/2)*x/(-d)^(1
/2))/(-d)^(3/2)/e^(1/2)-1/2*b^2*n^2*polylog(2,-e^(1/2)*x/(-d)^(1/2))/(-d)^
(3/2)/e^(1/2)+1/2*b*n*(a+b*ln(c*x^n))*polylog(2,-e^(1/2)*x/(-d)^(1/2))/(-d
)^(3/2)/e^(1/2)+1/2*b^2*n^2*polylog(2,e^(1/2)*x/(-d)^(1/2))/(-d)^(3/2)/e^(
1/2)-1/2*b*n*(a+b*ln(c*x^n))*polylog(2,e^(1/2)*x/(-d)^(1/2))/(-d)^(3/2)/e^
(1/2)-1/2*b^2*n^2*polylog(3,-e^(1/2)*x/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+1/2*
b^2*n^2*polylog(3,e^(1/2)*x/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)
```

Mathematica [A] (verified)

Time = 0.93 (sec) , antiderivative size = 432, normalized size of antiderivative = 0.95

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx$$
$$= \frac{-\frac{(a+b\log(cx^n))^2}{d(\sqrt{-d}-\sqrt{e}x)}+\frac{(a+b\log(cx^n))^2}{d(\sqrt{-d}+\sqrt{e}x)}-\frac{2bn(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{3/2}}+\frac{(a+b\log(cx^n))^2\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{3/2}}+\frac{2bn(a+b\log(cx^n))\log\left(1+\right.}{(-d)^{3/2}}}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(d + e*x^2)^2,x]
```

output
```
(-((a + b*Log[c*x^n])^2/(d*(Sqrt[-d] - Sqrt[e]*x))) + (a + b*Log[c*x^n])^2
/(d*(Sqrt[-d] + Sqrt[e]*x)) - (2*b*n*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x
)/Sqrt[-d]])/(-d)^(3/2) + ((a + b*Log[c*x^n])^2*Log[1 + (Sqrt[e]*x)/Sqrt[-
d]])/(-d)^(3/2) + (2*b*n*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/
2)])/(-d)^(3/2) + (d*(a + b*Log[c*x^n])^2*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)
])/(-d)^(5/2) + (2*b^2*n^2*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(3/2) -
(2*b*n*(a + b*Log[c*x^n])*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(3/2) - (
2*b^2*n^2*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(3/2) + (2*b*n*(a + b
*Log[c*x^n])*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(3/2) + (2*b^2*n^2
*PolyLog[3, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(3/2) - (2*b^2*n^2*PolyLog[3, (d*S
qrt[e]*x)/(-d)^(3/2)])/(-d)^(3/2))/(4*Sqrt[e])
```

Rubi [A] (verified)

Time = 0.95 (sec) , antiderivative size = 509, normalized size of antiderivative = 1.11, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx$$
$$\Big\downarrow \text{2767}$$

$$\int \left(-\frac{e(a+b\log(cx^n))^2}{2d(-de-e^2x^2)}-\frac{e(a+b\log(cx^n))^2}{4d\left(\sqrt{-d}\sqrt{e}-ex\right)^2}-\frac{e(a+b\log(cx^n))^2}{4d\left(\sqrt{-d}\sqrt{e}+ex\right)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{bn\operatorname{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}-\frac{bn\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}+\frac{bn\log\left(1-\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}-\frac{bn\log\left(\frac{\sqrt{e}x}{\sqrt{-d}}+1\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}+\frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}x\right)}+\frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}x\right)}-\frac{\log\left(1-\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))^2}{4(-d)^{3/2}\sqrt{e}}+\frac{\log\left(\frac{\sqrt{e}x}{\sqrt{-d}}+1\right)(a+b\log(cx^n))^2}{4(-d)^{3/2}\sqrt{e}}-\frac{b^2n^2\operatorname{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}+\frac{b^2n^2\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}-\frac{b^2n^2\operatorname{PolyLog}\left(3,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}+\frac{b^2n^2\operatorname{PolyLog}\left(3,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}$$

input

```
Int[(a + b*Log[c*x^n])^2/(d + e*x^2)^2,x]
```

output

```
(x*(a + b*Log[c*x^n])^2)/(4*(-d)^(3/2)*(Sqrt[-d] - Sqrt[e]*x)) + (x*(a + b
*Log[c*x^n])^2)/(4*(-d)^(3/2)*(Sqrt[-d] + Sqrt[e]*x)) + (b*n*(a + b*Log[c*
x^n])*Log[1 - (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*Sqrt[e]) - ((a + b*Log[
c*x^n])^2*Log[1 - (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[e]) - (b*n*(a
+ b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*Sqrt[e]) + ((
a + b*Log[c*x^n])^2*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[e])
- (b^2*n^2*PolyLog[2, -((Sqrt[e]*x)/Sqrt[-d])])/(2*(-d)^(3/2)*Sqrt[e]) + (
b*n*(a + b*Log[c*x^n])*PolyLog[2, -((Sqrt[e]*x)/Sqrt[-d])])/(2*(-d)^(3/2)*
Sqrt[e]) + (b^2*n^2*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*Sqrt[e
]) - (b*n*(a + b*Log[c*x^n])*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/
2)*Sqrt[e]) - (b^2*n^2*PolyLog[3, -((Sqrt[e]*x)/Sqrt[-d])])/(2*(-d)^(3/2)*
Sqrt[e]) + (b^2*n^2*PolyLog[3, (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*Sqrt[e
])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Maple [F]

$$\int \frac{(a+b\ln (c\,x^n))^2}{(e\,x^2+d)^2}dx$$

input
```
int((a+b*ln(c*x^n))^2/(e*x^2+d)^2,x)
```

output
```
int((a+b*ln(c*x^n))^2/(e*x^2+d)^2,x)
```

Fricas [F]

$$\int \frac{(a+b\log (cx^n))^2}{(d+ex^2)^2}\,dx=\int \frac{(b\log (cx^n)+a)^2}{(ex^2+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^2*x^4 + 2*d*e*x^2
+ d^2), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx = \int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/(e*x**2+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(d + e*x**2)**2, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex^2+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/(e*x^2 + d)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx=\int \frac{(a+b\,\ln(c\,x^n))^2}{(e\,x^2+d)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(d + e*x^2)^2,x)
```

output
```
int((a + b*log(c*x^n))^2/(d + e*x^2)^2, x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx = \frac{\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)a^2d+\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)a^2e\,x^2+2\left(\int \frac{\log(x^nc)^2}{e^2x^4+2de\,x^2+d^2}dx\right)b^2d^3e+2\left(\int \frac{\log(x^nc)^2}{e^2x^4+2de\,x^2+d^2}\right.}{2d^2e\,(e\,x^2+d)}$$

input
```
int((a+b*log(c*x^n))^2/(e*x^2+d)^2,x)
```

output
```
(sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a**2*d + sqrt(e)*sqrt(d)*at
an((e*x)/(sqrt(e)*sqrt(d)))*a**2*e*x**2 + 2*int(log(x**n*c)**2/(d**2 + 2*d
*e*x**2 + e**2*x**4),x)*b**2*d**3*e + 2*int(log(x**n*c)**2/(d**2 + 2*d*e*x
**2 + e**2*x**4),x)*b**2*d**2*e**2*x**2 + 4*int(log(x**n*c)/(d**2 + 2*d*e*
x**2 + e**2*x**4),x)*a*b*d**3*e + 4*int(log(x**n*c)/(d**2 + 2*d*e*x**2 + e
**2*x**4),x)*a*b*d**2*e**2*x**2 + a**2*d*e*x)/(2*d**2*e*(d + e*x**2))
```

3.248 $\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx$

Optimal result . . . 1898
Mathematica [C] (verified) . . . 1899
Rubi [A] (verified) . . . 1900
Maple [F] . . . 1902
Fricas [F] . . . 1902
Sympy [F] . . . 1903
Maxima [F(-2)] . . . 1903
Giac [F] . . . 1903
Mupad [F(-1)] . . . 1904
Reduce [F] . . . 1904

Optimal result

Integrand size = 22, antiderivative size = 659

$$
\begin{aligned}
\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx &= \frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}x\right)}+\frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}x\right)} \\
&+\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))^3}{2d^{3/2}\sqrt{e}} \\
&+\frac{3bn(a+b\log(cx^n))^2\log\left(1-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4(-d)^{3/2}\sqrt{e}} \\
&-\frac{3bn(a+b\log(cx^n))^2\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4(-d)^{3/2}\sqrt{e}} \\
&-\frac{3b^2n^2(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}} \\
&+\frac{3bn(a+b\log(cx^n))^2\operatorname{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4(-d)^{3/2}\sqrt{e}} \\
&+\frac{3b^2n^2(a+b\log(cx^n))\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}} \\
&-\frac{3bn(a+b\log(cx^n))^2\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4(-d)^{3/2}\sqrt{e}} \\
&+\frac{3b^3n^3\operatorname{PolyLog}\left(3,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}} \\
&-\frac{3b^2n^2(a+b\log(cx^n))\operatorname{PolyLog}\left(3,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}} \\
&-\frac{3b^3n^3\operatorname{PolyLog}\left(3,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}} \\
&+\frac{3b^2n^2(a+b\log(cx^n))\operatorname{PolyLog}\left(3,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}} \\
&+\frac{3b^3n^3\operatorname{PolyLog}\left(4,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}-\frac{3b^3n^3\operatorname{PolyLog}\left(4,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}
\end{aligned}
$$

output
```
1/4*x*(a+b*ln(c*x^n))^3/(-d)^(3/2)/((-d)^(1/2)-e^(1/2)*x)+1/4*x*(a+b*ln(c*
x^n))^3/(-d)^(3/2)/((-d)^(1/2)+e^(1/2)*x)+1/2*arctan(e^(1/2)*x/d^(1/2))*(a
+b*ln(c*x^n))^3/d^(3/2)/e^(1/2)+3/4*b*n*(a+b*ln(c*x^n))^2*ln(1-e^(1/2)*x/(
-d)^(1/2))/(-d)^(3/2)/e^(1/2)-3/4*b*n*(a+b*ln(c*x^n))^2*ln(1+e^(1/2)*x/(-d
)^(1/2))/(-d)^(3/2)/e^(1/2)-3/2*b^2*n^2*(a+b*ln(c*x^n))*polylog(2,-e^(1/2)
*x/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+3/4*b*n*(a+b*ln(c*x^n))^2*polylog(2,-e^(
1/2)*x/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+3/2*b^2*n^2*(a+b*ln(c*x^n))*polylog(
2,e^(1/2)*x/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-3/4*b*n*(a+b*ln(c*x^n))^2*polyl
og(2,e^(1/2)*x/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+3/2*b^3*n^3*polylog(3,-e^(1/
2)*x/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-3/2*b^2*n^2*(a+b*ln(c*x^n))*polylog(3,
-e^(1/2)*x/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-3/2*b^3*n^3*polylog(3,e^(1/2)*x/
(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+3/2*b^2*n^2*(a+b*ln(c*x^n))*polylog(3,e^(1/
2)*x/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+3/2*b^3*n^3*polylog(4,-e^(1/2)*x/(-d)^
(1/2))/(-d)^(3/2)/e^(1/2)-3/2*b^3*n^3*polylog(4,e^(1/2)*x/(-d)^(1/2))/(-d)
^(3/2)/e^(1/2)
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 5.54 (sec) , antiderivative size = 1073, normalized size of antiderivative = 1.63

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx = \text{Too large to display}$$

input
```
Integrate[(a + b*Log[c*x^n])^3/(d + e*x^2)^2,x]
```

output
```
((2*Sqrt[d]*x*(a - b*n*Log[x] + b*Log[c*x^n])^3)/(d + e*x^2) + (2*ArcTan[(
Sqrt[e]*x)/Sqrt[d]]*(a - b*n*Log[x] + b*Log[c*x^n])^3)/Sqrt[e] + 3*b*n*(a
- b*n*Log[x] + b*Log[c*x^n])^2*((Sqrt[e]*x*Log[x] + I*(Sqrt[d] + I*Sqrt[e]
*x)*Log[I*Sqrt[d] - Sqrt[e]*x])/(Sqrt[d]*Sqrt[e] + I*e*x) + (Sqrt[e]*x*Log
[x] + ((-I)*Sqrt[d] - Sqrt[e]*x)*Log[I*Sqrt[d] + Sqrt[e]*x])/(Sqrt[d]*Sqrt
[e] - I*e*x) - (I*(Log[x]*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] + PolyLog[2, ((-I
)*Sqrt[e]*x)/Sqrt[d]]))/Sqrt[e] + (I*(Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]
] + PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]]))/Sqrt[e]) + 3*b^2*n^2*(a - b*n*Log[
x] + b*Log[c*x^n])*((Log[x]*(Sqrt[e]*x*Log[x] + (2*I)*(Sqrt[d] + I*Sqrt[e]
*x)*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]]) + (2*I)*(Sqrt[d] + I*Sqrt[e]*x)*PolyLo
g[2, ((-I)*Sqrt[e]*x)/Sqrt[d]])/(Sqrt[d]*Sqrt[e] + I*e*x) + (Log[x]*(Sqrt[
e]*x*Log[x] - (2*I)*(Sqrt[d] - I*Sqrt[e]*x)*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]]
) - 2*(I*Sqrt[d] + Sqrt[e]*x)*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])/(Sqrt[d]*
Sqrt[e] - I*e*x) - (I*(Log[x]^2*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] + 2*Log[x]*
PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] - 2*PolyLog[3, ((-I)*Sqrt[e]*x)/Sqrt[
d]]))/Sqrt[e] + (I*(Log[x]^2*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + 2*Log[x]*Pol
yLog[2, (I*Sqrt[e]*x)/Sqrt[d]] - 2*PolyLog[3, (I*Sqrt[e]*x)/Sqrt[d]]))/Sqr
t[e]) + (I*b^3*n^3*(-Log[x]^3 + (Sqrt[d]*Log[x]^3)/(Sqrt[d] + I*Sqrt[e]*x)
 + (Sqrt[e]*x*Log[x]^3)/(I*Sqrt[d] + Sqrt[e]*x) - 3*Log[x]^2*Log[1 - (I*Sq
rt[e]*x)/Sqrt[d]] + Log[x]^3*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + 3*Log[x]^...
```

Rubi [A] (verified)

Time = 1.22 (sec) , antiderivative size = 711, normalized size of antiderivative = 1.08, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx$$

$$\Big\downarrow \text{ 2767}$$

$$\int \left(-\frac{e(a+b\log(cx^n))^3}{2d\,(-de-e^2x^2)}-\frac{e(a+b\log(cx^n))^3}{4d\,\left(\sqrt{-d}\sqrt{e}-ex\right)^2}-\frac{e(a+b\log(cx^n))^3}{4d\,\left(\sqrt{-d}\sqrt{e}+ex\right)^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{3b^2n^2\operatorname{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}+\frac{3b^2n^2\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}-\frac{3b^2n^2\operatorname{PolyLog}\left(3,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}+\frac{3b^2n^2\operatorname{PolyLog}\left(3,\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}+\frac{3bn\operatorname{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))^2}{4(-d)^{3/2}\sqrt{e}}-\frac{3bn\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))^2}{4(-d)^{3/2}\sqrt{e}}+\frac{3bn\log\left(1-\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))^2}{4(-d)^{3/2}\sqrt{e}}-\frac{3bn\log\left(\frac{\sqrt{e}x}{\sqrt{-d}}+1\right)(a+b\log(cx^n))^2}{4(-d)^{3/2}\sqrt{e}}+\frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}x\right)}+\frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}x\right)}-\frac{\log\left(1-\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))^3}{4(-d)^{3/2}\sqrt{e}}+\frac{\log\left(\frac{\sqrt{e}x}{\sqrt{-d}}+1\right)(a+b\log(cx^n))^3}{4(-d)^{3/2}\sqrt{e}}+\frac{3b^3n^3\operatorname{PolyLog}\left(3,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}-\frac{3b^3n^3\operatorname{PolyLog}\left(3,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}+\frac{3b^3n^3\operatorname{PolyLog}\left(4,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}-\frac{3b^3n^3\operatorname{PolyLog}\left(4,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}$$

input
```
Int[(a + b*Log[c*x^n])^3/(d + e*x^2)^2,x]
```

output
```
(x*(a + b*Log[c*x^n])^3)/(4*(-d)^(3/2)*(Sqrt[-d] - Sqrt[e]*x)) + (x*(a + b
*Log[c*x^n])^3)/(4*(-d)^(3/2)*(Sqrt[-d] + Sqrt[e]*x)) + (3*b*n*(a + b*Log[
c*x^n])^2*Log[1 - (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[e]) - ((a + b*
Log[c*x^n])^3*Log[1 - (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[e]) - (3*b
*n*(a + b*Log[c*x^n])^2*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[
e]) + ((a + b*Log[c*x^n])^3*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*S
qrt[e]) - (3*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[2, -((Sqrt[e]*x)/Sqrt[-d])
])/(2*(-d)^(3/2)*Sqrt[e]) + (3*b*n*(a + b*Log[c*x^n])^2*PolyLog[2, -((Sqrt
[e]*x)/Sqrt[-d])])/(4*(-d)^(3/2)*Sqrt[e]) + (3*b^2*n^2*(a + b*Log[c*x^n])*
PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*Sqrt[e]) - (3*b*n*(a + b*L
og[c*x^n])^2*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[e]) + (3
*b^3*n^3*PolyLog[3, -((Sqrt[e]*x)/Sqrt[-d])])/(2*(-d)^(3/2)*Sqrt[e]) - (3*
b^2*n^2*(a + b*Log[c*x^n])*PolyLog[3, -((Sqrt[e]*x)/Sqrt[-d])])/(2*(-d)^(3
/2)*Sqrt[e]) - (3*b^3*n^3*PolyLog[3, (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*
Sqrt[e]) + (3*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[3, (Sqrt[e]*x)/Sqrt[-d]])
/(2*(-d)^(3/2)*Sqrt[e]) + (3*b^3*n^3*PolyLog[4, -((Sqrt[e]*x)/Sqrt[-d])])/
(2*(-d)^(3/2)*Sqrt[e]) - (3*b^3*n^3*PolyLog[4, (Sqrt[e]*x)/Sqrt[-d]])/(2*(
-d)^(3/2)*Sqrt[e])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Maple [F]

$$\int \frac{\left(a +b \ln \left(c \,x^{n}\right)\right)^{3}}{\left(e \,x^{2}+d \right)^{2}}d x$$

input
```
int((a+b*ln(c*x^n))^3/(e*x^2+d)^2,x)
```

output
```
int((a+b*ln(c*x^n))^3/(e*x^2+d)^2,x)
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx=\int \frac{(b\log(cx^n)+a)^3}{(ex^2+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b^3*log(c*x^n)^3 + 3*a*b^2*log(c*x^n)^2 + 3*a^2*b*log(c*x^n) + a
^3)/(e^2*x^4 + 2*d*e*x^2 + d^2), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx=\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**3/(e*x**2+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))**3/(d + e*x**2)**2, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx=\text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))^3/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx=\int \frac{(b\log(cx^n)+a)^3}{(ex^2+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^3/(e*x^2 + d)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^3}{(e\,x^2+d)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^3/(d + e*x^2)^2,x)
```

output
```
int((a + b*log(c*x^n))^3/(d + e*x^2)^2, x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx$$
$$= \frac{\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)a^3d+\sqrt{e}\,\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)a^3e\,x^2+2\left(\int \frac{\log(x^nc)^3}{e^2x^4+2de\,x^2+d^2}dx\right)b^3d^3e+2\left(\int \frac{\log(x^nc)^3}{e^2x^4+2de\,x^2+d^2}\right.}{}$$

input
```
int((a+b*log(c*x^n))^3/(e*x^2+d)^2,x)
```

output
```
(sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a**3*d + sqrt(e)*sqrt(d)*at
an((e*x)/(sqrt(e)*sqrt(d)))*a**3*e*x**2 + 2*int(log(x**n*c)**3/(d**2 + 2*d
*e*x**2 + e**2*x**4),x)*b**3*d**3*e + 2*int(log(x**n*c)**3/(d**2 + 2*d*e*x
**2 + e**2*x**4),x)*b**3*d**2*e**2*x**2 + 6*int(log(x**n*c)**2/(d**2 + 2*d
*e*x**2 + e**2*x**4),x)*a*b**2*d**3*e + 6*int(log(x**n*c)**2/(d**2 + 2*d*e
*x**2 + e**2*x**4),x)*a*b**2*d**2*e**2*x**2 + 6*int(log(x**n*c)/(d**2 + 2*
d*e*x**2 + e**2*x**4),x)*a**2*b*d**3*e + 6*int(log(x**n*c)/(d**2 + 2*d*e*x
**2 + e**2*x**4),x)*a**2*b*d**2*e**2*x**2 + a**3*d*e*x)/(2*d**2*e*(d + e*x
**2))
```

3.249 $\int \frac{1}{\left(d+ex^2\right)^2(a+b\log(cx^n))}\,dx$

Optimal result . . . 1905
Mathematica [N/A] . . . 1905
Rubi [N/A] . . . 1906
Maple [N/A] . . . 1906
Fricas [N/A] . . . 1907
Sympy [N/A] . . . 1907
Maxima [N/A] . . . 1908
Giac [N/A] . . . 1908
Mupad [N/A] . . . 1908
Reduce [N/A] . . . 1909

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{1}{\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)}\,dx=\text{Int}\left(\frac{1}{\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)},x\right)$$

output
```
Defer(Int)(1/(e*x^2+d)^2/(a+b*ln(c*x^n)),x)
```

Mathematica [N/A]

Not integrable

Time = 4.04 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)}\,dx$$

input
```
Integrate[1/((d + e*x^2)^2*(a + b*Log[c*x^n])),x]
```

output
```
Integrate[1/((d + e*x^2)^2*(a + b*Log[c*x^n])), x]
```

Rubi [N/A]

Not integrable

Time = 0.19 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2768}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))} dx$$
$$\Big\downarrow \text{ 2768}$$
$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))}dx$$

input
```
Int[1/((d + e*x^2)^2*(a + b*Log[c*x^n])),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2768
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> Unintegrable[(d + e*x^r)^q*(a + b*Log[c*x^n])^p, x] /; F
reeQ[{a, b, c, d, e, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(e\,x^2+d)^2 (a+b\ln(c\,x^n))}dx$$

input
```
int(1/(e*x^2+d)^2/(a+b*ln(c*x^n)),x)
```

output
```
int(1/(e*x^2+d)^2/(a+b*ln(c*x^n)),x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.50

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))}\,dx = \int \frac{1}{(ex^2+d)^2(b\log(cx^n)+a)}\,dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral(1/(a*e^2*x^4 + 2*a*d*e*x^2 + a*d^2 + (b*e^2*x^4 + 2*b*d*e*x^2 + b
*d^2)*log(c*x^n)), x)
```

Sympy [N/A]

Not integrable

Time = 100.02 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))}\,dx = \int \frac{1}{(a+b\log(cx^n))\,(d+ex^2)^2}\,dx$$

input
```
integrate(1/(e*x**2+d)**2/(a+b*ln(c*x**n)),x)
```

output
```
Integral(1/((a + b*log(c*x**n))*(d + e*x**2)**2), x)
```

Maxima [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))} dx = \int \frac{1}{(ex^2+d)^2(b\log(cx^n)+a)} dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
integrate(1/((e*x^2 + d)^2*(b*log(c*x^n) + a)), x)
```

Giac [N/A]

Not integrable

Time = 0.11 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))} dx = \int \frac{1}{(ex^2+d)^2(b\log(cx^n)+a)} dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(1/((e*x^2 + d)^2*(b*log(c*x^n) + a)), x)
```

Mupad [N/A]

Not integrable

Time = 25.41 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))} dx = \int \frac{1}{(e\,x^2+d)^2\,(a+b\,\ln(c\,x^n))} dx$$

input
```
int(1/((d + e*x^2)^2*(a + b*log(c*x^n))),x)
```

output
```
int(1/((d + e*x^2)^2*(a + b*log(c*x^n))), x)
```

Reduce [N/A]

Not integrable

Time = 0.19 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.95

$$\int \frac{1}{\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)}\,dx$$
$$=\int \frac{1}{\log\left(x^n c\right)b\,d^2+2\log\left(x^n c\right)bde\,x^2+\log\left(x^n c\right)b\,e^2x^4+a\,d^2+2ade\,x^2+a\,e^2x^4}dx$$

input
```
int(1/(e*x^2+d)^2/(a+b*log(c*x^n)),x)
```

output
```
int(1/(log(x**n*c)*b*d**2 + 2*log(x**n*c)*b*d*e*x**2 + log(x**n*c)*b*e**2*
x**4 + a*d**2 + 2*a*d*e*x**2 + a*e**2*x**4),x)
```

3.250 $\int \frac{1}{(d+ex^2)^2(a+b\log(cx^n))^2}\,dx$

Optimal result . . . 1910
Mathematica [N/A] . . . 1910
Rubi [N/A] . . . 1911
Maple [N/A] . . . 1911
Fricas [N/A] . . . 1912
Sympy [F(-1)] . . . 1912
Maxima [N/A] . . . 1913
Giac [N/A] . . . 1913
Mupad [N/A] . . . 1914
Reduce [N/A] . . . 1914

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))^2}\,dx = \text{Int}\left(\frac{1}{(d+ex^2)^2 (a+b\log(cx^n))^2},x\right)$$

output
```
Defer(Int)(1/(e*x^2+d)^2/(a+b*ln(c*x^n))^2,x)
```

Mathematica [N/A]

Not integrable

Time = 17.88 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))^2}\,dx = \int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))^2}\,dx$$

input
```
Integrate[1/((d + e*x^2)^2*(a + b*Log[c*x^n])^2),x]
```

output
```
Integrate[1/((d + e*x^2)^2*(a + b*Log[c*x^n])^2), x]
```

Rubi [N/A]

Not integrable

Time = 0.19 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2768}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))^2} \, dx$$

$$\Big\downarrow \text{ 2768}$$

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))^2} dx$$

input
```
Int[1/((d + e*x^2)^2*(a + b*Log[c*x^n])^2),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2768
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> Unintegrable[(d + e*x^r)^q*(a + b*Log[c*x^n])^p, x] /; F
reeQ[{a, b, c, d, e, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(e\,x^2+d)^2 (a+b\ln(c\,x^n))^2} dx$$

input
```
int(1/(e*x^2+d)^2/(a+b*ln(c*x^n))^2,x)
```

output
```
int(1/(e*x^2+d)^2/(a+b*ln(c*x^n))^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 102, normalized size of antiderivative = 4.64

$$\int \frac{1}{(d+ex^2)^2 (a+b\log (cx^n))^2}\,dx = \int \frac{1}{(ex^2+d)^2(b\log (cx^n)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
integral(1/(a^2*e^2*x^4 + 2*a^2*d*e*x^2 + a^2*d^2 + (b^2*e^2*x^4 + 2*b^2*d
*e*x^2 + b^2*d^2)*log(c*x^n)^2 + 2*(a*b*e^2*x^4 + 2*a*b*d*e*x^2 + a*b*d^2)
*log(c*x^n)), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{1}{(d+ex^2)^2 (a+b\log (cx^n))^2}\,dx = \text{Timed out}$$

input
```
integrate(1/(e*x**2+d)**2/(a+b*ln(c*x**n))**2,x)
```

output
```
Timed out
```

Maxima [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 261, normalized size of antiderivative = 11.86

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))^2}\,dx = \int \frac{1}{(ex^2+d)^2(b\log(cx^n)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
-x/(b^2*d^2*n*log(c) + a*b*d^2*n + (b^2*e^2*n*log(c) + a*b*e^2*n)*x^4 + 2*
(b^2*d*e*n*log(c) + a*b*d*e*n)*x^2 + (b^2*e^2*n*x^4 + 2*b^2*d*e*n*x^2 + b^
2*d^2*n)*log(x^n)) - integrate((3*e*x^2 - d)/((b^2*e^3*n*log(c) + a*b*e^3*
n)*x^6 + b^2*d^3*n*log(c) + a*b*d^3*n + 3*(b^2*d*e^2*n*log(c) + a*b*d*e^2*
n)*x^4 + 3*(b^2*d^2*e*n*log(c) + a*b*d^2*e*n)*x^2 + (b^2*e^3*n*x^6 + 3*b^2
*d*e^2*n*x^4 + 3*b^2*d^2*e*n*x^2 + b^2*d^3*n)*log(x^n)), x)
```

Giac [N/A]

Not integrable

Time = 0.12 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))^2}\,dx = \int \frac{1}{(ex^2+d)^2(b\log(cx^n)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
integrate(1/((e*x^2 + d)^2*(b*log(c*x^n) + a)^2), x)
```

Mupad [N/A]

Not integrable

Time = 25.59 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))^2} dx = \int \frac{1}{(e\,x^2+d)^2 \left(a+b\,\ln(c\,x^n)\right)^2} dx$$

input
```
int(1/((d + e*x^2)^2*(a + b*log(c*x^n))^2),x)
```

output
```
int(1/((d + e*x^2)^2*(a + b*log(c*x^n))^2), x)
```

Reduce [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 127, normalized size of antiderivative = 5.77

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))^2} dx$$
$$= \int \frac{1}{\log(x^nc)^2 b^2d^2 + 2\log(x^nc)^2 b^2de\,x^2 + \log(x^nc)^2 b^2e^2x^4 + 2\log(x^nc)\,ab\,d^2 + 4\log(x^nc)\,abde\,x^2 + 2\log}$$

input
```
int(1/(e*x^2+d)^2/(a+b*log(c*x^n))^2,x)
```

output
```
int(1/(log(x**n*c)**2*b**2*d**2 + 2*log(x**n*c)**2*b**2*d*e*x**2 + log(x**
n*c)**2*b**2*e**2*x**4 + 2*log(x**n*c)*a*b*d**2 + 4*log(x**n*c)*a*b*d*e*x*
*2 + 2*log(x**n*c)*a*b*e**2*x**4 + a**2*d**2 + 2*a**2*d*e*x**2 + a**2*e**2
*x**4),x)
```

3.251 $\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$

Optimal result . . . 1915
Mathematica [A] (verified) . . . 1916
Rubi [A] (warning: unable to verify) . . . 1916
Maple [F] . . . 1919
Fricas [A] (verification not implemented) . . . 1919
Sympy [A] (verification not implemented) . . . 1920
Maxima [F(-2)] . . . 1921
Giac [A] (verification not implemented) . . . 1922
Mupad [F(-1)] . . . 1922
Reduce [B] (verification not implemented) . . . 1923

Optimal result

Integrand size = 25, antiderivative size = 208

$$\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = -\frac{8bd^3n\sqrt{d+ex^2}}{105e^3}-\frac{8bd^2n(d+ex^2)^{3/2}}{315e^3}+\frac{9bdn(d+ex^2)^{5/2}}{175e^3}-\frac{bn(d+ex^2)^{7/2}}{49e^3}+\frac{8bd^{7/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{105e^3}+\frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}-\frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}$$

output
```
-8/105*b*d^3*n*(e*x^2+d)^(1/2)/e^3-8/315*b*d^2*n*(e*x^2+d)^(3/2)/e^3+9/175
*b*d*n*(e*x^2+d)^(5/2)/e^3-1/49*b*n*(e*x^2+d)^(7/2)/e^3+8/105*b*d^(7/2)*n*
arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^3+1/3*d^2*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n
))/e^3-2/5*d*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/e^3+1/7*(e*x^2+d)^(7/2)*(a+b*
ln(c*x^n))/e^3
```

Mathematica [A] (verified)

Time = 0.26 (sec) , antiderivative size = 251, normalized size of antiderivative = 1.21

$$\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = -\frac{8bd^{7/2}n\log(x)}{105e^3}+\frac{bn\sqrt{d+ex^2}(8d^3-4d^2ex^2+3de^2x^4+15e^3x^6)\log(x)}{105e^3} + \sqrt{d+ex^2}\left(\frac{1}{49}x^6(7a-bn+7b(-n\log(x)+\log(cx^n))) + \frac{dx^4(35a-12bn+35b(-n\log(x)+\log(cx^n)))}{1225e} + \frac{2d^3(420a-389bn+420b(-n\log(x)+\log(cx^n)))}{11025e^3} - \frac{d^2x^2(420a-179bn+420b(-n\log(x)+\log(cx^n)))}{11025e^2}\right) + \frac{8bd^{7/2}n\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{105e^3}$$

input
```
Integrate[x^5*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
(-8*b*d^(7/2)*n*Log[x])/(105*e^3) + (b*n*Sqrt[d + e*x^2]*(8*d^3 - 4*d^2*e*
x^2 + 3*d*e^2*x^4 + 15*e^3*x^6)*Log[x])/(105*e^3) + Sqrt[d + e*x^2]*((x^6*
(7*a - b*n + 7*b*(-(n*Log[x]) + Log[c*x^n])))/49 + (d*x^4*(35*a - 12*b*n +
 35*b*(-(n*Log[x]) + Log[c*x^n])))/(1225*e) + (2*d^3*(420*a - 389*b*n + 42
0*b*(-(n*Log[x]) + Log[c*x^n])))/(11025*e^3) - (d^2*x^2*(420*a - 179*b*n +
 420*b*(-(n*Log[x]) + Log[c*x^n])))/(11025*e^2)) + (8*b*d^(7/2)*n*Log[d +
Sqrt[d]*Sqrt[d + e*x^2]])/(105*e^3)
```

Rubi [A] (warning: unable to verify)

Time = 0.54 (sec) , antiderivative size = 180, normalized size of antiderivative = 0.87, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.280$, Rules used = {2792, 27, 1578, 1192, 25, 1584, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int\frac{(ex^2+d)^{3/2}(15e^2x^4-12dex^2+8d^2)}{105e^3x}dx+\frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \text{27}$$

$$-\frac{bn\int\frac{(ex^2+d)^{3/2}(15e^2x^4-12dex^2+8d^2)}{x}dx}{105e^3}+\frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \text{1578}$$

$$-\frac{bn\int\frac{(ex^2+d)^{3/2}(15e^2x^4-12dex^2+8d^2)}{x^2}dx^2}{210e^3}+\frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \text{1192}$$

$$-\frac{bn\int-\frac{x^8(15e^2x^8-42de^2x^4+35d^2e^2)}{d-x^4}d\sqrt{ex^2+d}}{105e^5}+\frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \text{25}$$

$$\frac{bn\int\frac{x^8(15e^2x^8-42de^2x^4+35d^2e^2)}{d-x^4}d\sqrt{ex^2+d}}{105e^5}+\frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \text{1584}$$

$$\frac{bn\int\left(-15e^2x^{12}+27de^2x^8-8d^2e^2x^4-8d^3e^2+\frac{8d^4e^2}{d-x^4}\right)d\sqrt{ex^2+d}}{105e^5}+\frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\downarrow \text{2009}$$

$$\frac{d^2\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^3}+\frac{\left(d+ex^2\right)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^3}-\frac{2d\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^3}-\frac{bn\left(-8d^{7/2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+8d^3e^2\sqrt{d+ex^2}+\frac{8}{3}d^2e^2x^6-\frac{27}{5}de^2x^{10}+\frac{15e^2x^{14}}{7}\right)}{105e^5}$$

input
```
Int[x^5*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
-1/105*(b*n*((8*d^2*e^2*x^6)/3 - (27*d*e^2*x^10)/5 + (15*e^2*x^14)/7 + 8*d
^3*e^2*Sqrt[d + e*x^2] - 8*d^(7/2)*e^2*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]))/
e^5 + (d^2*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(3*e^3) - (2*d*(d + e*x^2
)^(5/2)*(a + b*Log[c*x^n]))/(5*e^3) + ((d + e*x^2)^(7/2)*(a + b*Log[c*x^n]
))/(7*e^3)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1192
```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[2/e^(n + 2*p + 1)   Subst[Int[x^(
2*m + 1)*(e*f - d*g + g*x^2)^n*(c*d^2 - b*d*e + a*e^2 - (2*c*d - b*e)*x^2 +
 c*x^4)^p, x], x, Sqrt[d + e*x]], x] /; FreeQ[{a, b, c, d, e, f, g}, x] &&
IGtQ[p, 0] && ILtQ[n, 0] && IntegerQ[m + 1/2]
```

rule 1578
```
Int[(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_
)^4)^(p_.), x_Symbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(d + e*x)^q*(a
+ b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x] && Int
egerQ[(m - 1)/2]
```

rule 1584
```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int x^{5}\sqrt{e\,x^{2}+d}\,\left(a+b\ln\left(c\,x^{n}\right)\right)dx$$

input
```
int(x^5*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x^5*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

Fricas [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 417, normalized size of antiderivative = 2.00

$$\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$=\left[\frac{420\,bd^{\frac{7}{2}}n\log\left(-\frac{ex^2+2\,\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-(225\,(be^3n-7\,ae^3)x^6+778\,bd^3n+9\,(12\,bde^2n-35\,ade^2)x^4-8\ldots}{\ldots}\right.$$
$$-\frac{840\,b\sqrt{-d}d^3n\arctan\left(\frac{\sqrt{ex^2+d}\sqrt{-d}}{d}\right)+(225\,(be^3n-7\,ae^3)x^6+778\,bd^3n+9\,(12\,bde^2n-35\,ade^2)x^4-8\ldots}{\ldots}$$

input
```
integrate(x^5*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[1/11025*(420*b*d^(7/2)*n*log(-(e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/x
^2) - (225*(b*e^3*n - 7*a*e^3)*x^6 + 778*b*d^3*n + 9*(12*b*d*e^2*n - 35*a*
d*e^2)*x^4 - 840*a*d^3 - (179*b*d^2*e*n - 420*a*d^2*e)*x^2 - 105*(15*b*e^3
*x^6 + 3*b*d*e^2*x^4 - 4*b*d^2*e*x^2 + 8*b*d^3)*log(c) - 105*(15*b*e^3*n*x
^6 + 3*b*d*e^2*n*x^4 - 4*b*d^2*e*n*x^2 + 8*b*d^3*n)*log(x))*sqrt(e*x^2 + d
))/e^3, -1/11025*(840*b*sqrt(-d)*d^3*n*arctan(sqrt(e*x^2 + d)*sqrt(-d)/d)
+ (225*(b*e^3*n - 7*a*e^3)*x^6 + 778*b*d^3*n + 9*(12*b*d*e^2*n - 35*a*d*e^
2)*x^4 - 840*a*d^3 - (179*b*d^2*e*n - 420*a*d^2*e)*x^2 - 105*(15*b*e^3*x^6
 + 3*b*d*e^2*x^4 - 4*b*d^2*e*x^2 + 8*b*d^3)*log(c) - 105*(15*b*e^3*n*x^6 +
 3*b*d*e^2*n*x^4 - 4*b*d^2*e*n*x^2 + 8*b*d^3*n)*log(x))*sqrt(e*x^2 + d))/e
^3]
```

Sympy [A] (verification not implemented)

Time = 23.88 (sec) , antiderivative size = 490, normalized size of antiderivative = 2.36

$$\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$= a\left(\begin{cases}\frac{8d^3\sqrt{d+ex^2}}{105e^3}-\frac{4d^2x^2\sqrt{d+ex^2}}{105e^2}+\frac{dx^4\sqrt{d+ex^2}}{35e}+\frac{x^6\sqrt{d+ex^2}}{7} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^6}{6} & \text{otherwise}\end{cases}\right)$$
$$-bn\left(\begin{cases}-\frac{8d^{\frac{7}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{105e^3}+\frac{8d^4}{105e^{\frac{7}{2}}x\sqrt{\frac{d}{ex^2}+1}}+\frac{8d^3x}{105e^{\frac{5}{2}}\sqrt{\frac{d}{ex^2}+1}}-\frac{4d^2\left(\begin{cases}\frac{d\sqrt{d+ex^2}}{3e}+\frac{x^2\sqrt{d+ex^2}}{3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}\right)}{105e^2}+\frac{d\left(\left(\begin{cases}\end{cases}\right.\right.}{} \\ \frac{\sqrt{d}x^6}{36}\end{cases}\right.$$
$$+b\left(\begin{cases}\frac{8d^3\sqrt{d+ex^2}}{105e^3}-\frac{4d^2x^2\sqrt{d+ex^2}}{105e^2}+\frac{dx^4\sqrt{d+ex^2}}{35e}+\frac{x^6\sqrt{d+ex^2}}{7} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^6}{6} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**5*(e*x**2+d)**(1/2)*(a+b*ln(c*x**n)),x)
```

output
```
a*Piecewise((8*d**3*sqrt(d + e*x**2)/(105*e**3) - 4*d**2*x**2*sqrt(d + e*x
**2)/(105*e**2) + d*x**4*sqrt(d + e*x**2)/(35*e) + x**6*sqrt(d + e*x**2)/7
, Ne(e, 0)), (sqrt(d)*x**6/6, True)) - b*n*Piecewise((-8*d**(7/2)*asinh(sq
rt(d)/(sqrt(e)*x))/(105*e**3) + 8*d**4/(105*e**(7/2)*x*sqrt(d/(e*x**2) + 1
)) + 8*d**3*x/(105*e**(5/2)*sqrt(d/(e*x**2) + 1)) - 4*d**2*Piecewise((d*sq
rt(d + e*x**2)/(3*e) + x**2*sqrt(d + e*x**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2
, True))/(105*e**2) + d*Piecewise((-2*d**2*sqrt(d + e*x**2)/(15*e**2) + d*
x**2*sqrt(d + e*x**2)/(15*e) + x**4*sqrt(d + e*x**2)/5, Ne(e, 0)), (sqrt(d
)*x**4/4, True))/(35*e) + Piecewise((8*d**3*sqrt(d + e*x**2)/(105*e**3) -
4*d**2*x**2*sqrt(d + e*x**2)/(105*e**2) + d*x**4*sqrt(d + e*x**2)/(35*e) +
 x**6*sqrt(d + e*x**2)/7, Ne(e, 0)), (sqrt(d)*x**6/6, True))/7, (e > -oo)
& (e < oo) & Ne(e, 0)), (sqrt(d)*x**6/36, True)) + b*Piecewise((8*d**3*sqr
t(d + e*x**2)/(105*e**3) - 4*d**2*x**2*sqrt(d + e*x**2)/(105*e**2) + d*x**
4*sqrt(d + e*x**2)/(35*e) + x**6*sqrt(d + e*x**2)/7, Ne(e, 0)), (sqrt(d)*x
**6/6, True))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^5*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 288, normalized size of antiderivative = 1.38

$$\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \frac{1}{7}\sqrt{ex^2+d}bx^6\log(c)+\frac{1}{7}\sqrt{ex^2+d}ax^6 + \frac{\sqrt{ex^2+d}bdx^4\log(c)}{35\,e}+\frac{\sqrt{ex^2+d}adx^4}{35\,e}-\frac{4\sqrt{ex^2+d}bd^2x^2\log(c)}{105\,e^2}-\frac{4\sqrt{ex^2+d}ad^2x^2}{105\,e^2} + \frac{1}{11025}bn\left(\frac{105\left(15\,(ex^2+d)^{\frac{7}{2}}-42\,(ex^2+d)^{\frac{5}{2}}d+35\,(ex^2+d)^{\frac{3}{2}}d^2\right)\log(x)}{e^3}-\frac{\frac{840\,d^4\arctan\left(\frac{\sqrt{ex^2+d}}{\sqrt{-d}}\right)}{\sqrt{-d}}+22\cdots}{\cdots}\right. + \frac{8\sqrt{ex^2+d}bd^3\log(c)}{105\,e^3}+\frac{8\sqrt{ex^2+d}ad^3}{105\,e^3}$$

input
```
integrate(x^5*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/7*sqrt(e*x^2 + d)*b*x^6*log(c) + 1/7*sqrt(e*x^2 + d)*a*x^6 + 1/35*sqrt(e
*x^2 + d)*b*d*x^4*log(c)/e + 1/35*sqrt(e*x^2 + d)*a*d*x^4/e - 4/105*sqrt(e
*x^2 + d)*b*d^2*x^2*log(c)/e^2 - 4/105*sqrt(e*x^2 + d)*a*d^2*x^2/e^2 + 1/1
1025*b*n*(105*(15*(e*x^2 + d)^(7/2) - 42*(e*x^2 + d)^(5/2)*d + 35*(e*x^2 +
 d)^(3/2)*d^2)*log(x)/e^3 - (840*d^4*arctan(sqrt(e*x^2 + d)/sqrt(-d))/sqrt
(-d) + 225*(e*x^2 + d)^(7/2) - 567*(e*x^2 + d)^(5/2)*d + 280*(e*x^2 + d)^(
3/2)*d^2 + 840*sqrt(e*x^2 + d)*d^3)/e^3) + 8/105*sqrt(e*x^2 + d)*b*d^3*log
(c)/e^3 + 8/105*sqrt(e*x^2 + d)*a*d^3/e^3
```

Mupad [F(-1)]

Timed out.

$$\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \int x^5\,\sqrt{e\,x^2+d}\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x^5*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)),x)
```

output
```
int(x^5*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 489, normalized size of antiderivative = 2.35

$$\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$

$$= \frac{840\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) b\,d^3-420\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) b\,d^2e\,x^2+315}{}$$

input

```
int(x^5*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x)
```

output

```
(840*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)
/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**3 - 420*sqrt(d +
e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sq
rt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2*e*x**2 + 315*sqrt(d + e*x**2)
*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d +
e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e**2*x**4 + 1575*sqrt(d + e*x**2)*log((
(2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2
) + sqrt(e)*x)**n*2**n))*b*e**3*x**6 + 840*sqrt(d + e*x**2)*a*d**3 - 420*s
qrt(d + e*x**2)*a*d**2*e*x**2 + 315*sqrt(d + e*x**2)*a*d*e**2*x**4 + 1575*
sqrt(d + e*x**2)*a*e**3*x**6 - 778*sqrt(d + e*x**2)*b*d**3*n + 179*sqrt(d
+ e*x**2)*b*d**2*e*n*x**2 - 108*sqrt(d + e*x**2)*b*d*e**2*n*x**4 - 225*sqr
t(d + e*x**2)*b*e**3*n*x**6 - 840*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d)
+ sqrt(e)*x)/sqrt(d))*b*d**3*n + 840*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(
d) + sqrt(e)*x)/sqrt(d))*b*d**3*n)/(11025*e**3)
```

3.252 $\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$

Optimal result 1924
Mathematica [A] (verified) 1925
Rubi [A] (verified) 1925
Maple [F] 1928
Fricas [A] (verification not implemented) 1929
Sympy [A] (verification not implemented) 1929
Maxima [F(-2)] 1930
Giac [A] (verification not implemented) 1931
Mupad [F(-1)] 1931
Reduce [B] (verification not implemented) 1932

Optimal result

Integrand size = 25, antiderivative size = 154

$$\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \frac{2bd^2n\sqrt{d+ex^2}}{15e^2}+\frac{2bdn(d+ex^2)^{3/2}}{45e^2} - \frac{bn(d+ex^2)^{5/2}}{25e^2}-\frac{2bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{15e^2} - \frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2} + \frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}$$

output
```
2/15*b*d^2*n*(e*x^2+d)^(1/2)/e^2+2/45*b*d*n*(e*x^2+d)^(3/2)/e^2-1/25*b*n*(
e*x^2+d)^(5/2)/e^2-2/15*b*d^(5/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^2-1
/3*d*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/e^2+1/5*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n
))/e^2
```

Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 204, normalized size of antiderivative = 1.32

$$\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$=\frac{2bd^{5/2}n\log(x)}{15e^2}-\frac{bn\sqrt{d+ex^2}(2d^2-dex^2-3e^2x^4)\log(x)}{15e^2}+\sqrt{d+ex^2}\left(\frac{1}{25}x^4(5a-bn+5b(-n\log(x)+\log(cx^n)))+\frac{dx^2(15a-8bn+15b(-n\log(x)+\log(cx^n)))}{225e}-\frac{d^2(30a-31bn+30b(-n\log(x)+\log(cx^n)))}{225e^2}\right)-\frac{2bd^{5/2}n\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{15e^2}$$

input
```
Integrate[x^3*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
(2*b*d^(5/2)*n*Log[x])/(15*e^2) - (b*n*Sqrt[d + e*x^2]*(2*d^2 - d*e*x^2 -
3*e^2*x^4)*Log[x])/(15*e^2) + Sqrt[d + e*x^2]*((x^4*(5*a - b*n + 5*b*(-(n*
Log[x]) + Log[c*x^n])))/25 + (d*x^2*(15*a - 8*b*n + 15*b*(-(n*Log[x]) + Lo
g[c*x^n])))/(225*e) - (d^2*(30*a - 31*b*n + 30*b*(-(n*Log[x]) + Log[c*x^n]
)))/(225*e^2)) - (2*b*d^(5/2)*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(15*e^2)
```

Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 143, normalized size of antiderivative = 0.93, number of steps used = 9, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.320, Rules used = {2792, 27, 354, 90, 60, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \ 2792$$

$$-bn\int -\frac{\left(2d-3ex^2\right)\left(ex^2+d\right)^{3/2}}{15e^2x}dx+\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{d\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{3e^2}$$

$\Big\downarrow$ 27

$$\frac{bn\int \frac{\left(2d-3ex^2\right)\left(ex^2+d\right)^{3/2}}{x}dx}{15e^2}+\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{d\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{3e^2}$$

$\Big\downarrow$ 354

$$\frac{bn\int \frac{\left(2d-3ex^2\right)\left(ex^2+d\right)^{3/2}}{x^2}dx^2}{30e^2}+\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{d\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{3e^2}$$

$\Big\downarrow$ 90

$$\frac{bn\left(2d\int \frac{\left(ex^2+d\right)^{3/2}}{x^2}dx^2-\frac{6}{5}\left(d+ex^2\right)^{5/2}\right)}{30e^2}+\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{d\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{3e^2}$$

$\Big\downarrow$ 60

$$\frac{bn\left(2d\left(d\int \frac{\sqrt{ex^2+d}}{x^2}dx^2+\frac{2}{3}\left(d+ex^2\right)^{3/2}\right)-\frac{6}{5}\left(d+ex^2\right)^{5/2}\right)}{30e^2}+\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{d\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{3e^2}$$

$\Big\downarrow$ 60

$$\frac{bn\left(2d\left(d\left(d\int \frac{1}{x^2\sqrt{ex^2+d}}dx^2+2\sqrt{d+ex^2}\right)+\frac{2}{3}\left(d+ex^2\right)^{3/2}\right)-\frac{6}{5}\left(d+ex^2\right)^{5/2}\right)}{30e^2}+\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{d\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{3e^2}$$

$\Big\downarrow$ 73

$$\frac{bn\left(2d\left(d\left(\frac{2d\int \frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{e}+2\sqrt{d+ex^2}\right)+\frac{2}{3}\left(d+ex^2\right)^{3/2}\right)-\frac{6}{5}\left(d+ex^2\right)^{5/2}\right)}{30e^2}+\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{d\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{3e^2}$$

$\Big\downarrow$ 221

$$\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2} - \frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2} + \frac{bn\left(2d\left(d\left(2\sqrt{d+ex^2}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex^2)^{3/2}\right)-\frac{6}{5}(d+ex^2)^{5/2}\right)}{30e^2}$$

input
```
Int[x^3*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
(b*n*((-6*(d + e*x^2)^(5/2))/5 + 2*d*((2*(d + e*x^2)^(3/2))/3 + d*(2*Sqrt[
d + e*x^2] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]))))/(30*e^2) - (d*
(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(3*e^2) + ((d + e*x^2)^(5/2)*(a + b*
Log[c*x^n]))/(5*e^2)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 354
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_S
ymbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(a + b*x)^p*(c + d*x)^q, x], x
, x^2], x] /; FreeQ[{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0] && IntegerQ
[(m - 1)/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int x^{3}\sqrt{e\,x^{2}+d}\,(a+b\ln(c\,x^{n}))\,dx$$

input
```
int(x^3*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x^3*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 312, normalized size of antiderivative = 2.03

$$\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$=\left[\frac{15\,bd^{\frac{5}{2}}n\log\left(-\frac{ex^2-2\,\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-(9\,(be^2n-5\,ae^2)x^4-31\,bd^2n+30\,ad^2+(8\,bden-15\,ade)x^2-1}{225\,e^2}\right.$$

input
```
integrate(x^3*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[1/225*(15*b*d^(5/2)*n*log(-(e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/x^2)
 - (9*(b*e^2*n - 5*a*e^2)*x^4 - 31*b*d^2*n + 30*a*d^2 + (8*b*d*e*n - 15*a*
d*e)*x^2 - 15*(3*b*e^2*x^4 + b*d*e*x^2 - 2*b*d^2)*log(c) - 15*(3*b*e^2*n*x
^4 + b*d*e*n*x^2 - 2*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/e^2, 1/225*(30*b*sq
rt(-d)*d^2*n*arctan(sqrt(e*x^2 + d)*sqrt(-d)/d) - (9*(b*e^2*n - 5*a*e^2)*x
^4 - 31*b*d^2*n + 30*a*d^2 + (8*b*d*e*n - 15*a*d*e)*x^2 - 15*(3*b*e^2*x^4
+ b*d*e*x^2 - 2*b*d^2)*log(c) - 15*(3*b*e^2*n*x^4 + b*d*e*n*x^2 - 2*b*d^2*
n)*log(x))*sqrt(e*x^2 + d))/e^2]
```

Sympy [A] (verification not implemented)

Time = 15.35 (sec) , antiderivative size = 343, normalized size of antiderivative = 2.23

$$\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$=a\left(\begin{cases}-\frac{2d^2\sqrt{d+ex^2}}{15e^2}+\frac{dx^2\sqrt{d+ex^2}}{15e}+\frac{x^4\sqrt{d+ex^2}}{5} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^4}{4} & \text{otherwise}\end{cases}\right)$$
$$-bn\left(\begin{cases}\frac{2d^{\frac{5}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{15e^2}-\frac{2d^3}{15e^{\frac{5}{2}}x\sqrt{\frac{d}{ex^2}+1}}-\frac{2d^2x}{15e^{\frac{3}{2}}\sqrt{\frac{d}{ex^2}+1}}+\frac{d\left(\begin{cases}\frac{d\sqrt{d+ex^2}}{3e}+\frac{x^2\sqrt{d+ex^2}}{3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}\right)}{15e}+\frac{\begin{cases}-\frac{2d^2\sqrt{d+}}{15e^2}\\ \frac{\sqrt{d}x^4}{4}\end{cases}}{} \\ \frac{\sqrt{d}x^4}{16}\end{cases}\right.$$
$$+b\left(\begin{cases}-\frac{2d^2\sqrt{d+ex^2}}{15e^2}+\frac{dx^2\sqrt{d+ex^2}}{15e}+\frac{x^4\sqrt{d+ex^2}}{5} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^4}{4} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**3*(e*x**2+d)**(1/2)*(a+b*ln(c*x**n)),x)
```

output
```
a*Piecewise((-2*d**2*sqrt(d + e*x**2)/(15*e**2) + d*x**2*sqrt(d + e*x**2)/
(15*e) + x**4*sqrt(d + e*x**2)/5, Ne(e, 0)), (sqrt(d)*x**4/4, True)) - b*n
*Piecewise((2*d**(5/2)*asinh(sqrt(d)/(sqrt(e)*x))/(15*e**2) - 2*d**3/(15*e
**(5/2)*x*sqrt(d/(e*x**2) + 1)) - 2*d**2*x/(15*e**(3/2)*sqrt(d/(e*x**2) +
1)) + d*Piecewise((d*sqrt(d + e*x**2)/(3*e) + x**2*sqrt(d + e*x**2)/3, Ne(
e, 0)), (sqrt(d)*x**2/2, True))/(15*e) + Piecewise((-2*d**2*sqrt(d + e*x**
2)/(15*e**2) + d*x**2*sqrt(d + e*x**2)/(15*e) + x**4*sqrt(d + e*x**2)/5, N
e(e, 0)), (sqrt(d)*x**4/4, True))/5, (e > -oo) & (e < oo) & Ne(e, 0)), (sq
rt(d)*x**4/16, True)) + b*Piecewise((-2*d**2*sqrt(d + e*x**2)/(15*e**2) +
d*x**2*sqrt(d + e*x**2)/(15*e) + x**4*sqrt(d + e*x**2)/5, Ne(e, 0)), (sqrt
(d)*x**4/4, True))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^3*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 215, normalized size of antiderivative = 1.40

$$\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$=\frac{1}{5}\sqrt{ex^2+d}bx^4\log(c)+\frac{1}{5}\sqrt{ex^2+d}ax^4+\frac{\sqrt{ex^2+d}bdx^2\log(c)}{15e}+\frac{\sqrt{ex^2+d}adx^2}{15e}$$
$$+\frac{1}{225}bn\left(\frac{15\left(3\,(ex^2+d)^{\frac{5}{2}}-5\,(ex^2+d)^{\frac{3}{2}}d\right)\log(x)}{e^2}+\frac{\frac{30\,d^3\arctan\left(\frac{\sqrt{ex^2+d}}{\sqrt{-d}}\right)}{\sqrt{-d}}-9\,(ex^2+d)^{\frac{5}{2}}+10\,(ex^2+d)\right.}{e^2}$$
$$-\frac{2\sqrt{ex^2+d}bd^2\log(c)}{15e^2}-\frac{2\sqrt{ex^2+d}ad^2}{15e^2}$$

input
```
integrate(x^3*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/5*sqrt(e*x^2 + d)*b*x^4*log(c) + 1/5*sqrt(e*x^2 + d)*a*x^4 + 1/15*sqrt(e
*x^2 + d)*b*d*x^2*log(c)/e + 1/15*sqrt(e*x^2 + d)*a*d*x^2/e + 1/225*b*n*(1
5*(3*(e*x^2 + d)^(5/2) - 5*(e*x^2 + d)^(3/2)*d)*log(x)/e^2 + (30*d^3*arcta
n(sqrt(e*x^2 + d)/sqrt(-d))/sqrt(-d) - 9*(e*x^2 + d)^(5/2) + 10*(e*x^2 + d
)^(3/2)*d + 30*sqrt(e*x^2 + d)*d^2)/e^2) - 2/15*sqrt(e*x^2 + d)*b*d^2*log(
c)/e^2 - 2/15*sqrt(e*x^2 + d)*a*d^2/e^2
```

Mupad [F(-1)]

Timed out.

$$\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx=\int x^3\,\sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int(x^3*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)),x)
```

output
```
int(x^3*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 374, normalized size of antiderivative = 2.43

$$\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$

$$= \frac{-30\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)b\,d^2+15\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)bde\,x^2+45\sqrt{e}}{}$$

input
```
int(x^3*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x)
```

output
```
( - 30*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*
c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2 + 15*sqrt(d +
 e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(s
qrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e*x**2 + 45*sqrt(d + e*x**2)*lo
g(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x
**2) + sqrt(e)*x)**n*2**n))*b*e**2*x**4 - 30*sqrt(d + e*x**2)*a*d**2 + 15*
sqrt(d + e*x**2)*a*d*e*x**2 + 45*sqrt(d + e*x**2)*a*e**2*x**4 + 31*sqrt(d
+ e*x**2)*b*d**2*n - 8*sqrt(d + e*x**2)*b*d*e*n*x**2 - 9*sqrt(d + e*x**2)*
b*e**2*n*x**4 + 30*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sq
rt(d))*b*d**2*n - 30*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/
sqrt(d))*b*d**2*n)/(225*e**2)
```

3.253 $\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$

Optimal result 1933
Mathematica [A] (verified) 1933
Rubi [A] (verified) 1934
Maple [F] 1936
Fricas [A] (verification not implemented) 1936
Sympy [A] (verification not implemented) 1937
Maxima [F(-2)] 1938
Giac [A] (verification not implemented) 1938
Mupad [F(-1)] 1939
Reduce [B] (verification not implemented) 1939

Optimal result

Integrand size = 23, antiderivative size = 102

$$\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = -\frac{bdn\sqrt{d+ex^2}}{3e}-\frac{bn(d+ex^2)^{3/2}}{9e}+\frac{bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}$$

output
```
-1/3*b*d*n*(e*x^2+d)^(1/2)/e-1/9*b*n*(e*x^2+d)^(3/2)/e+1/3*b*d^(3/2)*n*arc
tanh((e*x^2+d)^(1/2)/d^(1/2))/e+1/3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/e
```

Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 136, normalized size of antiderivative = 1.33

$$\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \frac{3ad\sqrt{d+ex^2}-4bdn\sqrt{d+ex^2}+3aex^2\sqrt{d+ex^2}-benx^2\sqrt{d+ex^2}-3bd^{3/2}n\log(x)+3b(d+ex^2)^{3/2}\log}{9e}$$

input
```
Integrate[x*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
(3*a*d*Sqrt[d + e*x^2] - 4*b*d*n*Sqrt[d + e*x^2] + 3*a*e*x^2*Sqrt[d + e*x^
2] - b*e*n*x^2*Sqrt[d + e*x^2] - 3*b*d^(3/2)*n*Log[x] + 3*b*(d + e*x^2)^(3
/2)*Log[c*x^n] + 3*b*d^(3/2)*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(9*e)
```

Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 95, normalized size of antiderivative = 0.93, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2776, 243, 60, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2776}$$

$$\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}-\frac{bn\int\frac{(ex^2+d)^{3/2}}{x}dx}{3e}$$

$$\Big\downarrow \text{243}$$

$$\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}-\frac{bn\int\frac{(ex^2+d)^{3/2}}{x^2}dx^2}{6e}$$

$$\Big\downarrow \text{60}$$

$$\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}-\frac{bn\left(d\int\frac{\sqrt{ex^2+d}}{x^2}dx^2+\frac{2}{3}(d+ex^2)^{3/2}\right)}{6e}$$

$$\Big\downarrow \text{60}$$

$$\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}-\frac{bn\left(d\left(d\int\frac{1}{x^2\sqrt{ex^2+d}}dx^2+2\sqrt{d+ex^2}\right)+\frac{2}{3}(d+ex^2)^{3/2}\right)}{6e}$$

$$\Big\downarrow \text{73}$$

$$\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}-\frac{bn\left(d\left(\frac{2d\int\frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{e}+2\sqrt{d+ex^2}\right)+\frac{2}{3}(d+ex^2)^{3/2}\right)}{6e}$$

$$\Big\downarrow \text{221}$$

$$\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}-\frac{bn\left(d\left(2\sqrt{d+ex^2}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex^2)^{3/2}\right)}{6e}$$

input
```
Int[x*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
-1/6*(b*n*((2*(d + e*x^2)^(3/2))/3 + d*(2*Sqrt[d + e*x^2] - 2*Sqrt[d]*ArcT
anh[Sqrt[d + e*x^2]/Sqrt[d]])))/e + ((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))
/(3*e)
```

Defintions of rubi rules used

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Maple [F]

$$\int x\sqrt{e\,x^{2}+d}\,(a+b\ln(c\,x^{n}))\,dx$$

input
```
int(x*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

Fricas [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 205, normalized size of antiderivative = 2.01

$$\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$=\left[\frac{3\,bd^{\frac{3}{2}}n\log\left(-\frac{ex^2+2\,\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-2\,(4\,bdn+(ben-3\,ae)x^2-3\,ad-3\,(bex^2+bd)\log(c)-3\,(benx^2}{18\,e}\right.$$
$$-\frac{3\,b\sqrt{-d}dn\arctan\left(\frac{\sqrt{ex^2+d}\sqrt{-d}}{d}\right)+(4\,bdn+(ben-3\,ae)x^2-3\,ad-3\,(bex^2+bd)\log(c)-3\,(benx^2+}{9\,e}$$

input
```
integrate(x*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[1/18*(3*b*d^(3/2)*n*log(-(e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/x^2) -
 2*(4*b*d*n + (b*e*n - 3*a*e)*x^2 - 3*a*d - 3*(b*e*x^2 + b*d)*log(c) - 3*(
b*e*n*x^2 + b*d*n)*log(x))*sqrt(e*x^2 + d))/e, -1/9*(3*b*sqrt(-d)*d*n*arct
an(sqrt(e*x^2 + d)*sqrt(-d)/d) + (4*b*d*n + (b*e*n - 3*a*e)*x^2 - 3*a*d -
3*(b*e*x^2 + b*d)*log(c) - 3*(b*e*n*x^2 + b*d*n)*log(x))*sqrt(e*x^2 + d))/
e]
```

Sympy [A] (verification not implemented)

Time = 12.82 (sec) , antiderivative size = 218, normalized size of antiderivative = 2.14

$$\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = a\left(\begin{cases}\frac{d\sqrt{d+ex^2}}{3e}+\frac{x^2\sqrt{d+ex^2}}{3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}\right) - bn\left(\begin{cases}-\frac{d^{\frac{3}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{3e}+\frac{d^2}{3e^{\frac{3}{2}}x\sqrt{\frac{d}{ex^2}+1}}+\frac{dx}{3\sqrt{e}\sqrt{\frac{d}{ex^2}+1}}+\frac{\begin{cases}\frac{d\sqrt{d+ex^2}}{3e}+\frac{x^2\sqrt{d+ex^2}}{3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}}{3} & \text{for } e>-\infty\wedge \\ \frac{\sqrt{d}x^2}{4} & \text{otherwise}\end{cases}\right) + b\left(\begin{cases}\frac{d\sqrt{d+ex^2}}{3e}+\frac{x^2\sqrt{d+ex^2}}{3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x*(e*x**2+d)**(1/2)*(a+b*ln(c*x**n)),x)
```

output
```
a*Piecewise(((d*sqrt(d + e*x**2)/(3*e) + x**2*sqrt(d + e*x**2)/3, Ne(e, 0))
, (sqrt(d)*x**2/2, True)) - b*n*Piecewise((-d**(3/2)*asinh(sqrt(d)/(sqrt(e
)*x))/(3*e) + d**2/(3*e**(3/2)*x*sqrt(d/(e*x**2) + 1)) + d*x/(3*sqrt(e)*sq
rt(d/(e*x**2) + 1)) + Piecewise((d*sqrt(d + e*x**2)/(3*e) + x**2*sqrt(d +
e*x**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2, True))/3, (e > -oo) & (e < oo) & Ne
(e, 0)), (sqrt(d)*x**2/4, True)) + b*Piecewise((d*sqrt(d + e*x**2)/(3*e) +
 x**2*sqrt(d + e*x**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2, True))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.38

$$\begin{aligned}&\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx\\&=\frac{1}{3}\sqrt{ex^2+d}bx^2\log(c)+\frac{1}{3}\sqrt{ex^2+d}ax^2\\&+\frac{1}{9}\left(\frac{3\,(ex^2+d)^{\frac{3}{2}}\log(x)}{e}-\frac{\frac{3\,d^2\arctan\left(\frac{\sqrt{ex^2+d}}{\sqrt{-d}}\right)}{\sqrt{-d}}+(ex^2+d)^{\frac{3}{2}}+3\sqrt{ex^2+d}d}{e}\right)bn\\&+\frac{\sqrt{ex^2+d}bd\log(c)}{3\,e}+\frac{\sqrt{ex^2+d}ad}{3\,e}\end{aligned}$$

input
```
integrate(x*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/3*sqrt(e*x^2 + d)*b*x^2*log(c) + 1/3*sqrt(e*x^2 + d)*a*x^2 + 1/9*(3*(e*x
^2 + d)^(3/2)*log(x)/e - (3*d^2*arctan(sqrt(e*x^2 + d)/sqrt(-d))/sqrt(-d)
+ (e*x^2 + d)^(3/2) + 3*sqrt(e*x^2 + d)*d)/e)*b*n + 1/3*sqrt(e*x^2 + d)*b*
d*log(c)/e + 1/3*sqrt(e*x^2 + d)*a*d/e
```

Mupad [F(-1)]

Timed out.

$$\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx=\int x\,\sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int(x*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)),x)
```

output
```
int(x*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 255, normalized size of antiderivative = 2.50

$$\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$=\frac{3\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)bd+3\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)be\,x^2+3\sqrt{e\,x^2+d}\,a}{}$$

input
```
int(x*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x)
```

output
```
(3*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(
e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d + 3*sqrt(d + e*x**2)
*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d +
e*x**2) + sqrt(e)*x)**n*2**n))*b*e*x**2 + 3*sqrt(d + e*x**2)*a*d + 3*sqrt(
d + e*x**2)*a*e*x**2 - 4*sqrt(d + e*x**2)*b*d*n - sqrt(d + e*x**2)*b*e*n*x
**2 - 3*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d*
n + 3*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d*n)
/(9*e)
```

3.254 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}\,dx$

Optimal result 1940
Mathematica [C] (verified) 1941
Rubi [A] (verified) 1941
Maple [F] 1943
Fricas [F] 1943
Sympy [F] 1943
Maxima [F(-2)] 1944
Giac [F] 1944
Mupad [F(-1)] 1944
Reduce [F] 1945

Optimal result

Integrand size = 25, antiderivative size = 220

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}\,dx = -bn\sqrt{d+ex^2}+b\sqrt{d}n\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right) + \frac{1}{2}b\sqrt{d}n\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2 + \left(\sqrt{d+ex^2} - \sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)(a+b\log(cx^n)) - b\sqrt{d}n\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right) - \frac{1}{2}b\sqrt{d}n\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)$$

output
```
-b*n*(e*x^2+d)^(1/2)+b*d^(1/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))+1/2*b*d^
(1/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))^2+((e*x^2+d)^(1/2)-d^(1/2)*arctan
h((e*x^2+d)^(1/2)/d^(1/2)))*(a+b*ln(c*x^n))-b*d^(1/2)*n*arctanh((e*x^2+d)^
(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))-1/2*b*d^(1/2)*n*pol
ylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.42 (sec) , antiderivative size = 203, normalized size of antiderivative = 0.92

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}\,dx$$
$$=\frac{bn\sqrt{d+ex^2}\left(-{}_3F_2\left(-\frac{1}{2},-\frac{1}{2},-\frac{1}{2};\frac{1}{2},\frac{1}{2};-\frac{d}{ex^2}\right)+\sqrt{1+\frac{d}{ex^2}}\log(x)-\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)\log(x)}{\sqrt{e}x}\right)}{\sqrt{1+\frac{d}{ex^2}}}$$
$$+\sqrt{d+ex^2}(a-bn\log(x)+b\log(cx^n))+\sqrt{d}\log(x)\,(a-bn\log(x)+b\log(cx^n))$$
$$-\sqrt{d}(a-bn\log(x)+b\log(cx^n))\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)$$

input
```
Integrate[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x,x]
```

output
```
(b*n*Sqrt[d + e*x^2]*(-HypergeometricPFQ[{-1/2, -1/2, -1/2}, {1/2, 1/2}, -
(d/(e*x^2))] + Sqrt[1 + d/(e*x^2)]*Log[x] - (Sqrt[d]*ArcSinh[Sqrt[d]/(Sqrt
[e]*x)]*Log[x])/(Sqrt[e]*x)))/Sqrt[1 + d/(e*x^2)] + Sqrt[d + e*x^2]*(a - b
*n*Log[x] + b*Log[c*x^n]) + Sqrt[d]*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n])
 - Sqrt[d]*(a - b*n*Log[x] + b*Log[c*x^n])*Log[d + Sqrt[d]*Sqrt[d + e*x^2]
]
```

Rubi [A] (verified)

Time = 0.65 (sec) , antiderivative size = 213, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.080$, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}\,dx$$
$$\Big\downarrow \text{2790}$$

$$\left(\sqrt{d+ex^2}-\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)(a+b\log(cx^n))-bn\int\left(\frac{\sqrt{ex^2+d}}{x}-\frac{\sqrt{d}\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\left(\sqrt{d+ex^2}-\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)(a+b\log(cx^n))-bn\left(-\frac{1}{2}\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2-\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\right.$$

input
```
Int[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x,x]
```

output
```
(Sqrt[d + e*x^2] - Sqrt[d]*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])*(a + b*Log[c*
x^n]) - b*n*(Sqrt[d + e*x^2] - Sqrt[d]*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]] -
(Sqrt[d]*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]^2)/2 + Sqrt[d]*ArcTanh[Sqrt[d +
e*x^2]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])] + (Sqrt[d]*Po
lyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/2)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

Maple [F]

$$\int \frac{\sqrt{e\,x^{2}+d}\,\left(a+b\ln\left(c\,x^{n}\right)\right)}{x}dx$$

input
```
int((e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/x,x)
```

output
```
int((e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/x,x)
```

Fricas [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log\left(cx^n\right))}{x}\,dx=\int \frac{\sqrt{ex^2+d}(b\log\left(cx^n\right)+a)}{x}\,dx$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/x, x)
```

Sympy [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log\left(cx^n\right))}{x}\,dx=\int \frac{\left(a+b\log\left(cx^n\right)\right)\sqrt{d+ex^2}}{x}\,dx$$

input
```
integrate((e*x**2+d)**(1/2)*(a+b*ln(c*x**n))/x,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x**2)/x, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}\,dx = \int \frac{\sqrt{ex^2+d}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*log(c*x^n) + a)/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}\,dx = \int \frac{\sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))}{x}\,dx$$

input
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x, x)
```

Reduce [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}\,dx = \sqrt{e\,x^2+d}\,a+\sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}-\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)a - \sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)a + \left(\int \frac{\sqrt{e\,x^2+d}\log(x^n c)}{x}dx\right)b$$

input
```
int((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x,x)
```

output
```
sqrt(d + e*x**2)*a + sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/
sqrt(d))*a - sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))
*a + int((sqrt(d + e*x**2)*log(x**n*c))/x,x)*b
```

3.255 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx$

Optimal result . . . 1946
Mathematica [C] (verified) . . . 1947
Rubi [A] (verified) . . . 1947
Maple [F] . . . 1949
Fricas [F] . . . 1950
Sympy [F] . . . 1950
Maxima [F(-2)] . . . 1950
Giac [F] . . . 1951
Mupad [F(-1)] . . . 1951
Reduce [F] . . . 1951

Optimal result

Integrand size = 25, antiderivative size = 252

$$\begin{aligned}\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx &= -\frac{bn\sqrt{d+ex^2}}{4x^2} - \frac{ben\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4\sqrt{d}} \\ &\quad + \frac{ben\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4\sqrt{d}} - \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2x^2} \\ &\quad - \frac{e\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}} \\ &\quad - \frac{ben\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{2\sqrt{d}} \\ &\quad - \frac{ben\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{4\sqrt{d}}\end{aligned}$$

output
```
-1/4*b*n*(e*x^2+d)^(1/2)/x^2-1/4*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^
(1/2)+1/4*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))^2/d^(1/2)-1/2*(e*x^2+d)^(
1/2)*(a+b*ln(c*x^n))/x^2-1/2*e*arctanh((e*x^2+d)^(1/2)/d^(1/2))*(a+b*ln(c*
x^n))/d^(1/2)-1/2*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(
1/2)-(e*x^2+d)^(1/2)))/d^(1/2)-1/4*b*e*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e
*x^2+d)^(1/2)))/d^(1/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.65 (sec) , antiderivative size = 303, normalized size of antiderivative = 1.20

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx$$
$$= \frac{-2b\sqrt{d}n\sqrt{d+ex^2}\,{}_3F_2\left(\frac{1}{2},\frac{1}{2},\frac{1}{2};\frac{3}{2},\frac{3}{2};-\frac{d}{ex^2}\right)-b\sqrt{e}nx\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)(1+2\log(x))+\sqrt{1+\frac{d}{ex^2}}\left(-\right.}{}$$

input
```
Integrate[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(-2*b*Sqrt[d]*n*Sqrt[d + e*x^2]*HypergeometricPFQ[{1/2, 1/2, 1/2}, {3/2, 3
/2}, -(d/(e*x^2))] - b*Sqrt[e]*n*x*Sqrt[d + e*x^2]*ArcSinh[Sqrt[d]/(Sqrt[e
]*x)]*(1 + 2*Log[x]) + Sqrt[1 + d/(e*x^2)]*(-2*a*Sqrt[d]*Sqrt[d + e*x^2] -
 b*Sqrt[d]*n*Sqrt[d + e*x^2] - 2*b*e*n*x^2*Log[x]^2 - 2*a*e*x^2*Log[d + Sq
rt[d]*Sqrt[d + e*x^2]] + 2*e*x^2*Log[x]*(a + b*Log[c*x^n] + b*n*Log[d + Sq
rt[d]*Sqrt[d + e*x^2]]) - 2*b*Log[c*x^n]*(Sqrt[d]*Sqrt[d + e*x^2] + e*x^2*
Log[d + Sqrt[d]*Sqrt[d + e*x^2]])))/(4*Sqrt[d]*Sqrt[1 + d/(e*x^2)]*x^2)
```

Rubi [A] (verified)

Time = 0.72 (sec) , antiderivative size = 247, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.160$, Rules used = {2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx$$
$$\Big\downarrow \; 2792$$

$$-bn\int -\frac{\frac{e\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)x^2}{\sqrt{d}}+\sqrt{ex^2+d}}{2x^3}dx-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2x^2}$$

$\Big\downarrow$ 27

$$\frac{1}{2}bn\int \frac{\frac{e\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)x^2}{\sqrt{d}}+\sqrt{ex^2+d}}{x^3}dx-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2x^2}$$

$\Big\downarrow$ 2010

$$\frac{1}{2}bn\int \left(\frac{e\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{\sqrt{d}x}+\frac{\sqrt{ex^2+d}}{x^3}\right)dx-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2x^2}$$

$\Big\downarrow$ 2009

$$-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2x^2}+\frac{1}{2}bn\left(\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2\sqrt{d}}-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{2\sqrt{d}}-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{\sqrt{d}}-\frac{e\,\text{PolyLog}\left(2,1-\frac{}{\sqrt{}}\right.}{2\sqrt{d}}\right.$$

input
```
Int[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-1/2*(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^2 - (e*ArcTanh[Sqrt[d + e*x^2]
/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*Sqrt[d]) + (b*n*(-1/2*Sqrt[d + e*x^2]/x^2
 - (e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(2*Sqrt[d]) + (e*ArcTanh[Sqrt[d +
e*x^2]/Sqrt[d]]^2)/(2*Sqrt[d]) - (e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*Log[(
2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/Sqrt[d] - (e*PolyLog[2, 1 - (2*Sq
rt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(2*Sqrt[d])))/2
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{\sqrt{e\,x^{2}+d}\,\left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{3}}dx$$

input
```
int((e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/x^3,x)
```

output
```
int((e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/x^3,x)
```

Fricas [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx=\int \frac{\sqrt{ex^2+d}(b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/x^3, x)
```

Sympy [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx=\int \frac{(a+b\log(cx^n))\sqrt{d+ex^2}}{x^3}\,dx$$

input
```
integrate((e*x**2+d)**(1/2)*(a+b*ln(c*x**n))/x**3,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x**2)/x**3, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx=\text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{\sqrt{ex^2+d}(b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*log(c*x^n) + a)/x^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{\sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))}{x^3}\,dx$$

input
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^3,x)
```

output
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^3, x)
```

Reduce [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx$$
$$= \frac{-\sqrt{e\,x^2+d}\,ad+\sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}-\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)ae\,x^2-\sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)ae\,x^2+2\left(\int\frac{\sqrt{e\,x^2+d}\log(x^n c)}{x^3}d}{2d\,x^2}$$

input
```
int((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^3,x)
```

output
```
( - sqrt(d + e*x**2)*a*d + sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(
e)*x)/sqrt(d))*a*e*x**2 - sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e
)*x)/sqrt(d))*a*e*x**2 + 2*int((sqrt(d + e*x**2)*log(x**n*c))/x**3,x)*b*d*
x**2)/(2*d*x**2)
```

3.256 $\int x^4\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$

Optimal result . . . 1952
Mathematica [C] (verified) . . . 1953
Rubi [A] (verified) . . . 1954
Maple [F] . . . 1956
Fricas [F] . . . 1956
Sympy [F] . . . 1957
Maxima [F(-2)] . . . 1957
Giac [F] . . . 1957
Mupad [F(-1)] . . . 1958
Reduce [F] . . . 1958

Optimal result

Integrand size = 25, antiderivative size = 469

$$\int x^4\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \frac{7bd^2nx\sqrt{d+ex^2}}{192e^2}-\frac{5bdnx^3\sqrt{d+ex^2}}{288e}$$
$$-\frac{1}{36}bnx^5\sqrt{d+ex^2}+\frac{5bd^{5/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{192e^{5/2}\sqrt{1+\frac{ex^2}{d}}}+\frac{bd^{5/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{32e^{5/2}\sqrt{1+\frac{ex^2}{d}}}$$
$$-\frac{bd^{5/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{16e^{5/2}\sqrt{1+\frac{ex^2}{d}}}$$
$$-\frac{d^2x\sqrt{d+ex^2}(a+b\log(cx^n))}{16e^2}+\frac{dx^3\sqrt{d+ex^2}(a+b\log(cx^n))}{24e}$$
$$+\frac{1}{6}x^5\sqrt{d+ex^2}(a+b\log(cx^n))+\frac{d^{5/2}\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{16e^{5/2}\sqrt{1+\frac{ex^2}{d}}}-\frac{bd^{5/2}n\sqrt{d+ex^2}\operatorname{PolyLog}}{32e^{5/2}\sqrt{1}}$$

output
```
7/192*b*d^2*n*x*(e*x^2+d)^(1/2)/e^2-5/288*b*d*n*x^3*(e*x^2+d)^(1/2)/e-1/36
*b*n*x^5*(e*x^2+d)^(1/2)+5/192*b*d^(5/2)*n*(e*x^2+d)^(1/2)*arcsinh(e^(1/2)
*x/d^(1/2))/e^(5/2)/(1+e*x^2/d)^(1/2)+1/32*b*d^(5/2)*n*(e*x^2+d)^(1/2)*arc
sinh(e^(1/2)*x/d^(1/2))^2/e^(5/2)/(1+e*x^2/d)^(1/2)-1/16*b*d^(5/2)*n*(e*x^
2+d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))*ln(1-(e^(1/2)*x/d^(1/2)+(1+e*x^2/d)^
(1/2))^2)/e^(5/2)/(1+e*x^2/d)^(1/2)-1/16*d^2*x*(e*x^2+d)^(1/2)*(a+b*ln(c*x
^n))/e^2+1/24*d*x^3*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/e+1/6*x^5*(e*x^2+d)^(1
/2)*(a+b*ln(c*x^n))+1/16*d^(5/2)*(e*x^2+d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2)
)*(a+b*ln(c*x^n))/e^(5/2)/(1+e*x^2/d)^(1/2)-1/32*b*d^(5/2)*n*(e*x^2+d)^(1/
2)*polylog(2,(e^(1/2)*x/d^(1/2)+(1+e*x^2/d)^(1/2))^2)/e^(5/2)/(1+e*x^2/d)^
(1/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.72 (sec) , antiderivative size = 276, normalized size of antiderivative = 0.59

$$\int x^4\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$= \frac{-48be^{5/2}nx^5\sqrt{d+ex^2}\,{}_3F_2\left(-\frac{1}{2},\frac{5}{2},\frac{5}{2};\frac{7}{2},\frac{7}{2};-\frac{ex^2}{d}\right)+75bd^{5/2}n\sqrt{d+ex^2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log(x)+25\sqrt{1+\frac{ex^2}{d}}\cdots}{\cdots}$$

input
```
Integrate[x^4*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
(-48*b*e^(5/2)*n*x^5*Sqrt[d + e*x^2]*HypergeometricPFQ[{-1/2, 5/2, 5/2}, {
7/2, 7/2}, -((e*x^2)/d)] + 75*b*d^(5/2)*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]
*x)/Sqrt[d]]*Log[x] + 25*Sqrt[1 + (e*x^2)/d]*(a*Sqrt[e]*x*Sqrt[d + e*x^2]*
(-3*d^2 + 2*d*e*x^2 + 8*e^2*x^4) + 3*d^3*(a - b*n*Log[x])*Log[e*x + Sqrt[e
]*Sqrt[d + e*x^2]] + b*Log[c*x^n]*(Sqrt[e]*x*Sqrt[d + e*x^2]*(-3*d^2 + 2*d
*e*x^2 + 8*e^2*x^4) + 3*d^3*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])))/(1200*e^
(5/2)*Sqrt[1 + (e*x^2)/d])
```

Rubi [A] (verified)

Time = 0.95 (sec) , antiderivative size = 373, normalized size of antiderivative = 0.80, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2786, 2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^4\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2786}$$

$$\frac{\sqrt{d+ex^2}\int x^4\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))dx}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{2792}$$

$$\frac{\sqrt{d+ex^2}\left(-bn\int -\frac{\sqrt{e}x\sqrt{\frac{ex^2}{d}+1}(-8e^2x^4-2dex^2+3d^2)-3d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{48e^{5/2}x}dx+\frac{d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{16e^{5/2}}-\frac{d^2x\sqrt{\frac{ex^2}{d}}}{}\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{27}$$

$$\frac{\sqrt{d+ex^2}\left(\frac{bn\int\frac{\sqrt{e}x\sqrt{\frac{ex^2}{d}+1}(-8e^2x^4-2dex^2+3d^2)-3d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{48e^{5/2}}+\frac{d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{16e^{5/2}}-\frac{d^2x\sqrt{\frac{ex^2}{d}+1}(a+b\,l}{16e^2}\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{2010}$$

$$\frac{\sqrt{d+ex^2}\left(\frac{bn\int\left(-8e^{5/2}\sqrt{\frac{ex^2}{d}+1}x^4-2de^{3/2}\sqrt{\frac{ex^2}{d}+1}x^2+3d^2\sqrt{e}\sqrt{\frac{ex^2}{d}+1}-\frac{3d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}\right)dx}{48e^{5/2}}+\frac{d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(c}{16e^{5/2}}\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{2009}$$

$$\sqrt{d+ex^2}\left(\frac{d^{5/2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{16e^{5/2}}-\frac{d^2x\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{16e^2}+\frac{1}{6}x^5\sqrt{\frac{ex^2}{d}+1}(a+b\log\left(cx^n\right))+\frac{dx^3\sqrt{\frac{ex^2}{d}+1}(}{24}\right.$$

input

```
Int[x^4*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output

```
(Sqrt[d + e*x^2]*(-1/16*(d^2*x*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/e^2
 + (d*x^3*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/(24*e) + (x^5*Sqrt[1 + (
e*x^2)/d]*(a + b*Log[c*x^n]))/6 + (d^(5/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a
 + b*Log[c*x^n]))/(16*e^(5/2)) + (b*n*((7*d^2*Sqrt[e]*x*Sqrt[1 + (e*x^2)/d
])/4 - (5*d*e^(3/2)*x^3*Sqrt[1 + (e*x^2)/d])/6 - (4*e^(5/2)*x^5*Sqrt[1 + (
e*x^2)/d])/3 + (5*d^(5/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/4 + (3*d^(5/2)*Arc
Sinh[(Sqrt[e]*x)/Sqrt[d]]^2)/2 - 3*d^(5/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Lo
g[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])] - (3*d^(5/2)*PolyLog[2, E^(2*Arc
Sinh[(Sqrt[e]*x)/Sqrt[d]])])/2))/(48*e^(5/2))))/Sqrt[1 + (e*x^2)/d]
```

Defintions of rubi rules used

rule 27

```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009

```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int x^{4} \sqrt{e\,x^{2}+d}\,\left(a +b \ln \left(c\,x^{n}\right)\right)dx$$

input
```
int(x^4*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x^4*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

Fricas [F]

$$\int x^4 \sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \int \sqrt{ex^2+d}(b\log(cx^n)+a)x^4\,dx$$

input
```
integrate(x^4*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral(sqrt(e*x^2 + d)*b*x^4*log(c*x^n) + sqrt(e*x^2 + d)*a*x^4, x)
```

Sympy [F]

$$\int x^4\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \int x^4(a+b\log(cx^n))\sqrt{d+ex^2}\,dx$$

input
```
integrate(x**4*(e*x**2+d)**(1/2)*(a+b*ln(c*x**n)),x)
```

output
```
Integral(x**4*(a + b*log(c*x**n))*sqrt(d + e*x**2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int x^4\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^4*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int x^4\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \int \sqrt{ex^2+d}(b\log(cx^n)+a)x^4\,dx$$

input
```
integrate(x^4*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*log(c*x^n) + a)*x^4, x)
```

Mupad [F(-1)]

Timed out.

$$\int x^4\sqrt{d+ex^2}(a+b\log(cx^n))\,dx=\int x^4\,\sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int(x^4*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)),x)
```

output
```
int(x^4*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)), x)
```

Reduce [F]

$$\int x^4\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$=\frac{-3\sqrt{e\,x^2+d}\,a\,d^2ex+2\sqrt{e\,x^2+d}\,ad\,e^2x^3+8\sqrt{e\,x^2+d}\,a\,e^3x^5+3\sqrt{e}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{e}\,x}{\sqrt{d}}\right)a\,d^3+48\left(\int\sqrt{e\,x^2+d}\ldots\right.}{48e^3}$$

input
```
int(x^4*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x)
```

output
```
( - 3*sqrt(d + e*x**2)*a*d**2*e*x + 2*sqrt(d + e*x**2)*a*d*e**2*x**3 + 8*s
qrt(d + e*x**2)*a*e**3*x**5 + 3*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(e)*x)
/sqrt(d))*a*d**3 + 48*int(sqrt(d + e*x**2)*log(x**n*c)*x**4,x)*b*e**3)/(48
*e**3)
```

3.257 $\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$

Optimal result . . . 1959
Mathematica [C] (verified) . . . 1960
Rubi [A] (verified) . . . 1961
Maple [F] . . . 1962
Fricas [F] . . . 1963
Sympy [F(-1)] . . . 1963
Maxima [F(-2)] . . . 1963
Giac [F] . . . 1964
Mupad [F(-1)] . . . 1964
Reduce [F] . . . 1964

Optimal result

Integrand size = 25, antiderivative size = 410

$$\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx=-\frac{bdnx\sqrt{d+ex^2}}{32e}-\frac{bnx(d+ex^2)^{3/2}}{16e}$$
$$-\frac{bd^{3/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{32e^{3/2}\sqrt{1+\frac{ex^2}{d}}}-\frac{bd^{3/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{16e^{3/2}\sqrt{1+\frac{ex^2}{d}}}$$
$$+\frac{bd^{3/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{8e^{3/2}\sqrt{1+\frac{ex^2}{d}}}$$
$$+\frac{dx\sqrt{d+ex^2}(a+b\log(cx^n))}{8e}$$
$$+\frac{1}{4}x^3\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{d^{3/2}\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{8e^{3/2}\sqrt{1+\frac{ex^2}{d}}}+\frac{bd^{3/2}n\sqrt{d+ex^2}\operatorname{PolyLog}\ldots}{16e^{3/2}\sqrt{1\ldots}}$$

output
```
-1/32*b*d*n*x*(e*x^2+d)^(1/2)/e-1/16*b*n*x*(e*x^2+d)^(3/2)/e-1/32*b*d^(3/2
)*n*(e*x^2+d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))/e^(3/2)/(1+e*x^2/d)^(1/2)-1
/16*b*d^(3/2)*n*(e*x^2+d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))^2/e^(3/2)/(1+e*
x^2/d)^(1/2)+1/8*b*d^(3/2)*n*(e*x^2+d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))*ln
(1-(e^(1/2)*x/d^(1/2)+(1+e*x^2/d)^(1/2))^2)/e^(3/2)/(1+e*x^2/d)^(1/2)+1/8*
d*x*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/e+1/4*x^3*(e*x^2+d)^(1/2)*(a+b*ln(c*x^
n))-1/8*d^(3/2)*(e*x^2+d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))*(a+b*ln(c*x^n))
/e^(3/2)/(1+e*x^2/d)^(1/2)+1/16*b*d^(3/2)*n*(e*x^2+d)^(1/2)*polylog(2,(e^(
1/2)*x/d^(1/2)+(1+e*x^2/d)^(1/2))^2)/e^(3/2)/(1+e*x^2/d)^(1/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.55 (sec) , antiderivative size = 250, normalized size of antiderivative = 0.61

$$\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$= \frac{-8be^{3/2}nx^3\sqrt{d+ex^2}\,{}_3F_2\left(-\frac{1}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{ex^2}{d}\right)-9bd^{3/2}n\sqrt{d+ex^2}\,\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log(x)+9\sqrt{1+\frac{ex^2}{d}}(a\cdots}{}$$

input
```
Integrate[x^2*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
(-8*b*e^(3/2)*n*x^3*Sqrt[d + e*x^2]*HypergeometricPFQ[{-1/2, 3/2, 3/2}, {5
/2, 5/2}, -((e*x^2)/d)] - 9*b*d^(3/2)*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x
)/Sqrt[d]]*Log[x] + 9*Sqrt[1 + (e*x^2)/d]*(a*Sqrt[e]*x*Sqrt[d + e*x^2]*(d
+ 2*e*x^2) + d^2*(-a + b*n*Log[x])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]] + b*
Log[c*x^n]*(Sqrt[e]*x*Sqrt[d + e*x^2]*(d + 2*e*x^2) - d^2*Log[e*x + Sqrt[e
]*Sqrt[d + e*x^2]])))/(72*e^(3/2)*Sqrt[1 + (e*x^2)/d])
```

Rubi [A] (verified)

Time = 0.71 (sec) , antiderivative size = 317, normalized size of antiderivative = 0.77, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.120, Rules used = {2786, 2792, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2786}$$

$$\frac{\sqrt{d+ex^2}\int x^2\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))\,dx}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{2792}$$

$$\frac{\sqrt{d+ex^2}\left(-bn\int\left(\frac{(2ex^2+d)\sqrt{\frac{ex^2}{d}+1}}{8e}-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{8e^{3/2}x}\right)dx-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{8e^{3/2}}+\frac{dx\sqrt{\frac{ex^2}{d}+1}(a+b\log(c\right.}{8e}}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{2009}$$

$$\frac{\sqrt{d+ex^2}\left(-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{8e^{3/2}}+\frac{dx\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{8e}+\frac{1}{4}x^3\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))-bn\left(-\frac{d^{3/2}}{\ldots}\right.\right.}{}$$

input
```
Int[x^2*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
(Sqrt[d + e*x^2]*((d*x*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/(8*e) + (x^
3*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/4 - (d^(3/2)*ArcSinh[(Sqrt[e]*x)
/Sqrt[d]]*(a + b*Log[c*x^n]))/(8*e^(3/2)) - b*n*((d*x*Sqrt[1 + (e*x^2)/d])
/(32*e) + (d*x*(1 + (e*x^2)/d)^(3/2))/(16*e) + (d^(3/2)*ArcSinh[(Sqrt[e]*x
)/Sqrt[d]])/(32*e^(3/2)) + (d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/(16*e^
(3/2)) - (d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[
e]*x)/Sqrt[d]])])/(8*e^(3/2)) - (d^(3/2)*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*
x)/Sqrt[d]])])/(16*e^(3/2)))))/Sqrt[1 + (e*x^2)/d]
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int x^2\sqrt{e\,x^2+d}\,(a+b\ln(c\,x^n))\,dx$$

input
```
int(x^2*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x^2*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

Fricas [F]

$$\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx=\int\sqrt{ex^2+d}(b\log(cx^n)+a)x^2\,dx$$

input
```
integrate(x^2*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral(sqrt(e*x^2 + d)*b*x^2*log(c*x^n) + sqrt(e*x^2 + d)*a*x^2, x)
```

Sympy [F(-1)]

Timed out.

$$\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx=\text{Timed out}$$

input
```
integrate(x**2*(e*x**2+d)**(1/2)*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx=\text{Exception raised: ValueError}$$

input
```
integrate(x^2*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx=\int\sqrt{ex^2+d}(b\log(cx^n)+a)x^2\,dx$$

input
```
integrate(x^2*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*log(c*x^n) + a)*x^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx=\int x^2\,\sqrt{e\,x^2+d}\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x^2*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)),x)
```

output
```
int(x^2*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)), x)
```

Reduce [F]

$$\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$=\frac{\sqrt{e\,x^2+d}\,adex+2\sqrt{e\,x^2+d}\,a\,e^2x^3-\sqrt{e}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{e}\,x}{\sqrt{d}}\right)a\,d^2+8\left(\int\sqrt{e\,x^2+d}\log(x^nc)\,x^2dx\right)b\,e^2}{8e^2}$$

input
```
int(x^2*(e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x)
```

output
```
(sqrt(d + e*x**2)*a*d*e*x + 2*sqrt(d + e*x**2)*a*e**2*x**3 - sqrt(e)*log((
sqrt(d + e*x**2) + sqrt(e)*x)/sqrt(d))*a*d**2 + 8*int(sqrt(d + e*x**2)*log
(x**n*c)*x**2,x)*b*e**2)/(8*e**2)
```

3.258 $\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx$

Optimal result . . . 1965
Mathematica [C] (verified) . . . 1966
Rubi [C] (verified) . . . 1967
Maple [F] . . . 1972
Fricas [F] . . . 1973
Sympy [F] . . . 1973
Maxima [F(-2)] . . . 1973
Giac [F] . . . 1974
Mupad [F(-1)] . . . 1974
Reduce [F] . . . 1974

Optimal result

Integrand size = 22, antiderivative size = 330

$$\begin{aligned}
&\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx\\
&= -\frac{1}{4}bnx\sqrt{d+ex^2}+\frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{4\sqrt{e}\sqrt{d+ex^2}}-\frac{bdn\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{4\sqrt{e}}\\
&\quad-\frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2\sqrt{e}\sqrt{d+ex^2}}\\
&\quad+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))+\frac{d^{3/2}\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{e}\sqrt{d+ex^2}}\\
&\quad-\frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{PolyLog}\left(2,e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{4\sqrt{e}\sqrt{d+ex^2}}
\end{aligned}$$

output
```
-1/4*b*n*x*(e*x^2+d)^(1/2)+1/4*b*d^(3/2)*n*(1+e*x^2/d)^(1/2)*arcsinh(e^(1/
2)*x/d^(1/2))^2/e^(1/2)/(e*x^2+d)^(1/2)-1/4*b*d*n*arctanh(e^(1/2)*x/(e*x^2
+d)^(1/2))/e^(1/2)-1/2*b*d^(3/2)*n*(1+e*x^2/d)^(1/2)*arcsinh(e^(1/2)*x/d^(
1/2))*ln(1-(e^(1/2)*x/d^(1/2)+(1+e*x^2/d)^(1/2))^2)/e^(1/2)/(e*x^2+d)^(1/2
)+1/2*x*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))+1/2*d^(3/2)*(1+e*x^2/d)^(1/2)*arcs
inh(e^(1/2)*x/d^(1/2))*(a+b*ln(c*x^n))/e^(1/2)/(e*x^2+d)^(1/2)-1/4*b*d^(3/
2)*n*(1+e*x^2/d)^(1/2)*polylog(2,(e^(1/2)*x/d^(1/2)+(1+e*x^2/d)^(1/2))^2)/
e^(1/2)/(e*x^2+d)^(1/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.45 (sec) , antiderivative size = 237, normalized size of antiderivative = 0.72

$$\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \frac{-2b\sqrt{e}nx\sqrt{d+ex^2}\,{}_3F_2\left(\frac{1}{2},\frac{1}{2},\frac{1}{2};\frac{3}{2},\frac{3}{2};-\frac{ex^2}{d}\right)+b\sqrt{d}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(-1+2\log(x))+\sqrt{1+\frac{ex^2}{d}}$$

input
```
Integrate[Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
(-2*b*Sqrt[e]*n*x*Sqrt[d + e*x^2]*HypergeometricPFQ[{1/2, 1/2, 1/2}, {3/2,
 3/2}, -((e*x^2)/d)] + b*Sqrt[d]*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqr
t[d]]*(-1 + 2*Log[x]) + Sqrt[1 + (e*x^2)/d]*(Sqrt[e]*(2*a - b*n)*x*Sqrt[d
+ e*x^2] + 2*d*(a - b*n*Log[x])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]] + 2*b*L
og[c*x^n]*(Sqrt[e]*x*Sqrt[d + e*x^2] + d*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]
])))/(4*Sqrt[e]*Sqrt[1 + (e*x^2)/d])
```

Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 0.88 (sec) , antiderivative size = 249, normalized size of antiderivative = 0.75, number of steps used = 15, number of rules used = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.636$, Rules used = {2758, 211, 224, 219, 2764, 2762, 6190, 3042, 26, 4199, 25, 2620, 2715, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2758}$$

$$\frac{1}{2}d\int \frac{a+b\log(cx^n)}{\sqrt{ex^2+d}}dx-\frac{1}{2}bn\int \sqrt{ex^2+d}dx+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))$$

$$\Big\downarrow \text{211}$$

$$\frac{1}{2}d\int \frac{a+b\log(cx^n)}{\sqrt{ex^2+d}}dx-\frac{1}{2}bn\left(\frac{1}{2}d\int \frac{1}{\sqrt{ex^2+d}}dx+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))$$

$$\Big\downarrow \text{224}$$

$$\frac{1}{2}d\int \frac{a+b\log(cx^n)}{\sqrt{ex^2+d}}dx-\frac{1}{2}bn\left(\frac{1}{2}d\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))$$

$$\Big\downarrow \text{219}$$

$$\frac{1}{2}d\int \frac{a+b\log(cx^n)}{\sqrt{ex^2+d}}dx+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$$\Big\downarrow \text{2764}$$

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\int \frac{a+b\log(cx^n)}{\sqrt{\frac{ex^2}{d}+1}}dx}{2\sqrt{d+ex^2}}+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$$\Big\downarrow \text{2762}$$

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}-\frac{b\sqrt{d}n\int \frac{\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{e}}\right)}{2\sqrt{d+ex^2}}+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$$\Big\downarrow \text{6190}$$

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}-\frac{b\sqrt{d}n\int \frac{\sqrt{d}\sqrt{\frac{ex^2}{d}+1}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}x}d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right)}{2\sqrt{d+ex^2}}+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$$\Big\downarrow \text{3042}$$

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}-\frac{b\sqrt{d}n\int -i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\tan\left(i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)+\frac{\pi}{2}\right)d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right)}{2\sqrt{d+ex^2}}+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$$\Big\downarrow \text{26}$$

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\int \text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\tan\left(i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)+\frac{\pi}{2}\right)d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right)}{2\sqrt{d+ex^2}}+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$\downarrow$ 4199

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(2i\int -\frac{e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}}d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right.}{2\sqrt{d+ex^2}}$$

$$\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$\downarrow$ 25

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\int \frac{e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}}d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right.}{2\sqrt{d+ex^2}}$$

$$\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$\downarrow$ 2620

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\left(\frac{1}{2}\int \log\left(1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(\right.\right.\right.}{\sqrt{e}}\right.}{2\sqrt{d+ex^2}}$$

$$\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$\downarrow$ 2715

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\left(\frac{1}{4}\int e^{-2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\log\left(1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)de^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}-\frac{1}{2}\text{ar}\right.\right.}{\sqrt{e}}}{2\sqrt{d+ex^2}}$$

$$\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$\Big\downarrow$ 2838

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\left(-\frac{1}{4}\text{PolyLog}\left(2,e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)-\frac{1}{2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\text{arcsinh}\left(\right.}\right.\right.\right.}{\sqrt{e}}}{2\sqrt{d+ex^2}}$$

$$\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

input
```
Int[Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
-1/2*(b*n*((x*Sqrt[d + e*x^2])/2 + (d*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]]
)/(2*Sqrt[e]))) + (x*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/2 + (d*Sqrt[1 + (
e*x^2)/d]*((Sqrt[d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/Sqrt[
e] + (I*b*Sqrt[d]*n*((-1/2*I)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2 - (2*I)*(-1/2
*(ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])]
) - PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])]/4)))/Sqrt[e]))/(2*Sqrt[
d + e*x^2])
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 26
```
Int[(Complex[0, a_])*(Fx_), x_Symbol] :> Simp[(Complex[Identity[0], a])   I
nt[Fx, x], x] /; FreeQ[a, x] && EqQ[a^2, 1]
```

rule 211
```
Int[((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[x*((a + b*x^2)^p/(2*p + 1
)), x] + Simp[2*a*(p/(2*p + 1))   Int[(a + b*x^2)^(p - 1), x], x] /; FreeQ[
{a, b}, x] && GtQ[p, 0] && (IntegerQ[4*p] || IntegerQ[6*p])
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 2620
```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Si
mp[d*(m/(b*f*g*n*Log[F]))   Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x
)))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

rule 2715
```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Simp[1/(d*e*n*Log[F])   Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x)
))^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

rule 2758
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_.), x_Sy
mbol] :> Simp[x*(d + e*x^2)^q*((a + b*Log[c*x^n])/(2*q + 1)), x] + (-Simp[b
*(n/(2*q + 1))   Int[(d + e*x^2)^q, x], x] + Simp[2*d*(q/(2*q + 1))   Int[(
d + e*x^2)^(q - 1)*(a + b*Log[c*x^n]), x], x]) /; FreeQ[{a, b, c, d, e, n},
 x] && GtQ[q, 0]
```

rule 2762
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Simp[ArcSinh[Rt[e, 2]*(x/Sqrt[d])]*((a + b*Log[c*x^n])/Rt[e, 2]), x]
 - Simp[b*(n/Rt[e, 2])   Int[ArcSinh[Rt[e, 2]*(x/Sqrt[d])]/x, x], x] /; Fre
eQ[{a, b, c, d, e, n}, x] && GtQ[d, 0] && PosQ[e]
```

rule 2764
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Simp[Sqrt[1 + (e/d)*x^2]/Sqrt[d + e*x^2]   Int[(a + b*Log[c*x^n])/Sq
rt[1 + (e/d)*x^2], x], x] /; FreeQ[{a, b, c, d, e, n}, x] &&  !GtQ[d, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4199
```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Simp
[2*I   Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x
))/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && In
tegerQ[4*k] && IGtQ[m, 0]
```

rule 6190
```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Simp[1/b
 Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[n, 0]
```

Maple [F]

$$\int \sqrt{e\,x^{2}+d}\,\left(a+b\ln\left(c\,x^{n}\right)\right)dx$$

input
```
int((e*x^2+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

output
```
int((e*x^2+d)^(1/2)*(a+b*ln(c*x^n)),x)
```

Fricas [F]

$$\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \int \sqrt{ex^2+d}(b\log(cx^n)+a)\,dx$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral(sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a, x)
```

Sympy [F]

$$\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \int (a+b\log(cx^n))\sqrt{d+ex^2}\,dx$$

input
```
integrate((e*x**2+d)**(1/2)*(a+b*ln(c*x**n)),x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x**2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \int \sqrt{ex^2+d}(b\log(cx^n)+a)\,dx$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*log(c*x^n) + a), x)
```

Mupad [F(-1)]

Timed out.

$$\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \int \sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int((d + e*x^2)^(1/2)*(a + b*log(c*x^n)),x)
```

output
```
int((d + e*x^2)^(1/2)*(a + b*log(c*x^n)), x)
```

Reduce [F]

$$\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$= \frac{\sqrt{e\,x^2+d}\,aex+\sqrt{e}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{e}\,x}{\sqrt{d}}\right)ad+2\left(\int \sqrt{e\,x^2+d}\log(x^n c)\,dx\right)be}{2e}$$

input
```
int((e*x^2+d)^(1/2)*(a+b*log(c*x^n)),x)
```

output
```
(sqrt(d + e*x**2)*a*e*x + sqrt(e)*log((sqrt(d + e*x**2) + sqrt(e)*x)/sqrt(
d))*a*d + 2*int(sqrt(d + e*x**2)*log(x**n*c),x)*b*e)/(2*e)
```

3.259 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx$

Optimal result 1975
Mathematica [C] (verified) 1976
Rubi [A] (verified) 1977
Maple [F] 1979
Fricas [F] 1979
Sympy [F] 1980
Maxima [F(-2)] 1980
Giac [F] 1980
Mupad [F(-1)] 1981
Reduce [F] 1981

Optimal result

Integrand size = 25, antiderivative size = 345

$$\begin{aligned}
&\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx \\
&= -\frac{bn\sqrt{d+ex^2}}{x}+\frac{b\sqrt{e}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}+\frac{b\sqrt{e}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{2\sqrt{d}\sqrt{1+\frac{ex^2}{d}}} \\
&\quad-\frac{b\sqrt{e}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}} \\
&\quad-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}+\frac{\sqrt{e}\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}} \\
&\quad-\frac{b\sqrt{e}n\sqrt{d+ex^2}\operatorname{PolyLog}\left(2,e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}
\end{aligned}$$

output
```
-b*n*(e*x^2+d)^(1/2)/x+b*e^(1/2)*n*(e*x^2+d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/
2))/d^(1/2)/(1+e*x^2/d)^(1/2)+1/2*b*e^(1/2)*n*(e*x^2+d)^(1/2)*arcsinh(e^(1
/2)*x/d^(1/2))^2/d^(1/2)/(1+e*x^2/d)^(1/2)-b*e^(1/2)*n*(e*x^2+d)^(1/2)*arc
sinh(e^(1/2)*x/d^(1/2))*ln(1-(e^(1/2)*x/d^(1/2)+(1+e*x^2/d)^(1/2))^2)/d^(1
/2)/(1+e*x^2/d)^(1/2)-(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/x+e^(1/2)*(e*x^2+d)^
(1/2)*arcsinh(e^(1/2)*x/d^(1/2))*(a+b*ln(c*x^n))/d^(1/2)/(1+e*x^2/d)^(1/2)
-1/2*b*e^(1/2)*n*(e*x^2+d)^(1/2)*polylog(2,(e^(1/2)*x/d^(1/2)+(1+e*x^2/d)^
(1/2))^2)/d^(1/2)/(1+e*x^2/d)^(1/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.63 (sec) , antiderivative size = 183, normalized size of antiderivative = 0.53

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx = \frac{bn\sqrt{d+ex^2}\left(-{}_3F_2\left(-\frac{1}{2},-\frac{1}{2},-\frac{1}{2};\frac{1}{2},\frac{1}{2};-\frac{ex^2}{d}\right)-\sqrt{1+\frac{ex^2}{d}}\log(x)+\frac{\sqrt{e}x\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log(x)}{\sqrt{d}}\right)}{x\sqrt{1+\frac{ex^2}{d}}} - \frac{\sqrt{d+ex^2}(a-bn\log(x)+b\log(cx^n))}{x} + \sqrt{e}(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)$$

input
```
Integrate[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
(b*n*Sqrt[d + e*x^2]*(-HypergeometricPFQ[{-1/2, -1/2, -1/2}, {1/2, 1/2}, -
((e*x^2)/d)] - Sqrt[1 + (e*x^2)/d]*Log[x] + (Sqrt[e]*x*ArcSinh[(Sqrt[e]*x)
/Sqrt[d]]*Log[x])/Sqrt[d]))/(x*Sqrt[1 + (e*x^2)/d]) - (Sqrt[d + e*x^2]*(a
- b*n*Log[x] + b*Log[c*x^n]))/x + Sqrt[e]*(a - b*n*Log[x] + b*Log[c*x^n])*
Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]]
```

Rubi [A] (verified)

Time = 0.67 (sec) , antiderivative size = 246, normalized size of antiderivative = 0.71, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2786, 2792, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}dx$$

$$\Big\downarrow \text{2786}$$

$$\frac{\sqrt{d+ex^2}\int \frac{\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{x^2}dx}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{2792}$$

$$\frac{\sqrt{d+ex^2}\left(-bn\int -\frac{\sqrt{\frac{ex^2}{d}+1}-\frac{\sqrt{e}x\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}}}{x^2}dx+\frac{\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{x}\right)}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{25}$$

$$\frac{\sqrt{d+ex^2}\left(bn\int \frac{\sqrt{\frac{ex^2}{d}+1}-\frac{\sqrt{e}x\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}}}{x^2}dx+\frac{\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{x}\right)}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{2010}$$

$$\frac{\sqrt{d+ex^2}\left(bn\int \left(\frac{\sqrt{\frac{ex^2}{d}+1}}{x^2}-\frac{\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}x}\right)dx+\frac{\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{x}\right)}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{2009}$$

$$\frac{\sqrt{d+ex^2}\left(\frac{\sqrt{e}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{x}+bn\left(-\frac{\sqrt{e}\operatorname{PolyLog}\left(2,e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2\sqrt{d}}+\frac{\sqrt{e}\operatorname{arcsinh}\left(\right.}{2\sqrt{d}}\right.\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

input
```
Int[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
(Sqrt[d + e*x^2]*(-((Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/x) + (Sqrt[e]
*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/Sqrt[d] + b*n*(-(Sqrt[1
+ (e*x^2)/d]/x) + (Sqrt[e]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/Sqrt[d] + (Sqrt[e
]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/(2*Sqrt[d]) - (Sqrt[e]*ArcSinh[(Sqrt[e]*
x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/Sqrt[d] - (Sqrt[e
]*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(2*Sqrt[d]))))/Sqrt[1 +
(e*x^2)/d]
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{\sqrt{e\,x^2+d}\,(a+b\ln(c\,x^n))}{x^2}dx$$

input
```
int((e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/x^2,x)
```

output
```
int((e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/x^2,x)
```

Fricas [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx=\int \frac{\sqrt{ex^2+d}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/x^2, x)
```

Sympy [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{(a+b\log(cx^n))\sqrt{d+ex^2}}{x^2}\,dx$$

input
```
integrate((e*x**2+d)**(1/2)*(a+b*ln(c*x**n))/x**2,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x**2)/x**2, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{\sqrt{ex^2+d}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*log(c*x^n) + a)/x^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx=\int \frac{\sqrt{e\,x^2+d}\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^2}\,dx$$

input
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^2,x)
```

output
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^2, x)
```

Reduce [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx = \frac{-\sqrt{e\,x^2+d}\,a+\sqrt{e}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{e}\,x}{\sqrt{d}}\right)ax-\sqrt{e}\,ax+\left(\int \frac{\sqrt{e\,x^2+d}\log(x^n c)}{x^2}dx\right)bx}{x}$$

input
```
int((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^2,x)
```

output
```
( - sqrt(d + e*x**2)*a + sqrt(e)*log((sqrt(d + e*x**2) + sqrt(e)*x)/sqrt(d
))*a*x - sqrt(e)*a*x + int((sqrt(d + e*x**2)*log(x**n*c))/x**2,x)*b*x)/x
```

3.260 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4}\,dx$

Optimal result 1982
Mathematica [A] (verified) 1982
Rubi [A] (verified) 1983
Maple [F] 1985
Fricas [A] (verification not implemented) 1985
Sympy [F] 1986
Maxima [F(-2)] 1986
Giac [F] 1986
Mupad [F(-1)] 1987
Reduce [B] (verification not implemented) 1987

Optimal result

Integrand size = 25, antiderivative size = 112

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4}\,dx = -\frac{ben\sqrt{d+ex^2}}{3dx} - \frac{bn(d+ex^2)^{3/2}}{9dx^3} + \frac{be^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{3d} - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3dx^3}$$

output
```
-1/3*b*e*n*(e*x^2+d)^(1/2)/d/x-1/9*b*n*(e*x^2+d)^(3/2)/d/x^3+1/3*b*e^(3/2)
*n*arctanh(e^(1/2)*x/(e*x^2+d)^(1/2))/d-1/3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)
)/d/x^3
```

Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 99, normalized size of antiderivative = 0.88

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4}\,dx = -\frac{\sqrt{d+ex^2}(3a(d+ex^2)+bn(d+4ex^2))+3b(d+ex^2)^{3/2}\log(cx^n)-3be^{3/2}nx^3\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right.}{9dx^3}$$

input
```
Integrate[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-1/9*(Sqrt[d + e*x^2]*(3*a*(d + e*x^2) + b*n*(d + 4*e*x^2)) + 3*b*(d + e*x
^2)^(3/2)*Log[c*x^n] - 3*b*e^(3/2)*n*x^3*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]
])/(d*x^3)
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 104, normalized size of antiderivative = 0.93, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2773, 247, 247, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4}dx$$

$$\Big\downarrow \text{2773}$$

$$\frac{bn\int \frac{(ex^2+d)^{3/2}}{x^4}dx}{3d}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{247}$$

$$\frac{bn\left(e\int \frac{\sqrt{ex^2+d}}{x^2}dx-\frac{(d+ex^2)^{3/2}}{3x^3}\right)}{3d}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{247}$$

$$\frac{bn\left(e\left(e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)}{3d}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{224}$$

$$\frac{bn\left(e\left(e\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)}{3d}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{219}$$

$$\frac{bn\left(e\left(\sqrt{e}\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)}{3d}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3dx^3}$$

input
```
Int[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(b*n*(-1/3*(d + e*x^2)^(3/2)/x^3 + e*(-(Sqrt[d + e*x^2]/x) + Sqrt[e]*ArcTa
nh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])))/(3*d) - ((d + e*x^2)^(3/2)*(a + b*Log[c
*x^n]))/(3*d*x^3)
```

Defintions of rubi rules used

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Maple [F]

$$\int \frac{\sqrt{e\,x^{2}+d}\,\left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{4}}dx$$

input
```
int((e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/x^4,x)
```

output
```
int((e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/x^4,x)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 212, normalized size of antiderivative = 1.89

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4}\,dx$$
$$= \left[\frac{3\,be^{\frac{3}{2}}nx^3\log\left(-2\,ex^2-2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)-2\,(bdn+(4\,ben+3\,ae)x^2+3\,ad+3\,(bex^2+bd)\log(c)\right.}{18\,dx^3}$$
$$-\frac{3\,b\sqrt{-e}enx^3\arctan\left(\frac{\sqrt{-e}x}{\sqrt{ex^2+d}}\right)+(bdn+(4\,ben+3\,ae)x^2+3\,ad+3\,(bex^2+bd)\log(c)+3\,(benx^2+bc}{9\,dx^3}$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
[1/18*(3*b*e^(3/2)*n*x^3*log(-2*e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(e)*x - d) -
 2*(b*d*n + (4*b*e*n + 3*a*e)*x^2 + 3*a*d + 3*(b*e*x^2 + b*d)*log(c) + 3*(
b*e*n*x^2 + b*d*n)*log(x))*sqrt(e*x^2 + d))/(d*x^3), -1/9*(3*b*sqrt(-e)*e*
n*x^3*arctan(sqrt(-e)*x/sqrt(e*x^2 + d)) + (b*d*n + (4*b*e*n + 3*a*e)*x^2
+ 3*a*d + 3*(b*e*x^2 + b*d)*log(c) + 3*(b*e*n*x^2 + b*d*n)*log(x))*sqrt(e*
x^2 + d))/(d*x^3)]
```

Sympy [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4}\,dx = \int \frac{(a+b\log(cx^n))\sqrt{d+ex^2}}{x^4}\,dx$$

input
```
integrate((e*x**2+d)**(1/2)*(a+b*ln(c*x**n))/x**4,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x**2)/x**4, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4}\,dx = \int \frac{\sqrt{ex^2+d}(b\log(cx^n)+a)}{x^4}\,dx$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*log(c*x^n) + a)/x^4, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4}\,dx = \int \frac{\sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))}{x^4}\,dx$$

input
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^4,x)
```

output
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^4, x)
```

Reduce [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 336, normalized size of antiderivative = 3.00

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4}\,dx = \frac{-3\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)bd-3\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)be\,x^2-3\sqrt{e\,x^2+d}$$

input
```
int((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^4,x)
```

output
```
( - 3*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c
)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d - 3*sqrt(d + e*x*
*2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d
 + e*x**2) + sqrt(e)*x)**n*2**n))*b*e*x**2 - 3*sqrt(d + e*x**2)*a*d - 3*sq
rt(d + e*x**2)*a*e*x**2 - sqrt(d + e*x**2)*b*d*n - 4*sqrt(d + e*x**2)*b*e*
n*x**2 + 3*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*b
*e*n*x**3 + 3*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d)
)*b*e*n*x**3 - 3*sqrt(e)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n
*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*e*x**3 - 3*sqrt(e
)*a*e*x**3)/(9*d*x**3)
```

3.261 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx$

Optimal result . . . 1988
Mathematica [A] (verified) . . . 1989
Rubi [A] (verified) . . . 1989
Maple [F] . . . 1992
Fricas [A] (verification not implemented) . . . 1992
Sympy [F] . . . 1993
Maxima [F(-2)] . . . 1993
Giac [F] . . . 1994
Mupad [F(-1)] . . . 1994
Reduce [B] (verification not implemented) . . . 1994

Optimal result

Integrand size = 25, antiderivative size = 170

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx = \frac{2be^2n\sqrt{d+ex^2}}{15d^2x} + \frac{2ben(d+ex^2)^{3/2}}{45d^2x^3} - \frac{bn(d+ex^2)^{5/2}}{25d^2x^5} - \frac{2be^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{15d^2} - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{5dx^5} + \frac{2e(d+ex^2)^{3/2}(a+b\log(cx^n))}{15d^2x^3}$$

output
```
2/15*b*e^2*n*(e*x^2+d)^(1/2)/d^2/x+2/45*b*e*n*(e*x^2+d)^(3/2)/d^2/x^3-1/25
*b*n*(e*x^2+d)^(5/2)/d^2/x^5-2/15*b*e^(5/2)*n*arctanh(e^(1/2)*x/(e*x^2+d)^
(1/2))/d^2-1/5*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/d/x^5+2/15*e*(e*x^2+d)^(3/2
)*(a+b*ln(c*x^n))/d^2/x^3
```

Mathematica [A] (verified)

Time = 0.27 (sec) , antiderivative size = 145, normalized size of antiderivative = 0.85

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx = -\frac{\sqrt{d+ex^2}(bn(9d^2+8dex^2-31e^2x^4)+15a(3d^2+dex^2-2e^2x^4))+15b\sqrt{d+ex^2}(3d^2+dex^2-2e^2x^4}{225d^2x^5}$$

input
```
Integrate[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-1/225*(Sqrt[d + e*x^2]*(b*n*(9*d^2 + 8*d*e*x^2 - 31*e^2*x^4) + 15*a*(3*d^
2 + d*e*x^2 - 2*e^2*x^4)) + 15*b*Sqrt[d + e*x^2]*(3*d^2 + d*e*x^2 - 2*e^2*
x^4)*Log[c*x^n] + 30*b*e^(5/2)*n*x^5*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(
d^2*x^5)
```

Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 158, normalized size of antiderivative = 0.93, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.280$, Rules used = {2792, 27, 358, 247, 247, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{(3d-2ex^2)\left(ex^2+d\right)^{3/2}}{15d^2x^6}dx+\frac{2e\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(3d-2ex^2)\left(ex^2+d\right)^{3/2}}{x^6}dx}{15d^2}+\frac{2e\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{358}$$

$$\frac{bn\left(-2e\int \frac{(ex^2+d)^{3/2}}{x^4}dx-\frac{3(d+ex^2)^{5/2}}{5x^5}\right)}{15d^2}+\frac{2e(d+ex^2)^{3/2}(a+b\log(cx^n))}{15d^2x^3}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{247}$$

$$\frac{bn\left(-2e\left(e\int \frac{\sqrt{ex^2+d}}{x^2}dx-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{3(d+ex^2)^{5/2}}{5x^5}\right)}{15d^2}+\frac{2e(d+ex^2)^{3/2}(a+b\log(cx^n))}{15d^2x^3}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{247}$$

$$\frac{bn\left(-2e\left(e\left(e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{3(d+ex^2)^{5/2}}{5x^5}\right)}{15d^2}+\frac{2e(d+ex^2)^{3/2}(a+b\log(cx^n))}{15d^2x^3}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{224}$$

$$\frac{bn\left(-2e\left(e\left(e\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{3(d+ex^2)^{5/2}}{5x^5}\right)}{15d^2}+\frac{2e(d+ex^2)^{3/2}(a+b\log(cx^n))}{15d^2x^3}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{219}$$

$$\frac{2e(d+ex^2)^{3/2}(a+b\log(cx^n))}{15d^2x^3}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{5dx^5}+\frac{bn\left(-2e\left(e\left(\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{3(d+ex^2)^{5/2}}{5x^5}\right)}{15d^2}$$

input
```
Int[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*((-3*(d + e*x^2)^(5/2))/(5*x^5) - 2*e*(-1/3*(d + e*x^2)^(3/2)/x^3 + e
*(-(Sqrt[d + e*x^2]/x) + Sqrt[e]*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]]))))/
(15*d^2) - ((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(5*d*x^5) + (2*e*(d + e*
x^2)^(3/2)*(a + b*Log[c*x^n]))/(15*d^2*x^3)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{\sqrt{e\,x^{2}+d}\,\left(a +b \ln \left(c\,x^{n}\right)\right)}{x^{6}}d x$$

input
```
int((e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/x^6,x)
```

output
```
int((e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/x^6,x)
```

Fricas [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 323, normalized size of antiderivative = 1.90

$$\int \frac{\sqrt{d+ex^2}(a+b\log{(cx^n)})}{x^6}\,dx = \left[\frac{15\,be^{\frac{5}{2}}nx^5\log\left(-2\,ex^2+2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)+((31\,be^2n+30\,ae^2)x^4-9\,bd^2n-45\,ad^2-(8\,bden+1}{225\,d^2}\right.$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
[1/225*(15*b*e^(5/2)*n*x^5*log(-2*e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(e)*x - d)
 + ((31*b*e^2*n + 30*a*e^2)*x^4 - 9*b*d^2*n - 45*a*d^2 - (8*b*d*e*n + 15*a
*d*e)*x^2 + 15*(2*b*e^2*x^4 - b*d*e*x^2 - 3*b*d^2)*log(c) + 15*(2*b*e^2*n*
x^4 - b*d*e*n*x^2 - 3*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(d^2*x^5), 1/225*(
30*b*sqrt(-e)*e^2*n*x^5*arctan(sqrt(-e)*x/sqrt(e*x^2 + d)) + ((31*b*e^2*n
+ 30*a*e^2)*x^4 - 9*b*d^2*n - 45*a*d^2 - (8*b*d*e*n + 15*a*d*e)*x^2 + 15*(
2*b*e^2*x^4 - b*d*e*x^2 - 3*b*d^2)*log(c) + 15*(2*b*e^2*n*x^4 - b*d*e*n*x^
2 - 3*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(d^2*x^5)]
```

Sympy [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx = \int \frac{(a+b\log(cx^n))\sqrt{d+ex^2}}{x^6}\,dx$$

input
```
integrate((e*x**2+d)**(1/2)*(a+b*ln(c*x**n))/x**6,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x**2)/x**6, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx = \int \frac{\sqrt{ex^2+d}(b\log(cx^n)+a)}{x^6}\,dx$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*log(c*x^n) + a)/x^6, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx = \int \frac{\sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))}{x^6}\,dx$$

input
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^6,x)
```

output
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^6, x)
```

Reduce [B] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 471, normalized size of antiderivative = 2.77

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx$$
$$= \frac{-45\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)b\,d^2-15\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)bde\,x^2+30\sqrt{e}}{}$$

input
```
int((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^6,x)
```

output
```
( - 45*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*
c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2 - 15*sqrt(d +
 e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(s
qrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e*x**2 + 30*sqrt(d + e*x**2)*lo
g(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x
**2) + sqrt(e)*x)**n*2**n))*b*e**2*x**4 - 45*sqrt(d + e*x**2)*a*d**2 - 15*
sqrt(d + e*x**2)*a*d*e*x**2 + 30*sqrt(d + e*x**2)*a*e**2*x**4 - 9*sqrt(d +
 e*x**2)*b*d**2*n - 8*sqrt(d + e*x**2)*b*d*e*n*x**2 + 31*sqrt(d + e*x**2)*
b*e**2*n*x**4 - 30*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sq
rt(d))*b*e**2*n*x**5 - 30*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e
)*x)/sqrt(d))*b*e**2*n*x**5 + 30*sqrt(e)*log(((2*sqrt(e)*sqrt(d + e*x**2)*
x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*e
**2*x**5 - 30*sqrt(e)*a*e**2*x**5 - 25*sqrt(e)*b*e**2*n*x**5)/(225*d**2*x*
*5)
```

3.262 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8} dx$

Optimal result 1996
Mathematica [A] (verified) 1997
Rubi [A] (verified) 1997
Maple [F] 2001
Fricas [A] (verification not implemented) 2001
Sympy [F] 2002
Maxima [F(-2)] 2002
Giac [F] 2003
Mupad [F(-1)] 2003
Reduce [B] (verification not implemented) 2003

Optimal result

Integrand size = 25, antiderivative size = 230

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx = -\frac{8be^3n\sqrt{d+ex^2}}{105d^3x}-\frac{8be^2n(d+ex^2)^{3/2}}{315d^3x^3} -\frac{bn(d+ex^2)^{5/2}}{49d^2x^7}+\frac{38ben(d+ex^2)^{5/2}}{1225d^3x^5} +\frac{8be^{7/2}n\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{105d^3} -\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7} +\frac{4e(d+ex^2)^{3/2}(a+b\log(cx^n))}{35d^2x^5} -\frac{8e^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{105d^3x^3}$$

output
```
-8/105*b*e^3*n*(e*x^2+d)^(1/2)/d^3/x-8/315*b*e^2*n*(e*x^2+d)^(3/2)/d^3/x^3
-1/49*b*n*(e*x^2+d)^(5/2)/d^2/x^7+38/1225*b*e*n*(e*x^2+d)^(5/2)/d^3/x^5+8/
105*b*e^(7/2)*n*arctanh(e^(1/2)*x/(e*x^2+d)^(1/2))/d^3-1/7*(e*x^2+d)^(3/2)
*(a+b*ln(c*x^n))/d/x^7+4/35*e*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/d^2/x^5-8/10
5*e^2*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/d^3/x^3
```

Mathematica [A] (verified)

Time = 0.32 (sec) , antiderivative size = 180, normalized size of antiderivative = 0.78

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx =$$
$$-\frac{\sqrt{d+ex^2}(105a(15d^3+3d^2ex^2-4de^2x^4+8e^3x^6)+bn(225d^3+108d^2ex^2-179de^2x^4+778e^3x^6))+}{11025d}$$

input
```
Integrate[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
-1/11025*(Sqrt[d + e*x^2]*(105*a*(15*d^3 + 3*d^2*e*x^2 - 4*d*e^2*x^4 + 8*e
^3*x^6) + b*n*(225*d^3 + 108*d^2*e*x^2 - 179*d*e^2*x^4 + 778*e^3*x^6)) + 1
05*b*Sqrt[d + e*x^2]*(15*d^3 + 3*d^2*e*x^2 - 4*d*e^2*x^4 + 8*e^3*x^6)*Log[
c*x^n] - 840*b*e^(7/2)*n*x^7*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(d^3*x^7)
```

Rubi [A] (verified)

Time = 0.48 (sec) , antiderivative size = 217, normalized size of antiderivative = 0.94, number of steps used = 10, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {2792, 27, 1588, 27, 358, 247, 247, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{(ex^2+d)^{3/2}(8e^2x^4-12dex^2+15d^2)}{105d^3x^8}dx-\frac{8e^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{105d^3x^3}+\frac{4e(d+ex^2)^{3/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{\left(ex^2+d\right)^{3/2}\left(8e^2x^4-12dex^2+15d^2\right)}{x^8}dx}{105d^3}-\frac{8e^2\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{105d^3x^3}+\frac{4e\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{35d^2x^5}-\frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{7dx^7}$$

$$\Big\downarrow \; 1588$$

$$\frac{bn\left(-\frac{\int \frac{2de\left(57d-28ex^2\right)\left(ex^2+d\right)^{3/2}}{x^6}dx}{7d}-\frac{15d\left(d+ex^2\right)^{5/2}}{7x^7}\right)}{105d^3}-\frac{8e^2\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{105d^3x^3}+\frac{4e\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{35d^2x^5}-\frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{7dx^7}$$

$$\Big\downarrow \; 27$$

$$\frac{bn\left(-\frac{2}{7}e\int \frac{\left(57d-28ex^2\right)\left(ex^2+d\right)^{3/2}}{x^6}dx-\frac{15d\left(d+ex^2\right)^{5/2}}{7x^7}\right)}{105d^3}-\frac{8e^2\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{105d^3x^3}+\frac{4e\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{35d^2x^5}-\frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{7dx^7}$$

$$\Big\downarrow \; 358$$

$$\frac{bn\left(-\frac{2}{7}e\left(-28e\int \frac{\left(ex^2+d\right)^{3/2}}{x^4}dx-\frac{57\left(d+ex^2\right)^{5/2}}{5x^5}\right)-\frac{15d\left(d+ex^2\right)^{5/2}}{7x^7}\right)}{105d^3}-\frac{8e^2\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{105d^3x^3}+\frac{4e\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{35d^2x^5}-\frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{7dx^7}$$

$$\Big\downarrow \; 247$$

$$\frac{bn\left(-\frac{2}{7}e\left(-28e\left(e\int \frac{\sqrt{ex^2+d}}{x^2}dx-\frac{\left(d+ex^2\right)^{3/2}}{3x^3}\right)-\frac{57\left(d+ex^2\right)^{5/2}}{5x^5}\right)-\frac{15d\left(d+ex^2\right)^{5/2}}{7x^7}\right)}{105d^3}-\frac{8e^2\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{105d^3x^3}+\frac{4e\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{35d^2x^5}-\frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{7dx^7}$$

$$\Big\downarrow \; 247$$

$$\frac{bn\left(-\frac{2}{7}e\left(-28e\left(e\left(e\int\frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{57(d+ex^2)^{5/2}}{5x^5}\right)-\frac{15d(d+ex^2)^{5/2}}{7x^7}\right)}{105d^3}-\frac{8e^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{105d^3x^3}+\frac{4e(d+ex^2)^{3/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \; 224$$

$$\frac{bn\left(-\frac{2}{7}e\left(-28e\left(e\left(e\int\frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{57(d+ex^2)^{5/2}}{5x^5}\right)-\frac{15d(d+ex^2)^{5/2}}{7x^7}\right)}{105d^3}-\frac{8e^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{105d^3x^3}+\frac{4e(d+ex^2)^{3/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \; 219$$

$$-\frac{8e^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{105d^3x^3}+\frac{4e(d+ex^2)^{3/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7}+\frac{bn\left(-\frac{2}{7}e\left(-28e\left(e\left(\sqrt{e}\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{57(d+ex^2)^{5/2}}{5x^5}\right)-\frac{15d(d+ex^2)^{5/2}}{7x^7}\right)}{105d^3}$$

input
```
Int[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
(b*n*((-15*d*(d + e*x^2)^(5/2))/(7*x^7) - (2*e*((-57*(d + e*x^2)^(5/2))/(5
*x^5) - 28*e*(-1/3*(d + e*x^2)^(3/2)/x^3 + e*(-(Sqrt[d + e*x^2]/x) + Sqrt[
e]*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]]))))/7))/(105*d^3) - ((d + e*x^2)^(
3/2)*(a + b*Log[c*x^n]))/(7*d*x^7) + (4*e*(d + e*x^2)^(3/2)*(a + b*Log[c*x
^n]))/(35*d^2*x^5) - (8*e^2*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(105*d^3
*x^3)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 1588
```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Simp[1/(d*f
^2*(m + 1))   Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x
) - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && Ne
Q[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{\sqrt{e\,x^{2}+d}\,\left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{8}}dx$$

input
```
int((e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/x^8,x)
```

output
```
int((e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/x^8,x)
```

Fricas [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 426, normalized size of antiderivative = 1.85

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx$$
$$= \left[\frac{420\,be^{\frac{7}{2}}nx^7\log\left(-2\,ex^2-2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)-\left(2\left(389\,be^3n+420\,ae^3\right)x^6+225\,bd^3n-\left(179\,bde^2n+\right.\right.}{}\right.$$
$$-\frac{840\,b\sqrt{-e}e^3nx^7\arctan\left(\frac{\sqrt{-e}x}{\sqrt{ex^2+d}}\right)+\left(2\left(389\,be^3n+420\,ae^3\right)x^6+225\,bd^3n-\left(179\,bde^2n+420\,ade^2\right)x^4\right.}{}$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

output
```
[1/11025*(420*b*e^(7/2)*n*x^7*log(-2*e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(e)*x -
 d) - (2*(389*b*e^3*n + 420*a*e^3)*x^6 + 225*b*d^3*n - (179*b*d*e^2*n + 42
0*a*d*e^2)*x^4 + 1575*a*d^3 + 9*(12*b*d^2*e*n + 35*a*d^2*e)*x^2 + 105*(8*b
*e^3*x^6 - 4*b*d*e^2*x^4 + 3*b*d^2*e*x^2 + 15*b*d^3)*log(c) + 105*(8*b*e^3
*n*x^6 - 4*b*d*e^2*n*x^4 + 3*b*d^2*e*n*x^2 + 15*b*d^3*n)*log(x))*sqrt(e*x^
2 + d))/(d^3*x^7), -1/11025*(840*b*sqrt(-e)*e^3*n*x^7*arctan(sqrt(-e)*x/sq
rt(e*x^2 + d)) + (2*(389*b*e^3*n + 420*a*e^3)*x^6 + 225*b*d^3*n - (179*b*d
*e^2*n + 420*a*d*e^2)*x^4 + 1575*a*d^3 + 9*(12*b*d^2*e*n + 35*a*d^2*e)*x^2
 + 105*(8*b*e^3*x^6 - 4*b*d*e^2*x^4 + 3*b*d^2*e*x^2 + 15*b*d^3)*log(c) + 1
05*(8*b*e^3*n*x^6 - 4*b*d*e^2*n*x^4 + 3*b*d^2*e*n*x^2 + 15*b*d^3*n)*log(x)
)*sqrt(e*x^2 + d))/(d^3*x^7)]
```

Sympy [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx = \int \frac{(a+b\log(cx^n))\sqrt{d+ex^2}}{x^8}\,dx$$

input
```
integrate((e*x**2+d)**(1/2)*(a+b*ln(c*x**n))/x**8,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x**2)/x**8, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx = \int \frac{\sqrt{ex^2+d}(b\log(cx^n)+a)}{x^8}\,dx$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*log(c*x^n) + a)/x^8, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx = \int \frac{\sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))}{x^8}\,dx$$

input
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^8,x)
```

output
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^8, x)
```

Reduce [B] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 586, normalized size of antiderivative = 2.55

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx = \frac{-1575\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) b\,d^3-315\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) b\,d^2e\,x^2+4}{}$$

input
```
int((e*x^2+d)^(1/2)*(a+b*log(c*x^n))/x^8,x)
```

output
```
( - 1575*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**
n*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**3 - 315*sqrt(
d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)
*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2*e*x**2 + 420*sqrt(d + e*x
**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(
d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e**2*x**4 - 840*sqrt(d + e*x**2)*lo
g(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x
**2) + sqrt(e)*x)**n*2**n))*b*e**3*x**6 - 1575*sqrt(d + e*x**2)*a*d**3 - 3
15*sqrt(d + e*x**2)*a*d**2*e*x**2 + 420*sqrt(d + e*x**2)*a*d*e**2*x**4 - 8
40*sqrt(d + e*x**2)*a*e**3*x**6 - 225*sqrt(d + e*x**2)*b*d**3*n - 108*sqrt
(d + e*x**2)*b*d**2*e*n*x**2 + 179*sqrt(d + e*x**2)*b*d*e**2*n*x**4 - 778*
sqrt(d + e*x**2)*b*e**3*n*x**6 + 840*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(
d) + sqrt(e)*x)/sqrt(d))*b*e**3*n*x**7 + 840*sqrt(e)*log((sqrt(d + e*x**2)
 + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*e**3*n*x**7 - 840*sqrt(e)*log(((2*sqrt(
e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt
(e)*x)**n*2**n))*b*e**3*x**7 + 840*sqrt(e)*a*e**3*x**7 + 658*sqrt(e)*b*e**
3*n*x**7)/(11025*d**3*x**7)
```

3.263 $\int x^5(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$

Optimal result . . . 2005
Mathematica [A] (verified) . . . 2006
Rubi [A] (warning: unable to verify) . . . 2006
Maple [F] . . . 2009
Fricas [A] (verification not implemented) . . . 2009
Sympy [A] (verification not implemented) . . . 2010
Maxima [F(-2)] . . . 2011
Giac [F] . . . 2012
Mupad [F(-1)] . . . 2012
Reduce [B] (verification not implemented) . . . 2012

Optimal result

Integrand size = 25, antiderivative size = 231

$$\begin{aligned}\int x^5\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))\,dx &= -\frac{8bd^4n\sqrt{d+ex^2}}{315e^3}-\frac{8bd^3n(d+ex^2)^{3/2}}{945e^3}\\ &-\frac{8bd^2n(d+ex^2)^{5/2}}{1575e^3}+\frac{11bdn(d+ex^2)^{7/2}}{441e^3}-\frac{bn(d+ex^2)^{9/2}}{81e^3}\\ &+\frac{8bd^{9/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{315e^3}+\frac{d^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}\\ &-\frac{2d(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}+\frac{(d+ex^2)^{9/2}(a+b\log(cx^n))}{9e^3}\end{aligned}$$

output
```
-8/315*b*d^4*n*(e*x^2+d)^(1/2)/e^3-8/945*b*d^3*n*(e*x^2+d)^(3/2)/e^3-8/157
5*b*d^2*n*(e*x^2+d)^(5/2)/e^3+11/441*b*d*n*(e*x^2+d)^(7/2)/e^3-1/81*b*n*(e
*x^2+d)^(9/2)/e^3+8/315*b*d^(9/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^3+1
/5*d^2*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/e^3-2/7*d*(e*x^2+d)^(7/2)*(a+b*ln(c
*x^n))/e^3+1/9*(e*x^2+d)^(9/2)*(a+b*ln(c*x^n))/e^3
```

Mathematica [A] (verified)

Time = 0.43 (sec) , antiderivative size = 256, normalized size of antiderivative = 1.11

$$\int x^5(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx = \frac{-2520bd^{9/2}n\log(x)+315bn(d+ex^2)^{5/2}(8d^2-20dex^2+35e^2x^4)\log(x)+\sqrt{d+ex^2}(12$$

input
```
Integrate[x^5*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(-2520*b*d^(9/2)*n*Log[x] + 315*b*n*(d + e*x^2)^(5/2)*(8*d^2 - 20*d*e*x^2
+ 35*e^2*x^4)*Log[x] + Sqrt[d + e*x^2]*(1225*e^4*x^8*(9*a - b*n - 9*b*n*Lo
g[x] + 9*b*Log[c*x^n]) + 3*d^2*e^2*x^4*(315*a - 143*b*n + 315*b*(-(n*Log[x
]) + Log[c*x^n])) + 25*d*e^3*x^6*(630*a - 97*b*n + 630*b*(-(n*Log[x]) + Lo
g[c*x^n])) + 2*d^4*(1260*a - 1307*b*n + 1260*b*(-(n*Log[x]) + Log[c*x^n]))
 - d^3*e*x^2*(1260*a - 677*b*n + 1260*b*(-(n*Log[x]) + Log[c*x^n]))) + 252
0*b*d^(9/2)*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(99225*e^3)
```

Rubi [A] (warning: unable to verify)

Time = 0.57 (sec) , antiderivative size = 193, normalized size of antiderivative = 0.84, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.280, Rules used = {2792, 27, 1578, 1192, 25, 1584, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^5(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int \frac{(ex^2+d)^{5/2}(35e^2x^4-20dex^2+8d^2)}{315e^3x}dx + \frac{d^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3} + \frac{(d+ex^2)^{9/2}(a+b\log(cx^n))}{9e^3} - \frac{2d(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$$\Big\downarrow \text{27}$$

$$-\frac{bn\int \frac{(ex^2+d)^{5/2}(35e^2x^4-20dex^2+8d^2)}{x}dx}{315e^3}+\frac{d^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{(d+ex^2)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{2d(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$$\Big\downarrow \text{1578}$$

$$-\frac{bn\int \frac{(ex^2+d)^{5/2}(35e^2x^4-20dex^2+8d^2)}{x^2}dx^2}{630e^3}+\frac{d^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{(d+ex^2)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{2d(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$$\Big\downarrow \text{1192}$$

$$-\frac{bn\int -\frac{x^{12}(35e^2x^8-90de^2x^4+63d^2e^2)}{d-x^4}d\sqrt{ex^2+d}}{315e^5}+\frac{d^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{(d+ex^2)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{2d(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$$\Big\downarrow \text{25}$$

$$\frac{bn\int \frac{x^{12}(35e^2x^8-90de^2x^4+63d^2e^2)}{d-x^4}d\sqrt{ex^2+d}}{315e^5}+\frac{d^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{(d+ex^2)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{2d(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$$\Big\downarrow \text{1584}$$

$$\frac{bn\int \left(-35e^2x^{16}+55de^2x^{12}-8d^2e^2x^8-8d^3e^2x^4-8d^4e^2+\frac{8d^5e^2}{d-x^4}\right)d\sqrt{ex^2+d}}{315e^5}+\frac{d^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{(d+ex^2)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{2d(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{(d+ex^2)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{2d(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{bn\left(-8d^{9/2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+8d^4e^2\sqrt{d+ex^2}+\frac{8}{3}d^3e^2x^6+\frac{8}{5}d^2e^2x^{10}-\frac{55}{7}de^2x^{14}+\frac{35e^2x^{18}}{9}\right)}{315e^5}$$

input
```
Int[x^5*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
-1/315*(b*n*((8*d^3*e^2*x^6)/3 + (8*d^2*e^2*x^10)/5 - (55*d*e^2*x^14)/7 +
(35*e^2*x^18)/9 + 8*d^4*e^2*Sqrt[d + e*x^2] - 8*d^(9/2)*e^2*ArcTanh[Sqrt[d
 + e*x^2]/Sqrt[d]]))/e^5 + (d^2*(d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(5*e
^3) - (2*d*(d + e*x^2)^(7/2)*(a + b*Log[c*x^n]))/(7*e^3) + ((d + e*x^2)^(9
/2)*(a + b*Log[c*x^n]))/(9*e^3)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1192
```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[2/e^(n + 2*p + 1)   Subst[Int[x^(
2*m + 1)*(e*f - d*g + g*x^2)^n*(c*d^2 - b*d*e + a*e^2 - (2*c*d - b*e)*x^2 +
 c*x^4)^p, x], x, Sqrt[d + e*x]], x] /; FreeQ[{a, b, c, d, e, f, g}, x] &&
IGtQ[p, 0] && ILtQ[n, 0] && IntegerQ[m + 1/2]
```

rule 1578
```
Int[(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_
)^4)^(p_.), x_Symbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(d + e*x)^q*(a
+ b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x] && Int
egerQ[(m - 1)/2]
```

rule 1584
```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int x^5 \left(e\,x^2+d\right)^{\frac{3}{2}} \left(a+b\ln\left(c\,x^n\right)\right) dx$$

input
```
int(x^5*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x^5*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

Fricas [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 517, normalized size of antiderivative = 2.24

$$\int x^5 \left(d+ex^2\right)^{3/2} (a +b\log\left(cx^n\right))\, dx = \left[\frac{1260\, bd^{\frac{9}{2}} n \log\left(-\frac{ex^2+2\,\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right) - (1225\,(be^4n-9\,ae^4)x^8 + 25\,(97\,bde^3n-630\,ad\dots}{\dots}\right.$$

$$-\frac{2520\, b\sqrt{-d}d^4 n \arctan\left(\frac{\sqrt{ex^2+d}\sqrt{-d}}{d}\right) + (1225\,(be^4n-9\,ae^4)x^8 + 25\,(97\,bde^3n-630\,ade^3)x^6 + 2614\,bd^4n \dots}{\dots}$$

input
```
integrate(x^5*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[1/99225*(1260*b*d^(9/2)*n*log(-(e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/
x^2) - (1225*(b*e^4*n - 9*a*e^4)*x^8 + 25*(97*b*d*e^3*n - 630*a*d*e^3)*x^6
 + 2614*b*d^4*n - 2520*a*d^4 + 3*(143*b*d^2*e^2*n - 315*a*d^2*e^2)*x^4 - (
677*b*d^3*e*n - 1260*a*d^3*e)*x^2 - 315*(35*b*e^4*x^8 + 50*b*d*e^3*x^6 + 3
*b*d^2*e^2*x^4 - 4*b*d^3*e*x^2 + 8*b*d^4)*log(c) - 315*(35*b*e^4*n*x^8 + 5
0*b*d*e^3*n*x^6 + 3*b*d^2*e^2*n*x^4 - 4*b*d^3*e*n*x^2 + 8*b*d^4*n)*log(x))
*sqrt(e*x^2 + d))/e^3, -1/99225*(2520*b*sqrt(-d)*d^4*n*arctan(sqrt(e*x^2 +
 d)*sqrt(-d)/d) + (1225*(b*e^4*n - 9*a*e^4)*x^8 + 25*(97*b*d*e^3*n - 630*a
*d*e^3)*x^6 + 2614*b*d^4*n - 2520*a*d^4 + 3*(143*b*d^2*e^2*n - 315*a*d^2*e
^2)*x^4 - (677*b*d^3*e*n - 1260*a*d^3*e)*x^2 - 315*(35*b*e^4*x^8 + 50*b*d*
e^3*x^6 + 3*b*d^2*e^2*x^4 - 4*b*d^3*e*x^2 + 8*b*d^4)*log(c) - 315*(35*b*e^
4*n*x^8 + 50*b*d*e^3*n*x^6 + 3*b*d^2*e^2*n*x^4 - 4*b*d^3*e*n*x^2 + 8*b*d^4
*n)*log(x))*sqrt(e*x^2 + d))/e^3]
```

Sympy [A] (verification not implemented)

Time = 105.05 (sec) , antiderivative size = 1161, normalized size of antiderivative = 5.03

$$\int x^5 \left(d+ex^2\right)^{3/2} \left(a+b\log\left(cx^n\right)\right)\,dx = \text{Too large to display}$$

input
```
integrate(x**5*(e*x**2+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*Piecewise((8*d**3*sqrt(d + e*x**2)/(105*e**3) - 4*d**2*x**2*sqrt(d + e
*x**2)/(105*e**2) + d*x**4*sqrt(d + e*x**2)/(35*e) + x**6*sqrt(d + e*x**2)
/7, Ne(e, 0)), (sqrt(d)*x**6/6, True)) + a*e*Piecewise((-16*d**4*sqrt(d +
e*x**2)/(315*e**4) + 8*d**3*x**2*sqrt(d + e*x**2)/(315*e**3) - 2*d**2*x**4
*sqrt(d + e*x**2)/(105*e**2) + d*x**6*sqrt(d + e*x**2)/(63*e) + x**8*sqrt(
d + e*x**2)/9, Ne(e, 0)), (sqrt(d)*x**8/8, True)) - b*d*n*Piecewise((-8*d*
*(7/2)*asinh(sqrt(d)/(sqrt(e)*x))/(105*e**3) + 8*d**4/(105*e**(7/2)*x*sqrt
(d/(e*x**2) + 1)) + 8*d**3*x/(105*e**(5/2)*sqrt(d/(e*x**2) + 1)) - 4*d**2*
Piecewise((d*sqrt(d + e*x**2)/(3*e) + x**2*sqrt(d + e*x**2)/3, Ne(e, 0)),
(sqrt(d)*x**2/2, True))/(105*e**2) + d*Piecewise((-2*d**2*sqrt(d + e*x**2)
/(15*e**2) + d*x**2*sqrt(d + e*x**2)/(15*e) + x**4*sqrt(d + e*x**2)/5, Ne(
e, 0)), (sqrt(d)*x**4/4, True))/(35*e) + Piecewise((8*d**3*sqrt(d + e*x**2
)/(105*e**3) - 4*d**2*x**2*sqrt(d + e*x**2)/(105*e**2) + d*x**4*sqrt(d + e
*x**2)/(35*e) + x**6*sqrt(d + e*x**2)/7, Ne(e, 0)), (sqrt(d)*x**6/6, True)
)/7, (e > -oo) & (e < oo) & Ne(e, 0)), (sqrt(d)*x**6/36, True)) + b*d*Piec
ewise((8*d**3*sqrt(d + e*x**2)/(105*e**3) - 4*d**2*x**2*sqrt(d + e*x**2)/(
105*e**2) + d*x**4*sqrt(d + e*x**2)/(35*e) + x**6*sqrt(d + e*x**2)/7, Ne(e
, 0)), (sqrt(d)*x**6/6, True))*log(c*x**n) - b*e*n*Piecewise((16*d**(9/2)*
asinh(sqrt(d)/(sqrt(e)*x))/(315*e**4) - 16*d**5/(315*e**(9/2)*x*sqrt(d/(e*
x**2) + 1)) - 16*d**4*x/(315*e**(7/2)*sqrt(d/(e*x**2) + 1)) + 8*d**3*Pi...
```

Maxima [F(-2)]

Exception generated.

$$\int x^5 (d + ex^2)^{3/2} (a + b \log (cx^n)) \, dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^5*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int x^5 (d+ex^2)^{3/2} (a+b\log(cx^n))\,dx = \int (ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)x^5\,dx$$

input
```
integrate(x^5*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)*x^5, x)
```

Mupad [F(-1)]

Timed out.

$$\int x^5 (d+ex^2)^{3/2} (a+b\log(cx^n))\,dx = \int x^5 \left(e\,x^2+d\right)^{3/2} (a+b\,\ln(c\,x^n))\,dx$$

input
```
int(x^5*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)),x)
```

output
```
int(x^5*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 604, normalized size of antiderivative = 2.61

$$\int x^5 (d+ex^2)^{3/2} (a+b\log(cx^n))\,dx = \frac{2520\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) b\,d^4 - 1260\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2}\right.}{}$$

input
```
int(x^5*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x)
```

output

```
(2520*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c
)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**4 - 1260*sqrt(d
+ e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(
sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**3*e*x**2 + 945*sqrt(d + e*x**
2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d
+ e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2*e**2*x**4 + 15750*sqrt(d + e*x**2)
*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d +
e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e**3*x**6 + 11025*sqrt(d + e*x**2)*log(
((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**
2) + sqrt(e)*x)**n*2**n))*b*e**4*x**8 + 2520*sqrt(d + e*x**2)*a*d**4 - 126
0*sqrt(d + e*x**2)*a*d**3*e*x**2 + 945*sqrt(d + e*x**2)*a*d**2*e**2*x**4 +
 15750*sqrt(d + e*x**2)*a*d*e**3*x**6 + 11025*sqrt(d + e*x**2)*a*e**4*x**8
 - 2614*sqrt(d + e*x**2)*b*d**4*n + 677*sqrt(d + e*x**2)*b*d**3*e*n*x**2 -
 429*sqrt(d + e*x**2)*b*d**2*e**2*n*x**4 - 2425*sqrt(d + e*x**2)*b*d*e**3*
n*x**6 - 1225*sqrt(d + e*x**2)*b*e**4*n*x**8 - 2520*sqrt(d)*log((sqrt(d +
e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d**4*n + 2520*sqrt(d)*log((sqrt(
d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d**4*n)/(99225*e**3)
```

3.264 $\int x^3(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$

Optimal result 2014
Mathematica [A] (verified) 2015
Rubi [A] (verified) 2015
Maple [F] 2018
Fricas [A] (verification not implemented) 2019
Sympy [A] (verification not implemented) 2019
Maxima [F(-2)] 2020
Giac [F] 2021
Mupad [F(-1)] 2021
Reduce [B] (verification not implemented) 2021

Optimal result

Integrand size = 25, antiderivative size = 177

$$\int x^3(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx = \frac{2bd^3n\sqrt{d+ex^2}}{35e^2}+\frac{2bd^2n(d+ex^2)^{3/2}}{105e^2} +\frac{2bdn(d+ex^2)^{5/2}}{175e^2}-\frac{bn(d+ex^2)^{7/2}}{49e^2}-\frac{2bd^{7/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{35e^2} -\frac{d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^2}$$

output
```
2/35*b*d^3*n*(e*x^2+d)^(1/2)/e^2+2/105*b*d^2*n*(e*x^2+d)^(3/2)/e^2+2/175*b
*d*n*(e*x^2+d)^(5/2)/e^2-1/49*b*n*(e*x^2+d)^(7/2)/e^2-2/35*b*d^(7/2)*n*arc
tanh((e*x^2+d)^(1/2)/d^(1/2))/e^2-1/5*d*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/e^
2+1/7*(e*x^2+d)^(7/2)*(a+b*ln(c*x^n))/e^2
```

Mathematica [A] (verified)

Time = 0.25 (sec) , antiderivative size = 227, normalized size of antiderivative = 1.28

$$\int x^3\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{2bd^{7/2}n\log(x)}{35e^2}-\frac{bn(2d-5ex^2)\left(d+ex^2\right)^{5/2}\log(x)}{35e^2}$$
$$+\sqrt{d+ex^2}\left(\frac{1}{49}ex^6(7a-bn+7b(-n\log(x)+\log\left(cx^n\right)))+\frac{d^2x^2(105a-71bn+105b(-n\log(x)+\log\left(cx^n\right))}{3675e}\right.$$

input
```
Integrate[x^3*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(2*b*d^(7/2)*n*Log[x])/(35*e^2) - (b*n*(2*d - 5*e*x^2)*(d + e*x^2)^(5/2)*L
og[x])/(35*e^2) + Sqrt[d + e*x^2]*((e*x^6*(7*a - b*n + 7*b*(-(n*Log[x]) +
Log[c*x^n])))/49 + (d^2*x^2*(105*a - 71*b*n + 105*b*(-(n*Log[x]) + Log[c*x
^n])))/(3675*e) - (d^3*(210*a - 247*b*n + 210*b*(-(n*Log[x]) + Log[c*x^n])
))/(3675*e^2) + (d*x^4*(280*a - 61*b*n + 280*b*(-(n*Log[x]) + Log[c*x^n]))
)/1225) - (2*b*d^(7/2)*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(35*e^2)
```

Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 161, normalized size of antiderivative = 0.91, number of steps used = 10, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.360, Rules used = {2792, 27, 354, 90, 60, 60, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{\left(2d-5ex^2\right)\left(ex^2+d\right)^{5/2}}{35e^2x}dx+\frac{\left(d+ex^2\right)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^2}-\frac{d\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(2d-5ex^2)(ex^2+d)^{5/2}}{x}dx}{35e^2}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \ 354$$

$$\frac{bn\int \frac{(2d-5ex^2)(ex^2+d)^{5/2}}{x^2}dx^2}{70e^2}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \ 90$$

$$\frac{bn\left(2d\int \frac{(ex^2+d)^{5/2}}{x^2}dx^2-\frac{10}{7}(d+ex^2)^{7/2}\right)}{70e^2}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \ 60$$

$$\frac{bn\left(2d\left(d\int \frac{(ex^2+d)^{3/2}}{x^2}dx^2+\frac{2}{5}(d+ex^2)^{5/2}\right)-\frac{10}{7}(d+ex^2)^{7/2}\right)}{70e^2}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \ 60$$

$$\frac{bn\left(2d\left(d\left(d\int \frac{\sqrt{ex^2+d}}{x^2}dx^2+\frac{2}{3}(d+ex^2)^{3/2}\right)+\frac{2}{5}(d+ex^2)^{5/2}\right)-\frac{10}{7}(d+ex^2)^{7/2}\right)}{70e^2}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \ 60$$

$$\frac{bn\left(2d\left(d\left(d\left(d\int \frac{1}{x^2\sqrt{ex^2+d}}dx^2+2\sqrt{d+ex^2}\right)+\frac{2}{3}(d+ex^2)^{3/2}\right)+\frac{2}{5}(d+ex^2)^{5/2}\right)-\frac{10}{7}(d+ex^2)^{7/2}\right)}{70e^2}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \ 73$$

$$\frac{bn\left(2d\left(d\left(d\left(\frac{2d\int \frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{e}+2\sqrt{d+ex^2}\right)+\frac{2}{3}(d+ex^2)^{3/2}\right)+\frac{2}{5}(d+ex^2)^{5/2}\right)-\frac{10}{7}(d+ex^2)^{7/2}\right)}{70e^2}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \text{221}$$

$$\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}+\frac{bn\left(2d\left(d\left(d\left(2\sqrt{d+ex^2}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex^2)^{3/2}\right)+\frac{2}{5}(d+ex^2)^{5/2}\right)-\frac{10}{7}(d+ex^2)^{7/2}\right)}{70e^2}$$

input
```
Int[x^3*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(b*n*((-10*(d + e*x^2)^(7/2))/7 + 2*d*((2*(d + e*x^2)^(5/2))/5 + d*((2*(d
+ e*x^2)^(3/2))/3 + d*(2*Sqrt[d + e*x^2] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x^
2]/Sqrt[d]])))))/(70*e^2) - (d*(d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(5*e^
2) + ((d + e*x^2)^(7/2)*(a + b*Log[c*x^n]))/(7*e^2)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 354
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_S
ymbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(a + b*x)^p*(c + d*x)^q, x], x
, x^2], x] /; FreeQ[{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0] && IntegerQ
[(m - 1)/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int x^{3} \left(e\,x^{2}+d\right)^{\frac{3}{2}} \left(a+b\ln\left(c\,x^{n}\right)\right)dx$$

input
```
int(x^3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x^3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

Fricas [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 412, normalized size of antiderivative = 2.33

$$\int x^3 \left(d+e x^2\right)^{3/2} (a+b \log (c x^n)) \, dx = \left[\frac{105\, b d^{\frac{7}{2}} n \log \left(-\frac{e x^2-2 \sqrt{e x^2+d} \sqrt{d}+2 d}{x^2}\right) - (75\,(b e^3 n - 7\, a e^3) x^6 - 247\, b d^3 n + 3\,(61\, b d e^2 n -\right.$$

input
```
integrate(x^3*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[1/3675*(105*b*d^(7/2)*n*log(-(e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/x^
2) - (75*(b*e^3*n - 7*a*e^3)*x^6 - 247*b*d^3*n + 3*(61*b*d*e^2*n - 280*a*d
*e^2)*x^4 + 210*a*d^3 + (71*b*d^2*e*n - 105*a*d^2*e)*x^2 - 105*(5*b*e^3*x^
6 + 8*b*d*e^2*x^4 + b*d^2*e*x^2 - 2*b*d^3)*log(c) - 105*(5*b*e^3*n*x^6 + 8
*b*d*e^2*n*x^4 + b*d^2*e*n*x^2 - 2*b*d^3*n)*log(x))*sqrt(e*x^2 + d))/e^2,
1/3675*(210*b*sqrt(-d)*d^3*n*arctan(sqrt(e*x^2 + d)*sqrt(-d)/d) - (75*(b*e
^3*n - 7*a*e^3)*x^6 - 247*b*d^3*n + 3*(61*b*d*e^2*n - 280*a*d*e^2)*x^4 + 2
10*a*d^3 + (71*b*d^2*e*n - 105*a*d^2*e)*x^2 - 105*(5*b*e^3*x^6 + 8*b*d*e^2
*x^4 + b*d^2*e*x^2 - 2*b*d^3)*log(c) - 105*(5*b*e^3*n*x^6 + 8*b*d*e^2*n*x^
4 + b*d^2*e*n*x^2 - 2*b*d^3*n)*log(x))*sqrt(e*x^2 + d))/e^2]
```

Sympy [A] (verification not implemented)

Time = 54.55 (sec) , antiderivative size = 845, normalized size of antiderivative = 4.77

$$\int x^3 \left(d+e x^2\right)^{3/2} (a+b \log (c x^n)) \, dx = \text{Too large to display}$$

input
```
integrate(x**3*(e*x**2+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*Piecewise((-2*d**2*sqrt(d + e*x**2)/(15*e**2) + d*x**2*sqrt(d + e*x**2
)/(15*e) + x**4*sqrt(d + e*x**2)/5, Ne(e, 0)), (sqrt(d)*x**4/4, True)) + a
*e*Piecewise((8*d**3*sqrt(d + e*x**2)/(105*e**3) - 4*d**2*x**2*sqrt(d + e*
x**2)/(105*e**2) + d*x**4*sqrt(d + e*x**2)/(35*e) + x**6*sqrt(d + e*x**2)/
7, Ne(e, 0)), (sqrt(d)*x**6/6, True)) - b*d*n*Piecewise((2*d**(5/2)*asinh(
sqrt(d)/(sqrt(e)*x))/(15*e**2) - 2*d**3/(15*e**(5/2)*x*sqrt(d/(e*x**2) + 1
)) - 2*d**2*x/(15*e**(3/2)*sqrt(d/(e*x**2) + 1)) + d*Piecewise((d*sqrt(d +
 e*x**2)/(3*e) + x**2*sqrt(d + e*x**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2, True
))/(15*e) + Piecewise((-2*d**2*sqrt(d + e*x**2)/(15*e**2) + d*x**2*sqrt(d
+ e*x**2)/(15*e) + x**4*sqrt(d + e*x**2)/5, Ne(e, 0)), (sqrt(d)*x**4/4, Tr
ue))/5, (e > -oo) & (e < oo) & Ne(e, 0)), (sqrt(d)*x**4/16, True)) + b*d*P
iecewise((-2*d**2*sqrt(d + e*x**2)/(15*e**2) + d*x**2*sqrt(d + e*x**2)/(15
*e) + x**4*sqrt(d + e*x**2)/5, Ne(e, 0)), (sqrt(d)*x**4/4, True))*log(c*x*
*n) - b*e*n*Piecewise((-8*d**(7/2)*asinh(sqrt(d)/(sqrt(e)*x))/(105*e**3) +
 8*d**4/(105*e**(7/2)*x*sqrt(d/(e*x**2) + 1)) + 8*d**3*x/(105*e**(5/2)*sqr
t(d/(e*x**2) + 1)) - 4*d**2*Piecewise((d*sqrt(d + e*x**2)/(3*e) + x**2*sqr
t(d + e*x**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2, True))/(105*e**2) + d*Piecewi
se((-2*d**2*sqrt(d + e*x**2)/(15*e**2) + d*x**2*sqrt(d + e*x**2)/(15*e) +
x**4*sqrt(d + e*x**2)/5, Ne(e, 0)), (sqrt(d)*x**4/4, True))/(35*e) + Piece
wise((8*d**3*sqrt(d + e*x**2)/(105*e**3) - 4*d**2*x**2*sqrt(d + e*x**2)...
```

Maxima [F(-2)]

Exception generated.

$$\int x^3 \left(d+ex^2\right)^{3/2} \left(a+b\log \left(cx^n\right)\right) \, dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^3*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int x^3 \left(d+ex^2\right)^{3/2} (a+b\log(cx^n))\, dx = \int (ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)x^3\, dx$$

input
```
integrate(x^3*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)*x^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int x^3 \left(d+ex^2\right)^{3/2} (a+b\log(cx^n))\, dx = \int x^3\, \left(e\,x^2+d\right)^{3/2}\, \left(a+b\,\ln\left(c\,x^n\right)\right)\, dx$$

input
```
int(x^3*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)),x)
```

output
```
int(x^3*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 489, normalized size of antiderivative = 2.76

$$\int x^3 \left(d+ex^2\right)^{3/2} (a + b\log(cx^n))\, dx = \frac{-210\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) b\,d^3+105\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right.}{}$$

input
```
int(x^3*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x)
```

output
```
( - 210*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n
*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**3 + 105*sqrt(d
 + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*
(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2*e*x**2 + 840*sqrt(d + e*x*
*2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d
 + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e**2*x**4 + 525*sqrt(d + e*x**2)*log
(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x*
*2) + sqrt(e)*x)**n*2**n))*b*e**3*x**6 - 210*sqrt(d + e*x**2)*a*d**3 + 105
*sqrt(d + e*x**2)*a*d**2*e*x**2 + 840*sqrt(d + e*x**2)*a*d*e**2*x**4 + 525
*sqrt(d + e*x**2)*a*e**3*x**6 + 247*sqrt(d + e*x**2)*b*d**3*n - 71*sqrt(d
+ e*x**2)*b*d**2*e*n*x**2 - 183*sqrt(d + e*x**2)*b*d*e**2*n*x**4 - 75*sqrt
(d + e*x**2)*b*e**3*n*x**6 + 210*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) +
 sqrt(e)*x)/sqrt(d))*b*d**3*n - 210*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d
) + sqrt(e)*x)/sqrt(d))*b*d**3*n)/(3675*e**2)
```

3.265 $\int x(d+ex^2)^{3/2} (a+b\log(cx^n))\,dx$

Optimal result 2023
Mathematica [A] (verified) 2023
Rubi [A] (verified) 2024
Maple [F] 2026
Fricas [A] (verification not implemented) 2027
Sympy [A] (verification not implemented) 2027
Maxima [F(-2)] 2028
Giac [F] 2029
Mupad [F(-1)] 2029
Reduce [B] (verification not implemented) 2029

Optimal result

Integrand size = 23, antiderivative size = 125

$$\int x(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx = -\frac{bd^2n\sqrt{d+ex^2}}{5e}-\frac{bdn(d+ex^2)^{3/2}}{15e}-\frac{bn(d+ex^2)^{5/2}}{25e}+\frac{bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{5e}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e}$$

output
```
-1/5*b*d^2*n*(e*x^2+d)^(1/2)/e-1/15*b*d*n*(e*x^2+d)^(3/2)/e-1/25*b*n*(e*x^
2+d)^(5/2)/e+1/5*b*d^(5/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e+1/5*(e*x^2
+d)^(5/2)*(a+b*ln(c*x^n))/e
```

Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 181, normalized size of antiderivative = 1.45

$$\int x(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx = -\frac{bd^{5/2}n\log(x)}{5e}+\frac{bn(d+ex^2)^{5/2}\log(x)}{5e}+\sqrt{d+ex^2}\left(\frac{1}{25}ex^4(5a-bn+5b(-n\log(x)+\log(cx^n)))+\frac{d^2(15a-23bn+15b(-n\log(x)+\log(cx^n)))}{75e}+\frac{1}{7\cdots}\right.$$

input
```
Integrate[x*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
-1/5*(b*d^(5/2)*n*Log[x])/e + (b*n*(d + e*x^2)^(5/2)*Log[x])/(5*e) + Sqrt[
d + e*x^2]*((e*x^4*(5*a - b*n + 5*b*(-(n*Log[x]) + Log[c*x^n])))/25 + (d^2
*(15*a - 23*b*n + 15*b*(-(n*Log[x]) + Log[c*x^n])))/(75*e) + (d*x^2*(30*a
- 11*b*n + 30*b*(-(n*Log[x]) + Log[c*x^n])))/75) + (b*d^(5/2)*n*Log[d + Sq
rt[d]*Sqrt[d + e*x^2]])/(5*e)
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.90, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {2776, 243, 60, 60, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2776}$$

$$\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e}-\frac{bn\int\frac{\left(ex^2+d\right)^{5/2}}{x}dx}{5e}$$

$$\Big\downarrow \text{243}$$

$$\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e}-\frac{bn\int\frac{\left(ex^2+d\right)^{5/2}}{x^2}dx^2}{10e}$$

$$\Big\downarrow \text{60}$$

$$\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e}-\frac{bn\left(d\int\frac{\left(ex^2+d\right)^{3/2}}{x^2}dx^2+\frac{2}{5}\left(d+ex^2\right)^{5/2}\right)}{10e}$$

$$\Big\downarrow \text{60}$$

$$\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e}-\frac{bn\left(d\left(d\int\frac{\sqrt{ex^2+d}}{x^2}dx^2+\frac{2}{3}\left(d+ex^2\right)^{3/2}\right)+\frac{2}{5}\left(d+ex^2\right)^{5/2}\right)}{10e}$$

$$\Big\downarrow \text{60}$$

$$\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e}-$$
$$\frac{bn\left(d\left(d\left(d\int\frac{1}{x^2\sqrt{ex^2+d}}dx^2+2\sqrt{d+ex^2}\right)+\frac{2}{3}(d+ex^2)^{3/2}\right)+\frac{2}{5}(d+ex^2)^{5/2}\right)}{10e}$$

$\Big\downarrow$ 73

$$\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e}-$$
$$\frac{bn\left(d\left(d\left(\frac{2d\int\frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{e}+2\sqrt{d+ex^2}\right)+\frac{2}{3}(d+ex^2)^{3/2}\right)+\frac{2}{5}(d+ex^2)^{5/2}\right)}{10e}$$

$\Big\downarrow$ 221

$$\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e}-$$
$$\frac{bn\left(d\left(d\left(2\sqrt{d+ex^2}-2\sqrt{d}\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex^2)^{3/2}\right)+\frac{2}{5}(d+ex^2)^{5/2}\right)}{10e}$$

input
```
Int[x*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
-1/10*(b*n*((2*(d + e*x^2)^(5/2))/5 + d*((2*(d + e*x^2)^(3/2))/3 + d*(2*Sq
rt[d + e*x^2] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]))))/e + ((d + e
*x^2)^(5/2)*(a + b*Log[c*x^n]))/(5*e)
```

Defintions of rubi rules used

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Maple [F]

$$\int x(e\,x^{2}+d)^{\frac{3}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)dx$$

input
```
int(x*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

Fricas [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 307, normalized size of antiderivative = 2.46

$$\int x(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx = \left[\frac{15\,bd^{\frac{5}{2}}n\log\left(-\frac{ex^2+2\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-2\,(3\,(be^2n-5\,ae^2)x^4+23\,bd^2n-15\,ad^2+(11\,bd\right.$$

$$-\frac{15\,b\sqrt{-d}d^2n\arctan\left(\frac{\sqrt{ex^2+d}\sqrt{-d}}{d}\right)+(3\,(be^2n-5\,ae^2)x^4+23\,bd^2n-15\,ad^2+(11\,bden-30\,ade)x^2-15}{75\,e}$$

input
```
integrate(x*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[1/150*(15*b*d^(5/2)*n*log(-(e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/x^2)
 - 2*(3*(b*e^2*n - 5*a*e^2)*x^4 + 23*b*d^2*n - 15*a*d^2 + (11*b*d*e*n - 30
*a*d*e)*x^2 - 15*(b*e^2*x^4 + 2*b*d*e*x^2 + b*d^2)*log(c) - 15*(b*e^2*n*x^
4 + 2*b*d*e*n*x^2 + b*d^2*n)*log(x))*sqrt(e*x^2 + d))/e, -1/75*(15*b*sqrt(
-d)*d^2*n*arctan(sqrt(e*x^2 + d)*sqrt(-d)/d) + (3*(b*e^2*n - 5*a*e^2)*x^4
+ 23*b*d^2*n - 15*a*d^2 + (11*b*d*e*n - 30*a*d*e)*x^2 - 15*(b*e^2*x^4 + 2*
b*d*e*x^2 + b*d^2)*log(c) - 15*(b*e^2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*log
(x))*sqrt(e*x^2 + d))/e]
```

Sympy [A] (verification not implemented)

Time = 33.45 (sec) , antiderivative size = 573, normalized size of antiderivative = 4.58

$$\int x(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x*(e*x**2+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*Piecewise((d*sqrt(d + e*x**2)/(3*e) + x**2*sqrt(d + e*x**2)/3, Ne(e, 0
)), (sqrt(d)*x**2/2, True)) + a*e*Piecewise((-2*d**2*sqrt(d + e*x**2)/(15*
e**2) + d*x**2*sqrt(d + e*x**2)/(15*e) + x**4*sqrt(d + e*x**2)/5, Ne(e, 0)
), (sqrt(d)*x**4/4, True)) - b*d*n*Piecewise((-d**(3/2)*asinh(sqrt(d)/(sqr
t(e)*x))/(3*e) + d**2/(3*e**(3/2)*x*sqrt(d/(e*x**2) + 1)) + d*x/(3*sqrt(e)
*sqrt(d/(e*x**2) + 1)) + Piecewise((d*sqrt(d + e*x**2)/(3*e) + x**2*sqrt(d
 + e*x**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2, True))/3, (e > -oo) & (e < oo) &
 Ne(e, 0)), (sqrt(d)*x**2/4, True)) + b*d*Piecewise((d*sqrt(d + e*x**2)/(3
*e) + x**2*sqrt(d + e*x**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2, True))*log(c*x*
*n) - b*e*n*Piecewise((2*d**(5/2)*asinh(sqrt(d)/(sqrt(e)*x))/(15*e**2) - 2
*d**3/(15*e**(5/2)*x*sqrt(d/(e*x**2) + 1)) - 2*d**2*x/(15*e**(3/2)*sqrt(d/
(e*x**2) + 1)) + d*Piecewise((d*sqrt(d + e*x**2)/(3*e) + x**2*sqrt(d + e*x
**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2, True))/(15*e) + Piecewise((-2*d**2*sqr
t(d + e*x**2)/(15*e**2) + d*x**2*sqrt(d + e*x**2)/(15*e) + x**4*sqrt(d + e
*x**2)/5, Ne(e, 0)), (sqrt(d)*x**4/4, True))/5, (e > -oo) & (e < oo) & Ne(
e, 0)), (sqrt(d)*x**4/16, True)) + b*e*Piecewise((-2*d**2*sqrt(d + e*x**2)
/(15*e**2) + d*x**2*sqrt(d + e*x**2)/(15*e) + x**4*sqrt(d + e*x**2)/5, Ne(
e, 0)), (sqrt(d)*x**4/4, True))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int x(d + ex^2)^{3/2} (a + b \log (cx^n)) \, dx = \text{Exception raised: ValueError}$$

input
```
integrate(x*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int x(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx=\int (ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)x\,dx$$

input
```
integrate(x*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)*x, x)
```

Mupad [F(-1)]

Timed out.

$$\int x(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx=\int x\,\left(e\,x^2+d\right)^{3/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)),x)
```

output
```
int(x*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 374, normalized size of antiderivative = 2.99

$$\int x(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx=\frac{15\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)b\,d^2+30\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)b$$

input
```
int(x*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x)
```

output
```
(15*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/
(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2 + 30*sqrt(d + e*
x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt
(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e*x**2 + 15*sqrt(d + e*x**2)*log((
(2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2
) + sqrt(e)*x)**n*2**n))*b*e**2*x**4 + 15*sqrt(d + e*x**2)*a*d**2 + 30*sqr
t(d + e*x**2)*a*d*e*x**2 + 15*sqrt(d + e*x**2)*a*e**2*x**4 - 23*sqrt(d + e
*x**2)*b*d**2*n - 11*sqrt(d + e*x**2)*b*d*e*n*x**2 - 3*sqrt(d + e*x**2)*b*
e**2*n*x**4 - 15*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt
(d))*b*d**2*n + 15*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sq
rt(d))*b*d**2*n)/(75*e)
```

3.266 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\,dx$

Optimal result . . . 2031
Mathematica [C] (verified) . . . 2032
Rubi [A] (verified) . . . 2032
Maple [F] . . . 2034
Fricas [F] . . . 2034
Sympy [F] . . . 2034
Maxima [F(-2)] . . . 2035
Giac [F] . . . 2035
Mupad [F(-1)] . . . 2035
Reduce [F] . . . 2036

Optimal result

Integrand size = 25, antiderivative size = 260

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\,dx = -\frac{4}{3}bdn\sqrt{d+ex^2}-\frac{1}{9}bn(d+ex^2)^{3/2}$$
$$+\frac{4}{3}bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+\frac{1}{2}bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2+\frac{1}{3}\left(3d\sqrt{d+ex^2}+(d+ex^2)^{3/2}-3d^{3/2}\operatorname{arct}\right.$$

output
```
-4/3*b*d*n*(e*x^2+d)^(1/2)-1/9*b*n*(e*x^2+d)^(3/2)+4/3*b*d^(3/2)*n*arctanh
((e*x^2+d)^(1/2)/d^(1/2))+1/2*b*d^(3/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))
^2+1/3*(3*d*(e*x^2+d)^(1/2)+(e*x^2+d)^(3/2)-3*d^(3/2)*arctanh((e*x^2+d)^(1
/2)/d^(1/2)))*(a+b*ln(c*x^n))-b*d^(3/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))
*ln(2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))-1/2*b*d^(3/2)*n*polylog(2,1-2*d^(
1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.95 (sec) , antiderivative size = 301, normalized size of antiderivative = 1.16

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\,dx = \frac{benx^2\sqrt{d+ex^2}\left(-\frac{1}{4}\,{}_3F_2\left(-\frac{1}{2},1,1;2,2;-\frac{ex^2}{d}\right)+\frac{d\left(-1+\left(1+\frac{ex^2}{d}\right)^{3/2}\right)\log(x)}{3ex^2}\right)}{\sqrt{1+\frac{ex^2}{d}}}$$
$$+\frac{bdn\sqrt{d+ex^2}\left(-\,{}_3F_2\left(-\frac{1}{2},-\frac{1}{2},-\frac{1}{2};\frac{1}{2},\frac{1}{2};-\frac{d}{ex^2}\right)+\sqrt{1+\frac{d}{ex^2}}\log(x)-\frac{\sqrt{d}\operatorname{arcsinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)\log(x)}{\sqrt{e}x}\right)}{\sqrt{1+\frac{d}{ex^2}}}$$
$$+\frac{1}{3}\sqrt{d+ex^2}(4d+ex^2)(a-bn\log(x)+b\log(cx^n))$$
$$+d^{3/2}\log(x)(a-bn\log(x)+b\log(cx^n))-d^{3/2}(a-bn\log(x)+b\log(cx^n))\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)$$

input
```
Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x,x]
```

output
```
(b*e*n*x^2*Sqrt[d + e*x^2]*(-1/4*HypergeometricPFQ[{-1/2, 1, 1}, {2, 2}, -
((e*x^2)/d)] + (d*(-1 + (1 + (e*x^2)/d)^(3/2))*Log[x])/(3*e*x^2)))/Sqrt[1
+ (e*x^2)/d] + (b*d*n*Sqrt[d + e*x^2]*(-HypergeometricPFQ[{-1/2, -1/2, -1/
2}, {1/2, 1/2}, -(d/(e*x^2))] + Sqrt[1 + d/(e*x^2)]*Log[x] - (Sqrt[d]*ArcS
inh[Sqrt[d]/(Sqrt[e]*x)]*Log[x])/(Sqrt[e]*x)))/Sqrt[1 + d/(e*x^2)] + (Sqrt
[d + e*x^2]*(4*d + e*x^2)*(a - b*n*Log[x] + b*Log[c*x^n]))/3 + d^(3/2)*Log
[x]*(a - b*n*Log[x] + b*Log[c*x^n]) - d^(3/2)*(a - b*n*Log[x] + b*Log[c*x^
n])*Log[d + Sqrt[d]*Sqrt[d + e*x^2]]
```

Rubi [A] (verified)

Time = 0.73 (sec) , antiderivative size = 252, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.080$, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\,dx$$

$\big\downarrow$ 2790

$$\frac{1}{3}\left(-3d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+3d\sqrt{d+ex^2}+(d+ex^2)^{3/2}\right)(a+b\log(cx^n))-bn\int\left(-\frac{\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)d^{3/2}}{x}+\frac{\sqrt{ex^2+d}\,d}{x}+\frac{(ex^2+d)^{3/2}}{3x}\right)dx$$

$\big\downarrow$ 2009

$$\frac{1}{3}\left(-3d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+3d\sqrt{d+ex^2}+(d+ex^2)^{3/2}\right)(a+b\log(cx^n))-bn\left(-\frac{1}{2}d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2-\frac{4}{3}d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+e\cdots}}\right.\right.$$

input
```
Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x,x]
```

output
```
((3*d*Sqrt[d + e*x^2] + (d + e*x^2)^(3/2) - 3*d^(3/2)*ArcTanh[Sqrt[d + e*x
^2]/Sqrt[d]])*(a + b*Log[c*x^n]))/3 - b*n*((4*d*Sqrt[d + e*x^2])/3 + (d +
e*x^2)^(3/2)/9 - (4*d^(3/2)*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/3 - (d^(3/2)
*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]^2)/2 + d^(3/2)*ArcTanh[Sqrt[d + e*x^2]/S
qrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])] + (d^(3/2)*PolyLog[2,
 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/2)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

Maple [F]

$$\int \frac{(e\,x^2+d)^{\frac{3}{2}}\,(a+b\ln (c\,x^n))}{x}dx$$

input
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x,x)
```

output
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x,x)
```

Fricas [F]

$$\int \frac{(d+ex^2)^{3/2}\,(a+b\log (cx^n))}{x}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log (cx^n)+a)}{x}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
integral(((b*e*x^2 + b*d)*sqrt(e*x^2 + d)*log(c*x^n) + (a*e*x^2 + a*d)*sqr
t(e*x^2 + d))/x, x)
```

Sympy [F]

$$\int \frac{(d+ex^2)^{3/2}\,(a+b\log (cx^n))}{x}\,dx = \int \frac{(a+b\log (cx^n))\,(d+ex^2)^{\frac{3}{2}}}{x}\,dx$$

input
```
integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x,x)
```

output
```
Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2)/x, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(e\,x^2+d)^{3/2}\,(a+b\,\ln(c\,x^n))}{x}\,dx$$

input
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x, x)
```

Reduce [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\,dx = \frac{\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)bd}{3} + \frac{\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)be\,x^2}{3} + \frac{4\sqrt{e\,x^2+d}\,ad}{3} + \frac{\sqrt{e\,x^2+d}\,ae\,x^2}{3} - \frac{4\sqrt{e\,x^2+d}\,bdn}{9} - \frac{\sqrt{e\,x^2+d}\,ben\,x^2}{9} + \sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}-\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)ad - \frac{\sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}-\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)bdn}{3} - \sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)ad + \frac{\sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)bdn}{3} + \left(\int \frac{\sqrt{e\,x^2+d}\log(x^n c)}{x}dx\right)bd$$

input
```
int((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x,x)
```

output
```
(3*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(
e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d + 3*sqrt(d + e*x**2)
*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d +
e*x**2) + sqrt(e)*x)**n*2**n))*b*e*x**2 + 12*sqrt(d + e*x**2)*a*d + 3*sqrt
(d + e*x**2)*a*e*x**2 - 4*sqrt(d + e*x**2)*b*d*n - sqrt(d + e*x**2)*b*e*n*
x**2 + 9*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*a*d
 - 3*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d*n -
 9*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*a*d + 3*s
qrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d*n + 9*int
((sqrt(d + e*x**2)*log(x**n*c))/x,x)*b*d)/9
```

3.267 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx$

Optimal result . . . 2037
Mathematica [C] (verified) . . . 2038
Rubi [A] (verified) . . . 2039
Maple [F] . . . 2041
Fricas [F] . . . 2041
Sympy [F] . . . 2042
Maxima [F(-2)] . . . 2042
Giac [F] . . . 2042
Mupad [F(-1)] . . . 2043
Reduce [F] . . . 2043

Optimal result

Integrand size = 25, antiderivative size = 295

$$\begin{aligned}\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx &= -ben\sqrt{d+ex^2}-\frac{bdn\sqrt{d+ex^2}}{4x^2}\\ &+\frac{3}{4}b\sqrt{d}en\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+\frac{3}{4}b\sqrt{d}en\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2\\ &+\frac{3}{2}e\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{2x^2}\\ &-\frac{3}{2}\sqrt{d}e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))\\ &-\frac{3}{2}b\sqrt{d}en\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\\ &-\frac{3}{4}b\sqrt{d}en\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\end{aligned}$$

output
```
-b*e*n*(e*x^2+d)^(1/2)-1/4*b*d*n*(e*x^2+d)^(1/2)/x^2+3/4*b*d^(1/2)*e*n*arc
tanh((e*x^2+d)^(1/2)/d^(1/2))+3/4*b*d^(1/2)*e*n*arctanh((e*x^2+d)^(1/2)/d^
(1/2))^2+3/2*e*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))-1/2*(e*x^2+d)^(3/2)*(a+b*ln
(c*x^n))/x^2-3/2*d^(1/2)*e*arctanh((e*x^2+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n)
)-3/2*b*d^(1/2)*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)
-(e*x^2+d)^(1/2)))-3/4*b*d^(1/2)*e*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x^2
+d)^(1/2)))
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 1.12 (sec) , antiderivative size = 349, normalized size of antiderivative = 1.18

$$
\begin{aligned}
\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx &= \frac{ben\sqrt{d+ex^2}\left(-{}_3F_2\left(-\frac{1}{2},-\frac{1}{2},-\frac{1}{2};\frac{1}{2},\frac{1}{2};-\frac{d}{ex^2}\right)+\sqrt{1+\frac{d}{ex^2}}\log(x)-\cdots\right.}{\sqrt{1+\frac{d}{ex^2}}} \\
&- \frac{b\sqrt{d}n\sqrt{d+ex^2}\left(2\sqrt{d}\,{}_3F_2\left(\frac{1}{2},\frac{1}{2},\frac{1}{2};\frac{3}{2},\frac{3}{2};-\frac{d}{ex^2}\right)+\left(\sqrt{d}\sqrt{1+\frac{d}{ex^2}}+\sqrt{e}x\,\text{arcsinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)\right)(1+2\log(x))\right)}{4\sqrt{1+\frac{d}{ex^2}}x^2} \\
&- \frac{(d-2ex^2)\sqrt{d+ex^2}(a-bn\log(x)+b\log(cx^n))}{2x^2} \\
&+ \frac{3}{2}\sqrt{d}e\log(x)(a-bn\log(x)+b\log(cx^n)) \\
&- \frac{3}{2}\sqrt{d}e(a-bn\log(x)+b\log(cx^n))\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)
\end{aligned}
$$

input
```
Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(b*e*n*Sqrt[d + e*x^2]*(-HypergeometricPFQ[{-1/2, -1/2, -1/2}, {1/2, 1/2},
 -(d/(e*x^2))] + Sqrt[1 + d/(e*x^2)]*Log[x] - (Sqrt[d]*ArcSinh[Sqrt[d]/(Sq
rt[e]*x)]*Log[x])/(Sqrt[e]*x)))/Sqrt[1 + d/(e*x^2)] - (b*Sqrt[d]*n*Sqrt[d
+ e*x^2]*(2*Sqrt[d]*HypergeometricPFQ[{1/2, 1/2, 1/2}, {3/2, 3/2}, -(d/(e*
x^2))] + (Sqrt[d]*Sqrt[1 + d/(e*x^2)] + Sqrt[e]*x*ArcSinh[Sqrt[d]/(Sqrt[e]
*x)])*(1 + 2*Log[x])))/(4*Sqrt[1 + d/(e*x^2)]*x^2) - ((d - 2*e*x^2)*Sqrt[d
 + e*x^2]*(a - b*n*Log[x] + b*Log[c*x^n]))/(2*x^2) + (3*Sqrt[d]*e*Log[x]*(
a - b*n*Log[x] + b*Log[c*x^n]))/2 - (3*Sqrt[d]*e*(a - b*n*Log[x] + b*Log[c
*x^n])*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/2
```

Rubi [A] (verified)

Time = 0.83 (sec) , antiderivative size = 288, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.160, Rules used = {2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(d+ex^2\right)^{3/2} (a+b\log(cx^n))}{x^3}dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{3\sqrt{d}e\,\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)x^2+\left(d-2ex^2\right)\sqrt{ex^2+d}}{2x^3}dx-\frac{3}{2}\sqrt{d}e\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))-\frac{\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{2x^2}+\frac{3}{2}e\sqrt{d+ex^2}(a+b\log(cx^n))$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}bn\int \frac{3\sqrt{d}e\,\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)x^2+\left(d-2ex^2\right)\sqrt{ex^2+d}}{x^3}dx-\frac{3}{2}\sqrt{d}e\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))-\frac{\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{2x^2}+\frac{3}{2}e\sqrt{d+ex^2}(a+b\log(cx^n))$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{2}bn\int \left(\frac{\sqrt{ex^2+d}d}{x^3}+\frac{3e\,\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)\sqrt{d}}{x}-\frac{2e\sqrt{ex^2+d}}{x}\right)dx-\frac{3}{2}\sqrt{d}e\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))-\frac{\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{2x^2}+\frac{3}{2}e\sqrt{d+ex^2}(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{3}{2}\sqrt{d}e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{2x^2}+\frac{3}{2}e\sqrt{d+ex^2}(a+b\log(cx^n))+\frac{1}{2}bn\left(\frac{3}{2}\sqrt{d}e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2+\frac{3}{2}\sqrt{d}e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)-3\sqrt{d}e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+\right.$$

input
```
Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(3*e*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/2 - ((d + e*x^2)^(3/2)*(a + b*Log
[c*x^n]))/(2*x^2) - (3*Sqrt[d]*e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*(a + b*L
og[c*x^n]))/2 + (b*n*(-2*e*Sqrt[d + e*x^2] - (d*Sqrt[d + e*x^2])/(2*x^2) +
 (3*Sqrt[d]*e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/2 + (3*Sqrt[d]*e*ArcTanh[S
qrt[d + e*x^2]/Sqrt[d]]^2)/2 - 3*Sqrt[d]*e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]
]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])] - (3*Sqrt[d]*e*PolyLog[2, 1
 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/2))/2
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{\left(e\,x^{2}+d\right)^{\frac{3}{2}} \left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{3}}dx$$

input
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^3,x)
```

output
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^3,x)
```

Fricas [F]

$$\int \frac{(d+ex^2)^{3/2}\,(a+b\log\left(cx^n\right))}{x^3}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log\left(cx^n\right)+a)}{x^3}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
integral(((b*e*x^2 + b*d)*sqrt(e*x^2 + d)*log(c*x^n) + (a*e*x^2 + a*d)*sqr
t(e*x^2 + d))/x^3, x)
```

Sympy [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(a+b\log(cx^n))(d+ex^2)^{\frac{3}{2}}}{x^3}\,dx$$

input
```
integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x**3,x)
```

output
```
Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2)/x**3, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)/x^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(e\,x^2+d)^{3/2}\,(a+b\,\ln(c\,x^n))}{x^3}\,dx$$

input
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^3,x)
```

output
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^3, x)
```

Reduce [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = \frac{-\sqrt{e\,x^2+d}\,ad+2\sqrt{e\,x^2+d}\,ae\,x^2+3\sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}-\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)ae\,x^2$$

input
```
int((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^3,x)
```

output
```
( - sqrt(d + e*x**2)*a*d + 2*sqrt(d + e*x**2)*a*e*x**2 + 3*sqrt(d)*log((sq
rt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*a*e*x**2 - 3*sqrt(d)*log((s
qrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*a*e*x**2 + 2*int((sqrt(d +
 e*x**2)*log(x**n*c))/x**3,x)*b*d*x**2 + 2*int((sqrt(d + e*x**2)*log(x**n*
c))/x,x)*b*e*x**2)/(2*x**2)
```

3.268 $\int x^2(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$

Optimal result . . . 2044
Mathematica [C] (verified) . . . 2045
Rubi [A] (verified) . . . 2046
Maple [F] . . . 2048
Fricas [F] . . . 2048
Sympy [F(-1)] . . . 2049
Maxima [F(-2)] . . . 2049
Giac [F] . . . 2049
Mupad [F(-1)] . . . 2050
Reduce [F] . . . 2050

Optimal result

Integrand size = 25, antiderivative size = 464

$$\int x^2\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))\,dx=-\frac{11bd^2nx\sqrt{d+ex^2}}{192e}-\frac{23}{288}bdnx^3\sqrt{d+ex^2}$$
$$-\frac{1}{36}benx^5\sqrt{d+ex^2}-\frac{bd^{5/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{192e^{3/2}\sqrt{1+\frac{ex^2}{d}}}-\frac{bd^{5/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{32e^{3/2}\sqrt{1+\frac{ex^2}{d}}}$$
$$+\frac{bd^{5/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{16e^{3/2}\sqrt{1+\frac{ex^2}{d}}}+\frac{d^2x\sqrt{d+ex^2}(a+b\log(cx^n))}{16e}$$
$$+\frac{1}{8}dx^3\sqrt{d+ex^2}(a+b\log(cx^n))+\frac{1}{6}x^3\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-\frac{d^{5/2}\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(\ldots}{16e^{3/2}\sqrt{1+\frac{ex^2}{d}}}$$

output
```
-11/192*b*d^2*n*x*(e*x^2+d)^(1/2)/e-23/288*b*d*n*x^3*(e*x^2+d)^(1/2)-1/36*
b*e*n*x^5*(e*x^2+d)^(1/2)-1/192*b*d^(5/2)*n*(e*x^2+d)^(1/2)*arcsinh(e^(1/2
)*x/d^(1/2))/e^(3/2)/(1+e*x^2/d)^(1/2)-1/32*b*d^(5/2)*n*(e*x^2+d)^(1/2)*ar
csinh(e^(1/2)*x/d^(1/2))^2/e^(3/2)/(1+e*x^2/d)^(1/2)+1/16*b*d^(5/2)*n*(e*x
^2+d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))*ln(1-(e^(1/2)*x/d^(1/2)+(1+e*x^2/d)
^(1/2))^2)/e^(3/2)/(1+e*x^2/d)^(1/2)+1/16*d^2*x*(e*x^2+d)^(1/2)*(a+b*ln(c*
x^n))/e+1/8*d*x^3*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))+1/6*x^3*(e*x^2+d)^(3/2)*
(a+b*ln(c*x^n))-1/16*d^(5/2)*(e*x^2+d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))*(a
+b*ln(c*x^n))/e^(3/2)/(1+e*x^2/d)^(1/2)+1/32*b*d^(5/2)*n*(e*x^2+d)^(1/2)*p
olylog(2,(e^(1/2)*x/d^(1/2)+(1+e*x^2/d)^(1/2))^2)/e^(3/2)/(1+e*x^2/d)^(1/2
)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 1.17 (sec) , antiderivative size = 331, normalized size of antiderivative = 0.71

$$\int x^2 (d+ex^2)^{3/2} (a+b\log(cx^n))\,dx = \frac{-400bde^{3/2}nx^3\sqrt{d+ex^2}\,{}_3F_2\left(-\frac{1}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{ex^2}{d}\right)-144be^{5/2}nx^5\sqrt{d+ex^2}\,{}_3F_2\left(-\frac{1}{2},\frac{5}{2},\frac{5}{2};\right.}{}$$

input
```
Integrate[x^2*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(-400*b*d*e^(3/2)*n*x^3*Sqrt[d + e*x^2]*HypergeometricPFQ[{-1/2, 3/2, 3/2}
, {5/2, 5/2}, -((e*x^2)/d)] - 144*b*e^(5/2)*n*x^5*Sqrt[d + e*x^2]*Hypergeo
metricPFQ[{-1/2, 5/2, 5/2}, {7/2, 7/2}, -((e*x^2)/d)] - 75*(3*b*d^(5/2)*n*
Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[x] + Sqrt[1 + (e*x^2)/d]*
(-(a*Sqrt[e]*x*Sqrt[d + e*x^2]*(3*d^2 + 14*d*e*x^2 + 8*e^2*x^4)) + 3*d^3*(
a - b*n*Log[x])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]] - b*Log[c*x^n]*(Sqrt[e]
*x*Sqrt[d + e*x^2]*(3*d^2 + 14*d*e*x^2 + 8*e^2*x^4) - 3*d^3*Log[e*x + Sqrt
[e]*Sqrt[d + e*x^2]]))))/(3600*e^(3/2)*Sqrt[1 + (e*x^2)/d])
```

Rubi [A] (verified)

Time = 0.96 (sec) , antiderivative size = 371, normalized size of antiderivative = 0.80, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {2786, 2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2 \left(d+ex^2\right)^{3/2} (a+b\log(cx^n)) \, dx$$

$$\Big\downarrow \text{ 2786}$$

$$\frac{d\sqrt{d+ex^2}\int x^2\left(\frac{ex^2}{d}+1\right)^{3/2}(a+b\log(cx^n))dx}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{ 2792}$$

$$\frac{d\sqrt{d+ex^2}\left(-bn\int \frac{\sqrt{e}x\sqrt{\frac{ex^2}{d}+1}(8e^2x^4+14dex^2+3d^2)-3d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{48de^{3/2}x}dx-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{16e^{3/2}}+\frac{dx\sqrt{\frac{ex^2}{d}+}}{}\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{d\sqrt{d+ex^2}\left(-\frac{bn\int \frac{\sqrt{e}x\sqrt{\frac{ex^2}{d}+1}\left(8e^2x^4+14dex^2+3d^2\right)-3d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{48de^{3/2}}-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{16e^{3/2}}+\frac{dx\sqrt{\frac{ex^2}{d}+1}(a+}{16e}\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{ 2010}$$

$$\frac{d\sqrt{d+ex^2}\left(-\frac{bn\int \left(8e^{5/2}\sqrt{\frac{ex^2}{d}+1}x^4+14de^{3/2}\sqrt{\frac{ex^2}{d}+1}x^2+3d^2\sqrt{e}\sqrt{\frac{ex^2}{d}+1}-\frac{3d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}\right)dx}{48de^{3/2}}-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log}{16e^{3/2}}\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{ 2009}$$

$$d\sqrt{d+ex^2}\left(-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{16e^{3/2}}+\frac{dx\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{16e}+\frac{1}{6}x^3\left(\frac{ex^2}{d}+1\right)^{3/2}(a+b\log(cx^n))+\frac{1}{8}x^3\sqrt{\right.$$

input
```
Int[x^2*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(d*Sqrt[d + e*x^2]*((d*x*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/(16*e) +
(x^3*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/8 + (x^3*(1 + (e*x^2)/d)^(3/2
)*(a + b*Log[c*x^n]))/6 - (d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log
[c*x^n]))/(16*e^(3/2)) - (b*n*((11*d^2*Sqrt[e]*x*Sqrt[1 + (e*x^2)/d])/4 +
(23*d*e^(3/2)*x^3*Sqrt[1 + (e*x^2)/d])/6 + (4*e^(5/2)*x^5*Sqrt[1 + (e*x^2)
/d])/3 + (d^(5/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/4 + (3*d^(5/2)*ArcSinh[(Sq
rt[e]*x)/Sqrt[d]]^2)/2 - 3*d^(5/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^
(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])] - (3*d^(5/2)*PolyLog[2, E^(2*ArcSinh[(Sq
rt[e]*x)/Sqrt[d]])])/2))/(48*d*e^(3/2))))/Sqrt[1 + (e*x^2)/d]
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int x^{2} \left(e \,x^{2}+d \right)^{\frac{3}{2}} \left(a +b \ln \left(c \,x^{n}\right)\right)d x$$

input
```
int(x^2*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x^2*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

Fricas [F]

$$\int x^2 \left(d+e x^2\right)^{3/2} (a+b \log (c x^n)) \, dx=\int (e x^{2} + d)^{\frac{3}{2}} (b \log \left(c x^{n}\right) + a) x^{2} \,d x$$

input
```
integrate(x^2*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral((b*e*x^4 + b*d*x^2)*sqrt(e*x^2 + d)*log(c*x^n) + (a*e*x^4 + a*d*x
^2)*sqrt(e*x^2 + d), x)
```

Sympy [F(-1)]

Timed out.

$$\int x^2 \left(d+ex^2\right)^{3/2} (a+b\log (cx^n))\,dx=\text{Timed out}$$

input
```
integrate(x**2*(e*x**2+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int x^2 \left(d+ex^2\right)^{3/2} (a+b\log (cx^n))\,dx=\text{Exception raised: ValueError}$$

input
```
integrate(x^2*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int x^2 \left(d+ex^2\right)^{3/2} (a+b\log (cx^n))\,dx=\int \left(ex^2+d\right)^{\frac{3}{2}} (b\log (cx^n)+a)x^2\,dx$$

input
```
integrate(x^2*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)*x^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int x^2 \left(d+ex^2\right)^{3/2} (a+b\log(cx^n)) \, dx = \int x^2 \left(e\,x^2+d\right)^{3/2} (a+b\,\ln(c\,x^n)) \, dx$$

input
```
int(x^2*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)),x)
```

output
```
int(x^2*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)), x)
```

Reduce [F]

$$\int x^2 \left(d+ex^2\right)^{3/2} (a + b\log(cx^n)) \, dx = \frac{3\sqrt{e\,x^2+d}\,a\,d^2ex + 14\sqrt{e\,x^2+d}\,ad\,e^2x^3 + 8\sqrt{e\,x^2+d}\,a\,e^3x^5 - 3\sqrt{e}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{e}\,x}{\sqrt{d}}\right) a}{48e^2}$$

input
```
int(x^2*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x)
```

output
```
(3*sqrt(d + e*x**2)*a*d**2*e*x + 14*sqrt(d + e*x**2)*a*d*e**2*x**3 + 8*sqr
t(d + e*x**2)*a*e**3*x**5 - 3*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(e)*x)/s
qrt(d))*a*d**3 + 48*int(sqrt(d + e*x**2)*log(x**n*c)*x**4,x)*b*e**3 + 48*i
nt(sqrt(d + e*x**2)*log(x**n*c)*x**2,x)*b*d*e**2)/(48*e**2)
```

3.269 $\int (d+ex^2)^{3/2} (a+b\log(cx^n))\, dx$

Optimal result 2051
Mathematica [C] (verified) 2052
Rubi [C] (verified) 2052
Maple [F] 2060
Fricas [F] 2061
Sympy [F(-1)] 2061
Maxima [F(-2)] 2061
Giac [F] 2062
Mupad [F(-1)] 2062
Reduce [F] 2062

Optimal result

Integrand size = 22, antiderivative size = 378

$$\int (d+ex^2)^{3/2} (a+b\log(cx^n))\, dx = -\frac{9}{32} bdnx\sqrt{d+ex^2} - \frac{1}{16} bnx(d+ex^2)^{3/2}$$
$$+ \frac{3bd^{5/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{16\sqrt{e}\sqrt{d+ex^2}} - \frac{9bd^2n\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{32\sqrt{e}}$$
$$- \frac{3bd^{5/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{8\sqrt{e}\sqrt{d+ex^2}}$$
$$+ \frac{3}{8} dx\sqrt{d+ex^2}(a+b\log(cx^n)) + \frac{1}{4} x(d+ex^2)^{3/2}(a+b\log(cx^n)) + \frac{3d^{5/2}\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(c}{8\sqrt{e}\sqrt{d+ex^2}}$$

output
```
-9/32*b*d*n*x*(e*x^2+d)^(1/2)-1/16*b*n*x*(e*x^2+d)^(3/2)+3/16*b*d^(5/2)*n*
(1+e*x^2/d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))^2/e^(1/2)/(e*x^2+d)^(1/2)-9/3
2*b*d^2*n*arctanh(e^(1/2)*x/(e*x^2+d)^(1/2))/e^(1/2)-3/8*b*d^(5/2)*n*(1+e*
x^2/d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))*ln(1-(e^(1/2)*x/d^(1/2)+(1+e*x^2/d
)^(1/2))^2)/e^(1/2)/(e*x^2+d)^(1/2)+3/8*d*x*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n)
)+1/4*x*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))+3/8*d^(5/2)*(1+e*x^2/d)^(1/2)*arcs
inh(e^(1/2)*x/d^(1/2))*(a+b*ln(c*x^n))/e^(1/2)/(e*x^2+d)^(1/2)-3/16*b*d^(5
/2)*n*(1+e*x^2/d)^(1/2)*polylog(2,(e^(1/2)*x/d^(1/2)+(1+e*x^2/d)^(1/2))^2)
/e^(1/2)/(e*x^2+d)^(1/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.98 (sec) , antiderivative size = 314, normalized size of antiderivative = 0.83

$$\int \left(d+ex^2\right)^{3/2} (a +b\log(cx^n))\, dx = \frac{-8be^{3/2}nx^3\sqrt{d+ex^2}\,{}_3F_2\left(-\frac{1}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{ex^2}{d}\right)+9\left(-4bd\sqrt{e}nx\sqrt{d+ex^2}\,{}_3F_2\left(\frac{1}{2},\frac{1}{2},\frac{1}{2};\frac{3}{2},\right.\right.}{}$$

input
```
Integrate[(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(-8*b*e^(3/2)*n*x^3*Sqrt[d + e*x^2]*HypergeometricPFQ[{-1/2, 3/2, 3/2}, {5
/2, 5/2}, -((e*x^2)/d)] + 9*(-4*b*d*Sqrt[e]*n*x*Sqrt[d + e*x^2]*Hypergeome
tricPFQ[{1/2, 1/2, 1/2}, {3/2, 3/2}, -((e*x^2)/d)] + b*d^(3/2)*n*Sqrt[d +
e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(-2 + 3*Log[x]) + Sqrt[1 + (e*x^2)/d]*
(Sqrt[e]*x*Sqrt[d + e*x^2]*(5*a*d - 2*b*d*n + 2*a*e*x^2) + 3*d^2*(a - b*n*
Log[x])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]] + b*Log[c*x^n]*(Sqrt[e]*x*Sqrt[
d + e*x^2]*(5*d + 2*e*x^2) + 3*d^2*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]]))))/
(72*Sqrt[e]*Sqrt[1 + (e*x^2)/d])
```

Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 1.21 (sec) , antiderivative size = 355, normalized size of antiderivative = 0.94, number of steps used = 20, number of rules used = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.864$, Rules used = {2758, 211, 211, 224, 219, 2758, 211, 224, 219, 2764, 2762, 6190, 3042, 26, 4199, 25, 2620, 2715, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d+ex^2\right)^{3/2} (a+b\log(cx^n))\, dx$$

$$\Big\downarrow \text{2758}$$

$$\frac{3}{4}d\int \sqrt{ex^2+d}(a+b\log(cx^n))\,dx-\frac{1}{4}bn\int \left(ex^2+d\right)^{3/2}dx+\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))$$

$$\Big\downarrow \text{211}$$

$$\frac{3}{4}d\int \sqrt{ex^2+d}(a+b\log(cx^n))\,dx-\frac{1}{4}bn\left(\frac{3}{4}d\int \sqrt{ex^2+d}dx+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))$$

$$\Big\downarrow \text{211}$$

$$\frac{3}{4}d\int \sqrt{ex^2+d}(a+b\log(cx^n))\,dx-\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{1}{2}d\int \frac{1}{\sqrt{ex^2+d}}dx+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))$$

$$\Big\downarrow \text{224}$$

$$\frac{3}{4}d\int \sqrt{ex^2+d}(a+b\log(cx^n))\,dx-\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{1}{2}d\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))$$

$$\Big\downarrow \text{219}$$

$$\frac{3}{4}d\int \sqrt{ex^2+d}(a+b\log(cx^n))\,dx+\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \text{2758}$$

$$\frac{3}{4}d\left(\frac{1}{2}d\int \frac{a+b\log(cx^n)}{\sqrt{ex^2+d}}dx-\frac{1}{2}bn\int \sqrt{ex^2+d}dx+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \text{211}$$

$$\frac{3}{4}d\left(\frac{1}{2}d\int\frac{a+b\log\left(cx^n\right)}{\sqrt{ex^2+d}}dx-\frac{1}{2}bn\left(\frac{1}{2}d\int\frac{1}{\sqrt{ex^2+d}}dx+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log\left(cx^n\right))\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)-\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$\big\downarrow$ 224

$$\frac{3}{4}d\left(\frac{1}{2}d\int\frac{a+b\log\left(cx^n\right)}{\sqrt{ex^2+d}}dx-\frac{1}{2}bn\left(\frac{1}{2}d\int\frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log\left(cx^n\right.\right.$$
$$\frac{1}{4}x\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)-\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$\big\downarrow$ 219

$$\frac{3}{4}d\left(\frac{1}{2}d\int\frac{a+b\log\left(cx^n\right)}{\sqrt{ex^2+d}}dx+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log\left(cx^n\right))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)-\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$\big\downarrow$ 2764

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\int\frac{a+b\log(cx^n)}{\sqrt{\frac{ex^2}{d}+1}}dx}{2\sqrt{d+ex^2}}+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log\left(cx^n\right))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)\right)$$
$$\frac{1}{4}x\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)-\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$\big\downarrow$ 2762

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}-\frac{b\sqrt{d}n\int\frac{\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{e}}\right)}{2\sqrt{d+ex^2}}+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log\left(cx^n\right))-\frac{1}{2}bn\right.$$

$$\frac{1}{4}x\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)-$$
$$\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \text{ 6190}$$

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}-\frac{b\sqrt{d}n\int\frac{\sqrt{d}\sqrt{\frac{ex^2}{d}+1}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}x}d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right)}{2\sqrt{d+ex^2}}+\frac{1}{2}x\sqrt{d+ex^2}(a\right.$$

$$\frac{1}{4}x\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)-$$
$$\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \text{ 3042}$$

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}-\frac{b\sqrt{d}n\int-i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\tan\left(i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)+\frac{\pi}{2}\right)d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right)}{2\sqrt{d+ex^2}}+\frac{1}{2}\right.$$

$$\frac{1}{4}x\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)-$$
$$\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \text{ 26}$$

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\int \text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\tan\left(i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)+\frac{\pi}{2}\right)d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right)}{2\sqrt{d+ex^2}}+\frac{1}{2}x\right.$$

$$\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-$$

$$\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \text{4199}$$

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(2i\int -\frac{e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}}d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\text{arcsinh}\left(\right.\right.}{\sqrt{e}}\right.}{2\sqrt{d+ex^2}}\right.$$

$$\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-$$

$$\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \text{25}$$

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\int\frac{e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}}d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\text{arcsinh}(}{\sqrt{e}}}{2\sqrt{d+ex^2}}\right.$$

$$\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-$$

$$\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \text{2620}$$

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\left(\frac{1}{2}\int\log\left(1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right.\right.\right.}{\sqrt{e}}}{2\sqrt{d+ex^2}}\right.$$

$$\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-$$

$$\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \text{2715}$$

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\left(\frac{1}{4}\int e^{-2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\log\left(1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)de^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right.\right.}{\sqrt{e}}\right.}{2\sqrt{d+ex^2}}\right.$$

$$\frac{1}{4}x(d+ex^2)^{3/2}(a+b\log(cx^n))-$$
$$\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x(d+ex^2)^{3/2}\right)$$

$$\Big\downarrow \text{2838}$$

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\left(-\frac{1}{4}\text{PolyLog}\left(2,e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)-\frac{1}{2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\text{ar}}\right.\right.\right.}{\sqrt{e}}\right.}{2\sqrt{d+ex^2}}\right.$$

$$\frac{1}{4}x(d+ex^2)^{3/2}(a+b\log(cx^n))-$$
$$\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x(d+ex^2)^{3/2}\right)$$

input
```
Int[(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
-1/4*(b*n*((x*(d + e*x^2)^(3/2))/4 + (3*d*((x*Sqrt[d + e*x^2])/2 + (d*ArcT
anh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])/(2*Sqrt[e])))/4)) + (x*(d + e*x^2)^(3/2)
*(a + b*Log[c*x^n]))/4 + (3*d*(-1/2*(b*n*((x*Sqrt[d + e*x^2])/2 + (d*ArcTa
nh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])/(2*Sqrt[e]))) + (x*Sqrt[d + e*x^2]*(a + b
*Log[c*x^n]))/2 + (d*Sqrt[1 + (e*x^2)/d]*((Sqrt[d]*ArcSinh[(Sqrt[e]*x)/Sqr
t[d]]*(a + b*Log[c*x^n]))/Sqrt[e] + (I*b*Sqrt[d]*n*((-1/2*I)*ArcSinh[(Sqrt
[e]*x)/Sqrt[d]]^2 - (2*I)*(-1/2*(ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2
*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])]) - PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqr
t[d]])]/4)))/Sqrt[e]))/(2*Sqrt[d + e*x^2])))/4
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 26
```
Int[(Complex[0, a_])*(Fx_), x_Symbol] :> Simp[(Complex[Identity[0], a])   I
nt[Fx, x], x] /; FreeQ[a, x] && EqQ[a^2, 1]
```

rule 211
```
Int[((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[x*((a + b*x^2)^p/(2*p + 1
)), x] + Simp[2*a*(p/(2*p + 1))   Int[(a + b*x^2)^(p - 1), x], x] /; FreeQ[
{a, b}, x] && GtQ[p, 0] && (IntegerQ[4*p] || IntegerQ[6*p])
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 2620
```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Si
mp[d*(m/(b*f*g*n*Log[F]))   Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x
)))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

rule 2715
```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Simp[1/(d*e*n*Log[F])   Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x)
))^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

rule 2758
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_.), x_Sy
mbol] :> Simp[x*(d + e*x^2)^q*((a + b*Log[c*x^n])/(2*q + 1)), x] + (-Simp[b
*(n/(2*q + 1))   Int[(d + e*x^2)^q, x], x] + Simp[2*d*(q/(2*q + 1))   Int[(
d + e*x^2)^(q - 1)*(a + b*Log[c*x^n]), x], x]) /; FreeQ[{a, b, c, d, e, n},
 x] && GtQ[q, 0]
```

rule 2762
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Simp[ArcSinh[Rt[e, 2]*(x/Sqrt[d])]*((a + b*Log[c*x^n])/Rt[e, 2]), x]
 - Simp[b*(n/Rt[e, 2])   Int[ArcSinh[Rt[e, 2]*(x/Sqrt[d])]/x, x], x] /; Fre
eQ[{a, b, c, d, e, n}, x] && GtQ[d, 0] && PosQ[e]
```

rule 2764
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Simp[Sqrt[1 + (e/d)*x^2]/Sqrt[d + e*x^2]   Int[(a + b*Log[c*x^n])/Sq
rt[1 + (e/d)*x^2], x], x] /; FreeQ[{a, b, c, d, e, n}, x] &&  !GtQ[d, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4199
```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Simp
[2*I   Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x
))/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && In
tegerQ[4*k] && IGtQ[m, 0]
```

rule 6190
```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Simp[1/b
 Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[n, 0]
```

Maple [F]

$$\int \left(e\,x^{2}+d\right)^{\frac{3}{2}} \left(a+b\ln\left(c\,x^{n}\right)\right)dx$$

input
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

output
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

Fricas [F]

$$\int \left(d+ex^2\right)^{3/2} \left(a+b\log\left(cx^n\right)\right)\,dx=\int \left(ex^2+d\right)^{\frac{3}{2}}\left(b\log\left(cx^n\right)+a\right)dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral((b*e*x^2 + b*d)*sqrt(e*x^2 + d)*log(c*x^n) + (a*e*x^2 + a*d)*sqrt
(e*x^2 + d), x)
```

Sympy [F(-1)]

Timed out.

$$\int \left(d+ex^2\right)^{3/2} \left(a+b\log\left(cx^n\right)\right)\,dx=\text{Timed out}$$

input
```
integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \left(d+ex^2\right)^{3/2} \left(a+b\log\left(cx^n\right)\right)\,dx=\text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \left(d+ex^2\right)^{3/2} (a+b\log \left(cx^n\right))\, dx = \int \left(ex^2+d\right)^{\frac{3}{2}} (b\log \left(cx^n\right)+a)\, dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a), x)
```

Mupad [F(-1)]

Timed out.

$$\int \left(d+ex^2\right)^{3/2} (a+b\log \left(cx^n\right))\, dx = \int \left(e\,x^2+d\right)^{3/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)\, dx$$

input
```
int((d + e*x^2)^(3/2)*(a + b*log(c*x^n)),x)
```

output
```
int((d + e*x^2)^(3/2)*(a + b*log(c*x^n)), x)
```

Reduce [F]

$$\int \left(d+ex^2\right)^{3/2} (a +b\log \left(cx^n\right))\, dx = \frac{5\sqrt{e\,x^2+d}\,adex+2\sqrt{e\,x^2+d}\,a\,e^2x^3+3\sqrt{e}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{e}\,x}{\sqrt{d}}\right)a\,d^2+8\left(\int \sqrt{e\,x^2+d}\log$$

input
```
int((e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x)
```

output
```
(5*sqrt(d + e*x**2)*a*d*e*x + 2*sqrt(d + e*x**2)*a*e**2*x**3 + 3*sqrt(e)*l
og((sqrt(d + e*x**2) + sqrt(e)*x)/sqrt(d))*a*d**2 + 8*int(sqrt(d + e*x**2)
*log(x**n*c)*x**2,x)*b*e**2 + 8*int(sqrt(d + e*x**2)*log(x**n*c),x)*b*d*e)
/(8*e)
```

3.270 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx$

Optimal result 2063
Mathematica [C] (verified) 2064
Rubi [A] (verified) 2065
Maple [F] 2067
Fricas [F] 2068
Sympy [F] 2068
Maxima [F(-2)] 2068
Giac [F] 2069
Mupad [F(-1)] 2069
Reduce [F] 2069

Optimal result

Integrand size = 25, antiderivative size = 400

$$\begin{aligned}
\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx &= -\frac{bdn\sqrt{d+ex^2}}{x}-\frac{1}{4}benx\sqrt{d+ex^2} \\
&+\frac{3b\sqrt{d}\sqrt{e}n\sqrt{d+ex^2}\,\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{4\sqrt{1+\frac{ex^2}{d}}}+\frac{3b\sqrt{d}\sqrt{e}n\sqrt{d+ex^2}\,\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{4\sqrt{1+\frac{ex^2}{d}}} \\
&-\frac{3b\sqrt{d}\sqrt{e}n\sqrt{d+ex^2}\,\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2\sqrt{1+\frac{ex^2}{d}}} \\
&+\frac{3}{2}ex\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x} \\
&+\frac{3\sqrt{d}\sqrt{e}\sqrt{d+ex^2}\,\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{1+\frac{ex^2}{d}}} \\
&-\frac{3b\sqrt{d}\sqrt{e}n\sqrt{d+ex^2}\,\text{PolyLog}\left(2,e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{4\sqrt{1+\frac{ex^2}{d}}}
\end{aligned}$$

output
```
-b*d*n*(e*x^2+d)^(1/2)/x-1/4*b*e*n*x*(e*x^2+d)^(1/2)+3/4*b*d^(1/2)*e^(1/2)
*n*(e*x^2+d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))/(1+e*x^2/d)^(1/2)+3/4*b*d^(1
/2)*e^(1/2)*n*(e*x^2+d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))^2/(1+e*x^2/d)^(1/
2)-3/2*b*d^(1/2)*e^(1/2)*n*(e*x^2+d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))*ln(1
-(e^(1/2)*x/d^(1/2)+(1+e*x^2/d)^(1/2))^2)/(1+e*x^2/d)^(1/2)+3/2*e*x*(e*x^2
+d)^(1/2)*(a+b*ln(c*x^n))-(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x+3/2*d^(1/2)*e^
(1/2)*(e*x^2+d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))*(a+b*ln(c*x^n))/(1+e*x^2/
d)^(1/2)-3/4*b*d^(1/2)*e^(1/2)*n*(e*x^2+d)^(1/2)*polylog(2,(e^(1/2)*x/d^(1
/2)+(1+e*x^2/d)^(1/2))^2)/(1+e*x^2/d)^(1/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 1.19 (sec) , antiderivative size = 329, normalized size of antiderivative = 0.82

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx = -\frac{b\sqrt{d}n\sqrt{d+ex^2}\left(\sqrt{d}\,{}_3F_2\left(-\frac{1}{2},-\frac{1}{2},-\frac{1}{2};\frac{1}{2},\frac{1}{2};-\frac{ex^2}{d}\right)+\left(\sqrt{d}\sqrt{1+\frac{ex^2}{d}}-\sqrt{e}x\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\right)\log(x)\right)}{x\sqrt{1+\frac{ex^2}{d}}} + \frac{b\sqrt{e}n\sqrt{d+ex^2}\left(-2\sqrt{e}x\,{}_3F_2\left(\frac{1}{2},\frac{1}{2},\frac{1}{2};\frac{3}{2},\frac{3}{2};-\frac{ex^2}{d}\right)+\left(\sqrt{e}x\sqrt{1+\frac{ex^2}{d}}+\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\right)(-1+2\log(x))\right)}{4\sqrt{1+\frac{ex^2}{d}}} - \frac{(2d-ex^2)\sqrt{d+ex^2}(a-bn\log(x)+b\log(cx^n))}{2x} + \frac{3}{2}d\sqrt{e}(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)$$

input
```
Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-((b*Sqrt[d]*n*Sqrt[d + e*x^2]*(Sqrt[d]*HypergeometricPFQ[{-1/2, -1/2, -1/
2}, {1/2, 1/2}, -((e*x^2)/d)] + (Sqrt[d]*Sqrt[1 + (e*x^2)/d] - Sqrt[e]*x*A
rcSinh[(Sqrt[e]*x)/Sqrt[d]])*Log[x]))/(x*Sqrt[1 + (e*x^2)/d])) + (b*Sqrt[e
]*n*Sqrt[d + e*x^2]*(-2*Sqrt[e]*x*HypergeometricPFQ[{1/2, 1/2, 1/2}, {3/2,
 3/2}, -((e*x^2)/d)] + (Sqrt[e]*x*Sqrt[1 + (e*x^2)/d] + Sqrt[d]*ArcSinh[(S
qrt[e]*x)/Sqrt[d]])*(-1 + 2*Log[x])))/(4*Sqrt[1 + (e*x^2)/d]) - ((2*d - e*
x^2)*Sqrt[d + e*x^2]*(a - b*n*Log[x] + b*Log[c*x^n]))/(2*x) + (3*d*Sqrt[e]
*(a - b*n*Log[x] + b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/2
```

Rubi [A] (verified)

Time = 0.83 (sec) , antiderivative size = 313, normalized size of antiderivative = 0.78, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2786, 2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(d+ex^2\right)^{3/2} (a+b\log (cx^n))}{x^2}dx$$

$$\Big\downarrow \text{2786}$$

$$\frac{d\sqrt{d+ex^2}\int \frac{\left(\frac{ex^2}{d}+1\right)^{3/2}(a+b\log (cx^n))}{x^2}dx}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{2792}$$

$$\frac{d\sqrt{d+ex^2}\left(-bn\int -\frac{\left(2d-ex^2\right)\sqrt{\frac{ex^2}{d}+1}-3\sqrt{d}\sqrt{e}x\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2dx^2}dx+\frac{3\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log (cx^n))}{2\sqrt{d}}-\frac{\left(\frac{ex^2}{d}+1\right)^{3/2}(a+b\log (\ldots}{x}\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{27}$$

$$\frac{d\sqrt{d+ex^2}\left(\frac{bn\int\frac{(2d-ex^2)\sqrt{\frac{ex^2}{d}+1}-3\sqrt{d}\sqrt{e}x\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x^2}dx}{2d}+\frac{3\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}-\frac{\left(\frac{ex^2}{d}+1\right)^{3/2}(a+b\log(cx^n))}{x}+\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

$\downarrow$ 2010

$$\frac{d\sqrt{d+ex^2}\left(\frac{bn\int\left(\frac{2\sqrt{\frac{ex^2}{d}+1}d}{x^2}-\frac{3\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\sqrt{d}}{x}-e\sqrt{\frac{ex^2}{d}+1}\right)dx}{2d}+\frac{3\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}-\frac{\left(\frac{ex^2}{d}+1\right)^{3/2}(a+b\log(\right.}{x}}{\sqrt{\frac{ex^2}{d}+1}}$$

$\downarrow$ 2009

$$\frac{d\sqrt{d+ex^2}\left(\frac{3\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}-\frac{\left(\frac{ex^2}{d}+1\right)^{3/2}(a+b\log(cx^n))}{x}+\frac{3ex\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{2d}+\frac{bn\left(-\frac{3}{2}\sqrt{d}\sqrt{e}\,\text{PolyLog}\right.}{}\right.}{}$$

input

```
Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^2,x]
```

output

```
(d*Sqrt[d + e*x^2]*((3*e*x*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/(2*d) -
 ((1 + (e*x^2)/d)^(3/2)*(a + b*Log[c*x^n]))/x + (3*Sqrt[e]*ArcSinh[(Sqrt[e
]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*Sqrt[d]) + (b*n*((-2*d*Sqrt[1 + (e*x^
2)/d])/x - (e*x*Sqrt[1 + (e*x^2)/d])/2 + (3*Sqrt[d]*Sqrt[e]*ArcSinh[(Sqrt[
e]*x)/Sqrt[d]])/2 + (3*Sqrt[d]*Sqrt[e]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/2 -
 3*Sqrt[d]*Sqrt[e]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt
[e]*x)/Sqrt[d]])] - (3*Sqrt[d]*Sqrt[e]*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)
/Sqrt[d]])])/2))/(2*d)))/Sqrt[1 + (e*x^2)/d]
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{(e\,x^{2}+d)^{\frac{3}{2}}\,(a+b\ln(c\,x^{n}))}{x^{2}}dx$$

input
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^2,x)
```

output
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^2,x)
```

Fricas [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
integral(((b*e*x^2 + b*d)*sqrt(e*x^2 + d)*log(c*x^n) + (a*e*x^2 + a*d)*sqr
t(e*x^2 + d))/x^2, x)
```

Sympy [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{(a+b\log(cx^n))(d+ex^2)^{\frac{3}{2}}}{x^2}\,dx$$

input
```
integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x**2,x)
```

output
```
Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2)/x**2, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)/x^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{(e\,x^2+d)^{3/2}\,(a+b\,\ln(c\,x^n))}{x^2}\,dx$$

input
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^2,x)
```

output
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^2, x)
```

Reduce [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx = \frac{-8\sqrt{e\,x^2+d}\,ad+4\sqrt{e\,x^2+d}\,ae\,x^2+12\sqrt{e}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{e}\,x}{\sqrt{d}}\right)adx-$$

input
```
int((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^2,x)
```

output
```
( - 8*sqrt(d + e*x**2)*a*d + 4*sqrt(d + e*x**2)*a*e*x**2 + 12*sqrt(e)*log(
(sqrt(d + e*x**2) + sqrt(e)*x)/sqrt(d))*a*d*x - 9*sqrt(e)*a*d*x + 8*int((s
qrt(d + e*x**2)*log(x**n*c))/x**2,x)*b*d*x + 8*int(sqrt(d + e*x**2)*log(x*
*n*c),x)*b*e*x)/(8*x)
```

3.271 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx$

Optimal result 2070
Mathematica [C] (verified) 2071
Rubi [A] (verified) 2072
Maple [F] 2073
Fricas [F] 2074
Sympy [F] 2074
Maxima [F(-2)] 2074
Giac [F] 2075
Mupad [F(-1)] 2075
Reduce [F] 2075

Optimal result

Integrand size = 25, antiderivative size = 400

$$\begin{aligned}\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx &= -\frac{4ben\sqrt{d+ex^2}}{3x}-\frac{bn(d+ex^2)^{3/2}}{9x^3}\\ &+\frac{4be^{3/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{3\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}+\frac{be^{3/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{2\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}\\ &-\frac{be^{3/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}\\ &-\frac{e\sqrt{d+ex^2}(a+b\log(cx^n))}{x}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3x^3}\\ &+\frac{e^{3/2}\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}\\ &-\frac{be^{3/2}n\sqrt{d+ex^2}\operatorname{PolyLog}\left(2,e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}\end{aligned}$$

output
```
-4/3*b*e*n*(e*x^2+d)^(1/2)/x-1/9*b*n*(e*x^2+d)^(3/2)/x^3+4/3*b*e^(3/2)*n*(
e*x^2+d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))/d^(1/2)/(1+e*x^2/d)^(1/2)+1/2*b*
e^(3/2)*n*(e*x^2+d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))^2/d^(1/2)/(1+e*x^2/d)
^(1/2)-b*e^(3/2)*n*(e*x^2+d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))*ln(1-(e^(1/2
)*x/d^(1/2)+(1+e*x^2/d)^(1/2))^2)/d^(1/2)/(1+e*x^2/d)^(1/2)-e*(e*x^2+d)^(1
/2)*(a+b*ln(c*x^n))/x-1/3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^3+e^(3/2)*(e*x
^2+d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))*(a+b*ln(c*x^n))/d^(1/2)/(1+e*x^2/d)
^(1/2)-1/2*b*e^(3/2)*n*(e*x^2+d)^(1/2)*polylog(2,(e^(1/2)*x/d^(1/2)+(1+e*x
^2/d)^(1/2))^2)/d^(1/2)/(1+e*x^2/d)^(1/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.99 (sec) , antiderivative size = 269, normalized size of antiderivative = 0.67

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx = \frac{bdn\sqrt{d+ex^2}\left(-\text{Hypergeometric2F1}\left(-\frac{3}{2},-\frac{3}{2},-\frac{1}{2},-\frac{ex^2}{d}\right)-3\left(1+\right.\right.}{9x^3\sqrt{1+\frac{ex^2}{d}}}$$
$$+\frac{ben\sqrt{d+ex^2}\left(-{}_3F_2\left(-\frac{1}{2},-\frac{1}{2},-\frac{1}{2};\frac{1}{2},\frac{1}{2};-\frac{ex^2}{d}\right)-\sqrt{1+\frac{ex^2}{d}}\log(x)+\frac{\sqrt{e}x\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log(x)}{\sqrt{d}}\right)}{x\sqrt{1+\frac{ex^2}{d}}}$$
$$-\frac{\sqrt{d+ex^2}(d+4ex^2)(a-bn\log(x)+b\log(cx^n))}{3x^3}$$
$$+e^{3/2}(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)$$

input
```
Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(b*d*n*Sqrt[d + e*x^2]*(-Hypergeometric2F1[-3/2, -3/2, -1/2, -((e*x^2)/d)]
 - 3*(1 + (e*x^2)/d)^(3/2)*Log[x]))/(9*x^3*Sqrt[1 + (e*x^2)/d]) + (b*e*n*S
qrt[d + e*x^2]*(-HypergeometricPFQ[{-1/2, -1/2, -1/2}, {1/2, 1/2}, -((e*x^
2)/d)] - Sqrt[1 + (e*x^2)/d]*Log[x] + (Sqrt[e]*x*ArcSinh[(Sqrt[e]*x)/Sqrt[
d]]*Log[x])/Sqrt[d]))/(x*Sqrt[1 + (e*x^2)/d]) - (Sqrt[d + e*x^2]*(d + 4*e*
x^2)*(a - b*n*Log[x] + b*Log[c*x^n]))/(3*x^3) + e^(3/2)*(a - b*n*Log[x] +
b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]]
```

Rubi [A] (verified)

Time = 0.76 (sec) , antiderivative size = 312, normalized size of antiderivative = 0.78, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.120$, Rules used = {2786, 2792, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx$$

$$\Big\downarrow \ 2786$$

$$\frac{d\sqrt{d+ex^2}\int \frac{\left(\frac{ex^2}{d}+1\right)^{3/2}(a+b\log(cx^n))}{x^4}dx}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \ 2792$$

$$\frac{d\sqrt{d+ex^2}\left(-bn\int\left(\frac{e^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{d^{3/2}x}-\frac{(4ex^2+d)\sqrt{\frac{ex^2}{d}+1}}{3dx^4}\right)dx+\frac{e^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}}-\frac{e\sqrt{\frac{ex^2}{d}+1}(a+b\log(c\ldots}{dx}\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \ 2009$$

$$\frac{d\sqrt{d+ex^2}\left(\frac{e^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}}-\frac{e\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{dx}-\frac{\left(\frac{ex^2}{d}+1\right)^{3/2}(a+b\log(cx^n))}{3x^3}-bn\left(\frac{e^{3/2}\text{PolyLog}\left(2,e^{2\ldots}\right.}{2d^{3/\ldots}}\right.\right.}{\ldots}$$

input
```
Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(d*Sqrt[d + e*x^2]*(-((e*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/(d*x)) -
((1 + (e*x^2)/d)^(3/2)*(a + b*Log[c*x^n]))/(3*x^3) + (e^(3/2)*ArcSinh[(Sqr
t[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/d^(3/2) - b*n*((4*e*Sqrt[1 + (e*x^2)/
d])/(3*d*x) + (1 + (e*x^2)/d)^(3/2)/(9*x^3) - (4*e^(3/2)*ArcSinh[(Sqrt[e]*
x)/Sqrt[d]])/(3*d^(3/2)) - (e^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/(2*d^(
3/2)) + (e^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e
]*x)/Sqrt[d]])])/d^(3/2) + (e^(3/2)*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sq
rt[d]])])/(2*d^(3/2)))))/Sqrt[1 + (e*x^2)/d]
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{(e\,x^2+d)^{\frac{3}{2}}\,(a+b\ln\left(c\,x^n\right))}{x^4}dx$$

input
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^4,x)
```

output
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^4,x)
```

Fricas [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^4}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
integral((((b*e*x^2 + b*d)*sqrt(e*x^2 + d)*log(c*x^n) + (a*e*x^2 + a*d)*sqr
t(e*x^2 + d))/x^4, x)
```

Sympy [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx = \int \frac{(a+b\log(cx^n))(d+ex^2)^{\frac{3}{2}}}{x^4}\,dx$$

input
```
integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x**4,x)
```

output
```
Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2)/x**4, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^4}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)/x^4, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx = \int \frac{(e\,x^2+d)^{3/2}\,(a+b\,\ln(c\,x^n))}{x^4}\,dx$$

input
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^4,x)
```

output
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^4, x)
```

Reduce [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx = \frac{-3\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)bd-3\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\sqrt{\right.}}{e^{\frac{n}{2}}\left(\sqrt{\right.}}\right.}{}$$

input
```
int((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^4,x)
```

output
```
( - 3*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c
)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d - 3*sqrt(d + e*x*
*2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d
 + e*x**2) + sqrt(e)*x)**n*2**n))*b*e*x**2 - 3*sqrt(d + e*x**2)*a*d - 12*s
qrt(d + e*x**2)*a*e*x**2 - sqrt(d + e*x**2)*b*d*n - 4*sqrt(d + e*x**2)*b*e
*n*x**2 + 3*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*
b*e*n*x**3 + 3*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d
))*b*e*n*x**3 + 9*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(e)*x)/sqrt(d))*a*e*
x**3 - 3*sqrt(e)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**
(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*e*x**3 + 9*int((sqrt(d +
e*x**2)*log(x**n*c))/x**2,x)*b*e*x**3)/(9*x**3)
```

3.272 $\int \frac{\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{x^6}\,dx$

Optimal result 2077
Mathematica [A] (verified) 2077
Rubi [A] (verified) 2078
Maple [F] 2080
Fricas [A] (verification not implemented) 2080
Sympy [F] 2081
Maxima [F(-2)] 2081
Giac [F] 2082
Mupad [F(-1)] 2082
Reduce [B] (verification not implemented) 2082

Optimal result

Integrand size = 25, antiderivative size = 138

$$\int \frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{x^6}\,dx = -\frac{be^2n\sqrt{d+ex^2}}{5dx} - \frac{ben(d+ex^2)^{3/2}}{15dx^3} - \frac{bn(d+ex^2)^{5/2}}{25dx^5} + \frac{be^{5/2}n\,\mathrm{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{5d} - \frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5dx^5}$$

output
```
-1/5*b*e^2*n*(e*x^2+d)^(1/2)/d/x-1/15*b*e*n*(e*x^2+d)^(3/2)/d/x^3-1/25*b*n
*(e*x^2+d)^(5/2)/d/x^5+1/5*b*e^(5/2)*n*arctanh(e^(1/2)*x/(e*x^2+d)^(1/2))/
d-1/5*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/d/x^5
```

Mathematica [A] (verified)

Time = 0.30 (sec) , antiderivative size = 114, normalized size of antiderivative = 0.83

$$\int \frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{x^6}\,dx = -\frac{\sqrt{d+ex^2}\left(15a\left(d+ex^2\right)^2+bn\left(3d^2+11dex^2+23e^2x^4\right)\right)+15b\left(d+ex^2\right)^{5/2}\log\left(cx^n\right)-15be^{5/2}nx^5\log\left(e\right.}{75dx^5}$$

input
```
Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-1/75*(Sqrt[d + e*x^2]*(15*a*(d + e*x^2)^2 + b*n*(3*d^2 + 11*d*e*x^2 + 23*
e^2*x^4)) + 15*b*(d + e*x^2)^(5/2)*Log[c*x^n] - 15*b*e^(5/2)*n*x^5*Log[e*x
 + Sqrt[e]*Sqrt[d + e*x^2]])/(d*x^5)
```

Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 125, normalized size of antiderivative = 0.91, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.240, Rules used = {2773, 247, 247, 247, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^6}dx$$

$$\Big\downarrow \text{2773}$$

$$\frac{bn\int \frac{(ex^2+d)^{5/2}}{x^6}dx}{5d}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{247}$$

$$\frac{bn\left(e\int \frac{(ex^2+d)^{3/2}}{x^4}dx-\frac{(d+ex^2)^{5/2}}{5x^5}\right)}{5d}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{247}$$

$$\frac{bn\left(e\left(e\int \frac{\sqrt{ex^2+d}}{x^2}dx-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)}{5d}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{247}$$

$$\frac{bn\left(e\left(e\left(e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)}{5d}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{224}$$

$$\frac{bn\left(e\left(e\left(e\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)}{5d}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{219}$$

$$\frac{bn\left(e\left(e\left(\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)}{5d}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5dx^5}$$

input
```
Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*(-1/5*(d + e*x^2)^(5/2)/x^5 + e*(-1/3*(d + e*x^2)^(3/2)/x^3 + e*(-(Sq
rt[d + e*x^2]/x) + Sqrt[e]*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]]))))/(5*d)
- ((d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(5*d*x^5)
```

Defintions of rubi rules used

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Maple [F]

$$\int \frac{\left(e\,x^{2}+d\right)^{\frac{3}{2}} \left(a+b\ln \left(c\,x^{n}\right)\right)}{x^{6}}dx$$

input
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^6,x)
```

output
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^6,x)
```

Fricas [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 314, normalized size of antiderivative = 2.28

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^6}\,dx = \left[\frac{15\,be^{\frac{5}{2}}nx^5\log\left(-2\,ex^2-2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)-2\left(\left(23\,be^2n+15\,ae\right.\right.}{}\right.$$

$$-\frac{15\,b\sqrt{-e}e^2nx^5\arctan\left(\frac{\sqrt{-e}x}{\sqrt{ex^2+d}}\right)+\left(\left(23\,be^2n+15\,ae^2\right)x^4+3\,bd^2n+15\,ad^2+\left(11\,bden+30\,ade\right)x^2+15\,(\right.}{75\,dx^5}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
[1/150*(15*b*e^(5/2)*n*x^5*log(-2*e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(e)*x - d)
 - 2*((23*b*e^2*n + 15*a*e^2)*x^4 + 3*b*d^2*n + 15*a*d^2 + (11*b*d*e*n + 3
0*a*d*e)*x^2 + 15*(b*e^2*x^4 + 2*b*d*e*x^2 + b*d^2)*log(c) + 15*(b*e^2*n*x
^4 + 2*b*d*e*n*x^2 + b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(d*x^5), -1/75*(15*
b*sqrt(-e)*e^2*n*x^5*arctan(sqrt(-e)*x/sqrt(e*x^2 + d)) + ((23*b*e^2*n + 1
5*a*e^2)*x^4 + 3*b*d^2*n + 15*a*d^2 + (11*b*d*e*n + 30*a*d*e)*x^2 + 15*(b*
e^2*x^4 + 2*b*d*e*x^2 + b*d^2)*log(c) + 15*(b*e^2*n*x^4 + 2*b*d*e*n*x^2 +
b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(d*x^5)]
```

Sympy [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^6}\,dx = \int \frac{(a+b\log(cx^n))(d+ex^2)^{\frac{3}{2}}}{x^6}\,dx$$

input
```
integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x**6,x)
```

output
```
Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2)/x**6, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^6}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^6}\,dx=\int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^6}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)/x^6, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^6}\,dx=\int \frac{(e\,x^2+d)^{3/2}\,(a+b\,\ln(c\,x^n))}{x^6}\,dx$$

input
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^6,x)
```

output
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^6, x)
```

Reduce [B] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 471, normalized size of antiderivative = 3.41

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^6}\,dx=\frac{-45\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)b\,d^2-90\sqrt{e\,x^2+d}\log\left(\frac{\left(2\right.}{e^{\frac{n}{2}}}\right.}{}$$

input
```
int((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^6,x)
```

output
```
( - 45*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*
c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2 - 90*sqrt(d +
 e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(s
qrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e*x**2 - 45*sqrt(d + e*x**2)*lo
g(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x
**2) + sqrt(e)*x)**n*2**n))*b*e**2*x**4 - 45*sqrt(d + e*x**2)*a*d**2 - 90*
sqrt(d + e*x**2)*a*d*e*x**2 - 45*sqrt(d + e*x**2)*a*e**2*x**4 - 9*sqrt(d +
 e*x**2)*b*d**2*n - 33*sqrt(d + e*x**2)*b*d*e*n*x**2 - 69*sqrt(d + e*x**2)
*b*e**2*n*x**4 + 45*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/s
qrt(d))*b*e**2*n*x**5 + 45*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(
e)*x)/sqrt(d))*b*e**2*n*x**5 - 45*sqrt(e)*log(((2*sqrt(e)*sqrt(d + e*x**2)
*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*
e**2*x**5 - 45*sqrt(e)*a*e**2*x**5 - 25*sqrt(e)*b*e**2*n*x**5)/(225*d*x**5
)
```

3.273 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx$

Optimal result 2084
Mathematica [A] (verified) 2085
Rubi [A] (verified) 2085
Maple [F] 2088
Fricas [A] (verification not implemented) 2088
Sympy [F] 2089
Maxima [F(-2)] 2089
Giac [F] 2090
Mupad [F(-1)] 2090
Reduce [B] (verification not implemented) 2090

Optimal result

Integrand size = 25, antiderivative size = 196

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx = \frac{2be^3n\sqrt{d+ex^2}}{35d^2x} + \frac{2be^2n(d+ex^2)^{3/2}}{105d^2x^3} + \frac{2ben(d+ex^2)^{5/2}}{175d^2x^5} - \frac{bn(d+ex^2)^{7/2}}{49d^2x^7} - \frac{2be^{7/2}n\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{35d^2} - \frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7} + \frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}$$

output
```
2/35*b*e^3*n*(e*x^2+d)^(1/2)/d^2/x+2/105*b*e^2*n*(e*x^2+d)^(3/2)/d^2/x^3+2
/175*b*e*n*(e*x^2+d)^(5/2)/d^2/x^5-1/49*b*n*(e*x^2+d)^(7/2)/d^2/x^7-2/35*b
*e^(7/2)*n*arctanh(e^(1/2)*x/(e*x^2+d)^(1/2))/d^2-1/7*(e*x^2+d)^(5/2)*(a+b
*ln(c*x^n))/d/x^7+2/35*e*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/d^2/x^5
```

Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 145, normalized size of antiderivative = 0.74

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx =$$
$$-\frac{\sqrt{d+ex^2}\left(105a(5d-2ex^2)(d+ex^2)^2+bn(75d^3+183d^2ex^2+71de^2x^4-247e^3x^6)\right)+105b(5d-2ex^2)}{3675d^2x^7}$$

input
```
Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
-1/3675*(Sqrt[d + e*x^2]*(105*a*(5*d - 2*e*x^2)*(d + e*x^2)^2 + b*n*(75*d^
3 + 183*d^2*e*x^2 + 71*d*e^2*x^4 - 247*e^3*x^6)) + 105*b*(5*d - 2*e*x^2)*(
d + e*x^2)^(5/2)*Log[c*x^n] + 210*b*e^(7/2)*n*x^7*Log[e*x + Sqrt[e]*Sqrt[d
 + e*x^2]])/(d^2*x^7)
```

Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 179, normalized size of antiderivative = 0.91, number of steps used = 9, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.320$, Rules used = {2792, 27, 358, 247, 247, 247, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx$$
$$\Big\downarrow \text{2792}$$
$$-bn\int -\frac{(5d-2ex^2)(ex^2+d)^{5/2}}{35d^2x^8}dx+\frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7}$$
$$\Big\downarrow \text{27}$$
$$\frac{bn\int \frac{(5d-2ex^2)(ex^2+d)^{5/2}}{x^8}dx}{35d^2}+\frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \text{358}$$

$$\frac{bn\left(-2e\int \frac{(ex^2+d)^{5/2}}{x^6}dx-\frac{5(d+ex^2)^{7/2}}{7x^7}\right)}{35d^2}+\frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \text{247}$$

$$\frac{bn\left(-2e\left(e\int \frac{(ex^2+d)^{3/2}}{x^4}dx-\frac{(d+ex^2)^{5/2}}{5x^5}\right)-\frac{5(d+ex^2)^{7/2}}{7x^7}\right)}{35d^2}+\frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \text{247}$$

$$\frac{bn\left(-2e\left(e\left(e\int \frac{\sqrt{ex^2+d}}{x^2}dx-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)-\frac{5(d+ex^2)^{7/2}}{7x^7}\right)}{35d^2}+\frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \text{247}$$

$$\frac{bn\left(-2e\left(e\left(e\left(e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)-\frac{5(d+ex^2)^{7/2}}{7x^7}\right)}{35d^2}+\frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \text{224}$$

$$\frac{bn\left(-2e\left(e\left(e\left(e\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)-\frac{5(d+ex^2)^{7/2}}{7x^7}\right)}{35d^2}+\frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \text{219}$$

$$\frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7}+\frac{bn\left(-2e\left(e\left(e\left(\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)-\frac{5(d+ex^2)^{7/2}}{7x^7}\right)}{35d^2}$$

input
```
Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
(b*n*((-5*(d + e*x^2)^(7/2))/(7*x^7) - 2*e*(-1/5*(d + e*x^2)^(5/2)/x^5 + e
*(-1/3*(d + e*x^2)^(3/2)/x^3 + e*(-(Sqrt[d + e*x^2]/x) + Sqrt[e]*ArcTanh[(
Sqrt[e]*x)/Sqrt[d + e*x^2]])))))/(35*d^2) - ((d + e*x^2)^(5/2)*(a + b*Log[
c*x^n]))/(7*d*x^7) + (2*e*(d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(35*d^2*x^
5)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{(e\,x^{2}+d)^{\frac{3}{2}}\,(a+b\ln(c\,x^{n}))}{x^{8}}dx$$

input
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^8,x)
```

output
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^8,x)
```

Fricas [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 423, normalized size of antiderivative = 2.16

$$\int \frac{(d+ex^2)^{3/2}\,(a+b\log(cx^n))}{x^8}\,dx = \left[\frac{105\,be^{\frac{7}{2}}nx^7\log\left(-2\,ex^2+2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)+((247\,be^3n+210\right.$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

output
```
[1/3675*(105*b*e^(7/2)*n*x^7*log(-2*e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(e)*x -
d) + ((247*b*e^3*n + 210*a*e^3)*x^6 - 75*b*d^3*n - (71*b*d*e^2*n + 105*a*d
*e^2)*x^4 - 525*a*d^3 - 3*(61*b*d^2*e*n + 280*a*d^2*e)*x^2 + 105*(2*b*e^3*
x^6 - b*d*e^2*x^4 - 8*b*d^2*e*x^2 - 5*b*d^3)*log(c) + 105*(2*b*e^3*n*x^6 -
 b*d*e^2*n*x^4 - 8*b*d^2*e*n*x^2 - 5*b*d^3*n)*log(x))*sqrt(e*x^2 + d))/(d^
2*x^7), 1/3675*(210*b*sqrt(-e)*e^3*n*x^7*arctan(sqrt(-e)*x/sqrt(e*x^2 + d)
) + ((247*b*e^3*n + 210*a*e^3)*x^6 - 75*b*d^3*n - (71*b*d*e^2*n + 105*a*d*
e^2)*x^4 - 525*a*d^3 - 3*(61*b*d^2*e*n + 280*a*d^2*e)*x^2 + 105*(2*b*e^3*x
^6 - b*d*e^2*x^4 - 8*b*d^2*e*x^2 - 5*b*d^3)*log(c) + 105*(2*b*e^3*n*x^6 -
b*d*e^2*n*x^4 - 8*b*d^2*e*n*x^2 - 5*b*d^3*n)*log(x))*sqrt(e*x^2 + d))/(d^2
*x^7)]
```

Sympy [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx = \int \frac{(a+b\log(cx^n))(d+ex^2)^{\frac{3}{2}}}{x^8}\,dx$$

input
```
integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x**8,x)
```

output
```
Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2)/x**8, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^8}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)/x^8, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx = \int \frac{(e\,x^2+d)^{3/2}\,(a+b\,\ln(c\,x^n))}{x^8}\,dx$$

input
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^8,x)
```

output
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^8, x)
```

Reduce [B] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 586, normalized size of antiderivative = 2.99

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx = \frac{-525\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) b\,d^3-840\sqrt{e\,x^2+d}\log\Bigg(}{}$$

input
```
int((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^8,x)
```

output
```
( - 525*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n
*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**3 - 840*sqrt(d
 + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*
(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2*e*x**2 - 105*sqrt(d + e*x*
*2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d
 + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e**2*x**4 + 210*sqrt(d + e*x**2)*log
(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x*
*2) + sqrt(e)*x)**n*2**n))*b*e**3*x**6 - 525*sqrt(d + e*x**2)*a*d**3 - 840
*sqrt(d + e*x**2)*a*d**2*e*x**2 - 105*sqrt(d + e*x**2)*a*d*e**2*x**4 + 210
*sqrt(d + e*x**2)*a*e**3*x**6 - 75*sqrt(d + e*x**2)*b*d**3*n - 183*sqrt(d
+ e*x**2)*b*d**2*e*n*x**2 - 71*sqrt(d + e*x**2)*b*d*e**2*n*x**4 + 247*sqrt
(d + e*x**2)*b*e**3*n*x**6 - 210*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) +
 sqrt(e)*x)/sqrt(d))*b*e**3*n*x**7 - 210*sqrt(e)*log((sqrt(d + e*x**2) + s
qrt(d) + sqrt(e)*x)/sqrt(d))*b*e**3*n*x**7 + 210*sqrt(e)*log(((2*sqrt(e)*s
qrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*
x)**n*2**n))*b*e**3*x**7 - 210*sqrt(e)*a*e**3*x**7 - 189*sqrt(e)*b*e**3*n*
x**7)/(3675*d**2*x**7)
```

3.274 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx$

Optimal result . . . 2092
Mathematica [A] (verified) . . . 2093
Rubi [A] (verified) . . . 2093
Maple [F] . . . 2097
Fricas [A] (verification not implemented) . . . 2097
Sympy [F(-1)] . . . 2098
Maxima [F(-2)] . . . 2098
Giac [F] . . . 2099
Mupad [F(-1)] . . . 2099
Reduce [B] (verification not implemented) . . . 2100

Optimal result

Integrand size = 25, antiderivative size = 256

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx = -\frac{8be^4n\sqrt{d+ex^2}}{315d^3x} - \frac{8be^3n(d+ex^2)^{3/2}}{945d^3x^3} - \frac{8be^2n(d+ex^2)^{5/2}}{1575d^3x^5} - \frac{bn(d+ex^2)^{7/2}}{81d^2x^9} + \frac{50ben(d+ex^2)^{7/2}}{3969d^3x^7} + \frac{8be^{9/2}n\,\mathrm{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{315d^3} - \frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9} + \frac{4e(d+ex^2)^{5/2}(a+b\log(cx^n))}{63d^2x^7} - \frac{8e^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{315d^3x^5}$$

output
```
-8/315*b*e^4*n*(e*x^2+d)^(1/2)/d^3/x-8/945*b*e^3*n*(e*x^2+d)^(3/2)/d^3/x^3
-8/1575*b*e^2*n*(e*x^2+d)^(5/2)/d^3/x^5-1/81*b*n*(e*x^2+d)^(7/2)/d^2/x^9+5
0/3969*b*e*n*(e*x^2+d)^(7/2)/d^3/x^7+8/315*b*e^(9/2)*n*arctanh(e^(1/2)*x/(
e*x^2+d)^(1/2))/d^3-1/9*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/d/x^9+4/63*e*(e*x^
2+d)^(5/2)*(a+b*ln(c*x^n))/d^2/x^7-8/315*e^2*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n
))/d^3/x^5
```

Mathematica [A] (verified)

Time = 0.42 (sec) , antiderivative size = 178, normalized size of antiderivative = 0.70

$$\int \frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{x^{10}}\,dx =$$

$$-\frac{\sqrt{d+ex^2}\Big(315a\left(d+ex^2\right)^2\left(35d^2-20dex^2+8e^2x^4\right)+bn\left(1225d^4+2425d^3ex^2+429d^2e^2x^4-677de^3x^6\right.}{992}$$

input
```
Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^10,x]
```

output
```
-1/99225*(Sqrt[d + e*x^2]*(315*a*(d + e*x^2)^2*(35*d^2 - 20*d*e*x^2 + 8*e^
2*x^4) + b*n*(1225*d^4 + 2425*d^3*e*x^2 + 429*d^2*e^2*x^4 - 677*d*e^3*x^6
+ 2614*e^4*x^8)) + 315*b*(d + e*x^2)^(5/2)*(35*d^2 - 20*d*e*x^2 + 8*e^2*x^
4)*Log[c*x^n] - 2520*b*e^(9/2)*n*x^9*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(
d^3*x^9)
```

Rubi [A] (verified)

Time = 0.50 (sec) , antiderivative size = 238, normalized size of antiderivative = 0.93, number of steps used = 11, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.400$, Rules used = {2792, 27, 1588, 27, 358, 247, 247, 247, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{x^{10}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{\left(ex^2+d\right)^{5/2}\left(8e^2x^4-20dex^2+35d^2\right)}{315d^3x^{10}}dx-\frac{8e^2\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{315d^3x^5}+\frac{4e\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{63d^2x^7}-\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{9dx^9}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(ex^2+d)^{5/2}(8e^2x^4-20dex^2+35d^2)}{x^{10}}dx}{315d^3}-\frac{8e^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{315d^3x^5}+\frac{4e(d+ex^2)^{5/2}(a+b\log(cx^n))}{63d^2x^7}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9}$$

$$\Big\downarrow \text{1588}$$

$$\frac{bn\left(-\frac{\int \frac{2de(125d-36ex^2)(ex^2+d)^{5/2}}{x^8}dx}{9d}-\frac{35d(d+ex^2)^{7/2}}{9x^9}\right)}{315d^3}-\frac{8e^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{315d^3x^5}+\frac{4e(d+ex^2)^{5/2}(a+b\log(cx^n))}{63d^2x^7}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\left(-\frac{2}{9}e\int \frac{(125d-36ex^2)(ex^2+d)^{5/2}}{x^8}dx-\frac{35d(d+ex^2)^{7/2}}{9x^9}\right)}{315d^3}-\frac{8e^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{315d^3x^5}+\frac{4e(d+ex^2)^{5/2}(a+b\log(cx^n))}{63d^2x^7}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9}$$

$$\Big\downarrow \text{358}$$

$$\frac{bn\left(-\frac{2}{9}e\left(-36e\int \frac{(ex^2+d)^{5/2}}{x^6}dx-\frac{125(d+ex^2)^{7/2}}{7x^7}\right)-\frac{35d(d+ex^2)^{7/2}}{9x^9}\right)}{315d^3}-\frac{8e^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{315d^3x^5}+\frac{4e(d+ex^2)^{5/2}(a+b\log(cx^n))}{63d^2x^7}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9}$$

$$\Big\downarrow \text{247}$$

$$\frac{bn\left(-\frac{2}{9}e\left(-36e\left(e\int \frac{(ex^2+d)^{3/2}}{x^4}dx-\frac{(d+ex^2)^{5/2}}{5x^5}\right)-\frac{125(d+ex^2)^{7/2}}{7x^7}\right)-\frac{35d(d+ex^2)^{7/2}}{9x^9}\right)}{315d^3}-\frac{8e^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{315d^3x^5}+\frac{4e(d+ex^2)^{5/2}(a+b\log(cx^n))}{63d^2x^7}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9}$$

$$\Big\downarrow \text{247}$$

$$\frac{bn\left(-\frac{2}{9}e\left(-36e\left(e\left(e\int\frac{\sqrt{ex^2+d}}{x^2}dx-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)-\frac{125(d+ex^2)^{7/2}}{7x^7}\right)-\frac{35d(d+ex^2)^{7/2}}{9x^9}\right)}{315d^3}-\frac{8e^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{315d^3x^5}+\frac{4e(d+ex^2)^{5/2}(a+b\log(cx^n))}{63d^2x^7}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9}$$

$$\Big\downarrow \ 247$$

$$\frac{bn\left(-\frac{2}{9}e\left(-36e\left(e\left(e\left(e\int\frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)-\frac{125(d+ex^2)^{7/2}}{7x^7}\right)-\frac{35d(d+ex^2)^{7/2}}{9x^9}\right)}{315d^3}-\frac{8e^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{315d^3x^5}+\frac{4e(d+ex^2)^{5/2}(a+b\log(cx^n))}{63d^2x^7}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9}$$

$$\Big\downarrow \ 224$$

$$\frac{bn\left(-\frac{2}{9}e\left(-36e\left(e\left(e\left(e\int\frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)-\frac{125(d+ex^2)^{7/2}}{7x^7}\right)-\frac{35d(d+ex^2)^{7/2}}{9x^9}\right)}{315d^3}-\frac{8e^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{315d^3x^5}+\frac{4e(d+ex^2)^{5/2}(a+b\log(cx^n))}{63d^2x^7}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9}$$

$$\Big\downarrow \ 219$$

$$-\frac{8e^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{315d^3x^5}+\frac{4e(d+ex^2)^{5/2}(a+b\log(cx^n))}{63d^2x^7}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9}+\frac{bn\left(-\frac{2}{9}e\left(-36e\left(e\left(e\left(\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)-\frac{125(d+ex^2)^{7/2}}{7x^7}\right)-\frac{35d(d+ex^2)^{7/2}}{9x^9}\right)}{315d^3}$$

input
```
Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^10,x]
```

output
```
(b*n*((-35*d*(d + e*x^2)^(7/2))/(9*x^9) - (2*e*((-125*(d + e*x^2)^(7/2))/(
7*x^7) - 36*e*(-1/5*(d + e*x^2)^(5/2)/x^5 + e*(-1/3*(d + e*x^2)^(3/2)/x^3
+ e*(-(Sqrt[d + e*x^2]/x) + Sqrt[e]*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]]))
)))/9))/(315*d^3) - ((d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(9*d*x^9) + (4*
e*(d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(63*d^2*x^7) - (8*e^2*(d + e*x^2)^
(5/2)*(a + b*Log[c*x^n]))/(315*d^3*x^5)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 1588
```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Simp[1/(d*f
^2*(m + 1))   Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x
) - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && Ne
Q[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{(e\,x^2+d)^{\frac{3}{2}}\,(a+b\ln(c\,x^n))}{x^{10}}dx$$

input
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^10,x)
```

output
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^10,x)
```

Fricas [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 526, normalized size of antiderivative = 2.05

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx = \left[\frac{1260\,be^{\frac{9}{2}}nx^9\log\left(-2\,ex^2-2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)-(2\,(1307\,be^4n+\right.$$

$$-\frac{2520\,b\sqrt{-e}e^4nx^9\arctan\left(\frac{\sqrt{-e}x}{\sqrt{ex^2+d}}\right)+(2\,(1307\,be^4n+1260\,ae^4)x^8-(677\,bde^3n+1260\,ade^3)x^6+1225\,bd}{}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^10,x, algorithm="fricas")
```

output
```
[1/99225*(1260*b*e^(9/2)*n*x^9*log(-2*e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(e)*x
- d) - (2*(1307*b*e^4*n + 1260*a*e^4)*x^8 - (677*b*d*e^3*n + 1260*a*d*e^3)
*x^6 + 1225*b*d^4*n + 11025*a*d^4 + 3*(143*b*d^2*e^2*n + 315*a*d^2*e^2)*x^
4 + 25*(97*b*d^3*e*n + 630*a*d^3*e)*x^2 + 315*(8*b*e^4*x^8 - 4*b*d*e^3*x^6
 + 3*b*d^2*e^2*x^4 + 50*b*d^3*e*x^2 + 35*b*d^4)*log(c) + 315*(8*b*e^4*n*x^
8 - 4*b*d*e^3*n*x^6 + 3*b*d^2*e^2*n*x^4 + 50*b*d^3*e*n*x^2 + 35*b*d^4*n)*l
og(x))*sqrt(e*x^2 + d))/(d^3*x^9), -1/99225*(2520*b*sqrt(-e)*e^4*n*x^9*arc
tan(sqrt(-e)*x/sqrt(e*x^2 + d)) + (2*(1307*b*e^4*n + 1260*a*e^4)*x^8 - (67
7*b*d*e^3*n + 1260*a*d*e^3)*x^6 + 1225*b*d^4*n + 11025*a*d^4 + 3*(143*b*d^
2*e^2*n + 315*a*d^2*e^2)*x^4 + 25*(97*b*d^3*e*n + 630*a*d^3*e)*x^2 + 315*(
8*b*e^4*x^8 - 4*b*d*e^3*x^6 + 3*b*d^2*e^2*x^4 + 50*b*d^3*e*x^2 + 35*b*d^4)
*log(c) + 315*(8*b*e^4*n*x^8 - 4*b*d*e^3*n*x^6 + 3*b*d^2*e^2*n*x^4 + 50*b*
d^3*e*n*x^2 + 35*b*d^4*n)*log(x))*sqrt(e*x^2 + d))/(d^3*x^9)]
```

Sympy [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx = \text{Timed out}$$

input
```
integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x**10,x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^10,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx=\int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^{10}}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^10,x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)/x^10, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx=\int \frac{(e\,x^2+d)^{3/2}\,(a+b\,\ln(c\,x^n))}{x^{10}}\,dx$$

input
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^10,x)
```

output
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^10, x)
```

Reduce [B] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 701, normalized size of antiderivative = 2.74

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx = \text{Too large to display}$$

input
```
int((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^10,x)
```

output
```
( - 11025*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)*
*n*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**4 - 15750*sq
rt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n
/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**3*e*x**2 - 945*sqrt(d +
e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sq
rt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2*e**2*x**4 + 1260*sqrt(d + e*x
**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(
d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e**3*x**6 - 2520*sqrt(d + e*x**2)*l
og(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*
x**2) + sqrt(e)*x)**n*2**n))*b*e**4*x**8 - 11025*sqrt(d + e*x**2)*a*d**4 -
 15750*sqrt(d + e*x**2)*a*d**3*e*x**2 - 945*sqrt(d + e*x**2)*a*d**2*e**2*x
**4 + 1260*sqrt(d + e*x**2)*a*d*e**3*x**6 - 2520*sqrt(d + e*x**2)*a*e**4*x
**8 - 1225*sqrt(d + e*x**2)*b*d**4*n - 2425*sqrt(d + e*x**2)*b*d**3*e*n*x*
*2 - 429*sqrt(d + e*x**2)*b*d**2*e**2*n*x**4 + 677*sqrt(d + e*x**2)*b*d*e*
*3*n*x**6 - 2614*sqrt(d + e*x**2)*b*e**4*n*x**8 + 2520*sqrt(e)*log((sqrt(d
 + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*b*e**4*n*x**9 + 2520*sqrt(e)*lo
g((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*e**4*n*x**9 - 2520*s
qrt(e)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqr
t(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*e**4*x**9 + 2520*sqrt(e)*a*e**4*x**
9 + 2094*sqrt(e)*b*e**4*n*x**9)/(99225*d**3*x**9)
```

3.275 $\int x\sqrt{4+x^2}\log(x)\,dx$

Optimal result 2101
Mathematica [A] (verified) 2101
Rubi [A] (verified) 2102
Maple [A] (verified) 2104
Fricas [A] (verification not implemented) 2104
Sympy [A] (verification not implemented) 2105
Maxima [A] (verification not implemented) 2105
Giac [A] (verification not implemented) 2105
Mupad [F(-1)] 2106
Reduce [B] (verification not implemented) 2106

Optimal result

Integrand size = 13, antiderivative size = 60

$$\int x\sqrt{4+x^2}\log(x)\,dx = -\frac{4}{3}\sqrt{4+x^2}-\frac{1}{9}\left(4+x^2\right)^{3/2}+\frac{8}{3}\text{arctanh}\left(\frac{\sqrt{4+x^2}}{2}\right)+\frac{1}{3}\left(4+x^2\right)^{3/2}\log(x)$$

output
```
-4/3*(x^2+4)^(1/2)-1/9*(x^2+4)^(3/2)+8/3*arctanh(1/2*(x^2+4)^(1/2))+1/3*(x
^2+4)^(3/2)*ln(x)
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 53, normalized size of antiderivative = 0.88

$$\int x\sqrt{4+x^2}\log(x)\,dx = \frac{1}{3}\left(-\frac{1}{3}\sqrt{4+x^2}\left(16+x^2\right)-8\log(x)+\left(4+x^2\right)^{3/2}\log(x)+8\log\left(2+\sqrt{4+x^2}\right)\right)$$

input
```
Integrate[x*Sqrt[4 + x^2]*Log[x],x]
```

output
```
(-1/3*(Sqrt[4 + x^2]*(16 + x^2)) - 8*Log[x] + (4 + x^2)^(3/2)*Log[x] + 8*L
og[2 + Sqrt[4 + x^2]])/3
```

Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 64, normalized size of antiderivative = 1.07, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.462, Rules used = {2776, 243, 60, 60, 73, 220}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x\sqrt{x^2+4}\log(x)\,dx$$

$$\Big\downarrow \text{2776}$$

$$\frac{1}{3}\left(x^2+4\right)^{3/2}\log(x)-\frac{1}{3}\int \frac{\left(x^2+4\right)^{3/2}}{x}dx$$

$$\Big\downarrow \text{243}$$

$$\frac{1}{3}\left(x^2+4\right)^{3/2}\log(x)-\frac{1}{6}\int \frac{\left(x^2+4\right)^{3/2}}{x^2}dx^2$$

$$\Big\downarrow \text{60}$$

$$\frac{1}{6}\left(-4\int \frac{\sqrt{x^2+4}}{x^2}dx^2-\frac{2}{3}\left(x^2+4\right)^{3/2}\right)+\frac{1}{3}\left(x^2+4\right)^{3/2}\log(x)$$

$$\Big\downarrow \text{60}$$

$$\frac{1}{6}\left(-4\left(4\int \frac{1}{x^2\sqrt{x^2+4}}dx^2+2\sqrt{x^2+4}\right)-\frac{2}{3}\left(x^2+4\right)^{3/2}\right)+\frac{1}{3}\left(x^2+4\right)^{3/2}\log(x)$$

$$\Big\downarrow \text{73}$$

$$\frac{1}{6}\left(-4\left(8\int \frac{1}{x^4-4}d\sqrt{x^2+4}+2\sqrt{x^2+4}\right)-\frac{2}{3}\left(x^2+4\right)^{3/2}\right)+\frac{1}{3}\left(x^2+4\right)^{3/2}\log(x)$$

$$\Big\downarrow \text{220}$$

$$\frac{1}{6}\left(-4\left(2\sqrt{x^2+4}-4\text{arctanh}\left(\frac{\sqrt{x^2+4}}{2}\right)\right)-\frac{2}{3}\left(x^2+4\right)^{3/2}\right)+\frac{1}{3}\left(x^2+4\right)^{3/2}\log(x)$$

input
```
Int[x*Sqrt[4 + x^2]*Log[x],x]
```

output
```
((-2*(4 + x^2)^(3/2))/3 - 4*(2*Sqrt[4 + x^2] - 4*ArcTanh[Sqrt[4 + x^2]/2])
)/6 + ((4 + x^2)^(3/2)*Log[x])/3
```

Defintions of rubi rules used

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 220
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(-(Rt[-a, 2]*Rt[b, 2])^(-
1))*ArcTanh[Rt[b, 2]*(x/Rt[-a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] &&
 (LtQ[a, 0] || GtQ[b, 0])
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Maple [A] (verified)

Time = 0.32 (sec) , antiderivative size = 75, normalized size of antiderivative = 1.25

method	result	siz
meijerg	$\left(-\frac{2\sqrt{1+\frac{x^2}{4}}}{9}+\frac{2\ln(x)\sqrt{1+\frac{x^2}{4}}}{3}\right)x^2+\frac{32}{9}-\frac{32\sqrt{1+\frac{x^2}{4}}}{9}+\ln(x)\left(-\frac{8}{3}+\frac{8\sqrt{1+\frac{x^2}{4}}}{3}\right)+\frac{8\ln\left(\frac{1}{2}+\frac{\sqrt{1+\frac{x^2}{4}}}{2}\right)}{3}$	75

input
```
int(x*(x^2+4)^(1/2)*ln(x),x,method=_RETURNVERBOSE)
```

output
```
(-2/9*(1+1/4*x^2)^(1/2)+2/3*ln(x)*(1+1/4*x^2)^(1/2))*x^2+32/9-32/9*(1+1/4*
x^2)^(1/2)+ln(x)*(-8/3+8/3*(1+1/4*x^2)^(1/2))+8/3*ln(1/2+1/2*(1+1/4*x^2)^(
1/2))
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 54, normalized size of antiderivative = 0.90

$$\int x\sqrt{4+x^2}\log(x)\,dx = -\frac{1}{9}\left(x^2-3\left(x^2+4\right)\log\left(x\right)+16\right)\sqrt{x^2+4} + \frac{8}{3}\log\left(-x+\sqrt{x^2+4}+2\right)-\frac{8}{3}\log\left(-x+\sqrt{x^2+4}-2\right)$$

input
```
integrate(x*(x^2+4)^(1/2)*log(x),x, algorithm="fricas")
```

output
```
-1/9*(x^2 - 3*(x^2 + 4)*log(x) + 16)*sqrt(x^2 + 4) + 8/3*log(-x + sqrt(x^2
 + 4) + 2) - 8/3*log(-x + sqrt(x^2 + 4) - 2)
```

Sympy [A] (verification not implemented)

Time = 7.54 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.18

$$\int x\sqrt{4+x^2}\log(x)\,dx = \left(\frac{x^2}{3}+\frac{4}{3}\right)\sqrt{x^2+4}\log(x) - \frac{(x^2+4)^{\frac{3}{2}}}{9} - \frac{4\sqrt{x^2+4}}{3} - \frac{4\log\left(\sqrt{x^2+4}-2\right)}{3} + \frac{4\log\left(\sqrt{x^2+4}+2\right)}{3}$$

input
```
integrate(x*(x**2+4)**(1/2)*ln(x),x)
```

output
```
(x**2/3 + 4/3)*sqrt(x**2 + 4)*log(x) - (x**2 + 4)**(3/2)/9 - 4*sqrt(x**2 +
 4)/3 - 4*log(sqrt(x**2 + 4) - 2)/3 + 4*log(sqrt(x**2 + 4) + 2)/3
```

Maxima [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 39, normalized size of antiderivative = 0.65

$$\int x\sqrt{4+x^2}\log(x)\,dx = \frac{1}{3}\left(x^2+4\right)^{\frac{3}{2}}\log(x) - \frac{1}{9}\left(x^2+4\right)^{\frac{3}{2}} - \frac{4}{3}\sqrt{x^2+4} + \frac{8}{3}\operatorname{arsinh}\left(\frac{2}{|x|}\right)$$

input
```
integrate(x*(x^2+4)^(1/2)*log(x),x, algorithm="maxima")
```

output
```
1/3*(x^2 + 4)^(3/2)*log(x) - 1/9*(x^2 + 4)^(3/2) - 4/3*sqrt(x^2 + 4) + 8/3
*arcsinh(2/abs(x))
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 54, normalized size of antiderivative = 0.90

$$\int x\sqrt{4+x^2}\log(x)\,dx = \frac{1}{3}\left(x^2+4\right)^{\frac{3}{2}}\log(x) - \frac{1}{9}\left(x^2+4\right)^{\frac{3}{2}} - \frac{4}{3}\sqrt{x^2+4} + \frac{4}{3}\log\left(\sqrt{x^2+4}+2\right) - \frac{4}{3}\log\left(\sqrt{x^2+4}-2\right)$$

input
```
integrate(x*(x^2+4)^(1/2)*log(x),x, algorithm="giac")
```

output
```
1/3*(x^2 + 4)^(3/2)*log(x) - 1/9*(x^2 + 4)^(3/2) - 4/3*sqrt(x^2 + 4) + 4/3
*log(sqrt(x^2 + 4) + 2) - 4/3*log(sqrt(x^2 + 4) - 2)
```

Mupad [F(-1)]

Timed out.

$$\int x\sqrt{4+x^2}\log(x)\,dx = \int x\,\ln(x)\,\sqrt{x^2+4}\,dx$$

input
```
int(x*log(x)*(x^2 + 4)^(1/2),x)
```

output
```
int(x*log(x)*(x^2 + 4)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 75, normalized size of antiderivative = 1.25

$$\int x\sqrt{4+x^2}\log(x)\,dx = \frac{\sqrt{x^2+4}\log(x)\,x^2}{3} + \frac{4\sqrt{x^2+4}\log(x)}{3} - \frac{\sqrt{x^2+4}\,x^2}{9} - \frac{16\sqrt{x^2+4}}{9} - \frac{8\log\left(\frac{\sqrt{x^2+4}}{2}+\frac{x}{2}-1\right)}{3} + \frac{8\log\left(\frac{\sqrt{x^2+4}}{2}+\frac{x}{2}+1\right)}{3}$$

input
```
int(x*(x^2+4)^(1/2)*log(x),x)
```

output
```
(3*sqrt(x**2 + 4)*log(x)*x**2 + 12*sqrt(x**2 + 4)*log(x) - sqrt(x**2 + 4)*
x**2 - 16*sqrt(x**2 + 4) - 24*log((sqrt(x**2 + 4) + x - 2)/2) + 24*log((sq
rt(x**2 + 4) + x + 2)/2))/9
```

3.276 $\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$

Optimal result 2107
Mathematica [A] (verified) 2108
Rubi [A] (warning: unable to verify) 2108
Maple [F] 2111
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Sympy [A] (verification not implemented) 2112
Maxima [F(-2)] 2113
Giac [F] 2113
Mupad [F(-1)] 2114
Reduce [B] (verification not implemented) 2114

Optimal result

Integrand size = 25, antiderivative size = 182

$$\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = -\frac{8bd^2n\sqrt{d+ex^2}}{15e^3}+\frac{7bdn(d+ex^2)^{3/2}}{45e^3}-\frac{bn(d+ex^2)^{5/2}}{25e^3} + \frac{8bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{15e^3}+\frac{d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3} - \frac{2d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3} + \frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}$$

output
```
-8/15*b*d^2*n*(e*x^2+d)^(1/2)/e^3+7/45*b*d*n*(e*x^2+d)^(3/2)/e^3-1/25*b*n*
(e*x^2+d)^(5/2)/e^3+8/15*b*d^(5/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^3+
d^2*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/e^3-2/3*d*(e*x^2+d)^(3/2)*(a+b*ln(c*x^
n))/e^3+1/5*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/e^3
```

Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 204, normalized size of antiderivative = 1.12

$$\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$$
$$= \frac{120ad^2\sqrt{d+ex^2}-94bd^2n\sqrt{d+ex^2}-60adex^2\sqrt{d+ex^2}+17bdenx^2\sqrt{d+ex^2}+45ae^2x^4\sqrt{d+ex^2}-9b}{}$$

input
```
Integrate[(x^5*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

output
```
(120*a*d^2*Sqrt[d + e*x^2] - 94*b*d^2*n*Sqrt[d + e*x^2] - 60*a*d*e*x^2*Sqr
t[d + e*x^2] + 17*b*d*e*n*x^2*Sqrt[d + e*x^2] + 45*a*e^2*x^4*Sqrt[d + e*x^
2] - 9*b*e^2*n*x^4*Sqrt[d + e*x^2] - 120*b*d^(5/2)*n*Log[x] + 15*b*Sqrt[d
+ e*x^2]*(8*d^2 - 4*d*e*x^2 + 3*e^2*x^4)*Log[c*x^n] + 120*b*d^(5/2)*n*Log[
d + Sqrt[d]*Sqrt[d + e*x^2]])/(225*e^3)
```

Rubi [A] (warning: unable to verify)

Time = 0.54 (sec) , antiderivative size = 164, normalized size of antiderivative = 0.90, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.280$, Rules used = {2792, 27, 1578, 1192, 25, 1584, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$$
$$\Big\downarrow \text{2792}$$
$$-bn\int \frac{\sqrt{ex^2+d}(3e^2x^4-4dex^2+8d^2)}{15e^3x}dx+\frac{d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{2d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$
$$\Big\downarrow \text{27}$$

$$-\frac{bn\int \frac{\sqrt{ex^2+d}(3e^2x^4-4dex^2+8d^2)}{x}dx}{15e^3}+\frac{d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{2d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{1578}$$

$$-\frac{bn\int \frac{\sqrt{ex^2+d}(3e^2x^4-4dex^2+8d^2)}{x^2}dx^2}{30e^3}+\frac{d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{2d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{1192}$$

$$-\frac{bn\int -\frac{x^4(3e^2x^8-10de^2x^4+15d^2e^2)}{d-x^4}d\sqrt{ex^2+d}}{15e^5}+\frac{d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{2d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{25}$$

$$\frac{bn\int \frac{x^4(3e^2x^8-10de^2x^4+15d^2e^2)}{d-x^4}d\sqrt{ex^2+d}}{15e^5}+\frac{d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{2d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{1584}$$

$$\frac{bn\int \left(-3e^2x^8+7de^2x^4-8d^2e^2+\frac{8d^3e^2}{d-x^4}\right)d\sqrt{ex^2+d}}{15e^5}+\frac{d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{2d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{2d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}-\frac{bn\left(-8d^{5/2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+8d^2e^2\sqrt{d+ex^2}-\frac{7}{3}de^2x^6+\frac{3e^2x^{10}}{5}\right)}{15e^5}$$

input
```
Int[(x^5*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

output
```
-1/15*(b*n*((-7*d*e^2*x^6)/3 + (3*e^2*x^10)/5 + 8*d^2*e^2*Sqrt[d + e*x^2]
- 8*d^(5/2)*e^2*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]))/e^5 + (d^2*Sqrt[d + e*x
^2]*(a + b*Log[c*x^n]))/e^3 - (2*d*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(
3*e^3) + ((d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(5*e^3)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1192
```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[2/e^(n + 2*p + 1)   Subst[Int[x^(
2*m + 1)*(e*f - d*g + g*x^2)^n*(c*d^2 - b*d*e + a*e^2 - (2*c*d - b*e)*x^2 +
 c*x^4)^p, x], x, Sqrt[d + e*x]], x] /; FreeQ[{a, b, c, d, e, f, g}, x] &&
IGtQ[p, 0] && ILtQ[n, 0] && IntegerQ[m + 1/2]
```

rule 1578
```
Int[(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_
)^4)^(p_.), x_Symbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(d + e*x)^q*(a
+ b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x] && Int
egerQ[(m - 1)/2]
```

rule 1584
```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x^5(a+b\ln(c\,x^n))}{\sqrt{e\,x^2+d}}dx$$

input
```
int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

output
```
int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 317, normalized size of antiderivative = 1.74

$$\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \left[\frac{60\,bd^{\frac{5}{2}}n\log\left(-\frac{ex^2+2\,\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-(9\,(be^2n-5\,ae^2)x^4+94\,bd^2n-120\,ad^2-(17\,bden-60\,ade)x^2-}{225\,e^3}\right.$$
$$-\frac{120\,b\sqrt{-d}d^2n\arctan\left(\frac{\sqrt{ex^2+d}\sqrt{-d}}{d}\right)+(9\,(be^2n-5\,ae^2)x^4+94\,bd^2n-120\,ad^2-(17\,bden-60\,ade)x^2}{225\,e^3}$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
[1/225*(60*b*d^(5/2)*n*log(-(e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/x^2)
 - (9*(b*e^2*n - 5*a*e^2)*x^4 + 94*b*d^2*n - 120*a*d^2 - (17*b*d*e*n - 60*
a*d*e)*x^2 - 15*(3*b*e^2*x^4 - 4*b*d*e*x^2 + 8*b*d^2)*log(c) - 15*(3*b*e^2
*n*x^4 - 4*b*d*e*n*x^2 + 8*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/e^3, -1/225*(
120*b*sqrt(-d)*d^2*n*arctan(sqrt(e*x^2 + d)*sqrt(-d)/d) + (9*(b*e^2*n - 5*
a*e^2)*x^4 + 94*b*d^2*n - 120*a*d^2 - (17*b*d*e*n - 60*a*d*e)*x^2 - 15*(3*
b*e^2*x^4 - 4*b*d*e*x^2 + 8*b*d^2)*log(c) - 15*(3*b*e^2*n*x^4 - 4*b*d*e*n*
x^2 + 8*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/e^3]
```

Sympy [A] (verification not implemented)

Time = 16.85 (sec) , antiderivative size = 359, normalized size of antiderivative = 1.97

$$\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = a\left(\begin{cases} \frac{8d^2\sqrt{d+ex^2}}{15e^3} - \frac{4dx^2\sqrt{d+ex^2}}{15e^2} + \frac{x^4\sqrt{d+ex^2}}{5e} & \text{for } e \neq 0 \\ \frac{x^6}{6\sqrt{d}} & \text{otherwise} \end{cases}\right) - bn\left(\begin{cases} -\frac{8d^{\frac{5}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{15e^3} + \frac{8d^3}{15e^{\frac{7}{2}}x\sqrt{\frac{d}{ex^2}+1}} + \frac{8d^2x}{15e^{\frac{5}{2}}\sqrt{\frac{d}{ex^2}+1}} - \frac{4d\left(\begin{cases} \frac{d\sqrt{d+ex^2}}{3e} + \frac{x^2\sqrt{d+ex^2}}{3} & \text{for } e \neq 0 \\ \frac{\sqrt{d}x^2}{2} & \text{otherwise} \end{cases}\right)}{15e^2} + \frac{\begin{cases} -\frac{2d^2 \cdots}{\cdots} \\ \frac{\sqrt{d}x^4}{4} \end{cases}}{\cdots} \\ \frac{x^6}{36\sqrt{d}} \end{cases}\right) + b\left(\begin{cases} \frac{8d^2\sqrt{d+ex^2}}{15e^3} - \frac{4dx^2\sqrt{d+ex^2}}{15e^2} + \frac{x^4\sqrt{d+ex^2}}{5e} & \text{for } e \neq 0 \\ \frac{x^6}{6\sqrt{d}} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate(x**5*(a+b*ln(c*x**n))/(e*x**2+d)**(1/2),x)
```

output
```
a*Piecewise((8*d**2*sqrt(d + e*x**2)/(15*e**3) - 4*d*x**2*sqrt(d + e*x**2)
/(15*e**2) + x**4*sqrt(d + e*x**2)/(5*e), Ne(e, 0)), (x**6/(6*sqrt(d)), Tr
ue)) - b*n*Piecewise((-8*d**(5/2)*asinh(sqrt(d)/(sqrt(e)*x))/(15*e**3) + 8
*d**3/(15*e**(7/2)*x*sqrt(d/(e*x**2) + 1)) + 8*d**2*x/(15*e**(5/2)*sqrt(d/
(e*x**2) + 1)) - 4*d*Piecewise((d*sqrt(d + e*x**2)/(3*e) + x**2*sqrt(d + e
*x**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2, True))/(15*e**2) + Piecewise((-2*d**
2*sqrt(d + e*x**2)/(15*e**2) + d*x**2*sqrt(d + e*x**2)/(15*e) + x**4*sqrt(
d + e*x**2)/5, Ne(e, 0)), (sqrt(d)*x**4/4, True))/(5*e), (e > -oo) & (e <
oo) & Ne(e, 0)), (x**6/(36*sqrt(d)), True)) + b*Piecewise((8*d**2*sqrt(d +
 e*x**2)/(15*e**3) - 4*d*x**2*sqrt(d + e*x**2)/(15*e**2) + x**4*sqrt(d + e
*x**2)/(5*e), Ne(e, 0)), (x**6/(6*sqrt(d)), True))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{\sqrt{ex^2+d}}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^5/sqrt(e*x^2 + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{x^5\,(a+b\,\ln(c\,x^n))}{\sqrt{e\,x^2+d}}\,dx$$

input
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2),x)
```

output
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 374, normalized size of antiderivative = 2.05

$$\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \frac{120\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) b\,d^2-60\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) bde\,x^2+45\sqrt{e\,x}}{}$$

input
```
int(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x)
```

output
```
(120*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)
/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2 - 60*sqrt(d + e
*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqr
t(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e*x**2 + 45*sqrt(d + e*x**2)*log(
((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**
2) + sqrt(e)*x)**n*2**n))*b*e**2*x**4 + 120*sqrt(d + e*x**2)*a*d**2 - 60*s
qrt(d + e*x**2)*a*d*e*x**2 + 45*sqrt(d + e*x**2)*a*e**2*x**4 - 94*sqrt(d +
 e*x**2)*b*d**2*n + 17*sqrt(d + e*x**2)*b*d*e*n*x**2 - 9*sqrt(d + e*x**2)*
b*e**2*n*x**4 - 120*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/s
qrt(d))*b*d**2*n + 120*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x
)/sqrt(d))*b*d**2*n)/(225*e**3)
```

3.277 $\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$

Optimal result 2115
Mathematica [A] (verified) 2115
Rubi [A] (verified) 2116
Maple [F] 2118
Fricas [A] (verification not implemented) 2119
Sympy [A] (verification not implemented) 2119
Maxima [F(-2)] 2120
Giac [F] 2120
Mupad [F(-1)] 2121
Reduce [B] (verification not implemented) 2121

Optimal result

Integrand size = 25, antiderivative size = 129

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \frac{2bdn\sqrt{d+ex^2}}{3e^2} - \frac{bn(d+ex^2)^{3/2}}{9e^2} - \frac{2bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^2} - \frac{d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2} + \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2}$$

output
```
2/3*b*d*n*(e*x^2+d)^(1/2)/e^2-1/9*b*n*(e*x^2+d)^(3/2)/e^2-2/3*b*d^(3/2)*n*
arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^2-d*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/e^2
+1/3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/e^2
```

Mathematica [A] (verified)

Time = 0.23 (sec) , antiderivative size = 145, normalized size of antiderivative = 1.12

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \frac{-6ad\sqrt{d+ex^2}+5bdn\sqrt{d+ex^2}+3aex^2\sqrt{d+ex^2}-benx^2\sqrt{d+ex^2}+6bd^{3/2}n\log(x)+3b(-2d+ex^2)}{9e^2}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

output
```
(-6*a*d*Sqrt[d + e*x^2] + 5*b*d*n*Sqrt[d + e*x^2] + 3*a*e*x^2*Sqrt[d + e*x
^2] - b*e*n*x^2*Sqrt[d + e*x^2] + 6*b*d^(3/2)*n*Log[x] + 3*b*(-2*d + e*x^2
)*Sqrt[d + e*x^2]*Log[c*x^n] - 6*b*d^(3/2)*n*Log[d + Sqrt[d]*Sqrt[d + e*x^
2]])/(9*e^2)
```

Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 123, normalized size of antiderivative = 0.95, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.280$, Rules used = {2792, 27, 354, 90, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{(2d-ex^2)\sqrt{ex^2+d}}{3e^2x}dx+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(2d-ex^2)\sqrt{ex^2+d}}{x}dx}{3e^2}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}$$

$$\Big\downarrow \text{354}$$

$$\frac{bn\int \frac{(2d-ex^2)\sqrt{ex^2+d}}{x^2}dx^2}{6e^2}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}$$

$$\Big\downarrow \text{90}$$

$$\frac{bn\left(2d\int \frac{\sqrt{ex^2+d}}{x^2}dx^2-\frac{2}{3}(d+ex^2)^{3/2}\right)}{6e^2}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}$$

$$\Big\downarrow \text{60}$$

$$\frac{bn\left(2d\left(d\int \frac{1}{x^2\sqrt{ex^2+d}}dx^2+2\sqrt{d+ex^2}\right)-\frac{2}{3}\left(d+ex^2\right)^{3/2}\right)}{6e^2}+\frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^2}-\frac{d\sqrt{d+ex^2}(a+b\log\left(cx^n\right))}{e^2}$$

$$\Big\downarrow \text{73}$$

$$\frac{bn\left(2d\left(\frac{2d\int \frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{e}+2\sqrt{d+ex^2}\right)-\frac{2}{3}\left(d+ex^2\right)^{3/2}\right)}{6e^2}+\frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^2}-\frac{d\sqrt{d+ex^2}(a+b\log\left(cx^n\right))}{e^2}$$

$$\Big\downarrow \text{221}$$

$$\frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^2}-\frac{d\sqrt{d+ex^2}(a+b\log\left(cx^n\right))}{e^2}+\frac{bn\left(2d\left(2\sqrt{d+ex^2}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)-\frac{2}{3}\left(d+ex^2\right)^{3/2}\right)}{6e^2}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

output
```
(b*n*((-2*(d + e*x^2)^(3/2))/3 + 2*d*(2*Sqrt[d + e*x^2] - 2*Sqrt[d]*ArcTan
h[Sqrt[d + e*x^2]/Sqrt[d]])))/(6*e^2) - (d*Sqrt[d + e*x^2]*(a + b*Log[c*x^
n]))/e^2 + ((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(3*e^2)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 354
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_S
ymbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(a + b*x)^p*(c + d*x)^q, x], x
, x^2], x] /; FreeQ[{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0] && IntegerQ
[(m - 1)/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x^{3} \left(a +b \ln \left(c \,x^{n}\right)\right)}{\sqrt{e \,x^{2}+d}}d x$$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

output
```
int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 210, normalized size of antiderivative = 1.63

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$$
$$= \left[\frac{3\,bd^{\frac{3}{2}}n\log\left(-\frac{ex^2-2\,\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)+(5\,bdn-(ben-3\,ae)x^2-6\,ad+3\,(bex^2-2\,bd)\log(c)+3\,(benx^2}{9\,e^2}\right.$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
[1/9*(3*b*d^(3/2)*n*log(-(e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/x^2) +
(5*b*d*n - (b*e*n - 3*a*e)*x^2 - 6*a*d + 3*(b*e*x^2 - 2*b*d)*log(c) + 3*(b
*e*n*x^2 - 2*b*d*n)*log(x))*sqrt(e*x^2 + d))/e^2, 1/9*(6*b*sqrt(-d)*d*n*ar
ctan(sqrt(e*x^2 + d)*sqrt(-d)/d) + (5*b*d*n - (b*e*n - 3*a*e)*x^2 - 6*a*d
+ 3*(b*e*x^2 - 2*b*d)*log(c) + 3*(b*e*n*x^2 - 2*b*d*n)*log(x))*sqrt(e*x^2
+ d))/e^2]
```

Sympy [A] (verification not implemented)

Time = 11.37 (sec) , antiderivative size = 236, normalized size of antiderivative = 1.83

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = a\left(\begin{cases}-\frac{2d\sqrt{d+ex^2}}{3e^2}+\frac{x^2\sqrt{d+ex^2}}{3e} & \text{for } e\neq 0\\ \frac{x^4}{4\sqrt{d}} & \text{otherwise}\end{cases}\right)$$
$$-bn\left(\begin{cases}\frac{2d^{\frac{3}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{3e^2}-\frac{2d^2}{3e^{\frac{5}{2}}x\sqrt{\frac{d}{ex^2}+1}}-\frac{2dx}{3e^{\frac{3}{2}}\sqrt{\frac{d}{ex^2}+1}}+\frac{\begin{cases}\frac{d\sqrt{d+ex^2}}{3e}+\frac{x^2\sqrt{d+ex^2}}{3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}}{3e} & \text{for } e>-\infty\wedge e\\ \frac{x^4}{16\sqrt{d}} & \text{otherwise}\end{cases}\right.$$
$$+b\left(\begin{cases}-\frac{2d\sqrt{d+ex^2}}{3e^2}+\frac{x^2\sqrt{d+ex^2}}{3e} & \text{for } e\neq 0\\ \frac{x^4}{4\sqrt{d}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x**2+d)**(1/2),x)
```

output
```
a*Piecewise((-2*d*sqrt(d + e*x**2)/(3*e**2) + x**2*sqrt(d + e*x**2)/(3*e),
 Ne(e, 0)), (x**4/(4*sqrt(d)), True)) - b*n*Piecewise((2*d**(3/2)*asinh(sq
rt(d)/(sqrt(e)*x))/(3*e**2) - 2*d**2/(3*e**(5/2)*x*sqrt(d/(e*x**2) + 1)) -
 2*d*x/(3*e**(3/2)*sqrt(d/(e*x**2) + 1)) + Piecewise((d*sqrt(d + e*x**2)/(
3*e) + x**2*sqrt(d + e*x**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2, True))/(3*e),
(e > -oo) & (e < oo) & Ne(e, 0)), (x**4/(16*sqrt(d)), True)) + b*Piecewise
((-2*d*sqrt(d + e*x**2)/(3*e**2) + x**2*sqrt(d + e*x**2)/(3*e), Ne(e, 0)),
 (x**4/(4*sqrt(d)), True))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{\sqrt{ex^2+d}}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/sqrt(e*x^2 + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))}{\sqrt{e\,x^2+d}}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 255, normalized size of antiderivative = 1.98

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \frac{-6\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) bd + 3\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) be\,x^2 - 6\sqrt{e\,x^2+d}}{}$$

input
```
int(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x)
```

output
```
( - 6*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c
)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d + 3*sqrt(d + e*x*
*2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d
 + e*x**2) + sqrt(e)*x)**n*2**n))*b*e*x**2 - 6*sqrt(d + e*x**2)*a*d + 3*sq
rt(d + e*x**2)*a*e*x**2 + 5*sqrt(d + e*x**2)*b*d*n - sqrt(d + e*x**2)*b*e*
n*x**2 + 6*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*b
*d*n - 6*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d
*n)/(9*e**2)
```

3.278 $\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$

Optimal result 2122
Mathematica [A] (verified) 2122
Rubi [A] (verified) 2123
Maple [F] 2125
Fricas [A] (verification not implemented) 2125
Sympy [A] (verification not implemented) 2126
Maxima [F(-2)] 2126
Giac [F] 2127
Mupad [F(-1)] 2127
Reduce [B] (verification not implemented) 2127

Optimal result

Integrand size = 23, antiderivative size = 73

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = -\frac{bn\sqrt{d+ex^2}}{e}+\frac{b\sqrt{d}n\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{e}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e}$$

output
```
-b*n*(e*x^2+d)^(1/2)/e+b*d^(1/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e+(e*x
^2+d)^(1/2)*(a+b*ln(c*x^n))/e
```

Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 91, normalized size of antiderivative = 1.25

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \frac{a\sqrt{d+ex^2}-bn\sqrt{d+ex^2}-b\sqrt{d}n\log(x)+b\sqrt{d+ex^2}\log(cx^n)+b\sqrt{d}n\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{e}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

output
```
(a*Sqrt[d + e*x^2] - b*n*Sqrt[d + e*x^2] - b*Sqrt[d]*n*Log[x] + b*Sqrt[d +
 e*x^2]*Log[c*x^n] + b*Sqrt[d]*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/e
```

Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 74, normalized size of antiderivative = 1.01, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.217, Rules used = {2776, 243, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}dx$$

$$\Big\downarrow \text{2776}$$

$$\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e}-\frac{bn\int \frac{\sqrt{ex^2+d}}{x}dx}{e}$$

$$\Big\downarrow \text{243}$$

$$\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e}-\frac{bn\int \frac{\sqrt{ex^2+d}}{x^2}dx^2}{2e}$$

$$\Big\downarrow \text{60}$$

$$\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e}-\frac{bn\left(d\int \frac{1}{x^2\sqrt{ex^2+d}}dx^2+2\sqrt{d+ex^2}\right)}{2e}$$

$$\Big\downarrow \text{73}$$

$$\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e}-\frac{bn\left(\frac{2d\int \frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{e}+2\sqrt{d+ex^2}\right)}{2e}$$

$$\Big\downarrow \text{221}$$

$$\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e}-\frac{bn\left(2\sqrt{d+ex^2}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)}{2e}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

output
```
-1/2*(b*n*(2*Sqrt[d + e*x^2] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])
)/e + (Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/e
```

Defintions of rubi rules used

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Maple [F]

$$\int \frac{x(a + b\ln (c\,x^{n}))}{\sqrt{e\,x^{2}+d}}dx$$

input
```
int(x*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

output
```
int(x*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.74

$$\int \frac{x(a + b\log(cx^n))}{\sqrt{d + ex^2}}\,dx = \left[\frac{b\sqrt{d}n\log\left(-\frac{ex^2+2\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right) + 2\sqrt{ex^2+d}(bn\log(x) - bn + b\log(c) + a)}{2\,e}, -\frac{b\sqrt{-d}n\arctan\left(\frac{\sqrt{ex^2+d}\sqrt{-d}}{d}\right) - \sqrt{ex^2+d}(bn\log(x) - bn + b\log(c) + a)}{e}\right]$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
[1/2*(b*sqrt(d)*n*log(-(e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/x^2) + 2*
sqrt(e*x^2 + d)*(b*n*log(x) - b*n + b*log(c) + a))/e, -(b*sqrt(-d)*n*arcta
n(sqrt(e*x^2 + d)*sqrt(-d)/d) - sqrt(e*x^2 + d)*(b*n*log(x) - b*n + b*log(
c) + a))/e]
```

Sympy [A] (verification not implemented)

Time = 2.20 (sec) , antiderivative size = 129, normalized size of antiderivative = 1.77

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = a\left(\begin{cases}\frac{\sqrt{d+ex^2}}{e} & \text{for } e\neq 0\\ \frac{x^2}{2\sqrt{d}} & \text{otherwise}\end{cases}\right) - bn\left(\begin{cases}-\frac{\sqrt{d}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{e}+\frac{d}{e^{\frac{3}{2}}x\sqrt{\frac{d}{ex^2}+1}}+\frac{x}{\sqrt{e}\sqrt{\frac{d}{ex^2}+1}} & \text{for } e>-\infty\wedge e<\infty\wedge e\neq 0\\ \frac{x^2}{4\sqrt{d}} & \text{otherwise}\end{cases}\right) + b\left(\begin{cases}\frac{\sqrt{d+ex^2}}{e} & \text{for } e\neq 0\\ \frac{x^2}{2\sqrt{d}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x**2+d)**(1/2),x)
```

output
```
a*Piecewise((sqrt(d + e*x**2)/e, Ne(e, 0)), (x**2/(2*sqrt(d)), True)) - b*
n*Piecewise((-sqrt(d)*asinh(sqrt(d)/(sqrt(e)*x))/e + d/(e**(3/2)*x*sqrt(d/
(e*x**2) + 1)) + x/(sqrt(e)*sqrt(d/(e*x**2) + 1)), (e > -oo) & (e < oo) &
Ne(e, 0)), (x**2/(4*sqrt(d)), True)) + b*Piecewise((sqrt(d + e*x**2)/e, Ne
(e, 0)), (x**2/(2*sqrt(d)), True))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{(b\log(cx^n)+a)x}{\sqrt{ex^2+d}}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/sqrt(e*x^2 + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{\sqrt{e\,x^2+d}}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2),x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 146, normalized size of antiderivative = 2.00

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$$
$$= \frac{\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)b+\sqrt{e\,x^2+d}\,a-\sqrt{e\,x^2+d}\,bn-\sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}-\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)bn+\sqrt{}}{e}$$

input
```
int(x*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x)
```

output
```
(sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e*
*(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b + sqrt(d + e*x**2)*a - s
qrt(d + e*x**2)*b*n - sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)
/sqrt(d))*b*n + sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(
d))*b*n)/e
```

3.279 $\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx$

Optimal result 2129
Mathematica [C] (verified) 2130
Rubi [A] (verified) 2130
Maple [F] 2134
Fricas [F] 2134
Sympy [F] 2135
Maxima [F(-2)] 2135
Giac [F] 2135
Mupad [F(-1)] 2136
Reduce [F] 2136

Optimal result

Integrand size = 25, antiderivative size = 166

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx = \frac{bn\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2\sqrt{d}} - \frac{\mathrm{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} - \frac{bn\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{\sqrt{d}} - \frac{bn\,\mathrm{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{2\sqrt{d}}$$

output

```
1/2*b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))^2/d^(1/2)-arctanh((e*x^2+d)^(1/2)
/d^(1/2))*(a+b*ln(c*x^n))/d^(1/2)-b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(
2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))/d^(1/2)-1/2*b*n*polylog(2,1-2*d^(1/2)
/(d^(1/2)-(e*x^2+d)^(1/2)))/d^(1/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.25 (sec) , antiderivative size = 162, normalized size of antiderivative = 0.98

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx = \frac{bn\sqrt{1+\frac{d}{ex^2}}\left(-{}_3F_2\left(\frac{1}{2},\frac{1}{2},\frac{1}{2};\frac{3}{2},\frac{3}{2};-\frac{d}{ex^2}\right)-\frac{\sqrt{e}x\text{arcsinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)\log(x)}{\sqrt{d}}\right)}{\sqrt{d+ex^2}} - \frac{\log(x)\left(-a-b(-n\log(x)+\log(cx^n))\right)}{\sqrt{d}} + \frac{\left(-a-b(-n\log(x)+\log(cx^n))\right)\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{\sqrt{d}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x^2]),x]
```

output
```
(b*n*Sqrt[1 + d/(e*x^2)]*(-HypergeometricPFQ[{1/2, 1/2, 1/2}, {3/2, 3/2},
-(d/(e*x^2))] - (Sqrt[e]*x*ArcSinh[Sqrt[d]/(Sqrt[e]*x)]*Log[x])/Sqrt[d]))/
Sqrt[d + e*x^2] - (Log[x]*(-a - b*(-(n*Log[x]) + Log[c*x^n])))/Sqrt[d] + (
(-a - b*(-(n*Log[x]) + Log[c*x^n]))*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/Sqrt
[d]
```

Rubi [A] (verified)

Time = 0.81 (sec) , antiderivative size = 154, normalized size of antiderivative = 0.93, number of steps used = 13, number of rules used = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.480$, Rules used = {2790, 25, 27, 7282, 7267, 25, 6546, 27, 6470, 27, 2849, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx$$

$$\Big\downarrow \text{2790}$$

$$-bn\int -\frac{\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{\sqrt{d}x}dx - \frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \; 25$$

$$bn\int \frac{\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{\sqrt{d}x}dx-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \; 27$$

$$\frac{bn\int \frac{\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \; 7282$$

$$\frac{bn\int \frac{\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{x^2}dx^2}{2\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \; 7267$$

$$\frac{bn\int -\frac{\sqrt{ex^2+d}\,\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{d-x^4}d\sqrt{ex^2+d}}{\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \; 25$$

$$-\frac{bn\int \frac{\sqrt{ex^2+d}\,\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{d-x^4}d\sqrt{ex^2+d}}{\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \; 6546$$

$$\frac{bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2-\frac{\int \frac{\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{ex^2+d}}d\sqrt{ex^2+d}}{\sqrt{d}}\right)}{\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \; 27$$

$$\frac{bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2-\int \frac{\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{ex^2+d}}d\sqrt{ex^2+d}\right)}{\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{6470}$$

$$\frac{bn\left(\frac{\int \frac{d\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^2+d}}\right)}{d-x^4}d\sqrt{ex^2+d}}{\sqrt{d}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\right)}{\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\left(\sqrt{d}\int \frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^2+d}}\right)}{d-x^4}d\sqrt{ex^2+d}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\right)}{\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{2849}$$

$$\frac{bn\left(-\sqrt{d}\int \frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^2+d}}\right)}{1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^2+d}}}d\frac{1}{\sqrt{d}-\sqrt{ex^2+d}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\right)}{\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{2752}$$

$$\frac{bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)-\frac{1}{2}\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^2+d}}\right)\right)}{\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

input
```
Int[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x^2]),x]
```

output
```
-((ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*(a + b*Log[c*x^n]))/Sqrt[d]) + (b*n*(A
rcTanh[Sqrt[d + e*x^2]/Sqrt[d]]^2/2 - ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*Log
[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])] - PolyLog[2, 1 - (2*Sqrt[d])/(Sq
rt[d] - Sqrt[d + e*x^2])]/2))/Sqrt[d]
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

rule 2849
```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Simp
[-e/g   Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[
{c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

rule 6470
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Simp[b*c
*(p/e)   Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^
2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2
, 0]
```

rule 6546
```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Simp[1/
(c*d)   Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

rule 7267
```
Int[u_, x_Symbol] :> With[{lst = SubstForFractionalPowerOfLinear[u, x]}, Si
mp[lst[[2]]*lst[[4]]   Subst[Int[lst[[1]], x], x, lst[[3]]^(1/lst[[2]])], x
] /;  !FalseQ[lst] && SubstForFractionalPowerQ[u, lst[[3]], x]]
```

rule 7282
```
Int[(u_)/(x_), x_Symbol] :> With[{lst = PowerVariableExpn[u, 0, x]}, Simp[1
/lst[[2]]   Subst[Int[NormalizeIntegrand[Simplify[lst[[1]]/x], x], x], x, (
lst[[3]]*x)^lst[[2]]], x] /;  !FalseQ[lst] && NeQ[lst[[2]], 0]] /; NonsumQ[
u] &&  !RationalFunctionQ[u, x]
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x\sqrt{e\,x^{2}+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x/(e*x^2+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(e*x^2+d)^(1/2),x)
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\sqrt{d+ex^{2}}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\sqrt{ex^{2}+d}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/(e*x^3 + d*x),
 x)
```

Sympy [F]

$$\int \frac{a + b\log{(cx^n)}}{x\sqrt{d + ex^2}}\,dx = \int \frac{a + b\log{(cx^n)}}{x\sqrt{d + ex^2}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x**2+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x*sqrt(d + e*x**2)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log{(cx^n)}}{x\sqrt{d + ex^2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a + b\log{(cx^n)}}{x\sqrt{d + ex^2}}\,dx = \int \frac{b\log{(cx^n)} + a}{\sqrt{ex^2 + d}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x^2 + d)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x\,\sqrt{e\,x^2+d}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^(1/2)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx = \frac{\sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}-\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)a-\sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)a+\left(\int\frac{\log(x^n c)}{\sqrt{e\,x^2+d}\,x}dx\right)bd}{d}$$

input
```
int((a+b*log(c*x^n))/x/(e*x^2+d)^(1/2),x)
```

output
```
(sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*a - sqrt(d)
*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*a + int(log(x**n*c)
/(sqrt(d + e*x**2)*x),x)*b*d)/d
```

3.280 $\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx$

Optimal result . . . 2137
Mathematica [C] (verified) . . . 2138
Rubi [A] (verified) . . . 2138
Maple [F] . . . 2140
Fricas [F] . . . 2141
Sympy [F] . . . 2141
Maxima [F(-2)] . . . 2141
Giac [F] . . . 2142
Mupad [F(-1)] . . . 2142
Reduce [F] . . . 2142

Optimal result

Integrand size = 25, antiderivative size = 258

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx = -\frac{bn\sqrt{d+ex^2}}{4dx^2}-\frac{ben\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4d^{3/2}}-\frac{ben\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{3/2}}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2dx^2}+\frac{e\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}}+\frac{ben\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{2d^{3/2}}+\frac{ben\,\mathrm{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{4d^{3/2}}$$

output

```
-1/4*b*n*(e*x^2+d)^(1/2)/d/x^2-1/4*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/
d^(3/2)-1/4*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))^2/d^(3/2)-1/2*(e*x^2+d)
^(1/2)*(a+b*ln(c*x^n))/d/x^2+1/2*e*arctanh((e*x^2+d)^(1/2)/d^(1/2))*(a+b*l
n(c*x^n))/d^(3/2)+1/2*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/
(d^(1/2)-(e*x^2+d)^(1/2)))/d^(3/2)+1/4*b*e*n*polylog(2,1-2*d^(1/2)/(d^(1/2
)-(e*x^2+d)^(1/2)))/d^(3/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 1.46 (sec) , antiderivative size = 229, normalized size of antiderivative = 0.89

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx = \frac{\frac{bn\sqrt{1+\frac{d}{ex^2}}\left(2d^{3/2}\,{}_3F_2\left(\frac{3}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{d}{ex^2}\right)+9ex^2\left(-\sqrt{d}\sqrt{1+\frac{d}{ex^2}}+\sqrt{e}x\text{arcsinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)\right)(1+2\log(x))\right)}{x^2\sqrt{d+ex^2}}-\frac{18\sqrt{d}\sqrt{d+ex^2}(a-bn\log(x)+b\log}{x^2}}{36}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*Sqrt[d + e*x^2]),x]
```

output
```
((b*n*Sqrt[1 + d/(e*x^2)]*(2*d^(3/2)*HypergeometricPFQ[{3/2, 3/2, 3/2}, {5
/2, 5/2}, -(d/(e*x^2))] + 9*e*x^2*(-(Sqrt[d]*Sqrt[1 + d/(e*x^2)]) + Sqrt[e
]*x*ArcSinh[Sqrt[d]/(Sqrt[e]*x)])*(1 + 2*Log[x])))/(x^2*Sqrt[d + e*x^2]) -
 (18*Sqrt[d]*Sqrt[d + e*x^2]*(a - b*n*Log[x] + b*Log[c*x^n]))/x^2 - 18*e*L
og[x]*(a - b*n*Log[x] + b*Log[c*x^n]) + 18*e*(a - b*n*Log[x] + b*Log[c*x^n
])*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(36*d^(3/2))
```

Rubi [A] (verified)

Time = 0.71 (sec) , antiderivative size = 252, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.160$, Rules used = {2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx$$

$$\Big\downarrow \text{ 2792}$$

$$-bn\int -\frac{\frac{\sqrt{ex^2+d}}{d}-\frac{ex^2\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{d^{3/2}}}{2x^3}dx+\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2dx^2}$$

$$\Big\downarrow \; 27$$

$$\frac{1}{2}bn\int \frac{\frac{\sqrt{ex^2+d}}{d}-\frac{ex^2\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{d^{3/2}}}{x^3}dx+\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2dx^2}$$

$$\Big\downarrow \; 2010$$

$$\frac{1}{2}bn\int \left(\frac{\sqrt{ex^2+d}}{dx^3}-\frac{e\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{d^{3/2}x}\right)dx+\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2dx^2}$$

$$\Big\downarrow \; 2009$$

$$\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2dx^2}+\frac{1}{2}bn\left(-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{3/2}}-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{2d^{3/2}}+\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{d^{3/2}}+\frac{e\,\text{PolyLog}\left(2,1-\right.}{2d^{3/2}}\right.$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*Sqrt[d + e*x^2]),x]
```

output
```
-1/2*(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/(d*x^2) + (e*ArcTanh[Sqrt[d + e*
x^2]/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*d^(3/2)) + (b*n*(-1/2*Sqrt[d + e*x^2]
/(d*x^2) - (e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(2*d^(3/2)) - (e*ArcTanh[S
qrt[d + e*x^2]/Sqrt[d]]^2)/(2*d^(3/2)) + (e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d
]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/d^(3/2) + (e*PolyLog[2, 1
 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(2*d^(3/2))))/2
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{3}\sqrt{e\,x^{2}+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^(1/2),x)
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex^2+d}x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/(e*x^5 + d*x^3
), x)
```

Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx = \int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x**2+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**3*sqrt(d + e*x**2)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex^2+d}\,x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x^2 + d)*x^3), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^3\,\sqrt{e\,x^2+d}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^(1/2)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx = \frac{-\sqrt{e\,x^2+d}\,ad-\sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}-\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)ae\,x^2+\sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)ae\,x^2+2\left(\int\frac{\log(x^n c)}{\sqrt{e\,x^2+d}\,x^3}dx\right)b}{2d^2x^2}$$

input
```
int((a+b*log(c*x^n))/x^3/(e*x^2+d)^(1/2),x)
```

output
```
( - sqrt(d + e*x**2)*a*d - sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(
e)*x)/sqrt(d))*a*e*x**2 + sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e
)*x)/sqrt(d))*a*e*x**2 + 2*int(log(x**n*c)/(sqrt(d + e*x**2)*x**3),x)*b*d*
*2*x**2)/(2*d**2*x**2)
```

3.281 $\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$

Optimal result 2143
Mathematica [C] (verified) 2144
Rubi [A] (verified) 2144
Maple [F] 2147
Fricas [F] 2147
Sympy [F] 2147
Maxima [F(-2)] 2148
Giac [F] 2148
Mupad [F(-1)] 2148
Reduce [F] 2149

Optimal result

Integrand size = 25, antiderivative size = 359

$$\begin{aligned}\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = &-\frac{bnx\sqrt{d+ex^2}}{4e}-\frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{4e^{3/2}\sqrt{d+ex^2}}\\
&-\frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{4e^{3/2}\sqrt{d+ex^2}}\\
&+\frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2e^{3/2}\sqrt{d+ex^2}}\\
&+\frac{x\sqrt{d+ex^2}(a+b\log(cx^n))}{2e}\\
&-\frac{d^{3/2}\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{3/2}\sqrt{d+ex^2}}\\
&+\frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{PolyLog}\left(2,e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{4e^{3/2}\sqrt{d+ex^2}}\end{aligned}$$

output
```
-1/4*b*n*x*(e*x^2+d)^(1/2)/e-1/4*b*d^(3/2)*n*(1+e*x^2/d)^(1/2)*arcsinh(e^(
1/2)*x/d^(1/2))/e^(3/2)/(e*x^2+d)^(1/2)-1/4*b*d^(3/2)*n*(1+e*x^2/d)^(1/2)*
arcsinh(e^(1/2)*x/d^(1/2))^2/e^(3/2)/(e*x^2+d)^(1/2)+1/2*b*d^(3/2)*n*(1+e*
x^2/d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))*ln(1-(e^(1/2)*x/d^(1/2)+(1+e*x^2/d
)^(1/2))^2)/e^(3/2)/(e*x^2+d)^(1/2)+1/2*x*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/
e-1/2*d^(3/2)*(1+e*x^2/d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))*(a+b*ln(c*x^n))
/e^(3/2)/(e*x^2+d)^(1/2)+1/4*b*d^(3/2)*n*(1+e*x^2/d)^(1/2)*polylog(2,(e^(1
/2)*x/d^(1/2)+(1+e*x^2/d)^(1/2))^2)/e^(3/2)/(e*x^2+d)^(1/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.97 (sec) , antiderivative size = 205, normalized size of antiderivative = 0.57

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \frac{\frac{bn\sqrt{1+\frac{ex^2}{d}}\left(2e^2x^3\,{}_3F_2\left(\frac{3}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{ex^2}{d}\right)+9d\sqrt{e}\left(\sqrt{e}x\sqrt{1+\frac{ex^2}{d}}-\sqrt{d}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\right)(-1+2\log(x))\right)}{\sqrt{d+ex^2}}+18ex\sqrt{d+ex^2}(a-bn}{36e^2}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

output
```
((b*n*Sqrt[1 + (e*x^2)/d]*(2*e^2*x^3*HypergeometricPFQ[{3/2, 3/2, 3/2}, {5
/2, 5/2}, -((e*x^2)/d)] + 9*d*Sqrt[e]*(Sqrt[e]*x*Sqrt[1 + (e*x^2)/d] - Sqr
t[d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])*(-1 + 2*Log[x])))/Sqrt[d + e*x^2] + 18*
e*x*Sqrt[d + e*x^2]*(a - b*n*Log[x] + b*Log[c*x^n]) - 18*d*Sqrt[e]*(a - b*
n*Log[x] + b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(36*e^2)
```

Rubi [A] (verified)

Time = 0.70 (sec) , antiderivative size = 263, normalized size of antiderivative = 0.73, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2786, 2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$$

$$\Big\downarrow \ 2786$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\int \frac{x^2(a+b\log(cx^n))}{\sqrt{\frac{ex^2}{d}+1}}dx}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 2792$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(-bn\int \frac{\frac{dx\sqrt{\frac{ex^2}{d}+1}}{e}-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{e^{3/2}}}{2x}dx-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{3/2}}+\frac{dx\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{2e}\right)}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 27$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(-\frac{1}{2}bn\int \frac{\frac{dx\sqrt{\frac{ex^2}{d}+1}}{e}-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{e^{3/2}}}{x}dx-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{3/2}}+\frac{dx\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{2e}\right)}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 2010$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(-\frac{1}{2}bn\int \left(\frac{d\sqrt{\frac{ex^2}{d}+1}}{e}-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{e^{3/2}x}\right)dx-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{3/2}}+\frac{dx\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{2e}\right)}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 2009$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{3/2}}+\frac{dx\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{2e}-\frac{1}{2}bn\left(-\frac{d^{3/2}\text{PolyLog}\left(2,e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2e^{3/2}}+\frac{d^{3/2}\ldots}{\ldots}\right.\right.}{\sqrt{d+ex^2}}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

output
```
(Sqrt[1 + (e*x^2)/d]*((d*x*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/(2*e) -
 (d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*e^(3/2)) - (
b*n*((d*x*Sqrt[1 + (e*x^2)/d])/(2*e) + (d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d
]])/(2*e^(3/2)) + (d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/(2*e^(3/2)) - (
d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt
[d]])])/e^(3/2) - (d^(3/2)*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])
/(2*e^(3/2))))/2))/Sqrt[d + e*x^2]
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x^2(a+b\ln(c\,x^n))}{\sqrt{e\,x^2+d}}dx$$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

output
```
int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{\sqrt{ex^2+d}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*x^2*log(c*x^n) + sqrt(e*x^2 + d)*a*x^2)/(e*x^2
 + d), x)
```

Sympy [F]

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x**2+d)**(1/2),x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))/sqrt(d + e*x**2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{\sqrt{ex^2+d}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/sqrt(e*x^2 + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{\sqrt{e\,x^2+d}}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2), x)
```

Reduce [F]

$$\int \frac{x^2(a + b\log(cx^n))}{\sqrt{d + ex^2}}\,dx$$
$$= \frac{\sqrt{e\,x^2 + d}\,aex - \sqrt{e}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{e}\,x}{\sqrt{d}}\right)ad + 2\left(\int \frac{\log(x^n c)x^2}{\sqrt{e\,x^2+d}}dx\right)b\,e^2}{2e^2}$$

input
```
int(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x)
```

output
```
(sqrt(d + e*x**2)*a*e*x - sqrt(e)*log((sqrt(d + e*x**2) + sqrt(e)*x)/sqrt(
d))*a*d + 2*int((log(x**n*c)*x**2)/sqrt(d + e*x**2),x)*b*e**2)/(2*e**2)
```

3.282 $\int \frac{a+b\log(cx^n)}{\sqrt{d+ex^2}}\,dx$

Optimal result 2150
Mathematica [A] (verified) 2151
Rubi [C] (verified) 2151
Maple [F] 2155
Fricas [F] 2155
Sympy [F] 2156
Maxima [F(-2)] 2156
Giac [F] 2156
Mupad [F(-1)] 2157
Reduce [F] 2157

Optimal result

Integrand size = 22, antiderivative size = 250

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex^2}}\,dx = \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{2\sqrt{e}\sqrt{d+ex^2}} - \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{\sqrt{e}\sqrt{d+ex^2}} + \frac{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}\sqrt{d+ex^2}} - \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{PolyLog}\left(2,e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2\sqrt{e}\sqrt{d+ex^2}}$$

output
```
1/2*b*d^(1/2)*n*(1+e*x^2/d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))^2/e^(1/2)/(e*
x^2+d)^(1/2)-b*d^(1/2)*n*(1+e*x^2/d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))*ln(1
-(e^(1/2)*x/d^(1/2)+(1+e*x^2/d)^(1/2))^2)/e^(1/2)/(e*x^2+d)^(1/2)+d^(1/2)*
(1+e*x^2/d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))*(a+b*ln(c*x^n))/e^(1/2)/(e*x^
2+d)^(1/2)-1/2*b*d^(1/2)*n*(1+e*x^2/d)^(1/2)*polylog(2,(e^(1/2)*x/d^(1/2)+
(1+e*x^2/d)^(1/2))^2)/e^(1/2)/(e*x^2+d)^(1/2)
```

Mathematica [A] (verified)

Time = 0.66 (sec) , antiderivative size = 186, normalized size of antiderivative = 0.74

$$\int \frac{a+b\log\left(cx^n\right)}{\sqrt{d+ex^2}}\,dx = \frac{(a-bn\log(x)+b\log\left(cx^n\right))\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{\sqrt{e}} + \frac{bn\sqrt{1+\frac{ex^2}{d}}\left(-\text{arcsinh}\left(\sqrt{\frac{e}{d}}x\right)^2-2\text{arcsinh}\left(\sqrt{\frac{e}{d}}x\right)\log\left(1-e^{-2\text{arcsinh}\left(\sqrt{\frac{e}{d}}x\right)}\right)+2\log(x)\log\left(\sqrt{\frac{e}{d}}x+\cdots\right.\right.}{2\sqrt{\frac{e}{d}}\sqrt{d+ex^2}}$$

input
```
Integrate[(a + b*Log[c*x^n])/Sqrt[d + e*x^2],x]
```

output
```
((a - b*n*Log[x] + b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/Sqrt[
e] + (b*n*Sqrt[1 + (e*x^2)/d]*(-ArcSinh[Sqrt[e/d]*x]^2 - 2*ArcSinh[Sqrt[e/
d]*x]*Log[1 - E^(-2*ArcSinh[Sqrt[e/d]*x])] + 2*Log[x]*Log[Sqrt[e/d]*x + Sq
rt[1 + (e*x^2)/d]] + PolyLog[2, E^(-2*ArcSinh[Sqrt[e/d]*x])]))/(2*Sqrt[e/d
]*Sqrt[d + e*x^2])
```

Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 0.61 (sec) , antiderivative size = 166, normalized size of antiderivative = 0.66, number of steps used = 11, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.455$, Rules used = {2764, 2762, 6190, 3042, 26, 4199, 25, 2620, 2715, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log\left(cx^n\right)}{\sqrt{d+ex^2}}dx$$

$$\Big\downarrow \text{2764}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\int \frac{a+b\log\left(cx^n\right)}{\sqrt{\frac{ex^2}{d}+1}}dx}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{2762}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}-\frac{b\sqrt{d}n\int\frac{\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{e}}\right)}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 6190$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}-\frac{b\sqrt{d}n\int\frac{\sqrt{d}\sqrt{\frac{ex^2}{d}+1}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}x}d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right)}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 3042$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}-\frac{b\sqrt{d}n\int-i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\tan\left(i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)+\frac{\pi}{2}\right)d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right)}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 26$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\int\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\tan\left(i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)+\frac{\pi}{2}\right)d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right)}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 4199$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(2i\int-\frac{e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}}d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2\right.}{\sqrt{e}}\right.}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 25$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\int\frac{e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}}d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2\right.}{\sqrt{e}}\right.}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 2620$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\left(\frac{1}{2}\int\log\left(1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1\right.\right.\right.}{\sqrt{e}}\right.}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 2715$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\left(\frac{1}{4}\int e^{-2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\log\left(1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)de^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}-\frac{1}{2}\text{arcs}\right.\right.}{\sqrt{e}}\right.}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 2838$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\left(-\frac{1}{4}\text{PolyLog}\left(2,e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)-\frac{1}{2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\text{arcsinh}\left(\right.}\right.\right.\right.}{\sqrt{e}}\right.}{\sqrt{d+ex^2}}$$

input
```
Int[(a + b*Log[c*x^n])/Sqrt[d + e*x^2],x]
```

output
```
(Sqrt[1 + (e*x^2)/d]*((Sqrt[d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x
^n]))/Sqrt[e] + (I*b*Sqrt[d]*n*((-1/2*I)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2 -
(2*I)*(-1/2*(ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)
/Sqrt[d]])]) - PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])]/4)))/Sqrt[e]
))/Sqrt[d + e*x^2]
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 26
```
Int[(Complex[0, a_])*(Fx_), x_Symbol] :> Simp[(Complex[Identity[0], a])   I
nt[Fx, x], x] /; FreeQ[a, x] && EqQ[a^2, 1]
```

rule 2620
```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Si
mp[d*(m/(b*f*g*n*Log[F]))   Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x
)))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

rule 2715
```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Simp[1/(d*e*n*Log[F])   Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x)
))^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

rule 2762
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Simp[ArcSinh[Rt[e, 2]*(x/Sqrt[d])]*((a + b*Log[c*x^n])/Rt[e, 2]), x]
 - Simp[b*(n/Rt[e, 2])   Int[ArcSinh[Rt[e, 2]*(x/Sqrt[d])]/x, x], x] /; Fre
eQ[{a, b, c, d, e, n}, x] && GtQ[d, 0] && PosQ[e]
```

rule 2764
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Simp[Sqrt[1 + (e/d)*x^2]/Sqrt[d + e*x^2]   Int[(a + b*Log[c*x^n])/Sq
rt[1 + (e/d)*x^2], x], x] /; FreeQ[{a, b, c, d, e, n}, x] &&  !GtQ[d, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4199
```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Simp
[2*I   Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x
))/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && In
tegerQ[4*k] && IGtQ[m, 0]
```

rule 6190
```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Simp[1/b
 Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[n, 0]
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{\sqrt{e\,x^{2}+d}}dx$$

input
```
int((a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{\sqrt{d+ex^{2}}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\sqrt{ex^{2}+d}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/(e*x^2 + d), x
)
```

Sympy [F]

$$\int \frac{a + b\log(cx^n)}{\sqrt{d + ex^2}}\, dx = \int \frac{a + b\log(cx^n)}{\sqrt{d + ex^2}}\, dx$$

input
```
integrate((a+b*ln(c*x**n))/(e*x**2+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/sqrt(d + e*x**2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log(cx^n)}{\sqrt{d + ex^2}}\, dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a + b\log(cx^n)}{\sqrt{d + ex^2}}\, dx = \int \frac{b\log(cx^n) + a}{\sqrt{ex^2 + d}}\, dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/sqrt(e*x^2 + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{\sqrt{d+ex^2}}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{\sqrt{e\,x^2+d}}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x^2)^(1/2),x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x^2)^(1/2), x)
```

Reduce [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\sqrt{d+ex^2}}\,dx=\frac{\sqrt{e}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{e}\,x}{\sqrt{d}}\right)a+\left(\int \frac{\log(x^n c)}{\sqrt{e\,x^2+d}}dx\right)be}{e}$$

input
```
int((a+b*log(c*x^n))/(e*x^2+d)^(1/2),x)
```

output
```
(sqrt(e)*log((sqrt(d + e*x**2) + sqrt(e)*x)/sqrt(d))*a + int(log(x**n*c)/s
qrt(d + e*x**2),x)*b*e)/e
```

3.283 $\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex^2}}\,dx$

Optimal result 2158
Mathematica [A] (verified) 2158
Rubi [A] (verified) 2159
Maple [F] 2160
Fricas [A] (verification not implemented) 2161
Sympy [F] 2161
Maxima [F(-2)] 2162
Giac [F] 2162
Mupad [F(-1)] 2162
Reduce [B] (verification not implemented) 2163

Optimal result

Integrand size = 25, antiderivative size = 81

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex^2}}\,dx = -\frac{bn\sqrt{d+ex^2}}{dx}+\frac{b\sqrt{e}n\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{d} - \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{dx}$$

output
```
-b*n*(e*x^2+d)^(1/2)/d/x+b*e^(1/2)*n*arctanh(e^(1/2)*x/(e*x^2+d)^(1/2))/d-
(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/d/x
```

Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 77, normalized size of antiderivative = 0.95

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex^2}}\,dx = \frac{-\left((a+bn)\sqrt{d+ex^2}\right)-b\sqrt{d+ex^2}\log(cx^n)+b\sqrt{e}nx\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{dx}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*Sqrt[d + e*x^2]),x]
```

output
```
(-((a + b*n)*Sqrt[d + e*x^2]) - b*Sqrt[d + e*x^2]*Log[c*x^n] + b*Sqrt[e]*n
*x*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(d*x)
```

Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 78, normalized size of antiderivative = 0.96, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.160$, Rules used = {2773, 247, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex^2}}\,dx$$

$$\Big\downarrow \ 2773$$

$$\frac{bn\int \frac{\sqrt{ex^2+d}}{x^2}dx}{d}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{dx}$$

$$\Big\downarrow \ 247$$

$$\frac{bn\left(e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)}{d}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{dx}$$

$$\Big\downarrow \ 224$$

$$\frac{bn\left(e\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)}{d}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{dx}$$

$$\Big\downarrow \ 219$$

$$\frac{bn\left(\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)}{d}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{dx}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*Sqrt[d + e*x^2]),x]
```

output
```
(b*n*(-(Sqrt[d + e*x^2]/x) + Sqrt[e]*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])
)/d - (Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/(d*x)
```

Defintions of rubi rules used

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Maple [F]

$$\int \frac{a+b\ln(c\,x^n)}{x^2\sqrt{e\,x^2+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^(1/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.57

$$\int \frac{a + b\log(cx^n)}{x^2\sqrt{d + ex^2}}\,dx = \left[\frac{b\sqrt{e}nx\log\left(-2\,ex^2 - 2\,\sqrt{ex^2 + d}\sqrt{e}x - d\right) - 2\,\sqrt{ex^2 + d}(bn\log(x) + bn + b\log(c) + a)}{2\,dx}, -\frac{b\sqrt{-e}nx\arctan\left(\frac{\sqrt{-e}x}{\sqrt{ex^2+d}}\right) + \sqrt{ex^2 + d}(bn\log(x) + bn + b\log(c) + a)}{dx}\right]$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
[1/2*(b*sqrt(e)*n*x*log(-2*e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(e)*x - d) - 2*sq
rt(e*x^2 + d)*(b*n*log(x) + b*n + b*log(c) + a))/(d*x), -(b*sqrt(-e)*n*x*a
rctan(sqrt(-e)*x/sqrt(e*x^2 + d)) + sqrt(e*x^2 + d)*(b*n*log(x) + b*n + b*
log(c) + a))/(d*x)]
```

Sympy [F]

$$\int \frac{a + b\log(cx^n)}{x^2\sqrt{d + ex^2}}\,dx = \int \frac{a + b\log(cx^n)}{x^2\sqrt{d + ex^2}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x**2+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*sqrt(d + e*x**2)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log(cx^n)}{x^2\sqrt{d + ex^2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a + b\log(cx^n)}{x^2\sqrt{d + ex^2}}\,dx = \int \frac{b\log(cx^n) + a}{\sqrt{ex^2 + d}x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x^2 + d)*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a + b\log(cx^n)}{x^2\sqrt{d + ex^2}}\,dx = \int \frac{a + b\ln(c\,x^n)}{x^2\,\sqrt{e\,x^2 + d}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^(1/2)), x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 225, normalized size of antiderivative = 2.78

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex^2}}\,dx$$
$$= \frac{-\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)b-\sqrt{e\,x^2+d}\,a-\sqrt{e\,x^2+d}\,bn+\sqrt{e}\log\left(\frac{\sqrt{e\,x^2+d}-\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)bnx}{dx}$$

input
```
int((a+b*log(c*x^n))/x^2/(e*x^2+d)^(1/2),x)
```

output
```
( - sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/
(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b - sqrt(d + e*x**2)*a
- sqrt(d + e*x**2)*b*n + sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)
*x)/sqrt(d))*b*n*x + sqrt(e)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/
sqrt(d))*b*n*x - sqrt(e)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n
*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*x - sqrt(e)*a*x -
 sqrt(e)*b*n*x)/(d*x)
```

3.284 $\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx$

Optimal result 2164
Mathematica [A] (verified) 2164
Rubi [A] (verified) 2165
Maple [F] 2167
Fricas [A] (verification not implemented) 2168
Sympy [F] 2168
Maxima [F(-2)] 2169
Giac [F] 2169
Mupad [F(-1)] 2169
Reduce [B] (verification not implemented) 2170

Optimal result

Integrand size = 25, antiderivative size = 144

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx = \frac{2ben\sqrt{d+ex^2}}{3d^2x} - \frac{bn(d+ex^2)^{3/2}}{9d^2x^3} - \frac{2be^{3/2}n\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{3d^2} - \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{3dx^3} + \frac{2e\sqrt{d+ex^2}(a+b\log(cx^n))}{3d^2x}$$

output
```
2/3*b*e*n*(e*x^2+d)^(1/2)/d^2/x-1/9*b*n*(e*x^2+d)^(3/2)/d^2/x^3-2/3*b*e^(3
/2)*n*arctanh(e^(1/2)*x/(e*x^2+d)^(1/2))/d^2-1/3*(e*x^2+d)^(1/2)*(a+b*ln(c
*x^n))/d/x^3+2/3*e*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/d^2/x
```

Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 110, normalized size of antiderivative = 0.76

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx = \frac{\sqrt{d+ex^2}(-3ad-bdn+6aex^2+5benx^2) - 3b(d-2ex^2)\sqrt{d+ex^2}\log(cx^n) - 6be^{3/2}nx^3\log\left(ex+\sqrt{e}\right.}{9d^2x^3}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^4*Sqrt[d + e*x^2]),x]
```

output
```
(Sqrt[d + e*x^2]*(-3*a*d - b*d*n + 6*a*e*x^2 + 5*b*e*n*x^2) - 3*b*(d - 2*e
*x^2)*Sqrt[d + e*x^2]*Log[c*x^n] - 6*b*e^(3/2)*n*x^3*Log[e*x + Sqrt[e]*Sqr
t[d + e*x^2]])/(9*d^2*x^3)
```

Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 137, normalized size of antiderivative = 0.95, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.240$, Rules used = {2792, 27, 358, 247, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{(d-2ex^2)\sqrt{ex^2+d}}{3d^2x^4}dx+\frac{2e\sqrt{d+ex^2}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(d-2ex^2)\sqrt{ex^2+d}}{x^4}dx}{3d^2}+\frac{2e\sqrt{d+ex^2}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{358}$$

$$\frac{bn\left(-2e\int \frac{\sqrt{ex^2+d}}{x^2}dx-\frac{(d+ex^2)^{3/2}}{3x^3}\right)}{3d^2}+\frac{2e\sqrt{d+ex^2}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{247}$$

$$\frac{bn\left(-2e\left(e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)}{3d^2}+\frac{2e\sqrt{d+ex^2}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{224}$$

$$\frac{bn\left(-2e\left(e\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)}{3d^2}+\frac{2e\sqrt{d+ex^2}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{219}$$

$$\frac{2e\sqrt{d+ex^2}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{3dx^3}+\frac{bn\left(-2e\left(\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)}{3d^2}$$

input
```
Int[(a + b*Log[c*x^n])/(x^4*Sqrt[d + e*x^2]),x]
```

output
```
(b*n*(-1/3*(d + e*x^2)^(3/2)/x^3 - 2*e*(-(Sqrt[d + e*x^2]/x) + Sqrt[e]*Arc
Tanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])))/(3*d^2) - (Sqrt[d + e*x^2]*(a + b*Log
[c*x^n]))/(3*d*x^3) + (2*e*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/(3*d^2*x)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{4}\sqrt{e\,x^{2}+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^(1/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 223, normalized size of antiderivative = 1.55

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx$$
$$= \left[\frac{3\,be^{\frac{3}{2}}nx^3\log\left(-2\,ex^2+2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)-(bdn-(5\,ben+6\,ae)x^2+3\,ad-3\,(2\,bex^2-bd)\log(c)}{9\,d^2x^3}\right.$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
[1/9*(3*b*e^(3/2)*n*x^3*log(-2*e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(e)*x - d) -
(b*d*n - (5*b*e*n + 6*a*e)*x^2 + 3*a*d - 3*(2*b*e*x^2 - b*d)*log(c) - 3*(2
*b*e*n*x^2 - b*d*n)*log(x))*sqrt(e*x^2 + d))/(d^2*x^3), 1/9*(6*b*sqrt(-e)*
e*n*x^3*arctan(sqrt(-e)*x/sqrt(e*x^2 + d)) - (b*d*n - (5*b*e*n + 6*a*e)*x^
2 + 3*a*d - 3*(2*b*e*x^2 - b*d)*log(c) - 3*(2*b*e*n*x^2 - b*d*n)*log(x))*s
qrt(e*x^2 + d))/(d^2*x^3)]
```

Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx = \int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**4/(e*x**2+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**4*sqrt(d + e*x**2)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex^2+dx^4}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x^2 + d)*x^4), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^4\,\sqrt{e\,x^2+d}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^(1/2)), x)
```

Reduce [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 346, normalized size of antiderivative = 2.40

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx$$
$$= \frac{-3\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)bd+6\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)be\,x^2-3\sqrt{e\,x^2+d}}{}$$

input
```
int((a+b*log(c*x^n))/x^4/(e*x^2+d)^(1/2),x)
```

output
```
( - 3*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c
)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d + 6*sqrt(d + e*x*
*2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d
 + e*x**2) + sqrt(e)*x)**n*2**n))*b*e*x**2 - 3*sqrt(d + e*x**2)*a*d + 6*sq
rt(d + e*x**2)*a*e*x**2 - sqrt(d + e*x**2)*b*d*n + 5*sqrt(d + e*x**2)*b*e*
n*x**2 - 6*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*b
*e*n*x**3 - 6*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d)
)*b*e*n*x**3 + 6*sqrt(e)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n
*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*e*x**3 - 6*sqrt(e
)*a*e*x**3 - 3*sqrt(e)*b*e*n*x**3)/(9*d**2*x**3)
```

3.285 $\int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}\,dx$

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Mathematica [A] (verified) 2172
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Optimal result

Integrand size = 25, antiderivative size = 204

$$\int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}\,dx = -\frac{8be^2n\sqrt{d+ex^2}}{15d^3x}-\frac{bn(d+ex^2)^{3/2}}{25d^2x^5}+\frac{26ben(d+ex^2)^{3/2}}{225d^3x^3}+\frac{8be^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{15d^3}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{5dx^5}+\frac{4e\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^2x^3}-\frac{8e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^3x}$$

output
```
-8/15*b*e^2*n*(e*x^2+d)^(1/2)/d^3/x-1/25*b*n*(e*x^2+d)^(3/2)/d^2/x^5+26/22
5*b*e*n*(e*x^2+d)^(3/2)/d^3/x^3+8/15*b*e^(5/2)*n*arctanh(e^(1/2)*x/(e*x^2+
d)^(1/2))/d^3-1/5*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/d/x^5+4/15*e*(e*x^2+d)^(
1/2)*(a+b*ln(c*x^n))/d^2/x^3-8/15*e^2*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/d^3/
x
```

Mathematica [A] (verified)

Time = 0.33 (sec) , antiderivative size = 147, normalized size of antiderivative = 0.72

$$\int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}\,dx = -\frac{\sqrt{d+ex^2}(15a(3d^2-4dex^2+8e^2x^4)+bn(9d^2-17dex^2+94e^2x^4))+15b\sqrt{d+ex^2}(3d^2-4dex^2+8e}{225d^3x^5}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^6*Sqrt[d + e*x^2]),x]
```

output
```
-1/225*(Sqrt[d + e*x^2]*(15*a*(3*d^2 - 4*d*e*x^2 + 8*e^2*x^4) + b*n*(9*d^2
 - 17*d*e*x^2 + 94*e^2*x^4)) + 15*b*Sqrt[d + e*x^2]*(3*d^2 - 4*d*e*x^2 + 8
*e^2*x^4)*Log[c*x^n] - 120*b*e^(5/2)*n*x^5*Log[e*x + Sqrt[e]*Sqrt[d + e*x^
2]])/(d^3*x^5)
```

Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 196, normalized size of antiderivative = 0.96, number of steps used = 9, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.320$, Rules used = {2792, 27, 1588, 27, 358, 247, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{\sqrt{ex^2+d}\,(8e^2x^4-4dex^2+3d^2)}{15d^3x^6}dx-\frac{8e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^3x}+\frac{4e\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{\sqrt{ex^2+d}(8e^2x^4-4dex^2+3d^2)}{x^6}dx}{15d^3}-\frac{8e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^3x}+\frac{4e\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{1588}$$

$$\frac{bn\left(-\frac{\int \frac{2de(13d-20ex^2)\sqrt{ex^2+d}}{x^4}dx}{5d}-\frac{3d(d+ex^2)^{3/2}}{5x^5}\right)}{15d^3}-\frac{8e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^3x}+\frac{4e\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\left(-\frac{2}{5}e\int \frac{(13d-20ex^2)\sqrt{ex^2+d}}{x^4}dx-\frac{3d(d+ex^2)^{3/2}}{5x^5}\right)}{15d^3}-\frac{8e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^3x}+\frac{4e\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{358}$$

$$\frac{bn\left(-\frac{2}{5}e\left(-20e\int \frac{\sqrt{ex^2+d}}{x^2}dx-\frac{13(d+ex^2)^{3/2}}{3x^3}\right)-\frac{3d(d+ex^2)^{3/2}}{5x^5}\right)}{15d^3}-\frac{8e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^3x}+\frac{4e\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{247}$$

$$\frac{bn\left(-\frac{2}{5}e\left(-20e\left(e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{13(d+ex^2)^{3/2}}{3x^3}\right)-\frac{3d(d+ex^2)^{3/2}}{5x^5}\right)}{15d^3}-\frac{8e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^3x}+\frac{4e\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{224}$$

$$\frac{bn\left(-\frac{2}{5}e\left(-20e\left(e\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{13(d+ex^2)^{3/2}}{3x^3}\right)-\frac{3d(d+ex^2)^{3/2}}{5x^5}\right)}{15d^3}-\frac{8e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^3x}+\frac{4e\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{219}$$

$$-\frac{8e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^3x}+\frac{4e\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{5dx^5}+\frac{bn\left(-\frac{2}{5}e\left(-20e\left(\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{13(d+ex^2)^{3/2}}{3x^3}\right)-\frac{3d(d+ex^2)^{3/2}}{5x^5}\right)}{15d^3}$$

input
```
Int[(a + b*Log[c*x^n])/(x^6*Sqrt[d + e*x^2]),x]
```

output
```
(b*n*((-3*d*(d + e*x^2)^(3/2))/(5*x^5) - (2*e*((-13*(d + e*x^2)^(3/2))/(3*
x^3) - 20*e*(-(Sqrt[d + e*x^2]/x) + Sqrt[e]*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e
*x^2]])))/5))/(15*d^3) - (Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/(5*d*x^5) +
(4*e*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/(15*d^2*x^3) - (8*e^2*Sqrt[d + e*
x^2]*(a + b*Log[c*x^n]))/(15*d^3*x)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 1588
```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Simp[1/(d*f
^2*(m + 1))   Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x
) - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && Ne
Q[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{6}\sqrt{e\,x^{2}+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x^6/(e*x^2+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^6/(e*x^2+d)^(1/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 326, normalized size of antiderivative = 1.60

$$\int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}\,dx$$
$$= \left[\frac{60\,be^{\frac{5}{2}}nx^5\log\left(-2\,ex^2-2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)-(2\,(47\,be^2n+60\,ae^2)x^4+9\,bd^2n+45\,ad^2-(17\,bden\ ...}{225\ ...}\right.$$
$$-\frac{120\,b\sqrt{-e}e^2nx^5\arctan\left(\frac{\sqrt{-e}x}{\sqrt{ex^2+d}}\right)+(2\,(47\,be^2n+60\,ae^2)x^4+9\,bd^2n+45\,ad^2-(17\,bden+60\,ade)x^2\ ...}{225\,d^3x^5\ ...}$$

input
```
integrate((a+b*log(c*x^n))/x^6/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
[1/225*(60*b*e^(5/2)*n*x^5*log(-2*e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(e)*x - d)
 - (2*(47*b*e^2*n + 60*a*e^2)*x^4 + 9*b*d^2*n + 45*a*d^2 - (17*b*d*e*n + 6
0*a*d*e)*x^2 + 15*(8*b*e^2*x^4 - 4*b*d*e*x^2 + 3*b*d^2)*log(c) + 15*(8*b*e
^2*n*x^4 - 4*b*d*e*n*x^2 + 3*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(d^3*x^5),
-1/225*(120*b*sqrt(-e)*e^2*n*x^5*arctan(sqrt(-e)*x/sqrt(e*x^2 + d)) + (2*(
47*b*e^2*n + 60*a*e^2)*x^4 + 9*b*d^2*n + 45*a*d^2 - (17*b*d*e*n + 60*a*d*e
)*x^2 + 15*(8*b*e^2*x^4 - 4*b*d*e*x^2 + 3*b*d^2)*log(c) + 15*(8*b*e^2*n*x^
4 - 4*b*d*e*n*x^2 + 3*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(d^3*x^5)]
```

Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}\,dx = \int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**6/(e*x**2+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**6*sqrt(d + e*x**2)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log(cx^n)}{x^6\sqrt{d + ex^2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^6/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a + b\log(cx^n)}{x^6\sqrt{d + ex^2}}\,dx = \int \frac{b\log(cx^n) + a}{\sqrt{ex^2 + d}x^6}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^6/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x^2 + d)*x^6), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a + b\log(cx^n)}{x^6\sqrt{d + ex^2}}\,dx = \int \frac{a + b\,\ln(c\,x^n)}{x^6\,\sqrt{e\,x^2 + d}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^6*(d + e*x^2)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^6*(d + e*x^2)^(1/2)), x)
```

Reduce [B] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 471, normalized size of antiderivative = 2.31

$$\int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}\,dx$$
$$= \frac{-45\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)b\,d^2+60\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)bde\,x^2-120\sqrt{e}}{}$$

input
```
int((a+b*log(c*x^n))/x^6/(e*x^2+d)^(1/2),x)
```

output
```
( - 45*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*
c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2 + 60*sqrt(d +
 e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(s
qrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e*x**2 - 120*sqrt(d + e*x**2)*l
og(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*
x**2) + sqrt(e)*x)**n*2**n))*b*e**2*x**4 - 45*sqrt(d + e*x**2)*a*d**2 + 60
*sqrt(d + e*x**2)*a*d*e*x**2 - 120*sqrt(d + e*x**2)*a*e**2*x**4 - 9*sqrt(d
 + e*x**2)*b*d**2*n + 17*sqrt(d + e*x**2)*b*d*e*n*x**2 - 94*sqrt(d + e*x**
2)*b*e**2*n*x**4 + 120*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x
)/sqrt(d))*b*e**2*n*x**5 + 120*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(d) + s
qrt(e)*x)/sqrt(d))*b*e**2*n*x**5 - 120*sqrt(e)*log(((2*sqrt(e)*sqrt(d + e*
x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n
))*b*e**2*x**5 + 120*sqrt(e)*a*e**2*x**5 + 70*sqrt(e)*b*e**2*n*x**5)/(225*
d**3*x**5)
```

3.286 $\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$

Optimal result . . . 2179
Mathematica [A] (verified) . . . 2180
Rubi [A] (verified) . . . 2180
Maple [F] . . . 2182
Fricas [A] (verification not implemented) . . . 2183
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Maxima [F(-2)] . . . 2185
Giac [F] . . . 2185
Mupad [F(-1)] . . . 2185
Reduce [B] (verification not implemented) . . . 2186

Optimal result

Integrand size = 25, antiderivative size = 209

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = -\frac{11bd^2n\sqrt{d+ex^2}}{5e^4}+\frac{4bdn(d+ex^2)^{3/2}}{15e^4} - \frac{bn(d+ex^2)^{5/2}}{25e^4}+\frac{16bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{5e^4} + \frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}+\frac{3d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4} - \frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^4}$$

output
```
-11/5*b*d^2*n*(e*x^2+d)^(1/2)/e^4+4/15*b*d*n*(e*x^2+d)^(3/2)/e^4-1/25*b*n*
(e*x^2+d)^(5/2)/e^4+16/5*b*d^(5/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^4+
d^3*(a+b*ln(c*x^n))/e^4/(e*x^2+d)^(1/2)+3*d^2*(e*x^2+d)^(1/2)*(a+b*ln(c*x^
n))/e^4-d*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/e^4+1/5*(e*x^2+d)^(5/2)*(a+b*ln(
c*x^n))/e^4
```

Mathematica [A] (verified)

Time = 0.31 (sec) , antiderivative size = 195, normalized size of antiderivative = 0.93

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \frac{240ad^3-148bd^3n+120ad^2ex^2-134bd^2enx^2-30ade^2x^4+11bde^2nx^4+15ae$$

input
```
Integrate[(x^7*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
(240*a*d^3 - 148*b*d^3*n + 120*a*d^2*e*x^2 - 134*b*d^2*e*n*x^2 - 30*a*d*e^
2*x^4 + 11*b*d*e^2*n*x^4 + 15*a*e^3*x^6 - 3*b*e^3*n*x^6 - 240*b*d^(5/2)*n*
Sqrt[d + e*x^2]*Log[x] + 15*b*(16*d^3 + 8*d^2*e*x^2 - 2*d*e^2*x^4 + e^3*x^
6)*Log[c*x^n] + 240*b*d^(5/2)*n*Sqrt[d + e*x^2]*Log[d + Sqrt[d]*Sqrt[d + e
*x^2]])/(75*e^4*Sqrt[d + e*x^2])
```

Rubi [A] (verified)

Time = 0.66 (sec) , antiderivative size = 195, normalized size of antiderivative = 0.93, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {2792, 27, 2331, 2123, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int \frac{e^3x^6-2de^2x^4+8d^2ex^2+16d^3}{5e^4x\sqrt{ex^2+d}}dx+\frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}+\frac{3d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}-\frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^4}$$

$$\Big\downarrow \text{27}$$

$$-\frac{bn\int \frac{e^3x^6-2de^2x^4+8d^2ex^2+16d^3}{x\sqrt{ex^2+d}}dx}{5e^4}+\frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}+\frac{3d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}-\frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^4}$$

$$\Big\downarrow \text{2331}$$

$$-\frac{bn\int \frac{e^3x^6-2de^2x^4+8d^2ex^2+16d^3}{x^2\sqrt{ex^2+d}}dx^2}{10e^4}+\frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}+\frac{3d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}-\frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^4}$$

$$\Big\downarrow \text{2123}$$

$$-\frac{bn\int \left(\frac{16d^3}{x^2\sqrt{ex^2+d}}+\frac{11ed^2}{\sqrt{ex^2+d}}-4e\sqrt{ex^2+d}d+e\left(ex^2+d\right)^{3/2}\right)dx^2}{10e^4}+\frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}+\frac{3d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}-\frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^4}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}+\frac{3d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}-\frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^4}-\frac{bn\left(-32d^{5/2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+22d^2\sqrt{d+ex^2}-\frac{8}{3}d\left(d+ex^2\right)^{3/2}+\frac{2}{5}\left(d+ex^2\right)^{5/2}\right)}{10e^4}$$

input
```
Int[(x^7*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
-1/10*(b*n*(22*d^2*Sqrt[d + e*x^2] - (8*d*(d + e*x^2)^(3/2))/3 + (2*(d + e
*x^2)^(5/2))/5 - 32*d^(5/2)*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]))/e^4 + (d^3*
(a + b*Log[c*x^n]))/(e^4*Sqrt[d + e*x^2]) + (3*d^2*Sqrt[d + e*x^2]*(a + b*
Log[c*x^n]))/e^4 - (d*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/e^4 + ((d + e*
x^2)^(5/2)*(a + b*Log[c*x^n]))/(5*e^4)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2123
```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2])
```

rule 2331
```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[1/2   S
ubst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x)^p, x], x, x^2], x] /;
 FreeQ[{a, b, p}, x] && PolyQ[Pq, x^2] && IntegerQ[(m - 1)/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x^7(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{3}{2}}}dx$$

input
```
int(x^7*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

output
```
int(x^7*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 464, normalized size of antiderivative = 2.22

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \left[\frac{120\,(bd^2enx^2+bd^3n)\sqrt{d}\log\left(-\frac{ex^2+2\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-(3\,(be^3n-5\,ae^3)x^6+14}{}\right.$$

$$-\frac{240\,(bd^2enx^2+bd^3n)\sqrt{-d}\arctan\left(\frac{\sqrt{ex^2+d}\sqrt{-d}}{d}\right)+(3\,(be^3n-5\,ae^3)x^6+148\,bd^3n-(11\,bde^2n-30\,ade^2)}{}$$

input
```
integrate(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
[1/75*(120*(b*d^2*e*n*x^2 + b*d^3*n)*sqrt(d)*log(-(e*x^2 + 2*sqrt(e*x^2 +
d)*sqrt(d) + 2*d)/x^2) - (3*(b*e^3*n - 5*a*e^3)*x^6 + 148*b*d^3*n - (11*b*
d*e^2*n - 30*a*d*e^2)*x^4 - 240*a*d^3 + 2*(67*b*d^2*e*n - 60*a*d^2*e)*x^2
- 15*(b*e^3*x^6 - 2*b*d*e^2*x^4 + 8*b*d^2*e*x^2 + 16*b*d^3)*log(c) - 15*(b
*e^3*n*x^6 - 2*b*d*e^2*n*x^4 + 8*b*d^2*e*n*x^2 + 16*b*d^3*n)*log(x))*sqrt(
e*x^2 + d))/(e^5*x^2 + d*e^4), -1/75*(240*(b*d^2*e*n*x^2 + b*d^3*n)*sqrt(-
d)*arctan(sqrt(e*x^2 + d)*sqrt(-d)/d) + (3*(b*e^3*n - 5*a*e^3)*x^6 + 148*b
*d^3*n - (11*b*d*e^2*n - 30*a*d*e^2)*x^4 - 240*a*d^3 + 2*(67*b*d^2*e*n - 6
0*a*d^2*e)*x^2 - 15*(b*e^3*x^6 - 2*b*d*e^2*x^4 + 8*b*d^2*e*x^2 + 16*b*d^3)
*log(c) - 15*(b*e^3*n*x^6 - 2*b*d*e^2*n*x^4 + 8*b*d^2*e*n*x^2 + 16*b*d^3*n
)*log(x))*sqrt(e*x^2 + d))/(e^5*x^2 + d*e^4)]
```

Sympy [A] (verification not implemented)

Time = 45.58 (sec) , antiderivative size = 374, normalized size of antiderivative = 1.79

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = a\left(\begin{cases} \frac{d^3}{e^4\sqrt{d+ex^2}} + \frac{3d^2\sqrt{d+ex^2}}{e^4} - \frac{d(d+ex^2)^{\frac{3}{2}}}{e^4} + \frac{(d+ex^2)^{\frac{5}{2}}}{5e^4} & \text{for } e\neq 0 \\ \frac{x^8}{8d^{\frac{3}{2}}} & \text{otherwise} \end{cases}\right)$$
$$-bn\left(\begin{cases} -\frac{77d^{\frac{5}{2}}\sqrt{1+\frac{ex^2}{d}}}{75e^4} - \frac{2d^{\frac{5}{2}}\log\left(\frac{ex^2}{d}\right)}{5e^4} + \frac{4d^{\frac{5}{2}}\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{5e^4} - \frac{4d^{\frac{5}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{e^4} - \frac{14d^{\frac{3}{2}}x^2\sqrt{1+\frac{ex^2}{d}}}{75e^3} + \frac{\sqrt{d}x^4\sqrt{1+\frac{ex^2}{d}}}{25e^2} + \\ \frac{x^8}{64d^{\frac{3}{2}}} \end{cases}\right)$$
$$+b\left(\begin{cases} \frac{d^3}{e^4\sqrt{d+ex^2}} + \frac{3d^2\sqrt{d+ex^2}}{e^4} - \frac{d(d+ex^2)^{\frac{3}{2}}}{e^4} + \frac{(d+ex^2)^{\frac{5}{2}}}{5e^4} & \text{for } e\neq 0 \\ \frac{x^8}{8d^{\frac{3}{2}}} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate(x**7*(a+b*ln(c*x**n))/(e*x**2+d)**(3/2),x)
```

output
```
a*Piecewise((d**3/(e**4*sqrt(d + e*x**2)) + 3*d**2*sqrt(d + e*x**2)/e**4 -
 d*(d + e*x**2)**(3/2)/e**4 + (d + e*x**2)**(5/2)/(5*e**4), Ne(e, 0)), (x*
*8/(8*d**(3/2)), True)) - b*n*Piecewise((-77*d**(5/2)*sqrt(1 + e*x**2/d)/(
75*e**4) - 2*d**(5/2)*log(e*x**2/d)/(5*e**4) + 4*d**(5/2)*log(sqrt(1 + e*x
**2/d) + 1)/(5*e**4) - 4*d**(5/2)*asinh(sqrt(d)/(sqrt(e)*x))/e**4 - 14*d**
(3/2)*x**2*sqrt(1 + e*x**2/d)/(75*e**3) + sqrt(d)*x**4*sqrt(1 + e*x**2/d)/
(25*e**2) + 3*d**3/(e**(9/2)*x*sqrt(d/(e*x**2) + 1)) + 3*d**2*x/(e**(7/2)*
sqrt(d/(e*x**2) + 1)), (e > -oo) & (e < oo) & Ne(e, 0)), (x**8/(64*d**(3/2
)), True)) + b*Piecewise((d**3/(e**4*sqrt(d + e*x**2)) + 3*d**2*sqrt(d + e
*x**2)/e**4 - d*(d + e*x**2)**(3/2)/e**4 + (d + e*x**2)**(5/2)/(5*e**4), N
e(e, 0)), (x**8/(8*d**(3/2)), True))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^7}{(ex^2+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^7/(e*x^2 + d)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \int \frac{x^7\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{3/2}}\,dx$$

input
```
int((x^7*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2),x)
```

output
```
int((x^7*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 568, normalized size of antiderivative = 2.72

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \frac{240\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) b\,d^3 + 120\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x\right.}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\right.}\right.}{}$$

input
```
int(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x)
```

output
```
(240*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)
/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**3 + 120*sqrt(d +
e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sq
rt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2*e*x**2 - 30*sqrt(d + e*x**2)*
log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e
*x**2) + sqrt(e)*x)**n*2**n))*b*d*e**2*x**4 + 15*sqrt(d + e*x**2)*log(((2*
sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2) +
 sqrt(e)*x)**n*2**n))*b*e**3*x**6 + 240*sqrt(d + e*x**2)*a*d**3 + 120*sqrt
(d + e*x**2)*a*d**2*e*x**2 - 30*sqrt(d + e*x**2)*a*d*e**2*x**4 + 15*sqrt(d
 + e*x**2)*a*e**3*x**6 - 148*sqrt(d + e*x**2)*b*d**3*n - 134*sqrt(d + e*x*
*2)*b*d**2*e*n*x**2 + 11*sqrt(d + e*x**2)*b*d*e**2*n*x**4 - 3*sqrt(d + e*x
**2)*b*e**3*n*x**6 - 240*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)
*x)/sqrt(d))*b*d**3*n - 240*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt
(e)*x)/sqrt(d))*b*d**2*e*n*x**2 + 240*sqrt(d)*log((sqrt(d + e*x**2) + sqrt
(d) + sqrt(e)*x)/sqrt(d))*b*d**3*n + 240*sqrt(d)*log((sqrt(d + e*x**2) + s
qrt(d) + sqrt(e)*x)/sqrt(d))*b*d**2*e*n*x**2)/(75*e**4*(d + e*x**2))
```

3.287 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$

Optimal result 2187
Mathematica [A] (verified) 2188
Rubi [A] (warning: unable to verify) 2188
Maple [F] 2191
Fricas [A] (verification not implemented) 2191
Sympy [A] (verification not implemented) 2192
Maxima [F(-2)] 2192
Giac [F] 2193
Mupad [F(-1)] 2193
Reduce [B] (verification not implemented) 2194

Optimal result

Integrand size = 25, antiderivative size = 158

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \frac{5bdn\sqrt{d+ex^2}}{3e^3} - \frac{bn(d+ex^2)^{3/2}}{9e^3} - \frac{8bd^{3/2}n\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^3} - \frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}} - \frac{2d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3} + \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

output
```
5/3*b*d*n*(e*x^2+d)^(1/2)/e^3-1/9*b*n*(e*x^2+d)^(3/2)/e^3-8/3*b*d^(3/2)*n*
arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^3-d^2*(a+b*ln(c*x^n))/e^3/(e*x^2+d)^(1/
2)-2*d*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/e^3+1/3*(e*x^2+d)^(3/2)*(a+b*ln(c*x
^n))/e^3
```

Mathematica [A] (verified)

Time = 0.27 (sec) , antiderivative size = 160, normalized size of antiderivative = 1.01

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \frac{-24ad^2+14bd^2n-12adex^2+13bdenx^2+3ae^2x^4-be^2nx^4+24bd^{3/2}n\sqrt{d+e}}{9}$$

input
```
Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
(-24*a*d^2 + 14*b*d^2*n - 12*a*d*e*x^2 + 13*b*d*e*n*x^2 + 3*a*e^2*x^4 - b*
e^2*n*x^4 + 24*b*d^(3/2)*n*Sqrt[d + e*x^2]*Log[x] - 3*b*(8*d^2 + 4*d*e*x^2
 - e^2*x^4)*Log[c*x^n] - 24*b*d^(3/2)*n*Sqrt[d + e*x^2]*Log[d + Sqrt[d]*Sq
rt[d + e*x^2]])/(9*e^3*Sqrt[d + e*x^2])
```

Rubi [A] (warning: unable to verify)

Time = 0.50 (sec) , antiderivative size = 150, normalized size of antiderivative = 0.95, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.280$, Rules used = {2792, 27, 1578, 1192, 25, 1467, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{-e^2x^4+4dex^2+8d^2}{3e^3x\sqrt{ex^2+d}}dx-\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}-\frac{2d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{-e^2x^4+4dex^2+8d^2}{x\sqrt{ex^2+d}}dx}{3e^3}-\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}-\frac{2d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{1578}$$

$$\frac{bn\int \frac{-e^2x^4+4dex^2+8d^2}{x^2\sqrt{ex^2+d}}dx^2}{6e^3}-\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}-\frac{2d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{1192}$$

$$\frac{bn\int -\frac{-e^2x^8+6de^2x^4+3d^2e^2}{d-x^4}d\sqrt{ex^2+d}}{3e^5}-\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}-\frac{2d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{25}$$

$$-\frac{bn\int \frac{-e^2x^8+6de^2x^4+3d^2e^2}{d-x^4}d\sqrt{ex^2+d}}{3e^5}-\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}-\frac{2d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{1467}$$

$$-\frac{bn\int \left(e^2x^4-5de^2+\frac{8d^2e^2}{d-x^4}\right)d\sqrt{ex^2+d}}{3e^5}-\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}-\frac{2d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}-\frac{2d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{bn\left(-8d^{3/2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+5de^2\sqrt{d+ex^2}-\frac{1}{3}e^2x^6\right)}{3e^5}$$

input
```
Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
(b*n*(-1/3*(e^2*x^6) + 5*d*e^2*Sqrt[d + e*x^2] - 8*d^(3/2)*e^2*ArcTanh[Sqr
t[d + e*x^2]/Sqrt[d]]))/(3*e^5) - (d^2*(a + b*Log[c*x^n]))/(e^3*Sqrt[d + e
*x^2]) - (2*d*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/e^3 + ((d + e*x^2)^(3/2)
*(a + b*Log[c*x^n]))/(3*e^3)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1192
```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[2/e^(n + 2*p + 1)   Subst[Int[x^(
2*m + 1)*(e*f - d*g + g*x^2)^n*(c*d^2 - b*d*e + a*e^2 - (2*c*d - b*e)*x^2 +
 c*x^4)^p, x], x, Sqrt[d + e*x]], x] /; FreeQ[{a, b, c, d, e, f, g}, x] &&
IGtQ[p, 0] && ILtQ[n, 0] && IntegerQ[m + 1/2]
```

rule 1467
```
Int[((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.),
 x_Symbol] :> Int[ExpandIntegrand[(d + e*x^2)^q*(a + b*x^2 + c*x^4)^p, x],
x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e
 + a*e^2, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

rule 1578
```
Int[(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_
)^4)^(p_.), x_Symbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(d + e*x)^q*(a
+ b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x] && Int
egerQ[(m - 1)/2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x^5(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{3}{2}}}dx$$

input
```
int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

output
```
int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 359, normalized size of antiderivative = 2.27

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \left[\frac{12\,(bdenx^2+bd^2n)\sqrt{d}\log\left(-\frac{ex^2-2\,\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-((be^2n-3\,ae^2)x^4-14\,bd\right.$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
[1/9*(12*(b*d*e*n*x^2 + b*d^2*n)*sqrt(d)*log(-(e*x^2 - 2*sqrt(e*x^2 + d)*s
qrt(d) + 2*d)/x^2) - ((b*e^2*n - 3*a*e^2)*x^4 - 14*b*d^2*n + 24*a*d^2 - (1
3*b*d*e*n - 12*a*d*e)*x^2 - 3*(b*e^2*x^4 - 4*b*d*e*x^2 - 8*b*d^2)*log(c) -
 3*(b*e^2*n*x^4 - 4*b*d*e*n*x^2 - 8*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(e^4
*x^2 + d*e^3), 1/9*(24*(b*d*e*n*x^2 + b*d^2*n)*sqrt(-d)*arctan(sqrt(e*x^2
+ d)*sqrt(-d)/d) - ((b*e^2*n - 3*a*e^2)*x^4 - 14*b*d^2*n + 24*a*d^2 - (13*
b*d*e*n - 12*a*d*e)*x^2 - 3*(b*e^2*x^4 - 4*b*d*e*x^2 - 8*b*d^2)*log(c) - 3
*(b*e^2*n*x^4 - 4*b*d*e*n*x^2 - 8*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(e^4*x
^2 + d*e^3)]
```

Sympy [A] (verification not implemented)

Time = 37.11 (sec) , antiderivative size = 308, normalized size of antiderivative = 1.95

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = a\left(\begin{cases} -\frac{d^2}{e^3\sqrt{d+ex^2}} - \frac{2d\sqrt{d+ex^2}}{e^3} + \frac{(d+ex^2)^{\frac{3}{2}}}{3e^3} & \text{for } e \neq 0 \\ \frac{x^6}{6d^{\frac{3}{2}}} & \text{otherwise} \end{cases}\right)$$

$$-bn\left(\begin{cases} \frac{4d^{\frac{3}{2}}\sqrt{1+\frac{ex^2}{d}}}{9e^3} + \frac{d^{\frac{3}{2}}\log\left(\frac{ex^2}{d}\right)}{6e^3} - \frac{d^{\frac{3}{2}}\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{3e^3} + \frac{3d^{\frac{3}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{e^3} + \frac{\sqrt{d}x^2\sqrt{1+\frac{ex^2}{d}}}{9e^2} - \frac{2d^2}{e^{\frac{7}{2}}x\sqrt{\frac{d}{ex^2}+1}} - \frac{2dx}{e^{\frac{5}{2}}\sqrt{\frac{d}{ex^2}\cdots}} \\ \frac{x^6}{36d^{\frac{3}{2}}} \end{cases}\right)$$

$$+b\left(\begin{cases} -\frac{d^2}{e^3\sqrt{d+ex^2}} - \frac{2d\sqrt{d+ex^2}}{e^3} + \frac{(d+ex^2)^{\frac{3}{2}}}{3e^3} & \text{for } e \neq 0 \\ \frac{x^6}{6d^{\frac{3}{2}}} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate(x**5*(a+b*ln(c*x**n))/(e*x**2+d)**(3/2),x)
```

output
```
a*Piecewise((-d**2/(e**3*sqrt(d + e*x**2)) - 2*d*sqrt(d + e*x**2)/e**3 + (
d + e*x**2)**(3/2)/(3*e**3), Ne(e, 0)), (x**6/(6*d**(3/2)), True)) - b*n*P
iecewise((4*d**(3/2)*sqrt(1 + e*x**2/d)/(9*e**3) + d**(3/2)*log(e*x**2/d)/
(6*e**3) - d**(3/2)*log(sqrt(1 + e*x**2/d) + 1)/(3*e**3) + 3*d**(3/2)*asin
h(sqrt(d)/(sqrt(e)*x))/e**3 + sqrt(d)*x**2*sqrt(1 + e*x**2/d)/(9*e**2) - 2
*d**2/(e**(7/2)*x*sqrt(d/(e*x**2) + 1)) - 2*d*x/(e**(5/2)*sqrt(d/(e*x**2)
+ 1)), (e > -oo) & (e < oo) & Ne(e, 0)), (x**6/(36*d**(3/2)), True)) + b*P
iecewise((-d**2/(e**3*sqrt(d + e*x**2)) - 2*d*sqrt(d + e*x**2)/e**3 + (d +
 e*x**2)**(3/2)/(3*e**3), Ne(e, 0)), (x**6/(6*d**(3/2)), True))*log(c*x**n
)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx=\int \frac{(b\log(cx^n)+a)x^5}{(ex^2+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^5/(e*x^2 + d)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx=\int \frac{x^5\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{3/2}}\,dx$$

input
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2),x)
```

output
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 449, normalized size of antiderivative = 2.84

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \frac{-24\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)b\,d^2-12\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x\right.}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\right.}\right.}{}$$

input
```
int(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x)
```

output
```
( - 24*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*
c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2 - 12*sqrt(d +
 e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(s
qrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e*x**2 + 3*sqrt(d + e*x**2)*log
(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x*
*2) + sqrt(e)*x)**n*2**n))*b*e**2*x**4 - 24*sqrt(d + e*x**2)*a*d**2 - 12*s
qrt(d + e*x**2)*a*d*e*x**2 + 3*sqrt(d + e*x**2)*a*e**2*x**4 + 14*sqrt(d +
e*x**2)*b*d**2*n + 13*sqrt(d + e*x**2)*b*d*e*n*x**2 - sqrt(d + e*x**2)*b*e
**2*n*x**4 + 24*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(
d))*b*d**2*n + 24*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqr
t(d))*b*d*e*n*x**2 - 24*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*
x)/sqrt(d))*b*d**2*n - 24*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e
)*x)/sqrt(d))*b*d*e*n*x**2)/(9*e**3*(d + e*x**2))
```

3.288 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$

Optimal result 2195
Mathematica [A] (verified) 2195
Rubi [A] (verified) 2196
Maple [F] 2198
Fricas [A] (verification not implemented) 2198
Sympy [A] (verification not implemented) 2199
Maxima [F(-2)] 2199
Giac [F] 2200
Mupad [F(-1)] 2200
Reduce [B] (verification not implemented) 2201

Optimal result

Integrand size = 25, antiderivative size = 100

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = -\frac{bn\sqrt{d+ex^2}}{e^2}+\frac{2b\sqrt{d}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{e^2}+\frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}$$

output
```
-b*n*(e*x^2+d)^(1/2)/e^2+2*b*d^(1/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^
2+d*(a+b*ln(c*x^n))/e^2/(e*x^2+d)^(1/2)+(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/e^
2
```

Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.18

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \frac{2ad-bdn+aex^2-benx^2-2b\sqrt{d}n\sqrt{d+ex^2}\log(x)+b(2d+ex^2)\log(cx^n)+}{e^2\sqrt{d+ex^2}}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
(2*a*d - b*d*n + a*e*x^2 - b*e*n*x^2 - 2*b*Sqrt[d]*n*Sqrt[d + e*x^2]*Log[x
] + b*(2*d + e*x^2)*Log[c*x^n] + 2*b*Sqrt[d]*n*Sqrt[d + e*x^2]*Log[d + Sqr
t[d]*Sqrt[d + e*x^2]])/(e^2*Sqrt[d + e*x^2])
```

Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.240$, Rules used = {2792, 27, 354, 90, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int \frac{ex^2+2d}{e^2x\sqrt{ex^2+d}}dx+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}+\frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{27}$$

$$-\frac{bn\int \frac{ex^2+2d}{x\sqrt{ex^2+d}}dx}{e^2}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}+\frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{354}$$

$$-\frac{bn\int \frac{ex^2+2d}{x^2\sqrt{ex^2+d}}dx^2}{2e^2}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}+\frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{90}$$

$$-\frac{bn\left(2d\int \frac{1}{x^2\sqrt{ex^2+d}}dx^2+2\sqrt{d+ex^2}\right)}{2e^2}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}+\frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{73}$$

$$-\frac{bn\left(\frac{4d\int \frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{e}+2\sqrt{d+ex^2}\right)}{2e^2}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}+\frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{221}$$

$$\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}+\frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}}-\frac{bn\left(2\sqrt{d+ex^2}-4\sqrt{d}\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)}{2e^2}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
-1/2*(b*n*(2*Sqrt[d + e*x^2] - 4*Sqrt[d]*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])
)/e^2 + (d*(a + b*Log[c*x^n]))/(e^2*Sqrt[d + e*x^2]) + (Sqrt[d + e*x^2]*(a
 + b*Log[c*x^n]))/e^2
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 354
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_S
ymbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(a + b*x)^p*(c + d*x)^q, x], x
, x^2], x] /; FreeQ[{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0] && IntegerQ
[(m - 1)/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x^3(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{3}{2}}}dx$$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

output
```
int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 248, normalized size of antiderivative = 2.48

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \left[\frac{(benx^2+bdn)\sqrt{d}\log\left(-\frac{ex^2+2\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-(bdn+(ben-ae)x^2-2\,ad-}{e^3x^2+de^2}\right.$$

$$-\frac{2\,(benx^2+bdn)\sqrt{-d}\arctan\left(\frac{\sqrt{ex^2+d}\sqrt{-d}}{d}\right)+(bdn+(ben-ae)x^2-2\,ad-(bex^2+2\,bd)\log(c)-(benx^2}{e^3x^2+de^2}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
[((b*e*n*x^2 + b*d*n)*sqrt(d)*log(-(e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(d) + 2*
d)/x^2) - (b*d*n + (b*e*n - a*e)*x^2 - 2*a*d - (b*e*x^2 + 2*b*d)*log(c) -
(b*e*n*x^2 + 2*b*d*n)*log(x))*sqrt(e*x^2 + d))/(e^3*x^2 + d*e^2), -(2*(b*e
*n*x^2 + b*d*n)*sqrt(-d)*arctan(sqrt(e*x^2 + d)*sqrt(-d)/d) + (b*d*n + (b*
e*n - a*e)*x^2 - 2*a*d - (b*e*x^2 + 2*b*d)*log(c) - (b*e*n*x^2 + 2*b*d*n)*
log(x))*sqrt(e*x^2 + d))/(e^3*x^2 + d*e^2)]
```

Sympy [A] (verification not implemented)

Time = 24.67 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.67

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = a\left(\begin{cases}\frac{d}{e^2\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}}{e^2} & \text{for } e\neq 0\\ \frac{x^4}{4d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right) - bn\left(\begin{cases}-\frac{2\sqrt{d}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{e^2}+\frac{d}{e^{\frac{5}{2}}x\sqrt{\frac{d}{ex^2}+1}}+\frac{x}{e^{\frac{3}{2}}\sqrt{\frac{d}{ex^2}+1}} & \text{for } e>-\infty\wedge e<\infty\wedge e\neq 0\\ \frac{x^4}{16d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right) + b\left(\begin{cases}\frac{d}{e^2\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}}{e^2} & \text{for } e\neq 0\\ \frac{x^4}{4d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x**2+d)**(3/2),x)
```

output
```
a*Piecewise((d/(e**2*sqrt(d + e*x**2)) + sqrt(d + e*x**2)/e**2, Ne(e, 0)),
 (x**4/(4*d**(3/2)), True)) - b*n*Piecewise((-2*sqrt(d)*asinh(sqrt(d)/(sqr
t(e)*x))/e**2 + d/(e**(5/2)*x*sqrt(d/(e*x**2) + 1)) + x/(e**(3/2)*sqrt(d/(
e*x**2) + 1)), (e > -oo) & (e < oo) & Ne(e, 0)), (x**4/(16*d**(3/2)), True
)) + b*Piecewise((d/(e**2*sqrt(d + e*x**2)) + sqrt(d + e*x**2)/e**2, Ne(e,
 0)), (x**4/(4*d**(3/2)), True))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x^3(a + b\log{(cx^n)})}{(d + ex^2)^{3/2}}\,dx = \int \frac{(b\log{(cx^n)} + a)x^3}{(ex^2 + d)^{\frac{3}{2}}}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x^2 + d)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a + b\log{(cx^n)})}{(d + ex^2)^{3/2}}\,dx = \int \frac{x^3\,(a + b\,\ln{(c\,x^n)})}{{(e\,x^2 + d)}^{3/2}}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 325, normalized size of antiderivative = 3.25

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \frac{2\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) bd+\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right.}{}$$

input
```
int(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x)
```

output
```
(2*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(
e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d + sqrt(d + e*x**2)*l
og(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*
x**2) + sqrt(e)*x)**n*2**n))*b*e*x**2 + 2*sqrt(d + e*x**2)*a*d + sqrt(d +
e*x**2)*a*e*x**2 - sqrt(d + e*x**2)*b*d*n - sqrt(d + e*x**2)*b*e*n*x**2 -
2*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d*n - 2*
sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*b*e*n*x**2 +
 2*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d*n + 2
*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*e*n*x**2)
/(e**2*(d + e*x**2))
```

3.289 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$

Optimal result 2202
Mathematica [A] (verified) 2202
Rubi [A] (verified) 2203
Maple [F] 2204
Fricas [A] (verification not implemented) 2205
Sympy [A] (verification not implemented) 2205
Maxima [F(-2)] 2206
Giac [F] 2206
Mupad [F(-1)] 2206
Reduce [B] (verification not implemented) 2207

Optimal result

Integrand size = 23, antiderivative size = 57

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = -\frac{bn\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{\sqrt{d}e} - \frac{a+b\log(cx^n)}{e\sqrt{d+ex^2}}$$

output
```
-b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(1/2)/e-(a+b*ln(c*x^n))/e/(e*x^2+d
)^(1/2)
```

Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 77, normalized size of antiderivative = 1.35

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = -\frac{\frac{a}{\sqrt{d+ex^2}} - \frac{bn\log(x)}{\sqrt{d}} + \frac{b\log(cx^n)}{\sqrt{d+ex^2}} + \frac{bn\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{\sqrt{d}}}{e}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
-((a/Sqrt[d + e*x^2] - (b*n*Log[x])/Sqrt[d] + (b*Log[c*x^n])/Sqrt[d + e*x^
2] + (b*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/Sqrt[d])/e)
```

Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2776, 243, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}dx$$

$$\Big\downarrow \text{2776}$$

$$\frac{bn\int \frac{1}{x\sqrt{ex^2+d}}dx}{e}-\frac{a+b\log(cx^n)}{e\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{243}$$

$$\frac{bn\int \frac{1}{x^2\sqrt{ex^2+d}}dx^2}{2e}-\frac{a+b\log(cx^n)}{e\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{73}$$

$$\frac{bn\int \frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{e^2}-\frac{a+b\log(cx^n)}{e\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{221}$$

$$-\frac{a+b\log(cx^n)}{e\sqrt{d+ex^2}}-\frac{bn\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{\sqrt{d}e}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
-((b*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(Sqrt[d]*e)) - (a + b*Log[c*x^n])
/(e*Sqrt[d + e*x^2])
```

Defintions of rubi rules used

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Maple [F]

$$\int \frac{x(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{3}{2}}}dx$$

input
```
int(x*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

output
```
int(x*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 172, normalized size of antiderivative = 3.02

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \left[\frac{(benx^2+bdn)\sqrt{d}\log\left(-\frac{ex^2-2\sqrt{ex^2+d}\sqrt{d}+2d}{x^2}\right)-2\left(bdn\log(x)+bd\log(c)+ad\right)}{2\left(de^2x^2+d^2e\right)}\right.$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
[1/2*((b*e*n*x^2 + b*d*n)*sqrt(d)*log(-(e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(d)
+ 2*d)/x^2) - 2*(b*d*n*log(x) + b*d*log(c) + a*d)*sqrt(e*x^2 + d))/(d*e^2*
x^2 + d^2*e), ((b*e*n*x^2 + b*d*n)*sqrt(-d)*arctan(sqrt(e*x^2 + d)*sqrt(-d
)/d) - (b*d*n*log(x) + b*d*log(c) + a*d)*sqrt(e*x^2 + d))/(d*e^2*x^2 + d^2
*e)]
```

Sympy [A] (verification not implemented)

Time = 5.24 (sec) , antiderivative size = 94, normalized size of antiderivative = 1.65

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = a\left(\begin{cases}-\frac{1}{e\sqrt{d+ex^2}} & \text{for } e\neq 0\\ \frac{x^2}{2d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right) - bn\left(\begin{cases}\frac{x^2}{4d^{\frac{3}{2}}} & \text{for } e=0\\ \frac{\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{\sqrt{d}e} & \text{otherwise}\end{cases}\right) + b\left(\begin{cases}\frac{x^2}{2d^{\frac{3}{2}}} & \text{for } e=0\\ -\frac{1}{e\sqrt{d+ex^2}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x**2+d)**(3/2),x)
```

output
```
a*Piecewise((-1/(e*sqrt(d + e*x**2)), Ne(e, 0)), (x**2/(2*d**(3/2)), True)
) - b*n*Piecewise((x**2/(4*d**(3/2)), Eq(e, 0)), (asinh(sqrt(d)/(sqrt(e)*x
))/(sqrt(d)*e), True)) + b*Piecewise((x**2/(2*d**(3/2)), Eq(e, 0)), (-1/(e
*sqrt(d + e*x**2)), True))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \int \frac{(b\log(cx^n)+a)x}{(ex^2+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x^2 + d)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{3/2}}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2),x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 218, normalized size of antiderivative = 3.82

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \frac{-\sqrt{e\,x^2+d}\log\left(\frac{d^{\frac{n}{2}}\left(\sqrt{e}\sqrt{e\,x^2+d}\,x+e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{d}\sqrt{e\,x^2+d}+\sqrt{e}\sqrt{d}\,x\right)^n}\right) bd-\sqrt{e\,x^2+d}\,ad+\sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}-\sqrt{}}{\sqrt{d}}\right.}{}$$

input
```
int(x*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x)
```

output
```
( - sqrt(d + e*x**2)*log((d**(n/2)*(sqrt(e)*sqrt(d + e*x**2)*x + e*x**2)**
n*c)/(e**(n/2)*(sqrt(d)*sqrt(d + e*x**2) + sqrt(e)*sqrt(d)*x)**n))*b*d - s
qrt(d + e*x**2)*a*d + sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)
/sqrt(d))*b*d*n + sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqr
t(d))*b*e*n*x**2 - sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sq
rt(d))*b*d*n - sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d
))*b*e*n*x**2)/(d*e*(d + e*x**2))
```

3.290 $\int \frac{a+b\log(cx^n)}{x\left(d+ex^2\right)^{3/2}}\,dx$

Optimal result 2208
Mathematica [C] (verified) 2209
Rubi [A] (verified) 2209
Maple [F] 2210
Fricas [F] 2211
Sympy [F] 2211
Maxima [F(-2)] 2211
Giac [F] 2212
Mupad [F(-1)] 2212
Reduce [F] 2212

Optimal result

Integrand size = 25, antiderivative size = 209

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)^{3/2}}\,dx = \frac{bn\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}} + \frac{bn\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{3/2}} + \left(\frac{1}{d\sqrt{d+ex^2}} - \frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}\right)\left(a+b\log\left(cx^n\right)\right) - \frac{bn\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{d^{3/2}} - \frac{bn\,\text{PolyLog}}{}$$

output
```
b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(3/2)+1/2*b*n*arctanh((e*x^2+d)^(1/
2)/d^(1/2))^2/d^(3/2)+(1/d/(e*x^2+d)^(1/2)-arctanh((e*x^2+d)^(1/2)/d^(1/2)
)/d^(3/2))*(a+b*ln(c*x^n))-b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/
2)/(d^(1/2)-(e*x^2+d)^(1/2)))/d^(3/2)-1/2*b*n*polylog(2,1-2*d^(1/2)/(d^(1/
2)-(e*x^2+d)^(1/2)))/d^(3/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.51 (sec) , antiderivative size = 241, normalized size of antiderivative = 1.15

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx = \frac{-bd^{3/2}n\sqrt{1+\frac{d}{ex^2}}\,{}_3F_2\left(\frac{3}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{d}{ex^2}\right)+9ex^2\left(-b\sqrt{e}n\sqrt{1+\frac{d}{ex^2}}x\operatorname{arcsinh}\left(\frac{\sqrt{d}}{\sqrt{ex}}\right)\right.}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^2)^(3/2)),x]
```

output
```
(-(b*d^(3/2)*n*Sqrt[1 + d/(e*x^2)]*HypergeometricPFQ[{3/2, 3/2, 3/2}, {5/2
, 5/2}, -(d/(e*x^2))]) + 9*e*x^2*(-(b*Sqrt[e]*n*Sqrt[1 + d/(e*x^2)]*x*ArcS
inh[Sqrt[d]/(Sqrt[e]*x)]*Log[x]) - b*n*Sqrt[d + e*x^2]*Log[x]^2 + Sqrt[d +
 e*x^2]*Log[x]*(a + b*Log[c*x^n] + b*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]]) +
 (a + b*Log[c*x^n])*(Sqrt[d] - Sqrt[d + e*x^2]*Log[d + Sqrt[d]*Sqrt[d + e*
x^2]])))/(9*d^(3/2)*e*x^2*Sqrt[d + e*x^2])
```

Rubi [A] (verified)

Time = 0.65 (sec) , antiderivative size = 206, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.080$, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx$$

$$\Big\downarrow \; 2790$$

$$\left(\frac{1}{d\sqrt{d+ex^2}}-\frac{\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}\right)(a+b\log(cx^n))-bn\int \left(\frac{1}{dx\sqrt{ex^2+d}}-\frac{\operatorname{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{d^{3/2}x}\right)dx$$

$$\downarrow \text{2009}$$

$$\left(\frac{1}{d\sqrt{d+ex^2}}-\frac{\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}\right)(a+b\log(cx^n))- bn\left(-\frac{\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{3/2}}-\frac{\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}+\frac{\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{d^{3/2}}+\frac{\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{e}}\right.}{2d^{3/2}}\right.$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^2)^(3/2)),x]
```

output
```
(1/(d*Sqrt[d + e*x^2]) - ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]/d^(3/2))*(a + b*
Log[c*x^n]) - b*n*(-(ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]/d^(3/2)) - ArcTanh[S
qrt[d + e*x^2]/Sqrt[d]]^2/(2*d^(3/2)) + (ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*
Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/d^(3/2) + PolyLog[2, 1 - (2*
Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])]/(2*d^(3/2)))
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

Maple [F]

$$\int \frac{a+b\ln(c\,x^n)}{x\,(e\,x^2+d)^{\frac{3}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x/(e*x^2+d)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(e*x^2+d)^(3/2),x)
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx=\int \frac{b\log(cx^n)+a}{(ex^2+d)^{\frac{3}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/(e^2*x^5 + 2*d
*e*x^3 + d^2*x), x)
```

Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx=\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x**2+d)**(3/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x*(d + e*x**2)**(3/2)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx=\text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^{\frac{3}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^(3/2)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx = \int \frac{a+b\ln(c\,x^n)}{x\,(e\,x^2+d)^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^(3/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^(3/2)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx = \frac{\sqrt{e\,x^2+d}\,ad+\sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}-\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)ad+\sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}-\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)ae\,x^2-\sqrt{d}}{}$$

input
```
int((a+b*log(c*x^n))/x/(e*x^2+d)^(3/2),x)
```

output
```
(sqrt(d + e*x**2)*a*d + sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*
x)/sqrt(d))*a*d + sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqr
t(d))*a*e*x**2 - sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt
(d))*a*d - sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*a
*e*x**2 + int(log(x**n*c)/(sqrt(d + e*x**2)*d*x + sqrt(d + e*x**2)*e*x**3)
,x)*b*d**3 + int(log(x**n*c)/(sqrt(d + e*x**2)*d*x + sqrt(d + e*x**2)*e*x*
*3),x)*b*d**2*e*x**2)/(d**2*(d + e*x**2))
```

3.291 $\int \frac{a+b\log(cx^n)}{x^3\left(d+ex^2\right)^{3/2}}\,dx$

Optimal result 2214
Mathematica [C] (verified) 2215
Rubi [A] (verified) 2215
Maple [F] 2217
Fricas [F] 2217
Sympy [F] 2217
Maxima [F(-2)] 2218
Giac [F] 2218
Mupad [F(-1)] 2218
Reduce [F] 2219

Optimal result

Integrand size = 25, antiderivative size = 287

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{3/2}}\,dx = & -\frac{bn\sqrt{d+ex^2}}{4d^2x^2}-\frac{5ben\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4d^{5/2}} \\ & -\frac{3ben\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{5/2}}-\frac{3e(a+b\log(cx^n))}{2d^2\sqrt{d+ex^2}} \\ & -\frac{a+b\log(cx^n)}{2dx^2\sqrt{d+ex^2}}+\frac{3e\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{5/2}} \\ & +\frac{3ben\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{2d^{5/2}}+\frac{3ben\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{4d^{5/2}}\end{aligned}$$

output
```
-1/4*b*n*(e*x^2+d)^(1/2)/d^2/x^2-5/4*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2)
)/d^(5/2)-3/4*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))^2/d^(5/2)-3/2*e*(a+b*
ln(c*x^n))/d^2/(e*x^2+d)^(1/2)-1/2*(a+b*ln(c*x^n))/d/x^2/(e*x^2+d)^(1/2)+3
/2*e*arctanh((e*x^2+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(5/2)+3/2*b*e*n*ar
ctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))/d^(
5/2)+3/4*b*e*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))/d^(5/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.40 (sec) , antiderivative size = 218, normalized size of antiderivative = 0.76

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{3/2}}\,dx = \frac{3bd^{5/2}n\sqrt{1+\frac{d}{ex^2}}\,{}_3F_2\left(\frac{5}{2},\frac{5}{2},\frac{5}{2};\frac{7}{2},\frac{7}{2};-\frac{d}{ex^2}\right)-5bd^{5/2}n\sqrt{1+\frac{d}{ex^2}}\,\text{Hypergeometric2F1}\left(\right.}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^(3/2)),x]
```

output
```
(3*b*d^(5/2)*n*Sqrt[1 + d/(e*x^2)]*HypergeometricPFQ[{5/2, 5/2, 5/2}, {7/2
, 7/2}, -(d/(e*x^2))] - 5*b*d^(5/2)*n*Sqrt[1 + d/(e*x^2)]*Hypergeometric2F
1[3/2, 5/2, 7/2, -(d/(e*x^2))]*(1 + 2*Log[x]) - 25*e*x^2*(a - b*n*Log[x] +
 b*Log[c*x^n])*(Sqrt[d]*(d + 3*e*x^2) + 3*e*x^2*Sqrt[d + e*x^2]*Log[x] - 3
*e*x^2*Sqrt[d + e*x^2]*Log[d + Sqrt[d]*Sqrt[d + e*x^2]]))/(50*d^(5/2)*e*x^
4*Sqrt[d + e*x^2])
```

Rubi [A] (verified)

Time = 0.74 (sec) , antiderivative size = 282, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2792, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{3/2}}\,dx$$

$$\Big\downarrow \text{ 2792}$$

$$-bn\int\left(\frac{3e\,\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{2d^{5/2}x}-\frac{3ex^2+d}{2d^2x^3\sqrt{ex^2+d}}\right)dx+\frac{3e\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{5/2}}-\frac{3e(a+b\log(cx^n))}{2d^2\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{2dx^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{2009}$$

$$\frac{3e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{5/2}}-\frac{3e(a+b\log(cx^n))}{2d^2\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{2dx^2\sqrt{d+ex^2}}-$$
$$bn\left(\frac{3e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{5/2}}+\frac{5e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4d^{5/2}}-\frac{3e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{2d^{5/2}}-\frac{3e\,\text{PolyLog}\left(2,1-\right.}{4d^{5/2}}\right.$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^(3/2)),x]
```

output
```
(-3*e*(a + b*Log[c*x^n]))/(2*d^2*Sqrt[d + e*x^2]) - (a + b*Log[c*x^n])/(2*
d*x^2*Sqrt[d + e*x^2]) + (3*e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*(a + b*Log[
c*x^n]))/(2*d^(5/2)) - b*n*(Sqrt[d + e*x^2]/(4*d^2*x^2) + (5*e*ArcTanh[Sqr
t[d + e*x^2]/Sqrt[d]])/(4*d^(5/2)) + (3*e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]
^2)/(4*d^(5/2)) - (3*e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*Log[(2*Sqrt[d])/(S
qrt[d] - Sqrt[d + e*x^2])])/(2*d^(5/2)) - (3*e*PolyLog[2, 1 - (2*Sqrt[d])/
(Sqrt[d] - Sqrt[d + e*x^2])])/(4*d^(5/2)))
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{3}\left(e\,x^{2}+d\right)^{\frac{3}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^(3/2),x)
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{3}\left(d+ex^{2}\right)^{3/2}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\left(ex^{2}+d\right)^{\frac{3}{2}}x^{3}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/(e^2*x^7 + 2*d
*e*x^5 + d^2*x^3), x)
```

Sympy [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{3}\left(d+ex^{2}\right)^{3/2}}\,dx=\int \frac{a+b\log\left(cx^{n}\right)}{x^{3}\left(d+ex^{2}\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x**2+d)**(3/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**3*(d + e*x**2)**(3/2)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{3/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^{\frac{3}{2}}x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^(3/2)*x^3), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{3/2}}\,dx = \int \frac{a+b\ln(c\,x^n)}{x^3\,(e\,x^2+d)^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^(3/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^(3/2)), x)
```

Reduce [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^2\right)^{3/2}}\,dx = \frac{-\sqrt{e\,x^2+d}\,a\,d^2-3\sqrt{e\,x^2+d}\,ade\,x^2-3\sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}-\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)ade\,x^2-3\sqrt{d}\,\mathrm{lo}}{}$$

input
```
int((a+b*log(c*x^n))/x^3/(e*x^2+d)^(3/2),x)
```

output
```
( - sqrt(d + e*x**2)*a*d**2 - 3*sqrt(d + e*x**2)*a*d*e*x**2 - 3*sqrt(d)*lo
g((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*a*d*e*x**2 - 3*sqrt(d)
*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*a*e**2*x**4 + 3*sqr
t(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*a*d*e*x**2 + 3*
sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*a*e**2*x**4
+ 2*int(log(x**n*c)/(sqrt(d + e*x**2)*d*x**3 + sqrt(d + e*x**2)*e*x**5),x)
*b*d**4*x**2 + 2*int(log(x**n*c)/(sqrt(d + e*x**2)*d*x**3 + sqrt(d + e*x**
2)*e*x**5),x)*b*d**3*e*x**4)/(2*d**3*x**2*(d + e*x**2))
```

3.292 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$

Optimal result 2220
Mathematica [C] (verified) 2221
Rubi [A] (verified) 2222
Maple [F] 2224
Fricas [F] 2224
Sympy [F] 2225
Maxima [F(-2)] 2225
Giac [F] 2225
Mupad [F(-1)] 2226
Reduce [F] 2226

Optimal result

Integrand size = 25, antiderivative size = 328

$$\begin{aligned}\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx &= \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{e^{3/2}\sqrt{d+ex^2}} \\ &+ \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{2e^{3/2}\sqrt{d+ex^2}} \\ &- \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{e^{3/2}\sqrt{d+ex^2}} \\ &- \frac{x(a+b\log(cx^n))}{e\sqrt{d+ex^2}} + \frac{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}\sqrt{d+ex^2}} \\ &- \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{PolyLog}\left(2,e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2e^{3/2}\sqrt{d+ex^2}}\end{aligned}$$

output
```
b*d^(1/2)*n*(1+e*x^2/d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))/e^(3/2)/(e*x^2+d)
^(1/2)+1/2*b*d^(1/2)*n*(1+e*x^2/d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))^2/e^(3
/2)/(e*x^2+d)^(1/2)-b*d^(1/2)*n*(1+e*x^2/d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2
))*ln(1-(e^(1/2)*x/d^(1/2)+(1+e*x^2/d)^(1/2))^2)/e^(3/2)/(e*x^2+d)^(1/2)-x
*(a+b*ln(c*x^n))/e/(e*x^2+d)^(1/2)+d^(1/2)*(1+e*x^2/d)^(1/2)*arcsinh(e^(1/
2)*x/d^(1/2))*(a+b*ln(c*x^n))/e^(3/2)/(e*x^2+d)^(1/2)-1/2*b*d^(1/2)*n*(1+e
*x^2/d)^(1/2)*polylog(2,(e^(1/2)*x/d^(1/2)+(1+e*x^2/d)^(1/2))^2)/e^(3/2)/(
e*x^2+d)^(1/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.63 (sec) , antiderivative size = 217, normalized size of antiderivative = 0.66

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx =$$

$$-\frac{bn\sqrt{1+\frac{ex^2}{d}}\left(e^{3/2}x^3(d+ex^2)\ {}_3F_2\left(\frac{3}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{ex^2}{d}\right)+9d^2\sqrt{e}x\sqrt{1+\frac{ex^2}{d}}\log(x)-9d^{3/2}(d+ex^2)\operatorname{arcsin}}{9de^{3/2}\left(d+ex^2\right)^{3/2}}$$

$$-\frac{x(a-bn\log(x)+b\log(cx^n))}{e\sqrt{d+ex^2}}+\frac{(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{e^{3/2}}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
-1/9*(b*n*Sqrt[1 + (e*x^2)/d]*(e^(3/2)*x^3*(d + e*x^2)*HypergeometricPFQ[{
3/2, 3/2, 3/2}, {5/2, 5/2}, -((e*x^2)/d)] + 9*d^2*Sqrt[e]*x*Sqrt[1 + (e*x^
2)/d]*Log[x] - 9*d^(3/2)*(d + e*x^2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[x]))
/(d*e^(3/2)*(d + e*x^2)^(3/2)) - (x*(a - b*n*Log[x] + b*Log[c*x^n]))/(e*Sq
rt[d + e*x^2]) + ((a - b*n*Log[x] + b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d
 + e*x^2]])/e^(3/2)
```

Rubi [A] (verified)

Time = 0.81 (sec) , antiderivative size = 232, normalized size of antiderivative = 0.71, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2786, 2792, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}} \, dx$$

$$\Big\downarrow \text{ 2786}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\int \frac{x^2(a+b\log(cx^n))}{\left(\frac{ex^2}{d}+1\right)^{3/2}}dx}{d\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 2792}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(-bn\int -\frac{\frac{dx}{e\sqrt{\frac{ex^2}{d}+1}}-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{e^{3/2}}}{x}dx+\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}}-\frac{dx(a+b\log(cx^n))}{e\sqrt{\frac{ex^2}{d}+1}}\right)}{d\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 25}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(bn\int \frac{\frac{dx}{e\sqrt{\frac{ex^2}{d}+1}}-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{e^{3/2}}}{x}dx+\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}}-\frac{dx(a+b\log(cx^n))}{e\sqrt{\frac{ex^2}{d}+1}}\right)}{d\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 2010}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(bn\int \left(\frac{d^2\sqrt{\frac{ex^2}{d}+1}}{e(ex^2+d)}-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{e^{3/2}x}\right)dx+\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}}-\frac{dx(a+b\log(cx^n))}{e\sqrt{\frac{ex^2}{d}+1}}\right)}{d\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}}-\frac{dx(a+b\log(cx^n))}{e\sqrt{\frac{ex^2}{d}+1}}+bn\left(-\frac{d^{3/2}\,\text{PolyLog}\left(2,e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2e^{3/2}}+\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}}{\sqrt{}}\right.}{2e^{3/2}}\right.\right.}{d\sqrt{d+ex^2}}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
(Sqrt[1 + (e*x^2)/d]*(-((d*x*(a + b*Log[c*x^n]))/(e*Sqrt[1 + (e*x^2)/d]))
+ (d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/e^(3/2) + b*n*
((d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/e^(3/2) + (d^(3/2)*ArcSinh[(Sqrt[e
]*x)/Sqrt[d]]^2)/(2*e^(3/2)) - (d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1
 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/e^(3/2) - (d^(3/2)*PolyLog[2, E^(2
*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(2*e^(3/2)))))/(d*Sqrt[d + e*x^2])
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x^{2}\left(a +b \ln \left(c \,x^{n}\right)\right)}{\left(e \,x^{2}+d \right)^{\frac{3}{2}}}d x$$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

output
```
int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx=\int \frac{(b\log(cx^n)+a)x^2}{(ex^2+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*x^2*log(c*x^n) + sqrt(e*x^2 + d)*a*x^2)/(e^2*x
^4 + 2*d*e*x^2 + d^2), x)
```

Sympy [F]

$$\int \frac{x^2(a + b \log (cx^n))}{(d + ex^2)^{3/2}} \, dx = \int \frac{x^2(a + b \log (cx^n))}{(d + ex^2)^{\frac{3}{2}}} \, dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x**2+d)**(3/2),x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))/(d + e*x**2)**(3/2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x^2(a + b \log (cx^n))}{(d + ex^2)^{3/2}} \, dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x^2(a + b \log (cx^n))}{(d + ex^2)^{3/2}} \, dx = \int \frac{(b \log (cx^n) + a)x^2}{(ex^2 + d)^{\frac{3}{2}}} \, dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x^2 + d)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{3/2}}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2), x)
```

Reduce [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \frac{-\sqrt{e\,x^2+d}\,aex+\sqrt{e}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{e}\,x}{\sqrt{d}}\right)ad+\sqrt{e}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{e}\,x}{\sqrt{d}}\right)ae\,x^2-\sqrt{e}}{e^2(}$$

input
```
int(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x)
```

output
```
( - sqrt(d + e*x**2)*a*e*x + sqrt(e)*log((sqrt(d + e*x**2) + sqrt(e)*x)/sq
rt(d))*a*d + sqrt(e)*log((sqrt(d + e*x**2) + sqrt(e)*x)/sqrt(d))*a*e*x**2
- sqrt(e)*a*d - sqrt(e)*a*e*x**2 + int((log(x**n*c)*x**2)/(sqrt(d + e*x**2
)*d + sqrt(d + e*x**2)*e*x**2),x)*b*d*e**2 + int((log(x**n*c)*x**2)/(sqrt(
d + e*x**2)*d + sqrt(d + e*x**2)*e*x**2),x)*b*e**3*x**2)/(e**2*(d + e*x**2
))
```

3.293 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^{3/2}}\,dx$

Optimal result . . . 2227
Mathematica [A] (verified) . . . 2227
Rubi [A] (verified) . . . 2228
Maple [F] . . . 2229
Fricas [A] (verification not implemented) . . . 2229
Sympy [F] . . . 2230
Maxima [F(-2)] . . . 2230
Giac [F] . . . 2231
Mupad [F(-1)] . . . 2231
Reduce [B] (verification not implemented) . . . 2231

Optimal result

Integrand size = 22, antiderivative size = 58

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{3/2}}\,dx = -\frac{bn\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{d\sqrt{e}}+\frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}}$$

output
```
-b*n*arctanh(e^(1/2)*x/(e*x^2+d)^(1/2))/d/e^(1/2)+x*(a+b*ln(c*x^n))/d/(e*x
^2+d)^(1/2)
```

Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 70, normalized size of antiderivative = 1.21

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{3/2}}\,dx = \frac{\frac{ax}{\sqrt{d+ex^2}}+\frac{bx\log(cx^n)}{\sqrt{d+ex^2}}-\frac{bn\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{\sqrt{e}}}{d}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x^2)^(3/2),x]
```

output
```
((a*x)/Sqrt[d + e*x^2] + (b*x*Log[c*x^n])/Sqrt[d + e*x^2] - (b*n*Log[e*x +
 Sqrt[e]*Sqrt[d + e*x^2]])/Sqrt[e])/d
```

Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.136$, Rules used = {2751, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{3/2}}dx$$

$$\Big\downarrow \text{ 2751}$$

$$\frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}}-\frac{bn\int \frac{1}{\sqrt{ex^2+d}}dx}{d}$$

$$\Big\downarrow \text{ 224}$$

$$\frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}}-\frac{bn\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}}{d}$$

$$\Big\downarrow \text{ 219}$$

$$\frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}}-\frac{bn\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{d\sqrt{e}}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x^2)^(3/2),x]
```

output
```
-((b*n*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])/(d*Sqrt[e])) + (x*(a + b*Log[
c*x^n]))/(d*Sqrt[d + e*x^2])
```

Defintions of rubi rules used

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{\left(e\,x^{2}+d\right)^{\frac{3}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 172, normalized size of antiderivative = 2.97

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{3/2}}\,dx = \left[\frac{(benx^2+bdn)\sqrt{e}\log\left(-2\,ex^2+2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)+2\left(benx\log(x)+bex\log(\right.}{2\left(de^2x^2+d^2e\right)}\right.$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
[1/2*((b*e*n*x^2 + b*d*n)*sqrt(e)*log(-2*e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(e)
*x - d) + 2*(b*e*n*x*log(x) + b*e*x*log(c) + a*e*x)*sqrt(e*x^2 + d))/(d*e^
2*x^2 + d^2*e), ((b*e*n*x^2 + b*d*n)*sqrt(-e)*arctan(sqrt(-e)*x/sqrt(e*x^2
 + d)) + (b*e*n*x*log(x) + b*e*x*log(c) + a*e*x)*sqrt(e*x^2 + d))/(d*e^2*x
^2 + d^2*e)]
```

Sympy [F]

$$\int \frac{a + b\log(cx^n)}{(d + ex^2)^{3/2}}\, dx = \int \frac{a + b\log(cx^n)}{(d + ex^2)^{\frac{3}{2}}}\, dx$$

input
```
integrate((a+b*ln(c*x**n))/(e*x**2+d)**(3/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(d + e*x**2)**(3/2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log(cx^n)}{(d + ex^2)^{3/2}}\, dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{3/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^2 + d)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{3/2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{(e\,x^2+d)^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x^2)^(3/2),x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x^2)^(3/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 351, normalized size of antiderivative = 6.05

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{3/2}}\,dx = \frac{\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) bex+\sqrt{e\,x^2+d}\,aex-\sqrt{e}\log\left(\frac{\sqrt{e\,x^2+d}-\sqrt{d}+\sqrt{e}}{\sqrt{d}}\right.}{}$$

input
```
int((a+b*log(c*x^n))/(e*x^2+d)^(3/2),x)
```

output
```
(sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e*
*(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*e*x + sqrt(d + e*x**2)*a
*e*x - sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d*n
 - sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*b*e*n*x**
2 - sqrt(e)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d*n -
sqrt(e)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*e*n*x**2 +
 sqrt(e)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(s
qrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d + sqrt(e)*log(((2*sqrt(e)*sqrt(
d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**
n*2**n))*b*e*x**2 + sqrt(e)*a*d + sqrt(e)*a*e*x**2)/(d*e*(d + e*x**2))
```

3.294 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}\,dx$

Optimal result . . . 2233
Mathematica [A] (verified) . . . 2233
Rubi [A] (verified) . . . 2234
Maple [F] . . . 2236
Fricas [A] (verification not implemented) . . . 2236
Sympy [F] . . . 2237
Maxima [F(-2)] . . . 2237
Giac [F] . . . 2237
Mupad [F(-1)] . . . 2238
Reduce [B] (verification not implemented) . . . 2238

Optimal result

Integrand size = 25, antiderivative size = 110

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}\,dx = -\frac{bn\sqrt{d+ex^2}}{d^2x} + \frac{2b\sqrt{e}n\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{d^2} + \frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}} - \frac{2\sqrt{d+ex^2}(a+b\log(cx^n))}{d^2x}$$

output
```
-b*n*(e*x^2+d)^(1/2)/d^2/x+2*b*e^(1/2)*n*arctanh(e^(1/2)*x/(e*x^2+d)^(1/2)
)/d^2+(a+b*ln(c*x^n))/d/x/(e*x^2+d)^(1/2)-2*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n)
)/d^2/x
```

Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 103, normalized size of antiderivative = 0.94

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}\,dx = \frac{-ad-bdn-2aex^2-benx^2-b(d+2ex^2)\log(cx^n)+2b\sqrt{e}nx\sqrt{d+ex^2}\log\left(ex+\right.}{d^2x\sqrt{d+ex^2}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^(3/2)),x]
```

output
```
(-(a*d) - b*d*n - 2*a*e*x^2 - b*e*n*x^2 - b*(d + 2*e*x^2)*Log[c*x^n] + 2*b
*Sqrt[e]*n*x*Sqrt[d + e*x^2]*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(d^2*x*Sq
rt[d + e*x^2])
```

Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 107, normalized size of antiderivative = 0.97, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.240$, Rules used = {2792, 25, 27, 358, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{2ex^2+d}{d^2x^2\sqrt{ex^2+d}}dx-\frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{25}$$

$$bn\int \frac{2ex^2+d}{d^2x^2\sqrt{ex^2+d}}dx-\frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{2ex^2+d}{x^2\sqrt{ex^2+d}}dx}{d^2}-\frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{358}$$

$$\frac{bn\left(2e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)}{d^2}-\frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{224}$$

$$\frac{bn\left(2e\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)}{d^2}-\frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{219}$$

$$-\frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}}+\frac{bn\left(2\sqrt{e}\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)}{d^2}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^(3/2)),x]
```

output
```
(b*n*(-(Sqrt[d + e*x^2]/x) + 2*Sqrt[e]*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]
]))/d^2 - (a + b*Log[c*x^n])/(d*x*Sqrt[d + e*x^2]) - (2*e*x*(a + b*Log[c*x
^n]))/(d^2*Sqrt[d + e*x^2])
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{2}\left(e\,x^{2}+d\right)^{\frac{3}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^(3/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 241, normalized size of antiderivative = 2.19

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{2}\left(d+ex^{2}\right)^{3/2}}\,dx = \left[\frac{(benx^{3}+bdnx)\sqrt{e}\log\left(-2\,ex^{2}-2\,\sqrt{ex^{2}+d}\sqrt{e}x-d\right)-(bdn+(ben+2\,ae)x^{2}+}{d^{2}ex^{3}+d^{3}x}\right.$$

$$-\frac{2\,(benx^{3}+bdnx)\sqrt{-e}\arctan\left(\frac{\sqrt{-e}x}{\sqrt{ex^{2}+d}}\right)+(bdn+(ben+2\,ae)x^{2}+ad+(2\,bex^{2}+bd)\log\left(c\right)+(2\,benx^{2}}{d^{2}ex^{3}+d^{3}x}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
[((b*e*n*x^3 + b*d*n*x)*sqrt(e)*log(-2*e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(e)*x
 - d) - (b*d*n + (b*e*n + 2*a*e)*x^2 + a*d + (2*b*e*x^2 + b*d)*log(c) + (2
*b*e*n*x^2 + b*d*n)*log(x))*sqrt(e*x^2 + d))/(d^2*e*x^3 + d^3*x), -(2*(b*e
*n*x^3 + b*d*n*x)*sqrt(-e)*arctan(sqrt(-e)*x/sqrt(e*x^2 + d)) + (b*d*n + (
b*e*n + 2*a*e)*x^2 + a*d + (2*b*e*x^2 + b*d)*log(c) + (2*b*e*n*x^2 + b*d*n
)*log(x))*sqrt(e*x^2 + d))/(d^2*e*x^3 + d^3*x)]
```

Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}\,dx = \int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x**2+d)**(3/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*(d + e*x**2)**(3/2)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^{\frac{3}{2}}x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^(3/2)*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^2\,(e\,x^2+d)^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^(3/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^(3/2)), x)
```

Reduce [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 490, normalized size of antiderivative = 4.45

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}\,dx = \frac{-\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) bd-2\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right.}{}$$

input
```
int((a+b*log(c*x^n))/x^2/(e*x^2+d)^(3/2),x)
```

output
```
( - sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/
(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d - 2*sqrt(d + e*x**2
)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d +
 e*x**2) + sqrt(e)*x)**n*2**n))*b*e*x**2 - sqrt(d + e*x**2)*a*d - 2*sqrt(d
 + e*x**2)*a*e*x**2 - sqrt(d + e*x**2)*b*d*n - sqrt(d + e*x**2)*b*e*n*x**2
 + 2*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d*n*x
 + 2*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*b*e*n*x
**3 + 2*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d*
n*x + 2*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*e*
n*x**3 - 2*sqrt(e)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e
**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*x - 2*sqrt(e)*log(((2
*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2)
+ sqrt(e)*x)**n*2**n))*b*e*x**3 - 2*sqrt(e)*a*d*x - 2*sqrt(e)*a*e*x**3 - s
qrt(e)*b*d*n*x - sqrt(e)*b*e*n*x**3)/(d**2*x*(d + e*x**2))
```

3.295 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}\,dx$

Optimal result 2239
Mathematica [A] (verified) 2239
Rubi [A] (verified) 2240
Maple [F] 2242
Fricas [A] (verification not implemented) 2243
Sympy [F] 2243
Maxima [F(-2)] 2244
Giac [F] 2244
Mupad [F(-1)] 2244
Reduce [B] (verification not implemented) 2245

Optimal result

Integrand size = 25, antiderivative size = 172

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}\,dx = -\frac{bn\sqrt{d+ex^2}}{9d^2x^3}+\frac{14ben\sqrt{d+ex^2}}{9d^3x}-\frac{8be^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{3d^3}+\frac{a+b\log(cx^n)}{dx^3\sqrt{d+ex^2}}-\frac{4\sqrt{d+ex^2}(a+b\log(cx^n))}{3d^2x^3}+\frac{8e\sqrt{d+ex^2}(a+b\log(cx^n))}{3d^3x}$$

output
```
-1/9*b*n*(e*x^2+d)^(1/2)/d^2/x^3+14/9*b*e*n*(e*x^2+d)^(1/2)/d^3/x-8/3*b*e^
(3/2)*n*arctanh(e^(1/2)*x/(e*x^2+d)^(1/2))/d^3+(a+b*ln(c*x^n))/d/x^3/(e*x^
2+d)^(1/2)-4/3*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/d^2/x^3+8/3*e*(e*x^2+d)^(1/
2)*(a+b*ln(c*x^n))/d^3/x
```

Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 144, normalized size of antiderivative = 0.84

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}\,dx = \frac{-3ad^2-bd^2n+12adex^2+13bdenx^2+24ae^2x^4+14be^2nx^4-3b(d^2-4dex^2-8e}{9d^3x^3\sqrt{d+ex^2}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^(3/2)),x]
```

output
```
(-3*a*d^2 - b*d^2*n + 12*a*d*e*x^2 + 13*b*d*e*n*x^2 + 24*a*e^2*x^4 + 14*b*
e^2*n*x^4 - 3*b*(d^2 - 4*d*e*x^2 - 8*e^2*x^4)*Log[c*x^n] - 24*b*e^(3/2)*n*
x^3*Sqrt[d + e*x^2]*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(9*d^3*x^3*Sqrt[d
+ e*x^2])
```

Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 173, normalized size of antiderivative = 1.01, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.280$, Rules used = {2792, 27, 1588, 27, 358, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{-8e^2x^4-4dex^2+d^2}{3d^3x^4\sqrt{ex^2+d}}dx+\frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}+\frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{-8e^2x^4-4dex^2+d^2}{x^4\sqrt{ex^2+d}}dx}{3d^3}+\frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}+\frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{1588}$$

$$\frac{bn\left(-\frac{\int \frac{2de(12ex^2+7d)}{x^2\sqrt{ex^2+d}}dx}{3d}-\frac{d\sqrt{d+ex^2}}{3x^3}\right)}{3d^3}+\frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}+\frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\left(-\frac{2}{3}e\int \frac{12ex^2+7d}{x^2\sqrt{ex^2+d}}dx-\frac{d\sqrt{d+ex^2}}{3x^3}\right)}{3d^3}+\frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}+\frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}}$$

$$\Big\downarrow \; 358$$

$$\frac{bn\left(-\frac{2}{3}e\left(12e\int\frac{1}{\sqrt{ex^2+d}}dx-\frac{7\sqrt{d+ex^2}}{x}\right)-\frac{d\sqrt{d+ex^2}}{3x^3}\right)}{3d^3}+\frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}+\frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}}$$

$$\Big\downarrow \; 224$$

$$\frac{bn\left(-\frac{2}{3}e\left(12e\int\frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{7\sqrt{d+ex^2}}{x}\right)-\frac{d\sqrt{d+ex^2}}{3x^3}\right)}{3d^3}+\frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}+\frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}}$$

$$\Big\downarrow \; 219$$

$$\frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}+\frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}}+\frac{bn\left(-\frac{2}{3}e\left(12\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{7\sqrt{d+ex^2}}{x}\right)-\frac{d\sqrt{d+ex^2}}{3x^3}\right)}{3d^3}$$

input
```
Int[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^(3/2)),x]
```

output
```
(b*n*(-1/3*(d*Sqrt[d + e*x^2])/x^3 - (2*e*((-7*Sqrt[d + e*x^2])/x + 12*Sqr
t[e]*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]]))/3))/(3*d^3) - (a + b*Log[c*x^n
])/(3*d*x^3*Sqrt[d + e*x^2]) + (4*e*(a + b*Log[c*x^n]))/(3*d^2*x*Sqrt[d +
e*x^2]) + (8*e^2*x*(a + b*Log[c*x^n]))/(3*d^3*Sqrt[d + e*x^2])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 1588
```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Simp[1/(d*f
^2*(m + 1))   Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x
) - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && Ne
Q[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{a+b\ln \left(c\,x^{n}\right)}{x^{4} \left(e\,x^{2}+d\right)^{\frac{3}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^(3/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 370, normalized size of antiderivative = 2.15

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}\,dx = \left[\frac{12\,(be^2nx^5+bdenx^3)\sqrt{e}\log\left(-2\,ex^2+2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)+\left(2\,(7\,be^2n+12\,ae^2\right.}{}\right.$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
[1/9*(12*(b*e^2*n*x^5 + b*d*e*n*x^3)*sqrt(e)*log(-2*e*x^2 + 2*sqrt(e*x^2 +
 d)*sqrt(e)*x - d) + (2*(7*b*e^2*n + 12*a*e^2)*x^4 - b*d^2*n - 3*a*d^2 + (
13*b*d*e*n + 12*a*d*e)*x^2 + 3*(8*b*e^2*x^4 + 4*b*d*e*x^2 - b*d^2)*log(c)
+ 3*(8*b*e^2*n*x^4 + 4*b*d*e*n*x^2 - b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(d^
3*e*x^5 + d^4*x^3), 1/9*(24*(b*e^2*n*x^5 + b*d*e*n*x^3)*sqrt(-e)*arctan(sq
rt(-e)*x/sqrt(e*x^2 + d)) + (2*(7*b*e^2*n + 12*a*e^2)*x^4 - b*d^2*n - 3*a*
d^2 + (13*b*d*e*n + 12*a*d*e)*x^2 + 3*(8*b*e^2*x^4 + 4*b*d*e*x^2 - b*d^2)*
log(c) + 3*(8*b*e^2*n*x^4 + 4*b*d*e*n*x^2 - b*d^2*n)*log(x))*sqrt(e*x^2 +
d))/(d^3*e*x^5 + d^4*x^3)]
```

Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}\,dx = \int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**4/(e*x**2+d)**(3/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**4*(d + e*x**2)**(3/2)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^{\frac{3}{2}}x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^(3/2)*x^4), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}\,dx = \int \frac{a+b\ln(c\,x^n)}{x^4\,(e\,x^2+d)^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^(3/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^(3/2)), x)
```

Reduce [B] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 631, normalized size of antiderivative = 3.67

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^{3/2}}\,dx = \frac{-3\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) b\,d^2+12\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right.}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n}\right.}{}$$

input
```
int((a+b*log(c*x^n))/x^4/(e*x^2+d)^(3/2),x)
```

output
```
( - 3*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c
)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2 + 12*sqrt(d +
e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sq
rt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e*x**2 + 24*sqrt(d + e*x**2)*log
(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x*
*2) + sqrt(e)*x)**n*2**n))*b*e**2*x**4 - 3*sqrt(d + e*x**2)*a*d**2 + 12*sq
rt(d + e*x**2)*a*d*e*x**2 + 24*sqrt(d + e*x**2)*a*e**2*x**4 - sqrt(d + e*x
**2)*b*d**2*n + 13*sqrt(d + e*x**2)*b*d*e*n*x**2 + 14*sqrt(d + e*x**2)*b*e
**2*n*x**4 - 24*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(
d))*b*d*e*n*x**3 - 24*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)
/sqrt(d))*b*e**2*n*x**5 - 24*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(d) + sqr
t(e)*x)/sqrt(d))*b*d*e*n*x**3 - 24*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(d)
 + sqrt(e)*x)/sqrt(d))*b*e**2*n*x**5 + 24*sqrt(e)*log(((2*sqrt(e)*sqrt(d +
 e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2
**n))*b*d*e*x**3 + 24*sqrt(e)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**
2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*e**2*x**5 -
24*sqrt(e)*a*d*e*x**3 - 24*sqrt(e)*a*e**2*x**5 - 2*sqrt(e)*b*d*e*n*x**3 -
2*sqrt(e)*b*e**2*n*x**5)/(9*d**3*x**3*(d + e*x**2))
```

3.296 $\int \frac{a+b\log(cx^n)}{x^6\left(d+ex^2\right)^{3/2}}\,dx$

Optimal result . . . 2246
Mathematica [A] (verified) . . . 2247
Rubi [A] (verified) . . . 2247
Maple [F] . . . 2251
Fricas [A] (verification not implemented) . . . 2251
Sympy [F(-1)] . . . 2252
Maxima [F(-2)] . . . 2252
Giac [F] . . . 2253
Mupad [F(-1)] . . . 2253
Reduce [B] (verification not implemented) . . . 2253

Optimal result

Integrand size = 25, antiderivative size = 232

$$\int \frac{a+b\log(cx^n)}{x^6\left(d+ex^2\right)^{3/2}}\,dx = -\frac{bn\sqrt{d+ex^2}}{25d^2x^5}+\frac{14ben\sqrt{d+ex^2}}{75d^3x^3}-\frac{148be^2n\sqrt{d+ex^2}}{75d^4x} + \frac{16be^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{5d^4}+\frac{a+b\log(cx^n)}{dx^5\sqrt{d+ex^2}}-\frac{6\sqrt{d+ex^2}(a+b\log(cx^n))}{5d^2x^5} + \frac{8e\sqrt{d+ex^2}(a+b\log(cx^n))}{5d^3x^3}-\frac{16e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{5d^4x}$$

output
```
-1/25*b*n*(e*x^2+d)^(1/2)/d^2/x^5+14/75*b*e*n*(e*x^2+d)^(1/2)/d^3/x^3-148/
75*b*e^2*n*(e*x^2+d)^(1/2)/d^4/x+16/5*b*e^(5/2)*n*arctanh(e^(1/2)*x/(e*x^2
+d)^(1/2))/d^4+(a+b*ln(c*x^n))/d/x^5/(e*x^2+d)^(1/2)-6/5*(e*x^2+d)^(1/2)*(
a+b*ln(c*x^n))/d^2/x^5+8/5*e*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/d^3/x^3-16/5*
e^2*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/d^4/x
```

Mathematica [A] (verified)

Time = 0.24 (sec) , antiderivative size = 180, normalized size of antiderivative = 0.78

$$\int \frac{a+b\log(cx^n)}{x^6(d+ex^2)^{3/2}}\,dx = \frac{-15ad^3-3bd^3n+30ad^2ex^2+11bd^2enx^2-120ade^2x^4-134bde^2nx^4-240ae^3x^6}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^6*(d + e*x^2)^(3/2)),x]
```

output
```
(-15*a*d^3 - 3*b*d^3*n + 30*a*d^2*e*x^2 + 11*b*d^2*e*n*x^2 - 120*a*d*e^2*x
^4 - 134*b*d*e^2*n*x^4 - 240*a*e^3*x^6 - 148*b*e^3*n*x^6 - 15*b*(d^3 - 2*d
^2*e*x^2 + 8*d*e^2*x^4 + 16*e^3*x^6)*Log[c*x^n] + 240*b*e^(5/2)*n*x^5*Sqrt
[d + e*x^2]*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(75*d^4*x^5*Sqrt[d + e*x^2
])
```

Rubi [A] (verified)

Time = 0.64 (sec) , antiderivative size = 242, normalized size of antiderivative = 1.04, number of steps used = 11, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.400$, Rules used = {2792, 27, 2338, 9, 27, 1588, 27, 358, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^6(d+ex^2)^{3/2}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{16e^3x^6+8de^2x^4-2d^2ex^2+d^3}{5d^4x^6\sqrt{ex^2+d}}dx-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{16e^3x^6+8de^2x^4-2d^2ex^2+d^3}{x^6\sqrt{ex^2+d}}dx}{5d^4}-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{2338}$$

$$\frac{bn\left(-\frac{\int \frac{2\left(-40de^3x^5-20d^2e^2x^3+7d^3ex\right)}{x^5\sqrt{ex^2+d}}dx}{5d}-\frac{d^2\sqrt{d+ex^2}}{5x^5}\right)}{5d^4}-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{9}$$

$$\frac{bn\left(-\frac{\int \frac{2\left(-40de^3x^4-20d^2e^2x^2+7d^3e\right)}{x^4\sqrt{ex^2+d}}dx}{5d}-\frac{d^2\sqrt{d+ex^2}}{5x^5}\right)}{5d^4}-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\left(-\frac{2\int \frac{-40de^3x^4-20d^2e^2x^2+7d^3e}{x^4\sqrt{ex^2+d}}dx}{5d}-\frac{d^2\sqrt{d+ex^2}}{5x^5}\right)}{5d^4}-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{1588}$$

$$\frac{bn\left(-\frac{2\left(-\frac{\int \frac{2d^2e^2\left(60ex^2+37d\right)}{x^2\sqrt{ex^2+d}}dx}{3d}-\frac{7d^2e\sqrt{d+ex^2}}{3x^3}\right)}{5d}-\frac{d^2\sqrt{d+ex^2}}{5x^5}\right)}{5d^4}-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\left(-\frac{2\left(-\frac{2}{3}de^2\int \frac{60ex^2+37d}{x^2\sqrt{ex^2+d}}dx-\frac{7d^2e\sqrt{d+ex^2}}{3x^3}\right)}{5d}-\frac{d^2\sqrt{d+ex^2}}{5x^5}\right)}{5d^4}-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{358}$$

$$\frac{bn\left(-\frac{2\left(-\frac{2}{3}de^2\left(60e\int\frac{1}{\sqrt{ex^2+d}}dx-\frac{37\sqrt{d+ex^2}}{x}\right)-\frac{7d^2e\sqrt{d+ex^2}}{3x^3}\right)}{5d}-\frac{d^2\sqrt{d+ex^2}}{5x^5}\right)}{5d^4}-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}$$

$$\Big\downarrow 224$$

$$\frac{bn\left(-\frac{2\left(-\frac{2}{3}de^2\left(60e\int\frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{37\sqrt{d+ex^2}}{x}\right)-\frac{7d^2e\sqrt{d+ex^2}}{3x^3}\right)}{5d}-\frac{d^2\sqrt{d+ex^2}}{5x^5}\right)}{5d^4}-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}$$

$$\Big\downarrow 219$$

$$-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}+\frac{bn\left(-\frac{2\left(-\frac{2}{3}de^2\left(60\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{37\sqrt{d+ex^2}}{x}\right)-\frac{7d^2e\sqrt{d+ex^2}}{3x^3}\right)}{5d}-\frac{d^2\sqrt{d+ex^2}}{5x^5}\right)}{5d^4}$$

input
```
Int[(a + b*Log[c*x^n])/(x^6*(d + e*x^2)^(3/2)),x]
```

output
```
(b*n*(-1/5*(d^2*Sqrt[d + e*x^2])/x^5 - (2*((-7*d^2*e*Sqrt[d + e*x^2])/(3*x
^3) - (2*d*e^2*((-37*Sqrt[d + e*x^2])/x + 60*Sqrt[e]*ArcTanh[(Sqrt[e]*x)/S
qrt[d + e*x^2]]))/3))/(5*d)))/(5*d^4) - (a + b*Log[c*x^n])/(5*d*x^5*Sqrt[d
 + e*x^2]) + (2*e*(a + b*Log[c*x^n]))/(5*d^2*x^3*Sqrt[d + e*x^2]) - (8*e^2
*(a + b*Log[c*x^n]))/(5*d^3*x*Sqrt[d + e*x^2]) - (16*e^3*x*(a + b*Log[c*x^
n]))/(5*d^4*Sqrt[d + e*x^2])
```

Defintions of rubi rules used

rule 9
```
Int[(u_.)*(Px_)^(p_.)*((e_.)*(x_))^(m_.), x_Symbol] :> With[{r = Expon[Px,
x, Min]}, Simp[1/e^(p*r)   Int[u*(e*x)^(m + p*r)*ExpandToSum[Px/x^r, x]^p,
x], x] /; IGtQ[r, 0]] /; FreeQ[{e, m}, x] && PolyQ[Px, x] && IntegerQ[p] &&
  !MonomialQ[Px, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 1588
```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Simp[1/(d*f
^2*(m + 1))   Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x
) - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && Ne
Q[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

rule 2338
```
Int[(Pq_)*((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> With[{
Q = PolynomialQuotient[Pq, c*x, x], R = PolynomialRemainder[Pq, c*x, x]}, S
imp[R*(c*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*c*(m + 1))), x] + Simp[1/(a*c*(
m + 1))   Int[(c*x)^(m + 1)*(a + b*x^2)^p*ExpandToSum[a*c*(m + 1)*Q - b*R*(
m + 2*p + 3)*x, x], x], x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && Lt
Q[m, -1] && (IntegerQ[2*p] || NeQ[Expon[Pq, x], 1])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{a+b\ln \left(c\,x^{n}\right)}{x^{6} \left(e\,x^{2}+d\right)^{\frac{3}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x^6/(e*x^2+d)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^6/(e*x^2+d)^(3/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 473, normalized size of antiderivative = 2.04

$$\int \frac{a+b\log\left(cx^n\right)}{x^6\left(d+ex^2\right)^{3/2}}\,dx = \left[\frac{120\left(be^3nx^7+bde^2nx^5\right)\sqrt{e}\log\left(-2\,ex^2-2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)-(4\,(37\,be^3n+60 \cdots}{\cdots}\right.$$

$$-\frac{240\left(be^3nx^7+bde^2nx^5\right)\sqrt{-e}\arctan\left(\frac{\sqrt{-e}x}{\sqrt{ex^2+d}}\right)+(4\,(37\,be^3n+60\,ae^3)x^6+3\,bd^3n+2\,(67\,bde^2n+60\,ade^2 \cdots}{\cdots}$$

input
```
integrate((a+b*log(c*x^n))/x^6/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
[1/75*(120*(b*e^3*n*x^7 + b*d*e^2*n*x^5)*sqrt(e)*log(-2*e*x^2 - 2*sqrt(e*x
^2 + d)*sqrt(e)*x - d) - (4*(37*b*e^3*n + 60*a*e^3)*x^6 + 3*b*d^3*n + 2*(6
7*b*d*e^2*n + 60*a*d*e^2)*x^4 + 15*a*d^3 - (11*b*d^2*e*n + 30*a*d^2*e)*x^2
 + 15*(16*b*e^3*x^6 + 8*b*d*e^2*x^4 - 2*b*d^2*e*x^2 + b*d^3)*log(c) + 15*(
16*b*e^3*n*x^6 + 8*b*d*e^2*n*x^4 - 2*b*d^2*e*n*x^2 + b*d^3*n)*log(x))*sqrt
(e*x^2 + d))/(d^4*e*x^7 + d^5*x^5), -1/75*(240*(b*e^3*n*x^7 + b*d*e^2*n*x^
5)*sqrt(-e)*arctan(sqrt(-e)*x/sqrt(e*x^2 + d)) + (4*(37*b*e^3*n + 60*a*e^3
)*x^6 + 3*b*d^3*n + 2*(67*b*d*e^2*n + 60*a*d*e^2)*x^4 + 15*a*d^3 - (11*b*d
^2*e*n + 30*a*d^2*e)*x^2 + 15*(16*b*e^3*x^6 + 8*b*d*e^2*x^4 - 2*b*d^2*e*x^
2 + b*d^3)*log(c) + 15*(16*b*e^3*n*x^6 + 8*b*d*e^2*n*x^4 - 2*b*d^2*e*n*x^2
 + b*d^3*n)*log(x))*sqrt(e*x^2 + d))/(d^4*e*x^7 + d^5*x^5)]
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a + b\log(cx^n)}{x^6 (d + ex^2)^{3/2}}\, dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**6/(e*x**2+d)**(3/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log(cx^n)}{x^6 (d + ex^2)^{3/2}}\, dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^6/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^6(d+ex^2)^{3/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^{\frac{3}{2}}x^6}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^6/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^(3/2)*x^6), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^6(d+ex^2)^{3/2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^6\,(e\,x^2+d)^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^6*(d + e*x^2)^(3/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^6*(d + e*x^2)^(3/2)), x)
```

Reduce [B] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 756, normalized size of antiderivative = 3.26

$$\int \frac{a+b\log(cx^n)}{x^6(d+ex^2)^{3/2}}\,dx = \text{Too large to display}$$

input
```
int((a+b*log(c*x^n))/x^6/(e*x^2+d)^(3/2),x)
```

output
```
( - 15*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*
c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**3 + 30*sqrt(d +
 e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(s
qrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2*e*x**2 - 120*sqrt(d + e*x**2
)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d +
 e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e**2*x**4 - 240*sqrt(d + e*x**2)*log((
(2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2
) + sqrt(e)*x)**n*2**n))*b*e**3*x**6 - 15*sqrt(d + e*x**2)*a*d**3 + 30*sqr
t(d + e*x**2)*a*d**2*e*x**2 - 120*sqrt(d + e*x**2)*a*d*e**2*x**4 - 240*sqr
t(d + e*x**2)*a*e**3*x**6 - 3*sqrt(d + e*x**2)*b*d**3*n + 11*sqrt(d + e*x*
*2)*b*d**2*e*n*x**2 - 134*sqrt(d + e*x**2)*b*d*e**2*n*x**4 - 148*sqrt(d +
e*x**2)*b*e**3*n*x**6 + 240*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt
(e)*x)/sqrt(d))*b*d*e**2*n*x**5 + 240*sqrt(e)*log((sqrt(d + e*x**2) - sqrt
(d) + sqrt(e)*x)/sqrt(d))*b*e**3*n*x**7 + 240*sqrt(e)*log((sqrt(d + e*x**2
) + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d*e**2*n*x**5 + 240*sqrt(e)*log((sqrt(
d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*e**3*n*x**7 - 240*sqrt(e)*lo
g(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x
**2) + sqrt(e)*x)**n*2**n))*b*d*e**2*x**5 - 240*sqrt(e)*log(((2*sqrt(e)*sq
rt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x
)**n*2**n))*b*e**3*x**7 + 240*sqrt(e)*a*d*e**2*x**5 + 240*sqrt(e)*a*e**...
```

3.297 $\int \frac{x^7(a+b\log(cx^n))}{\left(d+ex^2\right)^{5/2}}\,dx$

Optimal result 2255
Mathematica [A] (verified) 2256
Rubi [A] (verified) 2256
Maple [F] 2258
Fricas [A] (verification not implemented) 2259
Sympy [A] (verification not implemented) 2259
Maxima [F(-2)] 2260
Giac [F] 2261
Mupad [F(-1)] 2261
Reduce [B] (verification not implemented) 2261

Optimal result

Integrand size = 25, antiderivative size = 212

$$\int \frac{x^7(a+b\log(cx^n))}{\left(d+ex^2\right)^{5/2}}\,dx = -\frac{bd^2n}{3e^4\sqrt{d+ex^2}}+\frac{8bdn\sqrt{d+ex^2}}{3e^4}-\frac{bn(d+ex^2)^{3/2}}{9e^4} -\frac{16bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^4}+\frac{d^3(a+b\log(cx^n))}{3e^4\left(d+ex^2\right)^{3/2}}-\frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}} -\frac{3d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}+\frac{\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{3e^4}$$

output
```
-1/3*b*d^2*n/e^4/(e*x^2+d)^(1/2)+8/3*b*d*n*(e*x^2+d)^(1/2)/e^4-1/9*b*n*(e*
x^2+d)^(3/2)/e^4-16/3*b*d^(3/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^4+1/3
*d^3*(a+b*ln(c*x^n))/e^4/(e*x^2+d)^(3/2)-3*d^2*(a+b*ln(c*x^n))/e^4/(e*x^2+
d)^(1/2)-3*d*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/e^4+1/3*(e*x^2+d)^(3/2)*(a+b*
ln(c*x^n))/e^4
```

Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 240, normalized size of antiderivative = 1.13

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{-48ad^3+20bd^3n-72ad^2ex^2+42bd^2enx^2-18ade^2x^4+21bde^2nx^4+3ae^3x^6}{}$$

input
```
Integrate[(x^7*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
(-48*a*d^3 + 20*b*d^3*n - 72*a*d^2*e*x^2 + 42*b*d^2*e*n*x^2 - 18*a*d*e^2*x
^4 + 21*b*d*e^2*n*x^4 + 3*a*e^3*x^6 - b*e^3*n*x^6 + 48*b*d^(3/2)*n*(d + e*
x^2)^(3/2)*Log[x] - 3*b*(16*d^3 + 24*d^2*e*x^2 + 6*d*e^2*x^4 - e^3*x^6)*Lo
g[c*x^n] - 48*b*d^(5/2)*n*Sqrt[d + e*x^2]*Log[d + Sqrt[d]*Sqrt[d + e*x^2]]
 - 48*b*d^(3/2)*e*n*x^2*Sqrt[d + e*x^2]*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/
(9*e^4*(d + e*x^2)^(3/2))
```

Rubi [A] (verified)

Time = 0.74 (sec) , antiderivative size = 196, normalized size of antiderivative = 0.92, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2792, 27, 2331, 2122, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{-e^3x^6+6de^2x^4+24d^2ex^2+16d^3}{3e^4x\left(ex^2+d\right)^{3/2}}dx+\frac{d^3(a+b\log(cx^n))}{3e^4\left(d+ex^2\right)^{3/2}}-\frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}-\frac{3d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}+\frac{\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{3e^4}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{-e^3x^6+6de^2x^4+24d^2ex^2+16d^3}{x(ex^2+d)^{3/2}}dx}{3e^4}+\frac{d^3(a+b\log(cx^n))}{3e^4(d+ex^2)^{3/2}}-\frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}-\frac{3d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^4}$$

$$\Big\downarrow \text{2331}$$

$$\frac{bn\int \frac{-e^3x^6+6de^2x^4+24d^2ex^2+16d^3}{x^2(ex^2+d)^{3/2}}dx^2}{6e^4}+\frac{d^3(a+b\log(cx^n))}{3e^4(d+ex^2)^{3/2}}-\frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}-\frac{3d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^4}$$

$$\Big\downarrow \text{2122}$$

$$\frac{bn\int \left(\frac{16d^2}{x^2\sqrt{ex^2+d}}+\frac{ed^2}{(ex^2+d)^{3/2}}+\frac{7ed}{\sqrt{ex^2+d}}-\frac{e^2x^2}{\sqrt{ex^2+d}}\right)dx^2}{6e^4}+\frac{d^3(a+b\log(cx^n))}{3e^4(d+ex^2)^{3/2}}-\frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}-\frac{3d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^4}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^3(a+b\log(cx^n))}{3e^4(d+ex^2)^{3/2}}-\frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}-\frac{3d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^4}+\frac{bn\left(-32d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)-\frac{2d^2}{\sqrt{d+ex^2}}+16d\sqrt{d+ex^2}-\frac{2}{3}(d+ex^2)^{3/2}\right)}{6e^4}$$

input
```
Int[(x^7*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
(b*n*((-2*d^2)/Sqrt[d + e*x^2] + 16*d*Sqrt[d + e*x^2] - (2*(d + e*x^2)^(3/
2))/3 - 32*d^(3/2)*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]))/(6*e^4) + (d^3*(a +
b*Log[c*x^n]))/(3*e^4*(d + e*x^2)^(3/2)) - (3*d^2*(a + b*Log[c*x^n]))/(e^4
*Sqrt[d + e*x^2]) - (3*d*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/e^4 + ((d + e
*x^2)^(3/2)*(a + b*Log[c*x^n]))/(3*e^4)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2122
```
Int[((Px_)*((c_.) + (d_.)*(x_))^(n_))/((a_.) + (b_.)*(x_)), x_Symbol] :> In
t[ExpandIntegrand[1/Sqrt[c + d*x], Px*((c + d*x)^(n + 1/2)/(a + b*x)), x],
x] /; FreeQ[{a, b, c, d, n}, x] && PolyQ[Px, x] && ILtQ[n + 1/2, 0]
```

rule 2331
```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[1/2   S
ubst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x)^p, x], x, x^2], x] /;
 FreeQ[{a, b, p}, x] && PolyQ[Pq, x^2] && IntegerQ[(m - 1)/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x^7(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{5}{2}}}dx$$

input
```
int(x^7*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
int(x^7*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 507, normalized size of antiderivative = 2.39

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \left[\frac{24\,(bde^2nx^4+2\,bd^2enx^2+bd^3n)\sqrt{d}\log\left(-\frac{ex^2-2\,\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-((be^3n-3\,a\right.$$

input
```
integrate(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
[1/9*(24*(b*d*e^2*n*x^4 + 2*b*d^2*e*n*x^2 + b*d^3*n)*sqrt(d)*log(-(e*x^2 -
 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/x^2) - ((b*e^3*n - 3*a*e^3)*x^6 - 20*b*d
^3*n - 3*(7*b*d*e^2*n - 6*a*d*e^2)*x^4 + 48*a*d^3 - 6*(7*b*d^2*e*n - 12*a*
d^2*e)*x^2 - 3*(b*e^3*x^6 - 6*b*d*e^2*x^4 - 24*b*d^2*e*x^2 - 16*b*d^3)*log
(c) - 3*(b*e^3*n*x^6 - 6*b*d*e^2*n*x^4 - 24*b*d^2*e*n*x^2 - 16*b*d^3*n)*lo
g(x))*sqrt(e*x^2 + d))/(e^6*x^4 + 2*d*e^5*x^2 + d^2*e^4), 1/9*(48*(b*d*e^2
*n*x^4 + 2*b*d^2*e*n*x^2 + b*d^3*n)*sqrt(-d)*arctan(sqrt(e*x^2 + d)*sqrt(-
d)/d) - ((b*e^3*n - 3*a*e^3)*x^6 - 20*b*d^3*n - 3*(7*b*d*e^2*n - 6*a*d*e^2
)*x^4 + 48*a*d^3 - 6*(7*b*d^2*e*n - 12*a*d^2*e)*x^2 - 3*(b*e^3*x^6 - 6*b*d
*e^2*x^4 - 24*b*d^2*e*x^2 - 16*b*d^3)*log(c) - 3*(b*e^3*n*x^6 - 6*b*d*e^2*
n*x^4 - 24*b*d^2*e*n*x^2 - 16*b*d^3*n)*log(x))*sqrt(e*x^2 + d))/(e^6*x^4 +
 2*d*e^5*x^2 + d^2*e^4)]
```

Sympy [A] (verification not implemented)

Time = 100.08 (sec) , antiderivative size = 556, normalized size of antiderivative = 2.62

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = a\left(\begin{cases}\frac{d^3}{3e^4(d+ex^2)^{\frac{3}{2}}}-\frac{3d^2}{e^4\sqrt{d+ex^2}}-\frac{3d\sqrt{d+ex^2}}{e^4}+\frac{(d+ex^2)^{\frac{3}{2}}}{3e^4} & \text{for } e\neq 0\\ \frac{x^8}{8d^{\frac{5}{2}}} & \text{otherwise}\end{cases}\right)$$

$$-bn\left(\begin{cases}\frac{4d^{\frac{3}{2}}\sqrt{1+\frac{ex^2}{d}}}{9e^4}+\frac{d^{\frac{3}{2}}\log\left(\frac{ex^2}{d}\right)}{6e^4}-\frac{d^{\frac{3}{2}}\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{3e^4}+\frac{6d^{\frac{3}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{e^4}+\frac{\sqrt{d}x^2\sqrt{1+\frac{ex^2}{d}}}{9e^3}+\frac{2d^6\sqrt{1+\frac{ex^2}{d}}}{6d^{\frac{9}{2}}e^4+6d^{\frac{7}{2}}e^5x^2}+\frac{d^6\log}{6d^{\frac{9}{2}}e^4\cdots}\\ \frac{x^8}{64d^{\frac{5}{2}}}\end{cases}\right.$$

$$+b\left(\begin{cases}\frac{d^3}{3e^4(d+ex^2)^{\frac{3}{2}}}-\frac{3d^2}{e^4\sqrt{d+ex^2}}-\frac{3d\sqrt{d+ex^2}}{e^4}+\frac{(d+ex^2)^{\frac{3}{2}}}{3e^4} & \text{for } e\neq 0\\ \frac{x^8}{8d^{\frac{5}{2}}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**7*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

output
```
a*Piecewise((d**3/(3*e**4*(d + e*x**2)**(3/2)) - 3*d**2/(e**4*sqrt(d + e*x
**2)) - 3*d*sqrt(d + e*x**2)/e**4 + (d + e*x**2)**(3/2)/(3*e**4), Ne(e, 0)
), (x**8/(8*d**(5/2)), True)) - b*n*Piecewise((4*d**(3/2)*sqrt(1 + e*x**2/
d)/(9*e**4) + d**(3/2)*log(e*x**2/d)/(6*e**4) - d**(3/2)*log(sqrt(1 + e*x*
*2/d) + 1)/(3*e**4) + 6*d**(3/2)*asinh(sqrt(d)/(sqrt(e)*x))/e**4 + sqrt(d)
*x**2*sqrt(1 + e*x**2/d)/(9*e**3) + 2*d**6*sqrt(1 + e*x**2/d)/(6*d**(9/2)*
e**4 + 6*d**(7/2)*e**5*x**2) + d**6*log(e*x**2/d)/(6*d**(9/2)*e**4 + 6*d**
(7/2)*e**5*x**2) - 2*d**6*log(sqrt(1 + e*x**2/d) + 1)/(6*d**(9/2)*e**4 + 6
*d**(7/2)*e**5*x**2) + d**5*x**2*log(e*x**2/d)/(6*d**(9/2)*e**3 + 6*d**(7/
2)*e**4*x**2) - 2*d**5*x**2*log(sqrt(1 + e*x**2/d) + 1)/(6*d**(9/2)*e**3 +
 6*d**(7/2)*e**4*x**2) - 3*d**2/(e**(9/2)*x*sqrt(d/(e*x**2) + 1)) - 3*d*x/
(e**(7/2)*sqrt(d/(e*x**2) + 1)), (e > -oo) & (e < oo) & Ne(e, 0)), (x**8/(
64*d**(5/2)), True)) + b*Piecewise((d**3/(3*e**4*(d + e*x**2)**(3/2)) - 3*
d**2/(e**4*sqrt(d + e*x**2)) - 3*d*sqrt(d + e*x**2)/e**4 + (d + e*x**2)**(
3/2)/(3*e**4), Ne(e, 0)), (x**8/(8*d**(5/2)), True))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^7}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^7/(e*x^2 + d)^(5/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{x^7\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{5/2}}\,dx$$

input
```
int((x^7*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

output
```
int((x^7*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 649, normalized size of antiderivative = 3.06

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{-48\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right)b\,d^3-72\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x\right.}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\right.}\right.}{}$$

input
```
int(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x)
```

output

```
( - 48*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*
c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**3 - 72*sqrt(d +
 e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(s
qrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2*e*x**2 - 18*sqrt(d + e*x**2)
*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d +
e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e**2*x**4 + 3*sqrt(d + e*x**2)*log(((2*
sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2) +
 sqrt(e)*x)**n*2**n))*b*e**3*x**6 - 48*sqrt(d + e*x**2)*a*d**3 - 72*sqrt(d
 + e*x**2)*a*d**2*e*x**2 - 18*sqrt(d + e*x**2)*a*d*e**2*x**4 + 3*sqrt(d +
e*x**2)*a*e**3*x**6 + 20*sqrt(d + e*x**2)*b*d**3*n + 42*sqrt(d + e*x**2)*b
*d**2*e*n*x**2 + 21*sqrt(d + e*x**2)*b*d*e**2*n*x**4 - sqrt(d + e*x**2)*b*
e**3*n*x**6 + 48*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt
(d))*b*d**3*n + 96*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sq
rt(d))*b*d**2*e*n*x**2 + 48*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt
(e)*x)/sqrt(d))*b*d*e**2*n*x**4 - 48*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(
d) + sqrt(e)*x)/sqrt(d))*b*d**3*n - 96*sqrt(d)*log((sqrt(d + e*x**2) + sqr
t(d) + sqrt(e)*x)/sqrt(d))*b*d**2*e*n*x**2 - 48*sqrt(d)*log((sqrt(d + e*x*
*2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d*e**2*n*x**4)/(9*e**4*(d**2 + 2*d*e
*x**2 + e**2*x**4))
```

3.298 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

Optimal result 2263
Mathematica [A] (verified) 2264
Rubi [A] (warning: unable to verify) 2264
Maple [F] 2267
Fricas [A] (verification not implemented) 2267
Sympy [A] (verification not implemented) 2268
Maxima [F(-2)] 2269
Giac [F] 2269
Mupad [F(-1)] 2269
Reduce [B] (verification not implemented) 2270

Optimal result

Integrand size = 25, antiderivative size = 155

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{bdn}{3e^3\sqrt{d+ex^2}} - \frac{bn\sqrt{d+ex^2}}{e^3} + \frac{8b\sqrt{d}n\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^3} - \frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}} + \frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}} + \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}$$

output
```
1/3*b*d*n/e^3/(e*x^2+d)^(1/2)-b*n*(e*x^2+d)^(1/2)/e^3+8/3*b*d^(1/2)*n*arct
anh((e*x^2+d)^(1/2)/d^(1/2))/e^3-1/3*d^2*(a+b*ln(c*x^n))/e^3/(e*x^2+d)^(3/
2)+2*d*(a+b*ln(c*x^n))/e^3/(e*x^2+d)^(1/2)+(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))
/e^3
```

Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 205, normalized size of antiderivative = 1.32

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = -\frac{8b\sqrt{d}n\log(x)}{3e^3} + \frac{bn(8d^2+12dex^2+3e^2x^4)\log(x)}{3e^3(d+ex^2)^{3/2}} + \sqrt{d+ex^2}\left(-\frac{d^2(a+b(-n\log(x)+\log(cx^n)))}{3e^3(d+ex^2)^2} + \frac{a-bn+b(-n\log(x)+\log(cx^n))}{e^3} + \frac{d(6a+bn+6b(-n\right.$$
$$+\frac{8b\sqrt{d}n\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{3e^3}$$

input
```
Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
(-8*b*Sqrt[d]*n*Log[x])/(3*e^3) + (b*n*(8*d^2 + 12*d*e*x^2 + 3*e^2*x^4)*Lo
g[x])/(3*e^3*(d + e*x^2)^(3/2)) + Sqrt[d + e*x^2]*(-1/3*(d^2*(a + b*(-(n*L
og[x]) + Log[c*x^n])))/(e^3*(d + e*x^2)^2) + (a - b*n + b*(-(n*Log[x]) + L
og[c*x^n]))/e^3 + (d*(6*a + b*n + 6*b*(-(n*Log[x]) + Log[c*x^n])))/(3*e^3*
(d + e*x^2))) + (8*b*Sqrt[d]*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(3*e^3)
```

Rubi [A] (warning: unable to verify)

Time = 0.56 (sec) , antiderivative size = 147, normalized size of antiderivative = 0.95, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.240$, Rules used = {2792, 27, 1578, 1192, 1584, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int \frac{3e^2x^4+12dex^2+8d^2}{3e^3x(ex^2+d)^{3/2}}dx - \frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}} + \frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}} + \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}$$

$$\Big\downarrow \; 27$$

$$-\frac{bn\int \frac{3e^2x^4+12dex^2+8d^2}{x(ex^2+d)^{3/2}}dx}{3e^3}-\frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}}+\frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}$$

$$\Big\downarrow \; 1578$$

$$-\frac{bn\int \frac{3e^2x^4+12dex^2+8d^2}{x^2(ex^2+d)^{3/2}}dx^2}{6e^3}-\frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}}+\frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}$$

$$\Big\downarrow \; 1192$$

$$-\frac{bn\int \frac{-3e^2x^8-6de^2x^4+d^2e^2}{x^4(d-x^4)}d\sqrt{ex^2+d}}{3e^5}-\frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}}+\frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}$$

$$\Big\downarrow \; 1584$$

$$-\frac{bn\int \left(-\frac{8de^2}{d-x^4}+\frac{de^2}{x^4}+3e^2\right)d\sqrt{ex^2+d}}{3e^5}-\frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}}+\frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}$$

$$\Big\downarrow \; 2009$$

$$-\frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}}+\frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}-\frac{bn\left(-8\sqrt{d}e^2\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+3e^2\sqrt{d+ex^2}-\frac{de^2}{x^2}\right)}{3e^5}$$

input
```
Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
-1/3*(b*n*(-((d*e^2)/x^2) + 3*e^2*Sqrt[d + e*x^2] - 8*Sqrt[d]*e^2*ArcTanh[
Sqrt[d + e*x^2]/Sqrt[d]]))/e^5 - (d^2*(a + b*Log[c*x^n]))/(3*e^3*(d + e*x^
2)^(3/2)) + (2*d*(a + b*Log[c*x^n]))/(e^3*Sqrt[d + e*x^2]) + (Sqrt[d + e*x
^2]*(a + b*Log[c*x^n]))/e^3
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1192
```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[2/e^(n + 2*p + 1)   Subst[Int[x^(
2*m + 1)*(e*f - d*g + g*x^2)^n*(c*d^2 - b*d*e + a*e^2 - (2*c*d - b*e)*x^2 +
 c*x^4)^p, x], x, Sqrt[d + e*x]], x] /; FreeQ[{a, b, c, d, e, f, g}, x] &&
IGtQ[p, 0] && ILtQ[n, 0] && IntegerQ[m + 1/2]
```

rule 1578
```
Int[(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_
)^4)^(p_.), x_Symbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(d + e*x)^q*(a
+ b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x] && Int
egerQ[(m - 1)/2]
```

rule 1584
```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x^5(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{5}{2}}}dx$$

input
```
int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 404, normalized size of antiderivative = 2.61

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \left[\frac{4\,(be^2nx^4+2\,bdenx^2+bd^2n)\sqrt{d}\log\left(-\frac{ex^2+2\,\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-(3\,(be^2n-ae^2)x\right.$$

$$-\frac{8\,(be^2nx^4+2\,bdenx^2+bd^2n)\sqrt{-d}\arctan\left(\frac{\sqrt{ex^2+d}\sqrt{-d}}{d}\right)+(3\,(be^2n-ae^2)x^4+2\,bd^2n-8\,ad^2+(5\,bden-}{3\,(e^5x^4+2\,de^4}$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
[1/3*(4*(b*e^2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*sqrt(d)*log(-(e*x^2 + 2*sq
rt(e*x^2 + d)*sqrt(d) + 2*d)/x^2) - (3*(b*e^2*n - a*e^2)*x^4 + 2*b*d^2*n -
 8*a*d^2 + (5*b*d*e*n - 12*a*d*e)*x^2 - (3*b*e^2*x^4 + 12*b*d*e*x^2 + 8*b*
d^2)*log(c) - (3*b*e^2*n*x^4 + 12*b*d*e*n*x^2 + 8*b*d^2*n)*log(x))*sqrt(e*
x^2 + d))/(e^5*x^4 + 2*d*e^4*x^2 + d^2*e^3), -1/3*(8*(b*e^2*n*x^4 + 2*b*d*
e*n*x^2 + b*d^2*n)*sqrt(-d)*arctan(sqrt(e*x^2 + d)*sqrt(-d)/d) + (3*(b*e^2
*n - a*e^2)*x^4 + 2*b*d^2*n - 8*a*d^2 + (5*b*d*e*n - 12*a*d*e)*x^2 - (3*b*
e^2*x^4 + 12*b*d*e*x^2 + 8*b*d^2)*log(c) - (3*b*e^2*n*x^4 + 12*b*d*e*n*x^2
 + 8*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(e^5*x^4 + 2*d*e^4*x^2 + d^2*e^3)]
```

Sympy [A] (verification not implemented)

Time = 65.17 (sec) , antiderivative size = 415, normalized size of antiderivative = 2.68

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = a\left(\begin{cases} -\frac{d^2}{3e^3(d+ex^2)^{\frac{3}{2}}}+\frac{2d}{e^3\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}}{e^3} & \text{for } e\neq 0 \\ \frac{x^6}{6d^{\frac{5}{2}}} & \text{otherwise} \end{cases}\right) - bn\left(\begin{cases} -\frac{3\sqrt{d}\,\mathrm{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{e^3}-\frac{2d^5\sqrt{1+\frac{ex^2}{d}}}{6d^{\frac{9}{2}}e^3+6d^{\frac{7}{2}}e^4x^2}-\frac{d^5\log\left(\frac{ex^2}{d}\right)}{6d^{\frac{9}{2}}e^3+6d^{\frac{7}{2}}e^4x^2}+\frac{2d^5\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{6d^{\frac{9}{2}}e^3+6d^{\frac{7}{2}}e^4x^2}-\frac{d^4x^2\log\left(\frac{ex^2}{d}\right)}{6d^{\frac{9}{2}}e^2+6d^{\frac{7}{2}}e^3x^2}+\frac{2d^4x^2\log\left(\sqrt{1\right.}{6d^{\frac{9}{2}}e^2+6d} \\ \frac{x^6}{36d^{\frac{5}{2}}} \end{cases}\right) + b\left(\begin{cases} -\frac{d^2}{3e^3(d+ex^2)^{\frac{3}{2}}}+\frac{2d}{e^3\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}}{e^3} & \text{for } e\neq 0 \\ \frac{x^6}{6d^{\frac{5}{2}}} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate(x**5*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

output
```
a*Piecewise((-d**2/(3*e**3*(d + e*x**2)**(3/2)) + 2*d/(e**3*sqrt(d + e*x**
2)) + sqrt(d + e*x**2)/e**3, Ne(e, 0)), (x**6/(6*d**(5/2)), True)) - b*n*P
iecewise((-3*sqrt(d)*asinh(sqrt(d)/(sqrt(e)*x))/e**3 - 2*d**5*sqrt(1 + e*x
**2/d)/(6*d**(9/2)*e**3 + 6*d**(7/2)*e**4*x**2) - d**5*log(e*x**2/d)/(6*d*
*(9/2)*e**3 + 6*d**(7/2)*e**4*x**2) + 2*d**5*log(sqrt(1 + e*x**2/d) + 1)/(
6*d**(9/2)*e**3 + 6*d**(7/2)*e**4*x**2) - d**4*x**2*log(e*x**2/d)/(6*d**(9
/2)*e**2 + 6*d**(7/2)*e**3*x**2) + 2*d**4*x**2*log(sqrt(1 + e*x**2/d) + 1)
/(6*d**(9/2)*e**2 + 6*d**(7/2)*e**3*x**2) + d/(e**(7/2)*x*sqrt(d/(e*x**2)
+ 1)) + x/(e**(5/2)*sqrt(d/(e*x**2) + 1)), (e > -oo) & (e < oo) & Ne(e, 0)
), (x**6/(36*d**(5/2)), True)) + b*Piecewise((-d**2/(3*e**3*(d + e*x**2)**
(3/2)) + 2*d/(e**3*sqrt(d + e*x**2)) + sqrt(d + e*x**2)/e**3, Ne(e, 0)), (
x**6/(6*d**(5/2)), True))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x^5(a + b\log(cx^n))}{(d + ex^2)^{5/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x^5(a + b\log(cx^n))}{(d + ex^2)^{5/2}}\,dx = \int \frac{(b\log(cx^n) + a)x^5}{(ex^2 + d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^5/(e*x^2 + d)^(5/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^5(a + b\log(cx^n))}{(d + ex^2)^{5/2}}\,dx = \int \frac{x^5\,(a + b\,\ln(c\,x^n))}{(e\,x^2 + d)^{5/2}}\,dx$$

input
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

output
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 528, normalized size of antiderivative = 3.41

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{8\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) b\,d^2 + 12\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x\cdots\right.}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\cdots\right.}\cdots\right.}{\cdots}$$

input
```
int(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
(8*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(
e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2 + 12*sqrt(d + e*x
**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(
d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e*x**2 + 3*sqrt(d + e*x**2)*log(((2
*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2)
+ sqrt(e)*x)**n*2**n))*b*e**2*x**4 + 8*sqrt(d + e*x**2)*a*d**2 + 12*sqrt(d
 + e*x**2)*a*d*e*x**2 + 3*sqrt(d + e*x**2)*a*e**2*x**4 - 2*sqrt(d + e*x**2
)*b*d**2*n - 5*sqrt(d + e*x**2)*b*d*e*n*x**2 - 3*sqrt(d + e*x**2)*b*e**2*n
*x**4 - 8*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*b*
d**2*n - 16*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*
b*d*e*n*x**2 - 8*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt
(d))*b*e**2*n*x**4 + 8*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x
)/sqrt(d))*b*d**2*n + 16*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)
*x)/sqrt(d))*b*d*e*n*x**2 + 8*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sq
rt(e)*x)/sqrt(d))*b*e**2*n*x**4)/(3*e**3*(d**2 + 2*d*e*x**2 + e**2*x**4))
```

3.299 $\int \frac{x^3(a+b\log(cx^n))}{\left(d+ex^2\right)^{5/2}}\,dx$

Optimal result 2271
Mathematica [A] (verified) 2271
Rubi [A] (verified) 2272
Maple [F] 2274
Fricas [A] (verification not implemented) 2274
Sympy [A] (verification not implemented) 2275
Maxima [A] (verification not implemented) 2276
Giac [F] 2276
Mupad [F(-1)] 2277
Reduce [B] (verification not implemented) 2277

Optimal result

Integrand size = 25, antiderivative size = 108

$$\int \frac{x^3(a+b\log(cx^n))}{\left(d+ex^2\right)^{5/2}}\,dx=-\frac{bn}{3e^2\sqrt{d+ex^2}}-\frac{2bn\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3\sqrt{d}e^2}+\frac{d(a+b\log(cx^n))}{3e^2\left(d+ex^2\right)^{3/2}}-\frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}}$$

output
```
-1/3*b*n/e^2/(e*x^2+d)^(1/2)-2/3*b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(1
/2)/e^2+1/3*d*(a+b*ln(c*x^n))/e^2/(e*x^2+d)^(3/2)-(a+b*ln(c*x^n))/e^2/(e*x
^2+d)^(1/2)
```

Mathematica [A] (verified)

Time = 0.37 (sec) , antiderivative size = 137, normalized size of antiderivative = 1.27

$$\int \frac{x^3(a+b\log(cx^n))}{\left(d+ex^2\right)^{5/2}}\,dx=\frac{\frac{2bn\log(x)}{\sqrt{d}}-\frac{bn\left(2d+3ex^2\right)\log(x)}{\left(d+ex^2\right)^{3/2}}+\frac{d(a-bn\log(x)+b\log(cx^n))-\left(d+ex^2\right)\left(3a+bn-3bn\log(x)+3b\log(cx\right.}{\left(d+ex^2\right)^{3/2}}}{3e^2}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
((2*b*n*Log[x])/Sqrt[d] - (b*n*(2*d + 3*e*x^2)*Log[x])/(d + e*x^2)^(3/2) +
 (d*(a - b*n*Log[x] + b*Log[c*x^n]) - (d + e*x^2)*(3*a + b*n - 3*b*n*Log[x
] + 3*b*Log[c*x^n]))/(d + e*x^2)^(3/2) - (2*b*n*Log[d + Sqrt[d]*Sqrt[d + e
*x^2]])/Sqrt[d])/(3*e^2)
```

Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 104, normalized size of antiderivative = 0.96, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.240$, Rules used = {2792, 27, 354, 87, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{3ex^2+2d}{3e^2x(ex^2+d)^{3/2}}dx-\frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{3ex^2+2d}{x(ex^2+d)^{3/2}}dx}{3e^2}-\frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{354}$$

$$\frac{bn\int \frac{3ex^2+2d}{x^2(ex^2+d)^{3/2}}dx^2}{6e^2}-\frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{87}$$

$$\frac{bn\left(2\int \frac{1}{x^2\sqrt{ex^2+d}}dx^2-\frac{2}{\sqrt{d+ex^2}}\right)}{6e^2}-\frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{73}$$

$$\frac{bn\left(\frac{4\int \frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{e}-\frac{2}{\sqrt{d+ex^2}}\right)}{6e^2}-\frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{221}$$

$$-\frac{a+b\log\left(cx^n\right)}{e^2\sqrt{d+ex^2}}+\frac{d(a+b\log\left(cx^n\right))}{3e^2\left(d+ex^2\right)^{3/2}}+\frac{bn\left(-\frac{4\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{\sqrt{d}}-\frac{2}{\sqrt{d+ex^2}}\right)}{6e^2}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
(b*n*(-2/Sqrt[d + e*x^2] - (4*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/Sqrt[d]))/
(6*e^2) + (d*(a + b*Log[c*x^n]))/(3*e^2*(d + e*x^2)^(3/2)) - (a + b*Log[c*
x^n])/(e^2*Sqrt[d + e*x^2])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 87
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[(-(b*e - a*f))*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(f*(p
+ 1)*(c*f - d*e))), x] - Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p
+ 1)))/(f*(p + 1)*(c*f - d*e))   Int[(c + d*x)^n*(e + f*x)^(p + 1), x], x]
/; FreeQ[{a, b, c, d, e, f, n}, x] && LtQ[p, -1] && ( !LtQ[n, -1] || Intege
rQ[p] ||  !(IntegerQ[n] ||  !(EqQ[e, 0] ||  !(EqQ[c, 0] || LtQ[p, n]))))
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 354
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_S
ymbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(a + b*x)^p*(c + d*x)^q, x], x
, x^2], x] /; FreeQ[{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0] && IntegerQ
[(m - 1)/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x^3(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{5}{2}}}dx$$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 328, normalized size of antiderivative = 3.04

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \left[\frac{(be^2nx^4+2\,bdenx^2+bd^2n)\sqrt{d}\log\left(-\frac{ex^2-2\,\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-(bd^2n+2\,ad^2+(}{3\,(de^4x^4+}\right.$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
[1/3*((b*e^2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*sqrt(d)*log(-(e*x^2 - 2*sqrt
(e*x^2 + d)*sqrt(d) + 2*d)/x^2) - (b*d^2*n + 2*a*d^2 + (b*d*e*n + 3*a*d*e)
*x^2 + (3*b*d*e*x^2 + 2*b*d^2)*log(c) + (3*b*d*e*n*x^2 + 2*b*d^2*n)*log(x)
)*sqrt(e*x^2 + d))/(d*e^4*x^4 + 2*d^2*e^3*x^2 + d^3*e^2), 1/3*(2*(b*e^2*n*
x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*sqrt(-d)*arctan(sqrt(e*x^2 + d)*sqrt(-d)/d)
 - (b*d^2*n + 2*a*d^2 + (b*d*e*n + 3*a*d*e)*x^2 + (3*b*d*e*x^2 + 2*b*d^2)*
log(c) + (3*b*d*e*n*x^2 + 2*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(d*e^4*x^4 +
 2*d^2*e^3*x^2 + d^3*e^2)]
```

Sympy [A] (verification not implemented)

Time = 28.44 (sec) , antiderivative size = 337, normalized size of antiderivative = 3.12

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = a\left(\begin{cases}\frac{d}{3e^2(d+ex^2)^{\frac{3}{2}}}-\frac{1}{e^2\sqrt{d+ex^2}} & \text{for } e\neq 0\\ \frac{x^4}{4d^{\frac{5}{2}}} & \text{otherwise}\end{cases}\right)$$
$$-bn\left(\left(\begin{cases}\frac{2d^4\sqrt{1+\frac{ex^2}{d}}}{6d^{\frac{9}{2}}e^2+6d^{\frac{7}{2}}e^3x^2}+\frac{d^4\log\left(\frac{ex^2}{d}\right)}{6d^{\frac{9}{2}}e^2+6d^{\frac{7}{2}}e^3x^2}-\frac{2d^4\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{6d^{\frac{9}{2}}e^2+6d^{\frac{7}{2}}e^3x^2}+\frac{d^3x^2\log\left(\frac{ex^2}{d}\right)}{6d^{\frac{9}{2}}e+6d^{\frac{7}{2}}e^2x^2}-\frac{2d^3x^2\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{6d^{\frac{9}{2}}e+6d^{\frac{7}{2}}e^2x^2}+\frac{\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{ex}}\right)}{\sqrt{d}e^2} \\ \frac{x^4}{16d^{\frac{5}{2}}}\end{cases}\right.\right.$$
$$+b\left(\begin{cases}\frac{d}{3e^2(d+ex^2)^{\frac{3}{2}}}-\frac{1}{e^2\sqrt{d+ex^2}} & \text{for } e\neq 0\\ \frac{x^4}{4d^{\frac{5}{2}}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

output
```
a*Piecewise((d/(3*e**2*(d + e*x**2)**(3/2)) - 1/(e**2*sqrt(d + e*x**2)), N
e(e, 0)), (x**4/(4*d**(5/2)), True)) - b*n*Piecewise((2*d**4*sqrt(1 + e*x*
*2/d)/(6*d**(9/2)*e**2 + 6*d**(7/2)*e**3*x**2) + d**4*log(e*x**2/d)/(6*d**
(9/2)*e**2 + 6*d**(7/2)*e**3*x**2) - 2*d**4*log(sqrt(1 + e*x**2/d) + 1)/(6
*d**(9/2)*e**2 + 6*d**(7/2)*e**3*x**2) + d**3*x**2*log(e*x**2/d)/(6*d**(9/
2)*e + 6*d**(7/2)*e**2*x**2) - 2*d**3*x**2*log(sqrt(1 + e*x**2/d) + 1)/(6*
d**(9/2)*e + 6*d**(7/2)*e**2*x**2) + asinh(sqrt(d)/(sqrt(e)*x))/(sqrt(d)*e
**2), (e > -oo) & (e < oo) & Ne(e, 0)), (x**4/(16*d**(5/2)), True)) + b*Pi
ecewise((d/(3*e**2*(d + e*x**2)**(3/2)) - 1/(e**2*sqrt(d + e*x**2)), Ne(e,
 0)), (x**4/(4*d**(5/2)), True))*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 137, normalized size of antiderivative = 1.27

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{1}{3}bn\left(\frac{\log\left(\frac{\sqrt{ex^2+d}-\sqrt{d}}{\sqrt{ex^2+d}+\sqrt{d}}\right)}{\sqrt{d}e^2} - \frac{1}{\sqrt{ex^2+d}e^2}\right) - \frac{1}{3}b\left(\frac{3\,x^2}{(ex^2+d)^{\frac{3}{2}}e} + \frac{2\,d}{(ex^2+d)^{\frac{3}{2}}e^2}\right)\log(cx^n) - \frac{1}{3}a\left(\frac{3\,x^2}{(ex^2+d)^{\frac{3}{2}}e} + \frac{2\,d}{(ex^2+d)^{\frac{3}{2}}e^2}\right)$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
1/3*b*n*(log((sqrt(e*x^2 + d) - sqrt(d))/(sqrt(e*x^2 + d) + sqrt(d)))/(sqr
t(d)*e^2) - 1/(sqrt(e*x^2 + d)*e^2)) - 1/3*b*(3*x^2/((e*x^2 + d)^(3/2)*e)
+ 2*d/((e*x^2 + d)^(3/2)*e^2))*log(c*x^n) - 1/3*a*(3*x^2/((e*x^2 + d)^(3/2
)*e) + 2*d/((e*x^2 + d)^(3/2)*e^2))
```

Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x^2 + d)^(5/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx=\int \frac{x^3\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{5/2}}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 425, normalized size of antiderivative = 3.94

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx=\frac{-2\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) b\,d^2-3\sqrt{e\,x^2+d}\,\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\right.}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\right.}\right.}{}$$

input
```
int(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
( - 2*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c
)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2 - 3*sqrt(d + e
*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqr
t(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e*x**2 - 2*sqrt(d + e*x**2)*a*d**
2 - 3*sqrt(d + e*x**2)*a*d*e*x**2 - sqrt(d + e*x**2)*b*d**2*n - sqrt(d + e
*x**2)*b*d*e*n*x**2 + 2*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*
x)/sqrt(d))*b*d**2*n + 4*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)
*x)/sqrt(d))*b*d*e*n*x**2 + 2*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sq
rt(e)*x)/sqrt(d))*b*e**2*n*x**4 - 2*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d
) + sqrt(e)*x)/sqrt(d))*b*d**2*n - 4*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(
d) + sqrt(e)*x)/sqrt(d))*b*d*e*n*x**2 - 2*sqrt(d)*log((sqrt(d + e*x**2) +
sqrt(d) + sqrt(e)*x)/sqrt(d))*b*e**2*n*x**4)/(3*d*e**2*(d**2 + 2*d*e*x**2
+ e**2*x**4))
```

3.300 $\int \frac{x(a+b\log(cx^n))}{\left(d+ex^2\right)^{5/2}}\,dx$

Optimal result 2278
Mathematica [A] (verified) 2278
Rubi [A] (verified) 2279
Maple [F] 2281
Fricas [A] (verification not implemented) 2281
Sympy [A] (verification not implemented) 2282
Maxima [F(-2)] 2282
Giac [F] 2283
Mupad [F(-1)] 2283
Reduce [B] (verification not implemented) 2284

Optimal result

Integrand size = 23, antiderivative size = 84

$$\int \frac{x(a+b\log(cx^n))}{\left(d+ex^2\right)^{5/2}}\,dx = \frac{bn}{3de\sqrt{d+ex^2}} - \frac{bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3d^{3/2}e} - \frac{a+b\log(cx^n)}{3e\left(d+ex^2\right)^{3/2}}$$

output
```
1/3*b*n/d/e/(e*x^2+d)^(1/2)-1/3*b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(3/
2)/e-1/3*(a+b*ln(c*x^n))/e/(e*x^2+d)^(3/2)
```

Mathematica [A] (verified)

Time = 0.31 (sec) , antiderivative size = 97, normalized size of antiderivative = 1.15

$$\int \frac{x(a+b\log(cx^n))}{\left(d+ex^2\right)^{5/2}}\,dx = -\frac{\frac{a}{(d+ex^2)^{3/2}} - \frac{bn}{d\sqrt{d+ex^2}} - \frac{bn\log(x)}{d^{3/2}} + \frac{b\log(cx^n)}{(d+ex^2)^{3/2}} + \frac{bn\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{d^{3/2}}}{3e}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
-1/3*(a/(d + e*x^2)^(3/2) - (b*n)/(d*Sqrt[d + e*x^2]) - (b*n*Log[x])/d^(3/
2) + (b*Log[c*x^n])/(d + e*x^2)^(3/2) + (b*n*Log[d + Sqrt[d]*Sqrt[d + e*x^
2]])/d^(3/2))/e
```

Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 80, normalized size of antiderivative = 0.95, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {2776, 243, 61, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}dx$$

$$\Big\downarrow \ 2776$$

$$\frac{bn\int \frac{1}{x(ex^2+d)^{3/2}}dx}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex^2)^{3/2}}$$

$$\Big\downarrow \ 243$$

$$\frac{bn\int \frac{1}{x^2(ex^2+d)^{3/2}}dx^2}{6e}-\frac{a+b\log(cx^n)}{3e(d+ex^2)^{3/2}}$$

$$\Big\downarrow \ 61$$

$$\frac{bn\left(\frac{\int \frac{1}{x^2\sqrt{ex^2+d}}dx^2}{d}+\frac{2}{d\sqrt{d+ex^2}}\right)}{6e}-\frac{a+b\log(cx^n)}{3e(d+ex^2)^{3/2}}$$

$$\Big\downarrow \ 73$$

$$\frac{bn\left(\frac{2\int \frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{de}+\frac{2}{d\sqrt{d+ex^2}}\right)}{6e}-\frac{a+b\log(cx^n)}{3e(d+ex^2)^{3/2}}$$

$$\Big\downarrow \ 221$$

$$\frac{bn\left(\frac{2}{d\sqrt{d+ex^2}}-\frac{2\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}\right)}{6e}-\frac{a+b\log\left(cx^n\right)}{3e\left(d+ex^2\right)^{3/2}}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
(b*n*(2/(d*Sqrt[d + e*x^2]) - (2*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/d^(3/2)
))/(6*e) - (a + b*Log[c*x^n])/(3*e*(d + e*x^2)^(3/2))
```

Defintions of rubi rules used

rule 61
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Simp[d*((
m + n + 2)/((b*c - a*d)*(m + 1)))   Int[(a + b*x)^(m + 1)*(c + d*x)^n, x],
x] /; FreeQ[{a, b, c, d, n}, x] && LtQ[m, -1] &&  !(LtQ[n, -1] && (EqQ[a, 0
] || (NeQ[c, 0] && LtQ[m - n, 0] && IntegerQ[n]))) && IntLinearQ[a, b, c, d
, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Maple [F]

$$\int \frac{x(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{5}{2}}}dx$$

input
```
int(x*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
int(x*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 270, normalized size of antiderivative = 3.21

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \left[\frac{(be^2nx^4+2\,bdenx^2+bd^2n)\sqrt{d}\log\left(-\frac{ex^2-2\,\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)+2\,(bdenx^2-bd^2n\,\mathrm{l}}{6\,(d^2e^3x^4+2\,d^3e^2x^2+d^4e)}\right.$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
[1/6*((b*e^2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*sqrt(d)*log(-(e*x^2 - 2*sqrt
(e*x^2 + d)*sqrt(d) + 2*d)/x^2) + 2*(b*d*e*n*x^2 - b*d^2*n*log(x) + b*d^2*
n - b*d^2*log(c) - a*d^2)*sqrt(e*x^2 + d))/(d^2*e^3*x^4 + 2*d^3*e^2*x^2 +
d^4*e), 1/3*((b*e^2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*sqrt(-d)*arctan(sqrt(
e*x^2 + d)*sqrt(-d)/d) + (b*d*e*n*x^2 - b*d^2*n*log(x) + b*d^2*n - b*d^2*l
og(c) - a*d^2)*sqrt(e*x^2 + d))/(d^2*e^3*x^4 + 2*d^3*e^2*x^2 + d^4*e)]
```

Sympy [A] (verification not implemented)

Time = 13.78 (sec) , antiderivative size = 272, normalized size of antiderivative = 3.24

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = a\left(\begin{cases} -\frac{1}{3e(d+ex^2)^{\frac{3}{2}}} & \text{for } e\neq 0 \\ \frac{x^2}{2d^{\frac{5}{2}}} & \text{otherwise} \end{cases}\right) - bn\left(\begin{cases} -\frac{2d^3\sqrt{1+\frac{ex^2}{d}}}{6d^{\frac{9}{2}}e+6d^{\frac{7}{2}}e^2x^2} - \frac{d^3\log\left(\frac{ex^2}{d}\right)}{6d^{\frac{9}{2}}e+6d^{\frac{7}{2}}e^2x^2} + \frac{2d^3\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{6d^{\frac{9}{2}}e+6d^{\frac{7}{2}}e^2x^2} - \frac{d^2x^2\log\left(\frac{ex^2}{d}\right)}{6d^{\frac{9}{2}}+6d^{\frac{7}{2}}ex^2} + \frac{2d^2x^2\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{6d^{\frac{9}{2}}+6d^{\frac{7}{2}}ex^2} & \text{for } e > - \\ \frac{x^2}{4d^{\frac{5}{2}}} & \text{otherwise} \end{cases}\right) + b\left(\begin{cases} -\frac{1}{3e(d+ex^2)^{\frac{3}{2}}} & \text{for } e\neq 0 \\ \frac{x^2}{2d^{\frac{5}{2}}} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

output
```
a*Piecewise((-1/(3*e*(d + e*x**2)**(3/2)), Ne(e, 0)), (x**2/(2*d**(5/2)),
True)) - b*n*Piecewise((-2*d**3*sqrt(1 + e*x**2/d)/(6*d**(9/2)*e + 6*d**(7
/2)*e**2*x**2) - d**3*log(e*x**2/d)/(6*d**(9/2)*e + 6*d**(7/2)*e**2*x**2)
+ 2*d**3*log(sqrt(1 + e*x**2/d) + 1)/(6*d**(9/2)*e + 6*d**(7/2)*e**2*x**2)
 - d**2*x**2*log(e*x**2/d)/(6*d**(9/2) + 6*d**(7/2)*e*x**2) + 2*d**2*x**2*
log(sqrt(1 + e*x**2/d) + 1)/(6*d**(9/2) + 6*d**(7/2)*e*x**2), (e > -oo) &
(e < oo) & Ne(e, 0)), (x**2/(4*d**(5/2)), True)) + b*Piecewise((-1/(3*e*(d
 + e*x**2)**(3/2)), Ne(e, 0)), (x**2/(2*d**(5/2)), True))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\log(cx^n)+a)x}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x^2 + d)^(5/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{x\,(a+b\ln(c\,x^n))}{(e\,x^2+d)^{5/2}}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 338, normalized size of antiderivative = 4.02

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{-\sqrt{e\,x^2+d}\log\left(\frac{d^{\frac{n}{2}}\left(\sqrt{e}\,\sqrt{e\,x^2+d}\,x+e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{d}\,\sqrt{e\,x^2+d}+\sqrt{e}\,\sqrt{d}\,x\right)^n}\right) b\,d^2-\sqrt{e\,x^2+d}\,a\,d^2+\sqrt{e\,x^2+d}\,b\,d^2 \cdots}{\cdots}$$

input
```
int(x*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
( - sqrt(d + e*x**2)*log((d**(n/2)*(sqrt(e)*sqrt(d + e*x**2)*x + e*x**2)**
n*c)/(e**(n/2)*(sqrt(d)*sqrt(d + e*x**2) + sqrt(e)*sqrt(d)*x)**n))*b*d**2
- sqrt(d + e*x**2)*a*d**2 + sqrt(d + e*x**2)*b*d**2*n + sqrt(d + e*x**2)*b
*d*e*n*x**2 + sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d)
)*b*d**2*n + 2*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d
))*b*d*e*n*x**2 + sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqr
t(d))*b*e**2*n*x**4 - sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)
/sqrt(d))*b*d**2*n - 2*sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x
)/sqrt(d))*b*d*e*n*x**2 - sqrt(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e
)*x)/sqrt(d))*b*e**2*n*x**4)/(3*d**2*e*(d**2 + 2*d*e*x**2 + e**2*x**4))
```

3.301 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{5/2}}\,dx$

Optimal result 2285
Mathematica [C] (verified) 2286
Rubi [A] (verified) 2286
Maple [F] 2288
Fricas [F] 2288
Sympy [F(-1)] 2288
Maxima [F(-2)] 2289
Giac [F] 2289
Mupad [F(-1)] 2289
Reduce [F] 2290

Optimal result

Integrand size = 25, antiderivative size = 251

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{5/2}}\,dx = -\frac{bn}{3d^2\sqrt{d+ex^2}} + \frac{4bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3d^{5/2}} + \frac{bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{5/2}}$$
$$+\frac{1}{3}\left(\frac{1}{d(d+ex^2)^{3/2}} + \frac{3}{d^2\sqrt{d+ex^2}} - \frac{3\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{5/2}}\right)(a+b\log(cx^n)) - \frac{bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{\cdots}}{\sqrt{d}-\sqrt{\cdots}}\right.}{d^{5/2}}$$

output
```
-1/3*b*n/d^2/(e*x^2+d)^(1/2)+4/3*b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(5
/2)+1/2*b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))^2/d^(5/2)+1/3*(1/d/(e*x^2+d)^
(3/2)+3/d^2/(e*x^2+d)^(1/2)-3*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(5/2))*(a
+b*ln(c*x^n))-b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(
e*x^2+d)^(1/2)))/d^(5/2)-1/2*b*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x^2+d)^
(1/2)))/d^(5/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.52 (sec) , antiderivative size = 273, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)^{5/2}}\,dx = \frac{bn\sqrt{1+\frac{d}{ex^2}}\left(-3d^{5/2}\left(d+ex^2\right)^2\,{}_3F_2\left(\frac{5}{2},\frac{5}{2},\frac{5}{2};\frac{7}{2},\frac{7}{2};-\frac{d}{ex^2}\right)+25\sqrt{d}e^3\sqrt{1+\frac{d}{ex^2}}x^6(4d+\right.}{75d^{5/2}e^2x^4\left(d+ex^2\right)^{5/2}}$$

$$+\frac{\left(4d+3ex^2\right)\left(a-bn\log(x)+b\log\left(cx^n\right)\right)}{3d^2\left(d+ex^2\right)^{3/2}}+\frac{\log(x)\left(a-bn\log(x)+b\log\left(cx^n\right)\right)}{d^{5/2}}$$

$$-\frac{\left(a-bn\log(x)+b\log\left(cx^n\right)\right)\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{d^{5/2}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^2)^(5/2)),x]
```

output
```
(b*n*Sqrt[1 + d/(e*x^2)]*(-3*d^(5/2)*(d + e*x^2)^2*HypergeometricPFQ[{5/2,
 5/2, 5/2}, {7/2, 7/2}, -(d/(e*x^2))] + 25*Sqrt[d]*e^3*Sqrt[1 + d/(e*x^2)]
*x^6*(4*d + 3*e*x^2)*Log[x] - 75*e^(5/2)*x^5*(d + e*x^2)^2*ArcSinh[Sqrt[d]
/(Sqrt[e]*x)]*Log[x]))/(75*d^(5/2)*e^2*x^4*(d + e*x^2)^(5/2)) + ((4*d + 3*
e*x^2)*(a - b*n*Log[x] + b*Log[c*x^n]))/(3*d^2*(d + e*x^2)^(3/2)) + (Log[x
]*(a - b*n*Log[x] + b*Log[c*x^n]))/d^(5/2) - ((a - b*n*Log[x] + b*Log[c*x^
n])*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/d^(5/2)
```

Rubi [A] (verified)

Time = 0.73 (sec) , antiderivative size = 245, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.080$, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)^{5/2}}\,dx$$

$$\Big\downarrow \; 2790$$

$$\frac{1}{3}\left(-\frac{3\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{5/2}}+\frac{3}{d^2\sqrt{d+ex^2}}+\frac{1}{d\left(d+ex^2\right)^{3/2}}\right)(a+b\log\left(cx^n\right))-bn\int\left(-\frac{\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{d^{5/2}x}+\frac{1}{d^2x\sqrt{ex^2+d}}+\frac{1}{3dx\left(ex^2+d\right)^{3/2}}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{3}\left(-\frac{3\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{5/2}}+\frac{3}{d^2\sqrt{d+ex^2}}+\frac{1}{d\left(d+ex^2\right)^{3/2}}\right)(a+b\log\left(cx^n\right))-bn\left(-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{5/2}}-\frac{4\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3d^{5/2}}+\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{d^{5/2}}+\frac{\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{2d^{5/2}}\right.$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^2)^(5/2)),x]
```

output
```
((1/(d*(d + e*x^2)^(3/2)) + 3/(d^2*Sqrt[d + e*x^2]) - (3*ArcTanh[Sqrt[d +
e*x^2]/Sqrt[d]])/d^(5/2))*(a + b*Log[c*x^n]))/3 - b*n*(1/(3*d^2*Sqrt[d + e
*x^2]) - (4*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(3*d^(5/2)) - ArcTanh[Sqrt[d
 + e*x^2]/Sqrt[d]]^2/(2*d^(5/2)) + (ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*Log[(
2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/d^(5/2) + PolyLog[2, 1 - (2*Sqrt[
d])/(Sqrt[d] - Sqrt[d + e*x^2])]/(2*d^(5/2)))
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x\left(e\,x^{2}+d\right)^{\frac{5}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x/(e*x^2+d)^(5/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(e*x^2+d)^(5/2),x)
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{2}\right)^{5/2}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\left(ex^{2}+d\right)^{\frac{5}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/(e^3*x^7 + 3*d
*e^2*x^5 + 3*d^2*e*x^3 + d^3*x), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{2}\right)^{5/2}}\,dx=\text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x**2+d)**(5/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log(cx^n)}{x(d + ex^2)^{5/2}} \, dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a + b\log(cx^n)}{x(d + ex^2)^{5/2}} \, dx = \int \frac{b\log(cx^n) + a}{(ex^2 + d)^{\frac{5}{2}}x} \, dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^(5/2)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a + b\log(cx^n)}{x(d + ex^2)^{5/2}} \, dx = \int \frac{a + b\,\ln(c\,x^n)}{x\,(e\,x^2 + d)^{5/2}} \, dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^(5/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^(5/2)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{5/2}}\,dx = \frac{4\sqrt{e\,x^2+d}\,a\,d^2+3\sqrt{e\,x^2+d}\,ade\,x^2+3\sqrt{d}\log\left(\frac{\sqrt{e\,x^2+d}-\sqrt{d}+\sqrt{e}\,x}{\sqrt{d}}\right)a\,d^2+6\sqrt{d}\log\left(\right.}{}$$

input
```
int((a+b*log(c*x^n))/x/(e*x^2+d)^(5/2),x)
```

output
```
(4*sqrt(d + e*x**2)*a*d**2 + 3*sqrt(d + e*x**2)*a*d*e*x**2 + 3*sqrt(d)*log
((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*a*d**2 + 6*sqrt(d)*log(
(sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*a*d*e*x**2 + 3*sqrt(d)*l
og((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*a*e**2*x**4 - 3*sqrt(
d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*a*d**2 - 6*sqrt(d
)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*a*d*e*x**2 - 3*sqr
t(d)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*a*e**2*x**4 + 3
*int(log(x**n*c)/(sqrt(d + e*x**2)*d**2*x + 2*sqrt(d + e*x**2)*d*e*x**3 +
sqrt(d + e*x**2)*e**2*x**5),x)*b*d**5 + 6*int(log(x**n*c)/(sqrt(d + e*x**2
)*d**2*x + 2*sqrt(d + e*x**2)*d*e*x**3 + sqrt(d + e*x**2)*e**2*x**5),x)*b*
d**4*e*x**2 + 3*int(log(x**n*c)/(sqrt(d + e*x**2)*d**2*x + 2*sqrt(d + e*x*
*2)*d*e*x**3 + sqrt(d + e*x**2)*e**2*x**5),x)*b*d**3*e**2*x**4)/(3*d**3*(d
**2 + 2*d*e*x**2 + e**2*x**4))
```

3.302 $\int \frac{a+b\log(cx^n)}{x^3\left(d+ex^2\right)^{5/2}}\,dx$

Optimal result 2291
Mathematica [C] (warning: unable to verify) 2292
Rubi [A] (verified) 2292
Maple [F] 2294
Fricas [F] 2294
Sympy [F(-1)] 2295
Maxima [F(-2)] 2295
Giac [F] 2295
Mupad [F(-1)] 2296
Reduce [F] 2296

Optimal result

Integrand size = 25, antiderivative size = 337

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^3\left(d+ex^2\right)^{5/2}}\,dx &= \frac{ben}{3d^3\sqrt{d+ex^2}} - \frac{bn\sqrt{d+ex^2}}{4d^3x^2} - \frac{31ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{12d^{7/2}} \\ &\quad - \frac{5ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{7/2}} - \frac{5e(a+b\log(cx^n))}{6d^2\left(d+ex^2\right)^{3/2}} - \frac{a+b\log(cx^n)}{2dx^2\left(d+ex^2\right)^{3/2}} \\ &\quad - \frac{5e(a+b\log(cx^n))}{2d^3\sqrt{d+ex^2}} + \frac{5e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{7/2}} \\ &\quad + \frac{5ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{2d^{7/2}} + \frac{5ben\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{4d^{7/2}}\end{aligned}$$

output
```
1/3*b*e*n/d^3/(e*x^2+d)^(1/2)-1/4*b*n*(e*x^2+d)^(1/2)/d^3/x^2-31/12*b*e*n*
arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(7/2)-5/4*b*e*n*arctanh((e*x^2+d)^(1/2)
/d^(1/2))^2/d^(7/2)-5/6*e*(a+b*ln(c*x^n))/d^2/(e*x^2+d)^(3/2)-1/2*(a+b*ln(
c*x^n))/d/x^2/(e*x^2+d)^(3/2)-5/2*e*(a+b*ln(c*x^n))/d^3/(e*x^2+d)^(1/2)+5/
2*e*arctanh((e*x^2+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(7/2)+5/2*b*e*n*arc
tanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))/d^(7
/2)+5/4*b*e*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))/d^(7/2)
```

Mathematica [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.35 (sec) , antiderivative size = 227, normalized size of antiderivative = 0.67

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{5/2}}\,dx = \frac{bn\sqrt{1+\frac{d}{ex^2}}\left(5\,{}_3F_2\left(\frac{7}{2},\frac{7}{2},\frac{7}{2};\frac{9}{2},\frac{9}{2};-\frac{d}{ex^2}\right)-7\,\text{Hypergeometric2F1}\left(\frac{5}{2},\frac{7}{2},\frac{9}{2},-\frac{d}{ex^2}\right)(1+\right.}{98e^2x^6\sqrt{d+ex^2}}$$
$$-\frac{(3d^2+20dex^2+15e^2x^4)(a-bn\log(x)+b\log(cx^n))}{6d^3x^2(d+ex^2)^{3/2}}$$
$$-\frac{5e\log(x)(a-bn\log(x)+b\log(cx^n))}{2d^{7/2}}$$
$$+\frac{5e(a-bn\log(x)+b\log(cx^n))\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{2d^{7/2}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^(5/2)),x]
```

output
```
(b*n*Sqrt[1 + d/(e*x^2)]*(5*HypergeometricPFQ[{7/2, 7/2, 7/2}, {9/2, 9/2},
 -(d/(e*x^2))] - 7*Hypergeometric2F1[5/2, 7/2, 9/2, -(d/(e*x^2))]*(1 + 2*L
og[x])))/(98*e^2*x^6*Sqrt[d + e*x^2]) - ((3*d^2 + 20*d*e*x^2 + 15*e^2*x^4)
*(a - b*n*Log[x] + b*Log[c*x^n]))/(6*d^3*x^2*(d + e*x^2)^(3/2)) - (5*e*Log
[x]*(a - b*n*Log[x] + b*Log[c*x^n]))/(2*d^(7/2)) + (5*e*(a - b*n*Log[x] +
b*Log[c*x^n])*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(2*d^(7/2))
```

Rubi [A] (verified)

Time = 0.83 (sec) , antiderivative size = 330, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.080$, Rules used = {2792, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{5/2}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int \left(\frac{5e\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{2d^{7/2}x}-\frac{15e^2x^4+20dex^2+3d^2}{6d^3x^3\left(ex^2+d\right)^{3/2}}\right)dx+$$
$$\frac{5e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{7/2}}-\frac{5e(a+b\log(cx^n))}{2d^3\sqrt{d+ex^2}}-\frac{5e(a+b\log(cx^n))}{6d^2\left(d+ex^2\right)^{3/2}}-$$
$$\frac{a+b\log(cx^n)}{2dx^2\left(d+ex^2\right)^{3/2}}$$

$$\Big\downarrow \text{2009}$$

$$\frac{5e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{7/2}}-\frac{5e(a+b\log(cx^n))}{2d^3\sqrt{d+ex^2}}-\frac{5e(a+b\log(cx^n))}{6d^2\left(d+ex^2\right)^{3/2}}-$$
$$\frac{a+b\log(cx^n)}{2dx^2\left(d+ex^2\right)^{3/2}}-$$
$$bn\left(\frac{5e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{7/2}}+\frac{31e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{12d^{7/2}}-\frac{5e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{2d^{7/2}}-\frac{5e\operatorname{PolyLog}\left(2,1\right.}{4d^{7/}}\right.$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^(5/2)),x]
```

output
```
(-5*e*(a + b*Log[c*x^n]))/(6*d^2*(d + e*x^2)^(3/2)) - (a + b*Log[c*x^n])/(
2*d*x^2*(d + e*x^2)^(3/2)) - (5*e*(a + b*Log[c*x^n]))/(2*d^3*Sqrt[d + e*x^
2]) + (5*e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*d^(7/2)
) - b*n*(-1/3*e/(d^3*Sqrt[d + e*x^2]) + Sqrt[d + e*x^2]/(4*d^3*x^2) + (31*
e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(12*d^(7/2)) + (5*e*ArcTanh[Sqrt[d + e
*x^2]/Sqrt[d]]^2)/(4*d^(7/2)) - (5*e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*Log[
(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(2*d^(7/2)) - (5*e*PolyLog[2, 1
- (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(4*d^(7/2)))
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{3}\left(e\,x^{2}+d\right)^{\frac{5}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^(5/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^(5/2),x)
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{3}\left(d+ex^{2}\right)^{5/2}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\left(ex^{2}+d\right)^{\frac{5}{2}}x^{3}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/(e^3*x^9 + 3*d
*e^2*x^7 + 3*d^2*e*x^5 + d^3*x^3), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{5/2}}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x**2+d)**(5/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{5/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{5/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^{\frac{5}{2}}x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^(5/2)*x^3), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^2\right)^{5/2}}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^3\,\left(e\,x^2+d\right)^{5/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^(5/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^(5/2)), x)
```

Reduce [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^2\right)^{5/2}}\,dx=\frac{-3\sqrt{e\,x^2+d}\,a\,d^3-20\sqrt{e\,x^2+d}\,a\,d^2e\,x^2-15\sqrt{e\,x^2+d}\,ad\,e^2x^4-15\sqrt{d}\log\left(\frac{\sqrt{e\,x^2+}}{}\right.}{}$$

input
```
int((a+b*log(c*x^n))/x^3/(e*x^2+d)^(5/2),x)
```

output
```
( - 3*sqrt(d + e*x**2)*a*d**3 - 20*sqrt(d + e*x**2)*a*d**2*e*x**2 - 15*sqr
t(d + e*x**2)*a*d*e**2*x**4 - 15*sqrt(d)*log((sqrt(d + e*x**2) - sqrt(d) +
 sqrt(e)*x)/sqrt(d))*a*d**2*e*x**2 - 30*sqrt(d)*log((sqrt(d + e*x**2) - sq
rt(d) + sqrt(e)*x)/sqrt(d))*a*d*e**2*x**4 - 15*sqrt(d)*log((sqrt(d + e*x**
2) - sqrt(d) + sqrt(e)*x)/sqrt(d))*a*e**3*x**6 + 15*sqrt(d)*log((sqrt(d +
e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*a*d**2*e*x**2 + 30*sqrt(d)*log((sq
rt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*a*d*e**2*x**4 + 15*sqrt(d)*
log((sqrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*a*e**3*x**6 + 6*int(
log(x**n*c)/(sqrt(d + e*x**2)*d**2*x**3 + 2*sqrt(d + e*x**2)*d*e*x**5 + sq
rt(d + e*x**2)*e**2*x**7),x)*b*d**6*x**2 + 12*int(log(x**n*c)/(sqrt(d + e*
x**2)*d**2*x**3 + 2*sqrt(d + e*x**2)*d*e*x**5 + sqrt(d + e*x**2)*e**2*x**7
),x)*b*d**5*e*x**4 + 6*int(log(x**n*c)/(sqrt(d + e*x**2)*d**2*x**3 + 2*sqr
t(d + e*x**2)*d*e*x**5 + sqrt(d + e*x**2)*e**2*x**7),x)*b*d**4*e**2*x**6)/
(6*d**4*x**2*(d**2 + 2*d*e*x**2 + e**2*x**4))
```

3.303 $\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

Optimal result . . . 2297
Mathematica [C] (warning: unable to verify) . . . 2298
Rubi [A] (verified) . . . 2299
Maple [F] . . . 2300
Fricas [F] . . . 2301
Sympy [F(-1)] . . . 2301
Maxima [F(-2)] . . . 2301
Giac [F] . . . 2302
Mupad [F(-1)] . . . 2302
Reduce [F] . . . 2303

Optimal result

Integrand size = 25, antiderivative size = 443

$$\begin{aligned}\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx &= \frac{bdnx}{3e^3\sqrt{d+ex^2}}-\frac{bnx\sqrt{d+ex^2}}{4e^3}\\
&-\frac{31bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{12e^{7/2}\sqrt{d+ex^2}}-\frac{5bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{4e^{7/2}\sqrt{d+ex^2}}\\
&+\frac{5bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2e^{7/2}\sqrt{d+ex^2}}\\
&-\frac{x^5(a+b\log(cx^n))}{3e(d+ex^2)^{3/2}}-\frac{5x^3(a+b\log(cx^n))}{3e^2\sqrt{d+ex^2}}+\frac{5x\sqrt{d+ex^2}(a+b\log(cx^n))}{2e^3}\\
&-\frac{5d^{3/2}\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{7/2}\sqrt{d+ex^2}}\\
&+\frac{5bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{PolyLog}\left(2,e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{4e^{7/2}\sqrt{d+ex^2}}\end{aligned}$$

output
```
1/3*b*d*n*x/e^3/(e*x^2+d)^(1/2)-1/4*b*n*x*(e*x^2+d)^(1/2)/e^3-31/12*b*d^(3
/2)*n*(1+e*x^2/d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))/e^(7/2)/(e*x^2+d)^(1/2)
-5/4*b*d^(3/2)*n*(1+e*x^2/d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))^2/e^(7/2)/(e
*x^2+d)^(1/2)+5/2*b*d^(3/2)*n*(1+e*x^2/d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))
*ln(1-(e^(1/2)*x/d^(1/2)+(1+e*x^2/d)^(1/2))^2)/e^(7/2)/(e*x^2+d)^(1/2)-1/3
*x^5*(a+b*ln(c*x^n))/e/(e*x^2+d)^(3/2)-5/3*x^3*(a+b*ln(c*x^n))/e^2/(e*x^2+
d)^(1/2)+5/2*x*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/e^3-5/2*d^(3/2)*(1+e*x^2/d)
^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))*(a+b*ln(c*x^n))/e^(7/2)/(e*x^2+d)^(1/2)+
5/4*b*d^(3/2)*n*(1+e*x^2/d)^(1/2)*polylog(2,(e^(1/2)*x/d^(1/2)+(1+e*x^2/d)
^(1/2))^2)/e^(7/2)/(e*x^2+d)^(1/2)
```

Mathematica [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.38 (sec) , antiderivative size = 199, normalized size of antiderivative = 0.45

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{bnx^7\sqrt{1+\frac{ex^2}{d}}\left(5\,{}_3F_2\left(\frac{7}{2},\frac{7}{2},\frac{7}{2};\frac{9}{2},\frac{9}{2};-\frac{ex^2}{d}\right)+7\,\text{Hypergeometric2F1}\left(\frac{5}{2},\frac{7}{2},\frac{9}{2},-\frac{ex^2}{d}\right.\right.}{98d^2\sqrt{d+ex^2}} + \frac{x(15d^2+20dex^2+3e^2x^4)\,(a-bn\log(x)+b\log(cx^n))}{6e^3\,(d+ex^2)^{3/2}} - \frac{5d(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{2e^{7/2}}$$

input
```
Integrate[(x^6*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
(b*n*x^7*Sqrt[1 + (e*x^2)/d]*(5*HypergeometricPFQ[{7/2, 7/2, 7/2}, {9/2, 9
/2}, -((e*x^2)/d)] + 7*Hypergeometric2F1[5/2, 7/2, 9/2, -((e*x^2)/d)]*(-1
+ 2*Log[x])))/(98*d^2*Sqrt[d + e*x^2]) + (x*(15*d^2 + 20*d*e*x^2 + 3*e^2*x
^4)*(a - b*n*Log[x] + b*Log[c*x^n]))/(6*e^3*(d + e*x^2)^(3/2)) - (5*d*(a -
 b*n*Log[x] + b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(2*e^(7/2)
)
```

Rubi [A] (verified)

Time = 0.86 (sec) , antiderivative size = 367, normalized size of antiderivative = 0.83, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.120, Rules used = {2786, 2792, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$$

$$\Big\downarrow \text{2786}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\int \frac{x^6(a+b\log(cx^n))}{\left(\frac{ex^2}{d}+1\right)^{5/2}}dx}{d^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{2792}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(-bn\int\left(\frac{d^3\sqrt{\frac{ex^2}{d}+1}(3e^2x^4+20dex^2+15d^2)}{6e^3(ex^2+d)^2}-\frac{5d^{7/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2e^{7/2}x}\right)dx-\frac{5d^{7/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{7/2}}+\frac{5d^3}{}\right.}{d^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{2009}$$

$$\sqrt{\frac{ex^2}{d}+1}\left(-\frac{5d^{7/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{7/2}}+\frac{5d^3x\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{2e^3}-\frac{5d^2x^3(a+b\log(cx^n))}{3e^2\sqrt{\frac{ex^2}{d}+1}}-\frac{dx^5(a+b\log(cx^n))}{3e\left(\frac{ex^2}{d}+1\right)^{3/2}}-bn\right.$$

input
```
Int[(x^6*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
(Sqrt[1 + (e*x^2)/d]*(-1/3*(d*x^5*(a + b*Log[c*x^n]))/(e*(1 + (e*x^2)/d)^(
3/2)) - (5*d^2*x^3*(a + b*Log[c*x^n]))/(3*e^2*Sqrt[1 + (e*x^2)/d]) + (5*d^
3*x*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/(2*e^3) - (5*d^(7/2)*ArcSinh[(
Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*e^(7/2)) - b*n*(-1/3*(d^3*x)/(e
^3*Sqrt[1 + (e*x^2)/d]) + (d^3*x*Sqrt[1 + (e*x^2)/d])/(4*e^3) + (31*d^(7/2
)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/(12*e^(7/2)) + (5*d^(7/2)*ArcSinh[(Sqrt[e]
*x)/Sqrt[d]]^2)/(4*e^(7/2)) - (5*d^(7/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[
1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(2*e^(7/2)) - (5*d^(7/2)*PolyLog[
2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(4*e^(7/2)))))/(d^2*Sqrt[d + e*x^2
])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x^6(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{5}{2}}}dx$$

input
```
int(x^6*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
int(x^6*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

Fricas [F]

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^6}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x^6*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*x^6*log(c*x^n) + sqrt(e*x^2 + d)*a*x^6)/(e^3*x
^6 + 3*d*e^2*x^4 + 3*d^2*e*x^2 + d^3), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \text{Timed out}$$

input
```
integrate(x**6*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^6*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx=\int \frac{(b\log(cx^n)+a)x^6}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x^6*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^6/(e*x^2 + d)^(5/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx=\int \frac{x^6\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{5/2}}\,dx$$

input
```
int((x^6*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

output
```
int((x^6*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

Reduce [F]

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{30\sqrt{e\,x^2+d}\,a\,d^2ex+40\sqrt{e\,x^2+d}\,ad\,e^2x^3+6\sqrt{e\,x^2+d}\,a\,e^3x^5-30\sqrt{e}\log\Big(\frac{\sqrt{e}}{}$$

input
```
int(x^6*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
(30*sqrt(d + e*x**2)*a*d**2*e*x + 40*sqrt(d + e*x**2)*a*d*e**2*x**3 + 6*sq
rt(d + e*x**2)*a*e**3*x**5 - 30*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(e)*x)
/sqrt(d))*a*d**3 - 60*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(e)*x)/sqrt(d))*
a*d**2*e*x**2 - 30*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(e)*x)/sqrt(d))*a*d
*e**2*x**4 - 5*sqrt(e)*a*d**3 - 10*sqrt(e)*a*d**2*e*x**2 - 5*sqrt(e)*a*d*e
**2*x**4 + 12*int((log(x**n*c)*x**6)/(sqrt(d + e*x**2)*d**2 + 2*sqrt(d + e
*x**2)*d*e*x**2 + sqrt(d + e*x**2)*e**2*x**4),x)*b*d**2*e**4 + 24*int((log
(x**n*c)*x**6)/(sqrt(d + e*x**2)*d**2 + 2*sqrt(d + e*x**2)*d*e*x**2 + sqrt
(d + e*x**2)*e**2*x**4),x)*b*d*e**5*x**2 + 12*int((log(x**n*c)*x**6)/(sqrt
(d + e*x**2)*d**2 + 2*sqrt(d + e*x**2)*d*e*x**2 + sqrt(d + e*x**2)*e**2*x*
*4),x)*b*e**6*x**4)/(12*e**4*(d**2 + 2*d*e*x**2 + e**2*x**4))
```

3.304 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

Optimal result . . . 2304
Mathematica [C] (verified) . . . 2305
Rubi [A] (verified) . . . 2306
Maple [F] . . . 2307
Fricas [F] . . . 2308
Sympy [F] . . . 2308
Maxima [F(-2)] . . . 2308
Giac [F] . . . 2309
Mupad [F(-1)] . . . 2309
Reduce [F] . . . 2309

Optimal result

Integrand size = 25, antiderivative size = 383

$$\begin{aligned}\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx =& -\frac{bnx}{3e^2\sqrt{d+ex^2}} \\ &+ \frac{4b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{3e^{5/2}\sqrt{d+ex^2}} + \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{2e^{5/2}\sqrt{d+ex^2}} \\ &- \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{e^{5/2}\sqrt{d+ex^2}} - \frac{x^3(a+b\log(cx^n))}{3e(d+ex^2)^{3/2}} \\ &- \frac{x(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}} + \frac{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{5/2}\sqrt{d+ex^2}} \\ &- \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{PolyLog}\left(2,e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2e^{5/2}\sqrt{d+ex^2}}\end{aligned}$$

output
```
-1/3*b*n*x/e^2/(e*x^2+d)^(1/2)+4/3*b*d^(1/2)*n*(1+e*x^2/d)^(1/2)*arcsinh(e
^(1/2)*x/d^(1/2))/e^(5/2)/(e*x^2+d)^(1/2)+1/2*b*d^(1/2)*n*(1+e*x^2/d)^(1/2
)*arcsinh(e^(1/2)*x/d^(1/2))^2/e^(5/2)/(e*x^2+d)^(1/2)-b*d^(1/2)*n*(1+e*x^
2/d)^(1/2)*arcsinh(e^(1/2)*x/d^(1/2))*ln(1-(e^(1/2)*x/d^(1/2)+(1+e*x^2/d)^
(1/2))^2)/e^(5/2)/(e*x^2+d)^(1/2)-1/3*x^3*(a+b*ln(c*x^n))/e/(e*x^2+d)^(3/2
)-x*(a+b*ln(c*x^n))/e^2/(e*x^2+d)^(1/2)+d^(1/2)*(1+e*x^2/d)^(1/2)*arcsinh(
e^(1/2)*x/d^(1/2))*(a+b*ln(c*x^n))/e^(5/2)/(e*x^2+d)^(1/2)-1/2*b*d^(1/2)*n
*(1+e*x^2/d)^(1/2)*polylog(2,(e^(1/2)*x/d^(1/2)+(1+e*x^2/d)^(1/2))^2)/e^(5
/2)/(e*x^2+d)^(1/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 1.11 (sec) , antiderivative size = 244, normalized size of antiderivative = 0.64

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx =$$

$$-\frac{bn\sqrt{1+\frac{ex^2}{d}}\left(3e^{5/2}x^5(d+ex^2)^2\,{}_3F_2\left(\frac{5}{2},\frac{5}{2},\frac{5}{2};\frac{7}{2},\frac{7}{2};-\frac{ex^2}{d}\right)+25d^3\sqrt{e}x(3d+4ex^2)\sqrt{1+\frac{ex^2}{d}}\log(x)-75d^{5/}\right.}{75d^2e^{5/2}(d+ex^2)^{5/2}}$$

$$-\frac{x(3d+4ex^2)(a-bn\log(x)+b\log(cx^n))}{3e^2(d+ex^2)^{3/2}}$$

$$+\frac{(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{e^{5/2}}$$

input
```
Integrate[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
-1/75*(b*n*Sqrt[1 + (e*x^2)/d]*(3*e^(5/2)*x^5*(d + e*x^2)^2*Hypergeometric
PFQ[{5/2, 5/2, 5/2}, {7/2, 7/2}, -((e*x^2)/d)] + 25*d^3*Sqrt[e]*x*(3*d + 4
*e*x^2)*Sqrt[1 + (e*x^2)/d]*Log[x] - 75*d^(5/2)*(d + e*x^2)^2*ArcSinh[(Sqr
t[e]*x)/Sqrt[d]]*Log[x]))/(d^2*e^(5/2)*(d + e*x^2)^(5/2)) - (x*(3*d + 4*e*
x^2)*(a - b*n*Log[x] + b*Log[c*x^n]))/(3*e^2*(d + e*x^2)^(3/2)) + ((a - b*
n*Log[x] + b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/e^(5/2)
```

Rubi [A] (verified)

Time = 0.82 (sec) , antiderivative size = 297, normalized size of antiderivative = 0.78, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.120$, Rules used = {2786, 2792, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4 (a+b\log(cx^n))}{(d+ex^2)^{5/2}}dx$$

$$\Big\downarrow \text{ 2786}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\int \frac{x^4(a+b\log(cx^n))}{\left(\frac{ex^2}{d}+1\right)^{5/2}}dx}{d^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 2792}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(-bn\int \left(\frac{d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{e^{5/2}x}-\frac{d^3(4ex^2+3d)\sqrt{\frac{ex^2}{d}+1}}{3e^2(ex^2+d)^2}\right)dx+\frac{d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{5/2}}-\frac{d^2x(a+b\log(cx^n))}{e^2\sqrt{\frac{ex^2}{d}+1}}\right.}{d^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{5/2}}-\frac{d^2x(a+b\log(cx^n))}{e^2\sqrt{\frac{ex^2}{d}+1}}-\frac{dx^3(a+b\log(cx^n))}{3e\left(\frac{ex^2}{d}+1\right)^{3/2}}-bn\left(\frac{d^{5/2}\text{PolyLog}\left(2,e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2e^{5/2}}\right.\right.}{d^2\sqrt{d+ex^2}}$$

input
```
Int[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
(Sqrt[1 + (e*x^2)/d]*(-1/3*(d*x^3*(a + b*Log[c*x^n]))/(e*(1 + (e*x^2)/d)^(
3/2)) - (d^2*x*(a + b*Log[c*x^n]))/(e^2*Sqrt[1 + (e*x^2)/d]) + (d^(5/2)*Ar
cSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/e^(5/2) - b*n*((d^2*x)/(3*e
^2*Sqrt[1 + (e*x^2)/d]) - (4*d^(5/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/(3*e^(5
/2)) - (d^(5/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/(2*e^(5/2)) + (d^(5/2)*Arc
Sinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/e^(
5/2) + (d^(5/2)*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(2*e^(5/2)
))))/(d^2*Sqrt[d + e*x^2])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x^4(a + b\ln(c\,x^n))}{(e\,x^2 + d)^{\frac{5}{2}}}dx$$

input
```
int(x^4*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
int(x^4*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

Fricas [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^4}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*x^4*log(c*x^n) + sqrt(e*x^2 + d)*a*x^4)/(e^3*x
^6 + 3*d*e^2*x^4 + 3*d^2*e*x^2 + d^3), x)
```

Sympy [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x**4*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

output
```
Integral(x**4*(a + b*log(c*x**n))/(d + e*x**2)**(5/2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx=\int \frac{(b\log(cx^n)+a)x^4}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^4/(e*x^2 + d)^(5/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx=\int \frac{x^4\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{5/2}}\,dx$$

input
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

output
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

Reduce [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx=\frac{-3\sqrt{e\,x^2+d}\,adex-4\sqrt{e\,x^2+d}\,a\,e^2x^3+3\sqrt{e}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{e}\,x}{\sqrt{d}}\right)a\,d^2+6\sqrt{e}\log}{}$$

input
```
int(x^4*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
( - 3*sqrt(d + e*x**2)*a*d*e*x - 4*sqrt(d + e*x**2)*a*e**2*x**3 + 3*sqrt(e
)*log((sqrt(d + e*x**2) + sqrt(e)*x)/sqrt(d))*a*d**2 + 6*sqrt(e)*log((sqrt
(d + e*x**2) + sqrt(e)*x)/sqrt(d))*a*d*e*x**2 + 3*sqrt(e)*log((sqrt(d + e*
x**2) + sqrt(e)*x)/sqrt(d))*a*e**2*x**4 + 3*int((log(x**n*c)*x**4)/(sqrt(d
 + e*x**2)*d**2 + 2*sqrt(d + e*x**2)*d*e*x**2 + sqrt(d + e*x**2)*e**2*x**4
),x)*b*d**2*e**3 + 6*int((log(x**n*c)*x**4)/(sqrt(d + e*x**2)*d**2 + 2*sqr
t(d + e*x**2)*d*e*x**2 + sqrt(d + e*x**2)*e**2*x**4),x)*b*d*e**4*x**2 + 3*
int((log(x**n*c)*x**4)/(sqrt(d + e*x**2)*d**2 + 2*sqrt(d + e*x**2)*d*e*x**
2 + sqrt(d + e*x**2)*e**2*x**4),x)*b*e**5*x**4)/(3*e**3*(d**2 + 2*d*e*x**2
 + e**2*x**4))
```

3.305 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

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Optimal result

Integrand size = 25, antiderivative size = 89

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx=\frac{bnx}{3de\sqrt{d+ex^2}}-\frac{bn\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{3de^{3/2}}+\frac{x^3(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}$$

output
```
1/3*b*n*x/d/e/(e*x^2+d)^(1/2)-1/3*b*n*arctanh(e^(1/2)*x/(e*x^2+d)^(1/2))/d
/e^(3/2)+1/3*x^3*(a+b*ln(c*x^n))/d/(e*x^2+d)^(3/2)
```

Mathematica [A] (verified)

Time = 0.24 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.13

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx=\frac{\sqrt{e}x(aex^2+bn(d+ex^2))+be^{3/2}x^3\log(cx^n)-bn(d+ex^2)^{3/2}\log\left(ex+\sqrt{e}\sqrt{d}\right.}{3de^{3/2}(d+ex^2)^{3/2}}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
(Sqrt[e]*x*(a*e*x^2 + b*n*(d + e*x^2)) + b*e^(3/2)*x^3*Log[c*x^n] - b*n*(d
 + e*x^2)^(3/2)*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(3*d*e^(3/2)*(d + e*x^
2)^(3/2))
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 84, normalized size of antiderivative = 0.94, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.160$, Rules used = {2773, 252, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$$

$$\Big\downarrow \text{2773}$$

$$\frac{x^3(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}-\frac{bn\int \frac{x^2}{(ex^2+d)^{3/2}}dx}{3d}$$

$$\Big\downarrow \text{252}$$

$$\frac{x^3(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}-\frac{bn\left(\frac{\int \frac{1}{\sqrt{ex^2+d}}dx}{e}-\frac{x}{e\sqrt{d+ex^2}}\right)}{3d}$$

$$\Big\downarrow \text{224}$$

$$\frac{x^3(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}-\frac{bn\left(\frac{\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}}{e}-\frac{x}{e\sqrt{d+ex^2}}\right)}{3d}$$

$$\Big\downarrow \text{219}$$

$$\frac{x^3(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}-\frac{bn\left(\frac{\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{e^{3/2}}-\frac{x}{e\sqrt{d+ex^2}}\right)}{3d}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
-1/3*(b*n*(-(x/(e*Sqrt[d + e*x^2])) + ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]]
/e^(3/2)))/d + (x^3*(a + b*Log[c*x^n]))/(3*d*(d + e*x^2)^(3/2))
```

Defintions of rubi rules used

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 252
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[c*(c*x
)^(m - 1)*((a + b*x^2)^(p + 1)/(2*b*(p + 1))), x] - Simp[c^2*((m - 1)/(2*b*
(p + 1)))   Int[(c*x)^(m - 2)*(a + b*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c
}, x] && LtQ[p, -1] && GtQ[m, 1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomi
alQ[a, b, c, 2, m, p, x]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Maple [F]

$$\int \frac{x^2(a + b\ln(c\,x^n))}{(e\,x^2 + d)^{\frac{5}{2}}}dx$$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 277, normalized size of antiderivative = 3.11

$$\int \frac{x^2(a + b\log(cx^n))}{(d + ex^2)^{5/2}}\,dx = \left[\frac{(be^2nx^4 + 2\,bdenx^2 + bd^2n)\sqrt{e}\log\left(-2\,ex^2 + 2\,\sqrt{ex^2 + d}\sqrt{e}x - d\right) + 2\,(be^2nx}{6\,(de^4x^4 + 2\,d^2e^3x^2 +}\right.$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
[1/6*((b*e^2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*sqrt(e)*log(-2*e*x^2 + 2*sqr
t(e*x^2 + d)*sqrt(e)*x - d) + 2*(b*e^2*n*x^3*log(x) + b*e^2*x^3*log(c) + b
*d*e*n*x + (b*e^2*n + a*e^2)*x^3)*sqrt(e*x^2 + d))/(d*e^4*x^4 + 2*d^2*e^3*
x^2 + d^3*e^2), 1/3*((b*e^2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*sqrt(-e)*arct
an(sqrt(-e)*x/sqrt(e*x^2 + d)) + (b*e^2*n*x^3*log(x) + b*e^2*x^3*log(c) +
b*d*e*n*x + (b*e^2*n + a*e^2)*x^3)*sqrt(e*x^2 + d))/(d*e^4*x^4 + 2*d^2*e^3
*x^2 + d^3*e^2)]
```

Sympy [F]

$$\int \frac{x^2(a + b\log(cx^n))}{(d + ex^2)^{5/2}}\,dx = \int \frac{x^2(a + b\log(cx^n))}{(d + ex^2)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))/(d + e*x**2)**(5/2), x)
```

Maxima [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
-1/3*a*(x/((e*x^2 + d)^(3/2)*e) - x/(sqrt(e*x^2 + d)*d*e)) + b*integrate((
x^2*log(c) + x^2*log(x^n))/((e^2*x^4 + 2*d*e*x^2 + d^2)*sqrt(e*x^2 + d)),
x)
```

Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x^2 + d)^(5/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{5/2}}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 598, normalized size of antiderivative = 6.72

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{3\sqrt{e\,x^2+d}\log\left(\frac{\left(2\sqrt{e}\,\sqrt{e\,x^2+d}\,x+2e\,x^2\right)^n c}{e^{\frac{n}{2}}\left(\sqrt{e\,x^2+d}+\sqrt{e}\,x\right)^n 2^n}\right) b\,e^2x^3+3\sqrt{e\,x^2+d}\,a\,e^2x^3+3\sqrt{e\,x^2+d}$$

input
```
int(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
(3*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(
e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*e**2*x**3 + 3*sqrt(d +
 e*x**2)*a*e**2*x**3 + 3*sqrt(d + e*x**2)*b*d*e*n*x + 3*sqrt(d + e*x**2)*b
*e**2*n*x**3 - 3*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt
(d))*b*d**2*n - 6*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqr
t(d))*b*d*e*n*x**2 - 3*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x
)/sqrt(d))*b*e**2*n*x**4 - 3*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(d) + sqr
t(e)*x)/sqrt(d))*b*d**2*n - 6*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(d) + sq
rt(e)*x)/sqrt(d))*b*d*e*n*x**2 - 3*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(d)
 + sqrt(e)*x)/sqrt(d))*b*e**2*n*x**4 + 3*sqrt(e)*log(((2*sqrt(e)*sqrt(d +
e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2*
*n))*b*d**2 + 6*sqrt(e)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*
c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e*x**2 + 3*sqrt(
e)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d
+ e*x**2) + sqrt(e)*x)**n*2**n))*b*e**2*x**4 + 3*sqrt(e)*a*d**2 + 6*sqrt(e
)*a*d*e*x**2 + 3*sqrt(e)*a*e**2*x**4 - sqrt(e)*b*d**2*n - 2*sqrt(e)*b*d*e*
n*x**2 - sqrt(e)*b*e**2*n*x**4)/(9*d*e**2*(d**2 + 2*d*e*x**2 + e**2*x**4))
```

3.306 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^{5/2}}\,dx$

Optimal result 2317
Mathematica [A] (verified) 2317
Rubi [A] (verified) 2318
Maple [F] 2320
Fricas [A] (verification not implemented) 2320
Sympy [F] 2321
Maxima [F] 2321
Giac [F] 2321
Mupad [F(-1)] 2322
Reduce [B] (verification not implemented) 2322

Optimal result

Integrand size = 22, antiderivative size = 113

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{5/2}}\,dx = -\frac{bnx}{3d^2\sqrt{d+ex^2}} - \frac{2bn\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{3d^2\sqrt{e}} + \frac{x(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}} + \frac{2x(a+b\log(cx^n))}{3d^2\sqrt{d+ex^2}}$$

output
```
-1/3*b*n*x/d^2/(e*x^2+d)^(1/2)-2/3*b*n*arctanh(e^(1/2)*x/(e*x^2+d)^(1/2))/
d^2/e^(1/2)+1/3*x*(a+b*ln(c*x^n))/d/(e*x^2+d)^(3/2)+2/3*x*(a+b*ln(c*x^n))/
d^2/(e*x^2+d)^(1/2)
```

Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.03

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{5/2}}\,dx = \frac{\sqrt{e}x(-bn(d+ex^2)+a(3d+2ex^2))+b\sqrt{e}x(3d+2ex^2)\log(cx^n)-2bn(d+ex^2)^{3/}}{3d^2\sqrt{e}(d+ex^2)^{3/2}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x^2)^(5/2),x]
```

output
```
(Sqrt[e]*x*(-(b*n*(d + e*x^2)) + a*(3*d + 2*e*x^2)) + b*Sqrt[e]*x*(3*d + 2
*e*x^2)*Log[c*x^n] - 2*b*n*(d + e*x^2)^(3/2)*Log[e*x + Sqrt[e]*Sqrt[d + e*
x^2]])/(3*d^2*Sqrt[e]*(d + e*x^2)^(3/2))
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.03, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227, Rules used = {2760, 208, 2751, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{5/2}}dx$$

$$\Big\downarrow \text{ 2760}$$

$$\frac{2\int \frac{a+b\log(cx^n)}{(ex^2+d)^{3/2}}dx}{3d}-\frac{bn\int \frac{1}{(ex^2+d)^{3/2}}dx}{3d}+\frac{x(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{ 208}$$

$$\frac{2\int \frac{a+b\log(cx^n)}{(ex^2+d)^{3/2}}dx}{3d}+\frac{x(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}-\frac{bnx}{3d^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 2751}$$

$$\frac{2\left(\frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}}-\frac{bn\int \frac{1}{\sqrt{ex^2+d}}dx}{d}\right)}{3d}+\frac{x(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}-\frac{bnx}{3d^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 224}$$

$$\frac{2\left(\frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}}-\frac{bn\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}}{d}\right)}{3d}+\frac{x(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}-\frac{bnx}{3d^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 219}$$

$$\frac{2\left(\frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}}-\frac{bn\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{d\sqrt{e}}\right)}{3d}+\frac{x(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}-\frac{bnx}{3d^2\sqrt{d+ex^2}}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x^2)^(5/2),x]
```

output
```
-1/3*(b*n*x)/(d^2*Sqrt[d + e*x^2]) + (x*(a + b*Log[c*x^n]))/(3*d*(d + e*x^
2)^(3/2)) + (2*(-((b*n*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])/(d*Sqrt[e]))
+ (x*(a + b*Log[c*x^n]))/(d*Sqrt[d + e*x^2])))/(3*d)
```

Defintions of rubi rules used

rule 208
```
Int[((a_) + (b_.)*(x_)^2)^(-3/2), x_Symbol] :> Simp[x/(a*Sqrt[a + b*x^2]),
x] /; FreeQ[{a, b}, x]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

rule 2760
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_), x_Sym
bol] :> Simp[(-x)*(d + e*x^2)^(q + 1)*((a + b*Log[c*x^n])/(2*d*(q + 1))), x
] + (Simp[(2*q + 3)/(2*d*(q + 1))   Int[(d + e*x^2)^(q + 1)*(a + b*Log[c*x^
n]), x], x] + Simp[b*(n/(2*d*(q + 1)))   Int[(d + e*x^2)^(q + 1), x], x]) /
; FreeQ[{a, b, c, d, e, n}, x] && LtQ[q, -1]
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{\left(e\,x^{2}+d\right)^{\frac{5}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
int((a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 337, normalized size of antiderivative = 2.98

$$\int \frac{a+b\log\left(cx^{n}\right)}{\left(d+ex^{2}\right)^{5/2}}\,dx = \left[\frac{(be^{2}nx^{4}+2\,bdenx^{2}+bd^{2}n)\sqrt{e}\log\left(-2\,ex^{2}+2\,\sqrt{ex^{2}+d}\sqrt{e}x-d\right)-((be^{2}n-2\,a}{3\,(d^{2}e^{3}x}\right.$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
[1/3*((b*e^2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*sqrt(e)*log(-2*e*x^2 + 2*sqr
t(e*x^2 + d)*sqrt(e)*x - d) - ((b*e^2*n - 2*a*e^2)*x^3 + (b*d*e*n - 3*a*d*
e)*x - (2*b*e^2*x^3 + 3*b*d*e*x)*log(c) - (2*b*e^2*n*x^3 + 3*b*d*e*n*x)*lo
g(x))*sqrt(e*x^2 + d))/(d^2*e^3*x^4 + 2*d^3*e^2*x^2 + d^4*e), 1/3*(2*(b*e^
2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*sqrt(-e)*arctan(sqrt(-e)*x/sqrt(e*x^2 +
 d)) - ((b*e^2*n - 2*a*e^2)*x^3 + (b*d*e*n - 3*a*d*e)*x - (2*b*e^2*x^3 + 3
*b*d*e*x)*log(c) - (2*b*e^2*n*x^3 + 3*b*d*e*n*x)*log(x))*sqrt(e*x^2 + d))/
(d^2*e^3*x^4 + 2*d^3*e^2*x^2 + d^4*e)]
```

Sympy [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^2\right)^{5/2}}\,dx = \int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^2\right)^{\frac{5}{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(d + e*x**2)**(5/2), x)
```

Maxima [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^2\right)^{5/2}}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^{\frac{5}{2}}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
1/3*a*(2*x/(sqrt(e*x^2 + d)*d^2) + x/((e*x^2 + d)^(3/2)*d)) + b*integrate(
(log(c) + log(x^n))/((e^2*x^4 + 2*d*e*x^2 + d^2)*sqrt(e*x^2 + d)), x)
```

Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^2\right)^{5/2}}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^{\frac{5}{2}}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^2 + d)^(5/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^2\right)^{5/2}}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{\left(e\,x^2+d\right)^{5/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x^2)^(5/2),x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x^2)^(5/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 678, normalized size of antiderivative = 6.00

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^2\right)^{5/2}}\,dx=\text{Too large to display}$$

input
```
int((a+b*log(c*x^n))/(e*x^2+d)^(5/2),x)
```

output

```
(9*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(
e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e*x + 6*sqrt(d + e*x
**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(
d + e*x**2) + sqrt(e)*x)**n*2**n))*b*e**2*x**3 + 9*sqrt(d + e*x**2)*a*d*e*
x + 6*sqrt(d + e*x**2)*a*e**2*x**3 - 3*sqrt(d + e*x**2)*b*d*e*n*x - 3*sqrt
(d + e*x**2)*b*e**2*n*x**3 - 6*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + s
qrt(e)*x)/sqrt(d))*b*d**2*n - 12*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) +
 sqrt(e)*x)/sqrt(d))*b*d*e*n*x**2 - 6*sqrt(e)*log((sqrt(d + e*x**2) - sqrt
(d) + sqrt(e)*x)/sqrt(d))*b*e**2*n*x**4 - 6*sqrt(e)*log((sqrt(d + e*x**2)
+ sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d**2*n - 12*sqrt(e)*log((sqrt(d + e*x**2
) + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d*e*n*x**2 - 6*sqrt(e)*log((sqrt(d + e
*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*e**2*n*x**4 + 6*sqrt(e)*log(((2*s
qrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2) +
sqrt(e)*x)**n*2**n))*b*d**2 + 12*sqrt(e)*log(((2*sqrt(e)*sqrt(d + e*x**2)*
x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d
*e*x**2 + 6*sqrt(e)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(
e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*e**2*x**4 - 6*sqrt(e)*
a*d**2 - 12*sqrt(e)*a*d*e*x**2 - 6*sqrt(e)*a*e**2*x**4 + sqrt(e)*b*d**2*n
+ 2*sqrt(e)*b*d*e*n*x**2 + sqrt(e)*b*e**2*n*x**4)/(9*d**2*e*(d**2 + 2*d*e*
x**2 + e**2*x**4))
```

3.307 $\int \frac{a+b\log(cx^n)}{x^2\left(d+ex^2\right)^{5/2}}\,dx$

Optimal result 2324
Mathematica [A] (verified) 2324
Rubi [A] (verified) 2325
Maple [F] 2328
Fricas [A] (verification not implemented) 2328
Sympy [F(-1)] 2329
Maxima [F(-2)] 2329
Giac [F] 2329
Mupad [F(-1)] 2330
Reduce [B] (verification not implemented) 2330

Optimal result

Integrand size = 25, antiderivative size = 170

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^2\right)^{5/2}}\,dx = \frac{benx}{3d^3\sqrt{d+ex^2}} - \frac{bn\sqrt{d+ex^2}}{d^3x} + \frac{8b\sqrt{e}n\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{3d^3} + \frac{a+b\log\left(cx^n\right)}{3dx\left(d+ex^2\right)^{3/2}} + \frac{4(a+b\log\left(cx^n\right))}{3d^2x\sqrt{d+ex^2}} - \frac{8\sqrt{d+ex^2}(a+b\log\left(cx^n\right))}{3d^3x}$$

output
```
1/3*b*e*n*x/d^3/(e*x^2+d)^(1/2)-b*n*(e*x^2+d)^(1/2)/d^3/x+8/3*b*e^(1/2)*n*
arctanh(e^(1/2)*x/(e*x^2+d)^(1/2))/d^3+1/3*(a+b*ln(c*x^n))/d/x/(e*x^2+d)^(
3/2)+4/3*(a+b*ln(c*x^n))/d^2/x/(e*x^2+d)^(1/2)-8/3*(e*x^2+d)^(1/2)*(a+b*ln
(c*x^n))/d^3/x
```

Mathematica [A] (verified)

Time = 0.25 (sec) , antiderivative size = 144, normalized size of antiderivative = 0.85

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^2\right)^{5/2}}\,dx = \frac{-3ad^2-3bd^2n-12adex^2-5bdenx^2-8ae^2x^4-2be^2nx^4-b(3d^2+12dex^2+8e^2}{3d^3x\left(d+ex^2\right)^{3/2}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^(5/2)),x]
```

output
```
(-3*a*d^2 - 3*b*d^2*n - 12*a*d*e*x^2 - 5*b*d*e*n*x^2 - 8*a*e^2*x^4 - 2*b*e
^2*n*x^4 - b*(3*d^2 + 12*d*e*x^2 + 8*e^2*x^4)*Log[c*x^n] + 8*b*Sqrt[e]*n*x
*(d + e*x^2)^(3/2)*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(3*d^3*x*(d + e*x^2
)^(3/2))
```

Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 161, normalized size of antiderivative = 0.95, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.280$, Rules used = {2792, 27, 1588, 27, 298, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{5/2}}dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{8e^2x^4+12dex^2+3d^2}{3d^3x^2(ex^2+d)^{3/2}}dx-\frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}-\frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{8e^2x^4+12dex^2+3d^2}{x^2(ex^2+d)^{3/2}}dx}{3d^3}-\frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}-\frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{1588}$$

$$\frac{bn\left(-\frac{\int -\frac{2de(4ex^2+3d)}{(ex^2+d)^{3/2}}dx}{d}-\frac{3d}{x\sqrt{d+ex^2}}\right)}{3d^3}-\frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}-\frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\left(2e\int \frac{4ex^2+3d}{(ex^2+d)^{3/2}}dx-\frac{3d}{x\sqrt{d+ex^2}}\right)}{3d^3}-\frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}-\frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{ 298}$$

$$\frac{bn\left(2e\left(4\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{x}{\sqrt{d+ex^2}}\right)-\frac{3d}{x\sqrt{d+ex^2}}\right)}{3d^3}-\frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}-\frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{ 224}$$

$$\frac{bn\left(2e\left(4\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{x}{\sqrt{d+ex^2}}\right)-\frac{3d}{x\sqrt{d+ex^2}}\right)}{3d^3}-\frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}-\frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{ 219}$$

$$-\frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}-\frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}}+\frac{bn\left(2e\left(\frac{4\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{\sqrt{e}}-\frac{x}{\sqrt{d+ex^2}}\right)-\frac{3d}{x\sqrt{d+ex^2}}\right)}{3d^3}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^(5/2)),x]
```

output
```
(b*n*((-3*d)/(x*Sqrt[d + e*x^2]) + 2*e*(-(x/Sqrt[d + e*x^2]) + (4*ArcTanh[
(Sqrt[e]*x)/Sqrt[d + e*x^2]])/Sqrt[e])))/(3*d^3) - (a + b*Log[c*x^n])/(d*x
*(d + e*x^2)^(3/2)) - (4*e*x*(a + b*Log[c*x^n]))/(3*d^2*(d + e*x^2)^(3/2))
 - (8*e*x*(a + b*Log[c*x^n]))/(3*d^3*Sqrt[d + e*x^2])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 298
```
Int[((a_) + (b_.)*(x_)^2)^(p_)*((c_) + (d_.)*(x_)^2), x_Symbol] :> Simp[(-(
b*c - a*d))*x*((a + b*x^2)^(p + 1)/(2*a*b*(p + 1))), x] - Simp[(a*d - b*c*(
2*p + 3))/(2*a*b*(p + 1))   Int[(a + b*x^2)^(p + 1), x], x] /; FreeQ[{a, b,
 c, d, p}, x] && NeQ[b*c - a*d, 0] && (LtQ[p, -1] || ILtQ[1/2 + p, 0])
```

rule 1588
```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Simp[1/(d*f
^2*(m + 1))   Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x
) - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && Ne
Q[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{2}\left(e\,x^{2}+d\right)^{\frac{5}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^(5/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^(5/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 399, normalized size of antiderivative = 2.35

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{2}\left(d+ex^{2}\right)^{5/2}}\,dx = \left[\frac{4\left(be^{2}nx^{5}+2\,bdenx^{3}+bd^{2}nx\right)\sqrt{e}\log\left(-2\,ex^{2}-2\,\sqrt{ex^{2}+d}\sqrt{e}x-d\right)-\left(2\left(be^{2}n\right.\right.}{}\right.$$

$$-\frac{8\left(be^{2}nx^{5}+2\,bdenx^{3}+bd^{2}nx\right)\sqrt{-e}\arctan\left(\frac{\sqrt{-e}x}{\sqrt{ex^{2}+d}}\right)+\left(2\left(be^{2}n+4\,ae^{2}\right)x^{4}+3\,bd^{2}n+3\,ad^{2}+\left(5\,bden+\right.\right.}{3\left(d^{3}e^{2}x^{5}+2\,d^{4}\right.}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
[1/3*(4*(b*e^2*n*x^5 + 2*b*d*e*n*x^3 + b*d^2*n*x)*sqrt(e)*log(-2*e*x^2 - 2
*sqrt(e*x^2 + d)*sqrt(e)*x - d) - (2*(b*e^2*n + 4*a*e^2)*x^4 + 3*b*d^2*n +
 3*a*d^2 + (5*b*d*e*n + 12*a*d*e)*x^2 + (8*b*e^2*x^4 + 12*b*d*e*x^2 + 3*b*
d^2)*log(c) + (8*b*e^2*n*x^4 + 12*b*d*e*n*x^2 + 3*b*d^2*n)*log(x))*sqrt(e*
x^2 + d))/(d^3*e^2*x^5 + 2*d^4*e*x^3 + d^5*x), -1/3*(8*(b*e^2*n*x^5 + 2*b*
d*e*n*x^3 + b*d^2*n*x)*sqrt(-e)*arctan(sqrt(-e)*x/sqrt(e*x^2 + d)) + (2*(b
*e^2*n + 4*a*e^2)*x^4 + 3*b*d^2*n + 3*a*d^2 + (5*b*d*e*n + 12*a*d*e)*x^2 +
 (8*b*e^2*x^4 + 12*b*d*e*x^2 + 3*b*d^2)*log(c) + (8*b*e^2*n*x^4 + 12*b*d*e
*n*x^2 + 3*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(d^3*e^2*x^5 + 2*d^4*e*x^3 +
d^5*x)]
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^2\right)^{5/2}}\,dx=\text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x**2+d)**(5/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^2\right)^{5/2}}\,dx=\text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^2\right)^{5/2}}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^{\frac{5}{2}}x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^(5/2)*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{5/2}}\,dx = \int \frac{a+b\ln(c\,x^n)}{x^2\,(e\,x^2+d)^{5/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^(5/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^(5/2)), x)
```

Reduce [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 788, normalized size of antiderivative = 4.64

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{5/2}}\,dx = \text{Too large to display}$$

input
```
int((a+b*log(c*x^n))/x^2/(e*x^2+d)^(5/2),x)
```

output
```
( - 3*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c
)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2 - 12*sqrt(d +
e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sq
rt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e*x**2 - 8*sqrt(d + e*x**2)*log(
((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**
2) + sqrt(e)*x)**n*2**n))*b*e**2*x**4 - 3*sqrt(d + e*x**2)*a*d**2 - 12*sqr
t(d + e*x**2)*a*d*e*x**2 - 8*sqrt(d + e*x**2)*a*e**2*x**4 - 3*sqrt(d + e*x
**2)*b*d**2*n - 5*sqrt(d + e*x**2)*b*d*e*n*x**2 - 2*sqrt(d + e*x**2)*b*e**
2*n*x**4 + 8*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt(d))
*b*d**2*n*x + 16*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt
(d))*b*d*e*n*x**3 + 8*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)
/sqrt(d))*b*e**2*n*x**5 + 8*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(d) + sqrt
(e)*x)/sqrt(d))*b*d**2*n*x + 16*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(d) +
sqrt(e)*x)/sqrt(d))*b*d*e*n*x**3 + 8*sqrt(e)*log((sqrt(d + e*x**2) + sqrt(
d) + sqrt(e)*x)/sqrt(d))*b*e**2*n*x**5 - 8*sqrt(e)*log(((2*sqrt(e)*sqrt(d
+ e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*
2**n))*b*d**2*x - 16*sqrt(e)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2
)**n*c)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d*e*x**3 - 8*
sqrt(e)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sq
rt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*e**2*x**5 + 8*sqrt(e)*a*d**2*x ...
```

3.308 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{5/2}}\,dx$

Optimal result 2332
Mathematica [A] (verified) 2333
Rubi [A] (verified) 2333
Maple [F] 2337
Fricas [A] (verification not implemented) 2337
Sympy [F(-1)] 2338
Maxima [F(-2)] 2338
Giac [F] 2338
Mupad [F(-1)] 2339
Reduce [B] (verification not implemented) 2339

Optimal result

Integrand size = 25, antiderivative size = 228

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{5/2}}\,dx = -\frac{be^2nx}{3d^4\sqrt{d+ex^2}} - \frac{bn\sqrt{d+ex^2}}{9d^3x^3} + \frac{23ben\sqrt{d+ex^2}}{9d^4x} - \frac{16be^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{3d^4} + \frac{a+b\log(cx^n)}{3dx^3(d+ex^2)^{3/2}} + \frac{2(a+b\log(cx^n))}{d^2x^3\sqrt{d+ex^2}} - \frac{8\sqrt{d+ex^2}(a+b\log(cx^n))}{3d^3x^3} + \frac{16e\sqrt{d+ex^2}(a+b\log(cx^n))}{3d^4x}$$

output
```
-1/3*b*e^2*n*x/d^4/(e*x^2+d)^(1/2)-1/9*b*n*(e*x^2+d)^(1/2)/d^3/x^3+23/9*b*
e*n*(e*x^2+d)^(1/2)/d^4/x-16/3*b*e^(3/2)*n*arctanh(e^(1/2)*x/(e*x^2+d)^(1/
2))/d^4+1/3*(a+b*ln(c*x^n))/d/x^3/(e*x^2+d)^(3/2)+2*(a+b*ln(c*x^n))/d^2/x^
3/(e*x^2+d)^(1/2)-8/3*(e*x^2+d)^(1/2)*(a+b*ln(c*x^n))/d^3/x^3+16/3*e*(e*x^
2+d)^(1/2)*(a+b*ln(c*x^n))/d^4/x
```

Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 182, normalized size of antiderivative = 0.80

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^{5/2}}\,dx = \frac{-3ad^3-bd^3n+18ad^2ex^2+21bd^2enx^2+72ade^2x^4+42bde^2nx^4+48ae^3x^6+20be}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^(5/2)),x]
```

output
```
(-3*a*d^3 - b*d^3*n + 18*a*d^2*e*x^2 + 21*b*d^2*e*n*x^2 + 72*a*d*e^2*x^4 +
 42*b*d*e^2*n*x^4 + 48*a*e^3*x^6 + 20*b*e^3*n*x^6 + 3*b*(-d^3 + 6*d^2*e*x^
2 + 24*d*e^2*x^4 + 16*e^3*x^6)*Log[c*x^n] - 48*b*e^(3/2)*n*x^3*(d + e*x^2)
^(3/2)*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(9*d^4*x^3*(d + e*x^2)^(3/2))
```

Rubi [A] (verified)

Time = 0.64 (sec) , antiderivative size = 228, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {2792, 27, 2336, 25, 1588, 27, 358, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^{5/2}}\,dx$$

$$\Big\downarrow \ 2792$$

$$-bn\int -\frac{-16e^3x^6-24de^2x^4-6d^2ex^2+d^3}{3d^4x^4\left(ex^2+d\right)^{3/2}}dx+\frac{16e^2x(a+b\log\left(cx^n\right))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log\left(cx^n\right))}{3d^3\left(d+ex^2\right)^{3/2}}+\frac{2e(a+b\log\left(cx^n\right))}{d^2x\left(d+ex^2\right)^{3/2}}-\frac{a+b\log\left(cx^n\right)}{3dx^3\left(d+ex^2\right)^{3/2}}$$

$$\Big\downarrow \ 27$$

$$\frac{bn\int \frac{-16e^3x^6-24de^2x^4-6d^2ex^2+d^3}{x^4\left(ex^2+d\right)^{3/2}}dx}{3d^4}+\frac{16e^2x(a+b\log\left(cx^n\right))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log\left(cx^n\right))}{3d^3\left(d+ex^2\right)^{3/2}}+\frac{2e(a+b\log\left(cx^n\right))}{d^2x\left(d+ex^2\right)^{3/2}}-\frac{a+b\log\left(cx^n\right)}{3dx^3\left(d+ex^2\right)^{3/2}}$$

$$\Big\downarrow \text{2336}$$

$$\frac{bn\left(-\frac{\int -\frac{-16de^2x^4-7d^2ex^2+d^3}{x^4\sqrt{ex^2+d}}dx}{d}-\frac{e^2x}{\sqrt{d+ex^2}}\right)}{3d^4}+\frac{16e^2x(a+b\log(cx^n))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log(cx^n))}{3d^3(d+ex^2)^{3/2}}+\frac{2e(a+b\log(cx^n))}{d^2x(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{3dx^3(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{25}$$

$$\frac{bn\left(\frac{\int \frac{-16de^2x^4-7d^2ex^2+d^3}{x^4\sqrt{ex^2+d}}dx}{d}-\frac{e^2x}{\sqrt{d+ex^2}}\right)}{3d^4}+\frac{16e^2x(a+b\log(cx^n))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log(cx^n))}{3d^3(d+ex^2)^{3/2}}+\frac{2e(a+b\log(cx^n))}{d^2x(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{3dx^3(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{1588}$$

$$\frac{bn\left(\frac{-\frac{\int \frac{d^2e\left(48ex^2+23d\right)}{x^2\sqrt{ex^2+d}}dx}{3d}-\frac{d^2\sqrt{d+ex^2}}{3x^3}}{d}-\frac{e^2x}{\sqrt{d+ex^2}}\right)}{3d^4}+\frac{16e^2x(a+b\log(cx^n))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log(cx^n))}{3d^3(d+ex^2)^{3/2}}+\frac{2e(a+b\log(cx^n))}{d^2x(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{3dx^3(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\left(\frac{-\frac{1}{3}de\int \frac{48ex^2+23d}{x^2\sqrt{ex^2+d}}dx-\frac{d^2\sqrt{d+ex^2}}{3x^3}}{d}-\frac{e^2x}{\sqrt{d+ex^2}}\right)}{3d^4}+\frac{16e^2x(a+b\log(cx^n))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log(cx^n))}{3d^3(d+ex^2)^{3/2}}+\frac{2e(a+b\log(cx^n))}{d^2x(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{3dx^3(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{358}$$

$$\frac{bn\left(\frac{-\frac{1}{3}de\left(48e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{23\sqrt{d+ex^2}}{x}\right)-\frac{d^2\sqrt{d+ex^2}}{3x^3}}{d}-\frac{e^2x}{\sqrt{d+ex^2}}\right)}{3d^4}+\frac{16e^2x(a+b\log(cx^n))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log(cx^n))}{3d^3(d+ex^2)^{3/2}}+\frac{2e(a+b\log(cx^n))}{d^2x(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{3dx^3(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{224}$$

$$\frac{bn\left(\frac{-\frac{1}{3}de\left(48e\int\frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{23\sqrt{d+ex^2}}{x}\right)-\frac{d^2\sqrt{d+ex^2}}{3x^3}}{d}-\frac{e^2x}{\sqrt{d+ex^2}}\right)}{3d^4}+\frac{16e^2x(a+b\log(cx^n))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log(cx^n))}{3d^3(d+ex^2)^{3/2}}+\frac{2e(a+b\log(cx^n))}{d^2x(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{3dx^3(d+ex^2)^{3/2}}$$

$$\Big\downarrow \; 219$$

$$\frac{16e^2x(a+b\log(cx^n))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log(cx^n))}{3d^3(d+ex^2)^{3/2}}+\frac{2e(a+b\log(cx^n))}{d^2x(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{3dx^3(d+ex^2)^{3/2}}+\frac{bn\left(\frac{-\frac{1}{3}de\left(48\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{23\sqrt{d+ex^2}}{x}\right)-\frac{d^2\sqrt{d+ex^2}}{3x^3}}{d}-\frac{e^2x}{\sqrt{d+ex^2}}\right)}{3d^4}$$

input
```
Int[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^(5/2)),x]
```

output
```
(b*n*(-((e^2*x)/Sqrt[d + e*x^2]) + (-1/3*(d^2*Sqrt[d + e*x^2])/x^3 - (d*e*
((-23*Sqrt[d + e*x^2])/x + 48*Sqrt[e]*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]]
))/3)/d))/(3*d^4) - (a + b*Log[c*x^n])/(3*d*x^3*(d + e*x^2)^(3/2)) + (2*e*
(a + b*Log[c*x^n]))/(d^2*x*(d + e*x^2)^(3/2)) + (8*e^2*x*(a + b*Log[c*x^n]
))/(3*d^3*(d + e*x^2)^(3/2)) + (16*e^2*x*(a + b*Log[c*x^n]))/(3*d^4*Sqrt[d
 + e*x^2])
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 1588
```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Simp[1/(d*f
^2*(m + 1))   Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x
) - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && Ne
Q[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

rule 2336
```
Int[(Pq_)*((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> With[
{Q = PolynomialQuotient[(c*x)^m*Pq, a + b*x^2, x], f = Coeff[PolynomialRema
inder[(c*x)^m*Pq, a + b*x^2, x], x, 0], g = Coeff[PolynomialRemainder[(c*x)
^m*Pq, a + b*x^2, x], x, 1]}, Simp[(a*g - b*f*x)*((a + b*x^2)^(p + 1)/(2*a*
b*(p + 1))), x] + Simp[1/(2*a*(p + 1))   Int[(c*x)^m*(a + b*x^2)^(p + 1)*Ex
pandToSum[(2*a*(p + 1)*Q)/(c*x)^m + (f*(2*p + 3))/(c*x)^m, x], x], x]] /; F
reeQ[{a, b, c}, x] && PolyQ[Pq, x] && LtQ[p, -1] && ILtQ[m, 0]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{4} \left(e\,x^{2}+d\right)^{\frac{5}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^(5/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^(5/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 520, normalized size of antiderivative = 2.28

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{5/2}}\,dx = \left[\frac{24\,(be^3nx^7+2\,bde^2nx^5+bd^2enx^3)\sqrt{e}\log\left(-2\,ex^2+2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)+(4\,(5\right.$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
[1/9*(24*(b*e^3*n*x^7 + 2*b*d*e^2*n*x^5 + b*d^2*e*n*x^3)*sqrt(e)*log(-2*e*
x^2 + 2*sqrt(e*x^2 + d)*sqrt(e)*x - d) + (4*(5*b*e^3*n + 12*a*e^3)*x^6 - b
*d^3*n + 6*(7*b*d*e^2*n + 12*a*d*e^2)*x^4 - 3*a*d^3 + 3*(7*b*d^2*e*n + 6*a
*d^2*e)*x^2 + 3*(16*b*e^3*x^6 + 24*b*d*e^2*x^4 + 6*b*d^2*e*x^2 - b*d^3)*lo
g(c) + 3*(16*b*e^3*n*x^6 + 24*b*d*e^2*n*x^4 + 6*b*d^2*e*n*x^2 - b*d^3*n)*l
og(x))*sqrt(e*x^2 + d))/(d^4*e^2*x^7 + 2*d^5*e*x^5 + d^6*x^3), 1/9*(48*(b*
e^3*n*x^7 + 2*b*d*e^2*n*x^5 + b*d^2*e*n*x^3)*sqrt(-e)*arctan(sqrt(-e)*x/sq
rt(e*x^2 + d)) + (4*(5*b*e^3*n + 12*a*e^3)*x^6 - b*d^3*n + 6*(7*b*d*e^2*n
+ 12*a*d*e^2)*x^4 - 3*a*d^3 + 3*(7*b*d^2*e*n + 6*a*d^2*e)*x^2 + 3*(16*b*e^
3*x^6 + 24*b*d*e^2*x^4 + 6*b*d^2*e*x^2 - b*d^3)*log(c) + 3*(16*b*e^3*n*x^6
 + 24*b*d*e^2*n*x^4 + 6*b*d^2*e*n*x^2 - b*d^3*n)*log(x))*sqrt(e*x^2 + d))/
(d^4*e^2*x^7 + 2*d^5*e*x^5 + d^6*x^3)]
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^{5/2}}\,dx=\text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**4/(e*x**2+d)**(5/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^{5/2}}\,dx=\text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^{5/2}}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^{\frac{5}{2}}x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^(5/2)*x^4), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^{5/2}}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^4\,\left(e\,x^2+d\right)^{5/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^(5/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^(5/2)), x)
```

Reduce [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 928, normalized size of antiderivative = 4.07

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^{5/2}}\,dx=\text{Too large to display}$$

input
```
int((a+b*log(c*x^n))/x^4/(e*x^2+d)^(5/2),x)
```

output

```
( - 3*sqrt(d + e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c
)/(e**(n/2)*(sqrt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**3 + 18*sqrt(d +
e*x**2)*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sq
rt(d + e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2*e*x**2 + 72*sqrt(d + e*x**2)*
log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e
*x**2) + sqrt(e)*x)**n*2**n))*b*d*e**2*x**4 + 48*sqrt(d + e*x**2)*log(((2*
sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d + e*x**2) +
 sqrt(e)*x)**n*2**n))*b*e**3*x**6 - 3*sqrt(d + e*x**2)*a*d**3 + 18*sqrt(d
+ e*x**2)*a*d**2*e*x**2 + 72*sqrt(d + e*x**2)*a*d*e**2*x**4 + 48*sqrt(d +
e*x**2)*a*e**3*x**6 - sqrt(d + e*x**2)*b*d**3*n + 21*sqrt(d + e*x**2)*b*d*
*2*e*n*x**2 + 42*sqrt(d + e*x**2)*b*d*e**2*n*x**4 + 20*sqrt(d + e*x**2)*b*
e**3*n*x**6 - 48*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e)*x)/sqrt
(d))*b*d**2*e*n*x**3 - 96*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d) + sqrt(e
)*x)/sqrt(d))*b*d*e**2*n*x**5 - 48*sqrt(e)*log((sqrt(d + e*x**2) - sqrt(d)
 + sqrt(e)*x)/sqrt(d))*b*e**3*n*x**7 - 48*sqrt(e)*log((sqrt(d + e*x**2) +
sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d**2*e*n*x**3 - 96*sqrt(e)*log((sqrt(d + e
*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*d*e**2*n*x**5 - 48*sqrt(e)*log((s
qrt(d + e*x**2) + sqrt(d) + sqrt(e)*x)/sqrt(d))*b*e**3*n*x**7 + 48*sqrt(e)
*log(((2*sqrt(e)*sqrt(d + e*x**2)*x + 2*e*x**2)**n*c)/(e**(n/2)*(sqrt(d +
e*x**2) + sqrt(e)*x)**n*2**n))*b*d**2*e*x**3 + 96*sqrt(e)*log(((2*sqrt(...
```

3.309 $\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$

Optimal result 2341
Mathematica [A] (verified) 2342
Rubi [A] (verified) 2342
Maple [F] 2345
Fricas [A] (verification not implemented) 2346
Sympy [F] 2346
Maxima [A] (verification not implemented) 2347
Giac [F] 2347
Mupad [F(-1)] 2348
Reduce [B] (verification not implemented) 2348

Optimal result

Integrand size = 33, antiderivative size = 251

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{2bd^2n(d^2-e^2x^2)}{3e^4\sqrt{d-ex}\sqrt{d+ex}} - \frac{bn(d^2-e^2x^2)^2}{9e^4\sqrt{d-ex}\sqrt{d+ex}} - \frac{2bd^4n\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{3e^4\sqrt{d-ex}\sqrt{d+ex}} - \frac{d^2(d^2-e^2x^2)(a+b\log(cx^n))}{e^4\sqrt{d-ex}\sqrt{d+ex}} + \frac{(d^2-e^2x^2)^2(a+b\log(cx^n))}{3e^4\sqrt{d-ex}\sqrt{d+ex}}$$

output
```
2/3*b*d^2*n*(-e^2*x^2+d^2)/e^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/9*b*n*(-e^2*
x^2+d^2)^2/e^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-2/3*b*d^4*n*(1-e^2*x^2/d^2)^(1
/2)*arctanh((1-e^2*x^2/d^2)^(1/2))/e^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-d^2*(-
e^2*x^2+d^2)*(a+b*ln(c*x^n))/e^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/3*(-e^2*x^
2+d^2)^2*(a+b*ln(c*x^n))/e^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

Mathematica [A] (verified)

Time = 0.59 (sec) , antiderivative size = 163, normalized size of antiderivative = 0.65

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = -\frac{-6bd^3n\log(x)+3bn\sqrt{d-ex}\sqrt{d+ex}(2d^2+e^2x^2)\log(x)+\sqrt{d-ex}\sqrt{d+ex}(e^2x^2(3a-bn-3bn\log}{9e^4}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
-1/9*(-6*b*d^3*n*Log[x] + 3*b*n*Sqrt[d - e*x]*Sqrt[d + e*x]*(2*d^2 + e^2*x
^2)*Log[x] + Sqrt[d - e*x]*Sqrt[d + e*x]*(e^2*x^2*(3*a - b*n - 3*b*n*Log[x
] + 3*b*Log[c*x^n]) + d^2*(6*a - 5*b*n - 6*b*n*Log[x] + 6*b*Log[c*x^n])) +
 6*b*d^3*n*Log[d + Sqrt[d - e*x]*Sqrt[d + e*x]])/e^4
```

Rubi [A] (verified)

Time = 0.81 (sec) , antiderivative size = 192, normalized size of antiderivative = 0.76, number of steps used = 9, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.242$, Rules used = {2787, 2792, 27, 354, 90, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

$$\Big\downarrow \text{2787}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{x^3(a+b\log(cx^n))}{\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{2792}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(-bn\int -\frac{d^2(2d^2+e^2x^2)\sqrt{1-\frac{e^2x^2}{d^2}}}{3e^4x}dx+\frac{d^4\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}(a+b\log(cx^n))}{3e^4}-\frac{d^4\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^4}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 27$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\int \frac{\left(2d^2+e^2x^2\right)\sqrt{1-\frac{e^2x^2}{d^2}}}{x}dx}{3e^4}+\frac{d^4\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}(a+b\log(cx^n))}{3e^4}-\frac{d^4\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^4}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 354$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\int \frac{\left(2d^2+e^2x^2\right)\sqrt{1-\frac{e^2x^2}{d^2}}}{x^2}dx^2}{6e^4}+\frac{d^4\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}(a+b\log(cx^n))}{3e^4}-\frac{d^4\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^4}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 90$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\left(2d^2\int \frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x^2}dx^2-\frac{2}{3}d^2\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}\right)}{6e^4}+\frac{d^4\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}(a+b\log(cx^n))}{3e^4}-\frac{d^4\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^4}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 60$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\left(2d^2\left(\int \frac{1}{x^2\sqrt{1-\frac{e^2x^2}{d^2}}}dx^2+2\sqrt{1-\frac{e^2x^2}{d^2}}\right)-\frac{2}{3}d^2\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}\right)}{6e^4}+\frac{d^4\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}(a+b\log(cx^n))}{3e^4}-\frac{d^4\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^4}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 73$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\left(2d^2\left(2\sqrt{1-\frac{e^2x^2}{d^2}}-\frac{2d^2\int \frac{1}{\frac{d^2}{e^2}-\frac{d^2x^4}{e^2}}d\sqrt{1-\frac{e^2x^2}{d^2}}}{e^2}\right)-\frac{2}{3}d^2\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}\right)}{6e^4}+\frac{d^4\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}(a+b\log(cx^n))}{3e^4}-\frac{d^4\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^4}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 221$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d^4\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}(a+b\log(cx^n))}{3e^4}-\frac{d^4\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^4}+\frac{bd^2n\left(2d^2\left(2\sqrt{1-\frac{e^2x^2}{d^2}}-2\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)\right)-\frac{2}{3}d^2\left(\right.}{6e^4}\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(Sqrt[1 - (e^2*x^2)/d^2]*((b*d^2*n*((-2*d^2*(1 - (e^2*x^2)/d^2)^(3/2))/3 +
 2*d^2*(2*Sqrt[1 - (e^2*x^2)/d^2] - 2*ArcTanh[Sqrt[1 - (e^2*x^2)/d^2]])))/
(6*e^4) - (d^4*Sqrt[1 - (e^2*x^2)/d^2]*(a + b*Log[c*x^n]))/e^4 + (d^4*(1 -
 (e^2*x^2)/d^2)^(3/2)*(a + b*Log[c*x^n]))/(3*e^4)))/(Sqrt[d - e*x]*Sqrt[d
+ e*x])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 354
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_S
ymbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(a + b*x)^p*(c + d*x)^q, x], x
, x^2], x] /; FreeQ[{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0] && IntegerQ
[(m - 1)/2]
```

rule 2787
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Simp[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q)   Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a
+ b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2
*e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x^3(a+b\ln(c\,x^n))}{\sqrt{-ex+d}\,\sqrt{ex+d}}dx$$

input
```
int(x^3*(a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
int(x^3*(a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 125, normalized size of antiderivative = 0.50

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{6\,bd^3n\log\left(\frac{\sqrt{ex+d}\sqrt{-ex+d}-d}{x}\right) + (5\,bd^2n - 6\,ad^2 + (be^2n - 3\,ae^2)x^2 - 3\,(be^2x^2 + 2\,bd^2)\log(c) - 3\,(be^2nx^2}{9\,e^4}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
fricas")
```

output
```
1/9*(6*b*d^3*n*log((sqrt(e*x + d)*sqrt(-e*x + d) - d)/x) + (5*b*d^2*n - 6*
a*d^2 + (b*e^2*n - 3*a*e^2)*x^2 - 3*(b*e^2*x^2 + 2*b*d^2)*log(c) - 3*(b*e^
2*n*x^2 + 2*b*d^2*n)*log(x))*sqrt(e*x + d)*sqrt(-e*x + d))/e^4
```

Sympy [F]

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

output
```
Integral(x**3*(a + b*log(c*x**n))/(sqrt(d - e*x)*sqrt(d + e*x)), x)
```

Maxima [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 199, normalized size of antiderivative = 0.79

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = -\frac{1}{9}bn\left(\frac{3\,d^3\log\left(d+\sqrt{-e^2x^2+d^2}\right)}{e^4} - \frac{3\,d^3\log\left(-d+\sqrt{-e^2x^2+d^2}\right)}{e^4} - \frac{6\sqrt{-e^2x^2+d^2}d^2 - (-e^2x^2+d\right. \\ -\frac{1}{3}b\left(\frac{\sqrt{-e^2x^2+d^2}x^2}{e^2} + \frac{2\sqrt{-e^2x^2+d^2}d^2}{e^4}\right)\log(cx^n) \\ -\frac{1}{3}a\left(\frac{\sqrt{-e^2x^2+d^2}x^2}{e^2} + \frac{2\sqrt{-e^2x^2+d^2}d^2}{e^4}\right)$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
maxima")
```

output
```
-1/9*b*n*(3*d^3*log(d + sqrt(-e^2*x^2 + d^2))/e^4 - 3*d^3*log(-d + sqrt(-e
^2*x^2 + d^2))/e^4 - (6*sqrt(-e^2*x^2 + d^2)*d^2 - (-e^2*x^2 + d^2)^(3/2))
/e^4) - 1/3*b*(sqrt(-e^2*x^2 + d^2)*x^2/e^2 + 2*sqrt(-e^2*x^2 + d^2)*d^2/e
^4)*log(c*x^n) - 1/3*a*(sqrt(-e^2*x^2 + d^2)*x^2/e^2 + 2*sqrt(-e^2*x^2 + d
^2)*d^2/e^4)
```

Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{\sqrt{ex+d}\sqrt{-ex+d}}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(sqrt(e*x + d)*sqrt(-e*x + d)), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{x^3\,(a+b\,\ln(c\,x^n))}{\sqrt{d+e\,x}\,\sqrt{d-e\,x}}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/((d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/((d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

Reduce [B] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 488, normalized size of antiderivative = 1.94

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{-6\sqrt{ex+d}\,\sqrt{-ex+d}\log\left(\frac{\left(\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\,\sqrt{2}}\right)}{2}\right)^4 d-6\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\,\sqrt{2}}\right)}{2}\right)^2 d+d\right)^n c}{e^n\left(\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\,\sqrt{2}}\right)}{2}\right)^4+2\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\,\sqrt{2}}\right)}{2}\right)^2+1\right)^n}\right) b\,d^2-3\sqrt{ex+d}\,\sqrt{-ex+}}{}$$

input
```
int(x^3*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output

```
( - 6*sqrt(d + e*x)*sqrt(d - e*x)*log(((tan(asin(sqrt(d - e*x)/(sqrt(d)*sq
rt(2)))/2)**4*d - 6*tan(asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2)**2*d + d)
**n*c)/(e**n*(tan(asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2)**4 + 2*tan(asin
(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2)**2 + 1)**n))*b*d**2 - 3*sqrt(d + e*x)
*sqrt(d - e*x)*log(((tan(asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2)**4*d - 6
*tan(asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2)**2*d + d)**n*c)/(e**n*(tan(a
sin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2)**4 + 2*tan(asin(sqrt(d - e*x)/(sqr
t(d)*sqrt(2)))/2)**2 + 1)**n))*b*e**2*x**2 - 6*sqrt(d + e*x)*sqrt(d - e*x)
*a*d**2 - 3*sqrt(d + e*x)*sqrt(d - e*x)*a*e**2*x**2 + 5*sqrt(d + e*x)*sqrt
(d - e*x)*b*d**2*n + sqrt(d + e*x)*sqrt(d - e*x)*b*e**2*n*x**2 - 6*log( -
sqrt(2) + tan(asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2) - 1)*b*d**3*n + 6*l
og( - sqrt(2) + tan(asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2) + 1)*b*d**3*n
 - 6*log(sqrt(2) + tan(asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2) - 1)*b*d**
3*n + 6*log(sqrt(2) + tan(asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2) + 1)*b*
d**3*n)/(9*e**4)
```

3.310 $\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$

Optimal result . . . 2350
Mathematica [A] (verified) . . . 2350
Rubi [A] (verified) . . . 2351
Maple [F] . . . 2353
Fricas [A] (verification not implemented) . . . 2354
Sympy [F] . . . 2354
Maxima [A] (verification not implemented) . . . 2354
Giac [F] . . . 2355
Mupad [F(-1)] . . . 2355
Reduce [B] (verification not implemented) . . . 2356

Optimal result

Integrand size = 31, antiderivative size = 148

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{bn(d^2-e^2x^2)}{e^2\sqrt{d-ex}\sqrt{d+ex}} - \frac{bd^2n\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{e^2\sqrt{d-ex}\sqrt{d+ex}} - \frac{(d^2-e^2x^2)\,(a+b\log(cx^n))}{e^2\sqrt{d-ex}\sqrt{d+ex}}$$

output
```
b*n*(-e^2*x^2+d^2)/e^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-b*d^2*n*(1-e^2*x^2/d^2
)^(1/2)*arctanh((1-e^2*x^2/d^2)^(1/2))/e^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-(-
e^2*x^2+d^2)*(a+b*ln(c*x^n))/e^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.76

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{bdn\log(x)}{e^2} - \frac{bn\sqrt{d-ex}\sqrt{d+ex}\log(x)}{e^2} - \frac{\sqrt{d-ex}\sqrt{d+ex}(a-bn+b(-n\log(x)+\log(cx^n)))}{e^2} - \frac{bdn\log\left(d+\sqrt{d-ex}\sqrt{d+ex}\right)}{e^2}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(b*d*n*Log[x])/e^2 - (b*n*Sqrt[d - e*x]*Sqrt[d + e*x]*Log[x])/e^2 - (Sqrt[
d - e*x]*Sqrt[d + e*x]*(a - b*n + b*(-(n*Log[x]) + Log[c*x^n])))/e^2 - (b*
d*n*Log[d + Sqrt[d - e*x]*Sqrt[d + e*x]])/e^2
```

Rubi [A] (verified)

Time = 0.54 (sec) , antiderivative size = 125, normalized size of antiderivative = 0.84, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.194$, Rules used = {2787, 2776, 243, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{ 2787}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{x(a+b\log(cx^n))}{\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 2776}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\int \frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x}dx}{e^2}-\frac{d^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 243}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\int \frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x^2}dx^2}{2e^2}-\frac{d^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 60}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\left(\int\frac{1}{x^2\sqrt{1-\frac{e^2x^2}{d^2}}}dx^2+2\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{2e^2}-\frac{d^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 73$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\left(2\sqrt{1-\frac{e^2x^2}{d^2}}-\frac{2d^2\int\frac{1}{\frac{d^2}{e^2}-\frac{d^2x^4}{e^2}}d\sqrt{1-\frac{e^2x^2}{d^2}}}{e^2}\right)}{2e^2}-\frac{d^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 221$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\left(2\sqrt{1-\frac{e^2x^2}{d^2}}-2\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)\right)}{2e^2}-\frac{d^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(Sqrt[1 - (e^2*x^2)/d^2]*((b*d^2*n*(2*Sqrt[1 - (e^2*x^2)/d^2] - 2*ArcTanh[
Sqrt[1 - (e^2*x^2)/d^2]]))/(2*e^2) - (d^2*Sqrt[1 - (e^2*x^2)/d^2]*(a + b*L
og[c*x^n]))/e^2))/(Sqrt[d - e*x]*Sqrt[d + e*x])
```

Defintions of rubi rules used

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2787
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Simp[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q)   Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a
+ b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2
*e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

Maple [F]

$$\int \frac{x(a+b\ln(c\,x^n))}{\sqrt{-ex+d}\,\sqrt{ex+d}}dx$$

input
```
int(x*(a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
int(x*(a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 66, normalized size of antiderivative = 0.45

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{bdn\log\left(\frac{\sqrt{ex+d}\sqrt{-ex+d}-d}{x}\right)-(bn\log(x)-bn+b\log(c)+a)\sqrt{ex+d}\sqrt{-ex+d}}{e^2}$$

input
```
integrate(x*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="fr
icas")
```

output
```
(b*d*n*log((sqrt(e*x + d)*sqrt(-e*x + d) - d)/x) - (b*n*log(x) - b*n + b*l
og(c) + a)*sqrt(e*x + d)*sqrt(-e*x + d))/e^2
```

Sympy [F]

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

input
```
integrate(x*(a+b*ln(c*x**n))/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

output
```
Integral(x*(a + b*log(c*x**n))/(sqrt(d - e*x)*sqrt(d + e*x)), x)
```

Maxima [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 105, normalized size of antiderivative = 0.71

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = -\frac{\left(d\log\left(\frac{2d^2}{|x|}+\frac{2\sqrt{-e^2x^2+d^2}d}{|x|}\right)-\sqrt{-e^2x^2+d^2}\right)bn}{e^2} - \frac{\sqrt{-e^2x^2+d^2}b\log(cx^n)}{e^2} - \frac{\sqrt{-e^2x^2+d^2}a}{e^2}$$

input
```
integrate(x*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="ma
xima")
```

output
```
-(d*log(2*d^2/abs(x) + 2*sqrt(-e^2*x^2 + d^2)*d/abs(x)) - sqrt(-e^2*x^2 +
d^2))*b*n/e^2 - sqrt(-e^2*x^2 + d^2)*b*log(c*x^n)/e^2 - sqrt(-e^2*x^2 + d^
2)*a/e^2
```

Giac [F]

$$\int \frac{x(a + b\log(cx^n))}{\sqrt{d - ex}\sqrt{d + ex}}\,dx = \int \frac{(b\log(cx^n) + a)x}{\sqrt{ex + d}\sqrt{-ex + d}}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="gi
ac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(sqrt(e*x + d)*sqrt(-e*x + d)), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x(a + b\log(cx^n))}{\sqrt{d - ex}\sqrt{d + ex}}\,dx = \int \frac{x\,(a + b\,\ln(c\,x^n))}{\sqrt{d + e\,x}\,\sqrt{d - e\,x}}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/((d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

output
```
int((x*(a + b*log(c*x^n)))/((d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

Reduce [B] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 288, normalized size of antiderivative = 1.95

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

$$= \frac{-\sqrt{ex+d}\,\sqrt{-ex+d}\log\left(\frac{\left(\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\sqrt{2}}\right)}{2}\right)^4 d-6\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\sqrt{2}}\right)}{2}\right)^2 d+d\right)^n c}{e^n\left(\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\sqrt{2}}\right)}{2}\right)^4+2\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\sqrt{2}}\right)}{2}\right)^2+1\right)^n}\right) b-\sqrt{ex+d}\,\sqrt{-ex+d}\,a+}{}$$

input
```
int(x*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
( - sqrt(d + e*x)*sqrt(d - e*x)*log(((tan(asin(sqrt(d - e*x)/(sqrt(d)*sqrt
(2)))/2)**4*d - 6*tan(asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2)**2*d + d)**
n*c)/(e**n*(tan(asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2)**4 + 2*tan(asin(s
qrt(d - e*x)/(sqrt(d)*sqrt(2)))/2)**2 + 1)**n))*b - sqrt(d + e*x)*sqrt(d -
 e*x)*a + sqrt(d + e*x)*sqrt(d - e*x)*b*n - log( - sqrt(2) + tan(asin(sqrt
(d - e*x)/(sqrt(d)*sqrt(2)))/2) - 1)*b*d*n + log( - sqrt(2) + tan(asin(sqr
t(d - e*x)/(sqrt(d)*sqrt(2)))/2) + 1)*b*d*n - log(sqrt(2) + tan(asin(sqrt(
d - e*x)/(sqrt(d)*sqrt(2)))/2) - 1)*b*d*n + log(sqrt(2) + tan(asin(sqrt(d
- e*x)/(sqrt(d)*sqrt(2)))/2) + 1)*b*d*n)/e**2
```

3.311 $\int \frac{a+b\log(cx^n)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx$

Optimal result 2357
Mathematica [A] (verified) 2358
Rubi [A] (verified) 2358
Maple [F] 2362
Fricas [F] 2362
Sympy [F] 2362
Maxima [F] 2363
Giac [F] 2363
Mupad [F(-1)] 2363
Reduce [F] 2364

Optimal result

Integrand size = 33, antiderivative size = 301

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{bn\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2}{2\sqrt{d-ex}\sqrt{d+ex}} - \frac{\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}} - \frac{bn\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)\log\left(\frac{2}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right)}{\sqrt{d-ex}\sqrt{d+ex}} - \frac{bn\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{PolyLog}\left(2,-\frac{1+\sqrt{1-\frac{e^2x^2}{d^2}}}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right)}{2\sqrt{d-ex}\sqrt{d+ex}}$$

output
```
1/2*b*n*(1-e^2*x^2/d^2)^(1/2)*arctanh((1-e^2*x^2/d^2)^(1/2))^2/(-e*x+d)^(1
/2)/(e*x+d)^(1/2)-(1-e^2*x^2/d^2)^(1/2)*arctanh((1-e^2*x^2/d^2)^(1/2))*(a+
b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-b*n*(1-e^2*x^2/d^2)^(1/2)*arctan
h((1-e^2*x^2/d^2)^(1/2))*ln(2/(1-(1-e^2*x^2/d^2)^(1/2)))/(-e*x+d)^(1/2)/(e
*x+d)^(1/2)-1/2*b*n*(1-e^2*x^2/d^2)^(1/2)*polylog(2,-(1+(1-e^2*x^2/d^2)^(1
/2))/(1-(1-e^2*x^2/d^2)^(1/2)))/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

Mathematica [A] (verified)

Time = 2.33 (sec) , antiderivative size = 310, normalized size of antiderivative = 1.03

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{\log(x)(a-bn\log(x)+b\log(cx^n))}{d} - \frac{(a-bn\log(x)+b\log(cx^n))\log\left(d+\sqrt{d-ex}\sqrt{d+ex}\right)}{d} + \frac{bn\sqrt{-d^2+e^2x^2}\left(-\frac{4\operatorname{arctanh}\left(\frac{\sqrt{-d^2+e^2x^2}}{\sqrt{-d^2}}\right)\left(2\log(x)-\log\left(\frac{e^2x^2}{d^2}\right)\right)}{\sqrt{-d^2}}+\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\log^2\left(\frac{e^2x^2}{d^2}\right)-4\log\left(\frac{e^2x^2}{d^2}\right)\log\left(\frac{1}{2}\left(1+\sqrt{1-\right.\right.\right.}{}\right)}{8\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(Log[x]*(a - b*n*Log[x] + b*Log[c*x^n]))/d - ((a - b*n*Log[x] + b*Log[c*x^
n])*Log[d + Sqrt[d - e*x]*Sqrt[d + e*x]])/d + (b*n*Sqrt[-d^2 + e^2*x^2]*((
-4*ArcTanh[Sqrt[-d^2 + e^2*x^2]/Sqrt[-d^2]]*(2*Log[x] - Log[(e^2*x^2)/d^2]
))/Sqrt[-d^2] + (Sqrt[1 - (e^2*x^2)/d^2]*(Log[(e^2*x^2)/d^2]^2 - 4*Log[(e^
2*x^2)/d^2]*Log[(1 + Sqrt[1 - (e^2*x^2)/d^2])/2] + 2*Log[(1 + Sqrt[1 - (e^
2*x^2)/d^2])/2]^2 - 4*PolyLog[2, 1/2 - Sqrt[1 - (e^2*x^2)/d^2]/2]))/Sqrt[-
d^2 + e^2*x^2]))/(8*Sqrt[d - e*x]*Sqrt[d + e*x])
```

Rubi [A] (verified)

Time = 1.25 (sec) , antiderivative size = 175, normalized size of antiderivative = 0.58, number of steps used = 11, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.303$, Rules used = {2787, 2790, 25, 7282, 7267, 25, 6546, 6470, 2849, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

$$\Big\downarrow \text{ 2787}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{a+b\log(cx^n)}{x\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{2790}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(-bn\int -\frac{\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{x}dx-\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{25}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(bn\int \frac{\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{x}dx-\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{7282}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{1}{2}bn\int \frac{\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{x^2}dx^2-\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{7267}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(bn\int -\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{1-x^4}d\sqrt{1-\frac{e^2x^2}{d^2}}-\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{25}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(-bn\int \frac{\sqrt{1-\frac{e^2x^2}{d^2}}\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{1-x^4}d\sqrt{1-\frac{e^2x^2}{d^2}}-\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{6546}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(bn\left(\frac{1}{2}\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2-\int \frac{\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}d\sqrt{1-\frac{e^2x^2}{d^2}}\right)-\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{6470}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(bn\left(\int \frac{\log\left(\frac{2}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right)}{1-x^4}d\sqrt{1-\frac{e^2x^2}{d^2}}+\frac{1}{2}\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2-\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)\log\left(\frac{2}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right.\right.\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

$\downarrow$ 2849

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(bn\left(-\int \frac{\log\left(\frac{2}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right)}{1-\frac{2}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}}d\frac{1}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}+\frac{1}{2}\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2-\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)\log\left(\frac{}{1-\sqrt{}}\right.\right.\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

$\downarrow$ 2752

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(bn\left(\frac{1}{2}\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2-\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)\log\left(\frac{2}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right)-\frac{1}{2}\text{PolyLog}\left(2,1-\frac{2}{1-\sqrt{1-}}\right.\right.\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Int[(a + b*Log[c*x^n])/(x*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(Sqrt[1 - (e^2*x^2)/d^2]*(-(ArcTanh[Sqrt[1 - (e^2*x^2)/d^2]]*(a + b*Log[c*
x^n])) + b*n*(ArcTanh[Sqrt[1 - (e^2*x^2)/d^2]]^2/2 - ArcTanh[Sqrt[1 - (e^2
*x^2)/d^2]]*Log[2/(1 - Sqrt[1 - (e^2*x^2)/d^2])] - PolyLog[2, 1 - 2/(1 - S
qrt[1 - (e^2*x^2)/d^2])]/2)))/(Sqrt[d - e*x]*Sqrt[d + e*x])
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2787
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Simp[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q)   Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a
+ b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2
*e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

rule 2849
```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Simp
[-e/g   Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[
{c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

rule 6470
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Simp[b*c
*(p/e)   Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^
2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2
, 0]
```

rule 6546
```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Simp[1/
(c*d)   Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

rule 7267
```
Int[u_, x_Symbol] :> With[{lst = SubstForFractionalPowerOfLinear[u, x]}, Si
mp[lst[[2]]*lst[[4]]   Subst[Int[lst[[1]], x], x, lst[[3]]^(1/lst[[2]])], x
] /;  !FalseQ[lst] && SubstForFractionalPowerQ[u, lst[[3]], x]]
```

rule 7282
```
Int[(u_)/(x_), x_Symbol] :> With[{lst = PowerVariableExpn[u, 0, x]}, Simp[1
/lst[[2]]   Subst[Int[NormalizeIntegrand[Simplify[lst[[1]]/x], x], x], x, (
lst[[3]]*x)^lst[[2]]], x] /;  !FalseQ[lst] && NeQ[lst[[2]], 0]] /; NonsumQ[
u] &&  !RationalFunctionQ[u, x]
```

Maple [F]

$$\int \frac{a + b\ln\left(c\,x^{n}\right)}{x\sqrt{-ex+d}\,\sqrt{ex+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

Fricas [F]

$$\int \frac{a + b\log\left(cx^{n}\right)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{b\log\left(cx^{n}\right) + a}{\sqrt{ex+d}\sqrt{-ex+d}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="fr
icas")
```

output
```
integral(-(sqrt(e*x + d)*sqrt(-e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*sqrt(
-e*x + d)*a)/(e^2*x^3 - d^2*x), x)
```

Sympy [F]

$$\int \frac{a + b\log\left(cx^{n}\right)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{a + b\log\left(cx^{n}\right)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x*sqrt(d - e*x)*sqrt(d + e*x)), x)
```

Maxima [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\sqrt{ex+d}\sqrt{-ex+d}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="ma
xima")
```

output
```
b*integrate((log(c) + log(x^n))/(sqrt(e*x + d)*sqrt(-e*x + d)*x), x) - a*l
og(2*d^2/abs(x) + 2*sqrt(-e^2*x^2 + d^2)*d/abs(x))/d
```

Giac [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\sqrt{ex+d}\sqrt{-ex+d}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="gi
ac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x + d)*sqrt(-e*x + d)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{a+b\,\ln\left(c\,x^{n}\right)}{x\,\sqrt{d+e\,x}\,\sqrt{d-e\,x}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx$$
$$= \frac{\left(\int \frac{\log(x^n c)}{\sqrt{ex+d}\,\sqrt{-ex+d}\,x}dx\right)bd - \log\left(-\sqrt{2}+\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\,\sqrt{2}}\right)}{2}\right)-1\right)a + \log\left(-\sqrt{2}+\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\,\sqrt{2}}\right)}{2}\right)+\cdots\right.}{d}$$

input
```
int((a+b*log(c*x^n))/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
(int(log(x**n*c)/(sqrt(d + e*x)*sqrt(d - e*x)*x),x)*b*d - log( - sqrt(2) +
 tan(asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2) - 1)*a + log( - sqrt(2) + ta
n(asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2) + 1)*a - log(sqrt(2) + tan(asin
(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2) - 1)*a + log(sqrt(2) + tan(asin(sqrt(
d - e*x)/(sqrt(d)*sqrt(2)))/2) + 1)*a)/d
```

3.312 $\int \frac{a+b\log(cx^n)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx$

Optimal result . . . 2365
Mathematica [C] (verified) . . . 2366
Rubi [A] (verified) . . . 2367
Maple [F] . . . 2368
Fricas [F] . . . 2369
Sympy [F(-1)] . . . 2369
Maxima [F] . . . 2369
Giac [F] . . . 2370
Mupad [F(-1)] . . . 2370
Reduce [F] . . . 2370

Optimal result

Integrand size = 33, antiderivative size = 489

$$
\begin{aligned}
\int \frac{a+b\log(cx^n)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx = &-\frac{bn(d^2-e^2x^2)}{4d^2x^2\sqrt{d-ex}\sqrt{d+ex}} \\
&+\frac{be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\,\mathrm{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{4d^2\sqrt{d-ex}\sqrt{d+ex}} \\
&+\frac{be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\,\mathrm{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2}{4d^2\sqrt{d-ex}\sqrt{d+ex}} \\
&-\frac{(d^2-e^2x^2)\,(a+b\log(cx^n))}{2d^2x^2\sqrt{d-ex}\sqrt{d+ex}} \\
&-\frac{e^2\sqrt{1-\frac{e^2x^2}{d^2}}\,\mathrm{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))}{2d^2\sqrt{d-ex}\sqrt{d+ex}} \\
&-\frac{be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\,\mathrm{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)\log\left(\frac{2}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right)}{2d^2\sqrt{d-ex}\sqrt{d+ex}} \\
&-\frac{be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\,\mathrm{PolyLog}\left(2,-\frac{1+\sqrt{1-\frac{e^2x^2}{d^2}}}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right)}{4d^2\sqrt{d-ex}\sqrt{d+ex}}
\end{aligned}
$$

output
```
-1/4*b*n*(-e^2*x^2+d^2)/d^2/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/4*b*e^2*n*(
1-e^2*x^2/d^2)^(1/2)*arctanh((1-e^2*x^2/d^2)^(1/2))/d^2/(-e*x+d)^(1/2)/(e*
x+d)^(1/2)+1/4*b*e^2*n*(1-e^2*x^2/d^2)^(1/2)*arctanh((1-e^2*x^2/d^2)^(1/2)
)^2/d^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/2*(-e^2*x^2+d^2)*(a+b*ln(c*x^n))/d^
2/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/2*e^2*(1-e^2*x^2/d^2)^(1/2)*arctanh((
1-e^2*x^2/d^2)^(1/2))*(a+b*ln(c*x^n))/d^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/2
*b*e^2*n*(1-e^2*x^2/d^2)^(1/2)*arctanh((1-e^2*x^2/d^2)^(1/2))*ln(2/(1-(1-e
^2*x^2/d^2)^(1/2)))/d^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/4*b*e^2*n*(1-e^2*x^
2/d^2)^(1/2)*polylog(2,-(1+(1-e^2*x^2/d^2)^(1/2))/(1-(1-e^2*x^2/d^2)^(1/2)
))/d^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 1.14 (sec) , antiderivative size = 255, normalized size of antiderivative = 0.52

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{\frac{bn(-d^2+e^2x^2)\left(2d^3\,{}_3F_2\left(\frac{3}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};\frac{d^2}{e^2x^2}\right)+9e^2x^2\left(d\sqrt{1-\frac{d^2}{e^2x^2}}-ex\arcsin\left(\frac{d}{ex}\right)\right)(1+2\log(x))\right)}{e^2\sqrt{1-\frac{d^2}{e^2x^2}}x^4\sqrt{d-ex}\sqrt{d+ex}}-\frac{18d\sqrt{d-ex}\sqrt{d+ex}(a-bn\log(x)+b\log(c}{x^2}}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
((b*n*(-d^2 + e^2*x^2)*(2*d^3*HypergeometricPFQ[{3/2, 3/2, 3/2}, {5/2, 5/2
}, d^2/(e^2*x^2)] + 9*e^2*x^2*(d*Sqrt[1 - d^2/(e^2*x^2)] - e*x*ArcSin[d/(e
*x)])*(1 + 2*Log[x])))/(e^2*Sqrt[1 - d^2/(e^2*x^2)]*x^4*Sqrt[d - e*x]*Sqrt
[d + e*x]) - (18*d*Sqrt[d - e*x]*Sqrt[d + e*x]*(a - b*n*Log[x] + b*Log[c*x
^n]))/x^2 + 18*e^2*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n]) - 18*e^2*(a - b*
n*Log[x] + b*Log[c*x^n])*Log[d + Sqrt[d - e*x]*Sqrt[d + e*x]])/(36*d^3)
```

Rubi [A] (verified)

Time = 1.11 (sec) , antiderivative size = 307, normalized size of antiderivative = 0.63, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {2787, 2792, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d-ex}\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{2787}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{a+b\log(cx^n)}{x^3\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{2792}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(-bn\int \left(-\frac{\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)e^2}{2d^2x}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{2x^3}\right)dx-\frac{e^2\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))}{2d^2}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{2x^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{2009}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(-\frac{e^2\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))}{2d^2}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{2x^2}-bn\left(-\frac{e^2\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2}{4d^2}-\frac{e^2\text{arctan}}{}\right.\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(Sqrt[1 - (e^2*x^2)/d^2]*(-1/2*(Sqrt[1 - (e^2*x^2)/d^2]*(a + b*Log[c*x^n])
)/x^2 - (e^2*ArcTanh[Sqrt[1 - (e^2*x^2)/d^2]]*(a + b*Log[c*x^n]))/(2*d^2)
- b*n*(Sqrt[1 - (e^2*x^2)/d^2]/(4*x^2) - (e^2*ArcTanh[Sqrt[1 - (e^2*x^2)/d
^2]])/(4*d^2) - (e^2*ArcTanh[Sqrt[1 - (e^2*x^2)/d^2]]^2)/(4*d^2) + (e^2*Ar
cTanh[Sqrt[1 - (e^2*x^2)/d^2]]*Log[2/(1 - Sqrt[1 - (e^2*x^2)/d^2])])/(2*d^
2) + (e^2*PolyLog[2, -((1 + Sqrt[1 - (e^2*x^2)/d^2])/(1 - Sqrt[1 - (e^2*x^
2)/d^2]))])/(4*d^2))))/(Sqrt[d - e*x]*Sqrt[d + e*x])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2787
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Simp[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q)   Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a
+ b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2
*e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{3}\sqrt{-ex+d}\,\sqrt{ex+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex+d}\sqrt{-ex+d}x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
fricas")
```

output
```
integral(-(sqrt(e*x + d)*sqrt(-e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*sqrt(
-e*x + d)*a)/(e^2*x^5 - d^2*x^3), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

output
```
Timed out
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex+d}\sqrt{-ex+d}x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
maxima")
```

output
```
-1/2*a*(e^2*log(2*d^2/abs(x) + 2*sqrt(-e^2*x^2 + d^2)*d/abs(x))/d^3 + sqrt
(-e^2*x^2 + d^2)/(d^2*x^2)) + b*integrate((log(c) + log(x^n))/(sqrt(e*x +
d)*sqrt(-e*x + d)*x^3), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex+d}\sqrt{-ex+d}x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x + d)*sqrt(-e*x + d)*x^3), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{a+b\ln(c\,x^n)}{x^3\sqrt{d+e\,x}\sqrt{d-e\,x}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx$$
$$= \frac{-\sqrt{ex+d}\sqrt{-ex+d}\,ad+2\left(\int \frac{\log(x^n c)}{\sqrt{ex+d}\sqrt{-ex+d}\,x^3}dx\right)b\,d^3x^2-\log\left(-\sqrt{2}+\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\sqrt{2}}\right)}{2}\right)-1\right)a\,e^2x^2 \cdots}{\cdots}$$

input
```
int((a+b*log(c*x^n))/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output

```
( - sqrt(d + e*x)*sqrt(d - e*x)*a*d + 2*int(log(x**n*c)/(sqrt(d + e*x)*sqr
t(d - e*x)*x**3),x)*b*d**3*x**2 - log( - sqrt(2) + tan(asin(sqrt(d - e*x)/
(sqrt(d)*sqrt(2)))/2) - 1)*a*e**2*x**2 + log( - sqrt(2) + tan(asin(sqrt(d
- e*x)/(sqrt(d)*sqrt(2)))/2) + 1)*a*e**2*x**2 - log(sqrt(2) + tan(asin(sqr
t(d - e*x)/(sqrt(d)*sqrt(2)))/2) - 1)*a*e**2*x**2 + log(sqrt(2) + tan(asin
(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2) + 1)*a*e**2*x**2)/(2*d**3*x**2)
```

3.313 $\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$

Optimal result 2372
Mathematica [A] (verified) 2373
Rubi [A] (verified) 2374
Maple [F] 2376
Fricas [F] 2376
Sympy [F(-1)] 2377
Maxima [F] 2377
Giac [F] 2377
Mupad [F(-1)] 2378
Reduce [F] 2378

Optimal result

Integrand size = 33, antiderivative size = 406

$$\begin{aligned}\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx &= \frac{bnx(d^2-e^2x^2)}{4e^2\sqrt{d-ex}\sqrt{d+ex}}+\frac{bd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)}{4e^3\sqrt{d-ex}\sqrt{d+ex}}\\
&+\frac{ibd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)^2}{4e^3\sqrt{d-ex}\sqrt{d+ex}}\\
&-\frac{bd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)\log\left(1-e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)}{2e^3\sqrt{d-ex}\sqrt{d+ex}}\\
&-\frac{x(d^2-e^2x^2)(a+b\log(cx^n))}{2e^2\sqrt{d-ex}\sqrt{d+ex}}\\
&+\frac{d^3\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{2e^3\sqrt{d-ex}\sqrt{d+ex}}\\
&+\frac{ibd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{PolyLog}\left(2,e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)}{4e^3\sqrt{d-ex}\sqrt{d+ex}}\end{aligned}$$

output
```
1/4*b*n*x*(-e^2*x^2+d^2)/e^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/4*b*d^3*n*(1-e
^2*x^2/d^2)^(1/2)*arcsin(e*x/d)/e^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/4*I*b*d
^3*n*(1-e^2*x^2/d^2)^(1/2)*arcsin(e*x/d)^2/e^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2
)-1/2*b*d^3*n*(1-e^2*x^2/d^2)^(1/2)*arcsin(e*x/d)*ln(1-(I*e*x/d+(1-e^2*x^2
/d^2)^(1/2))^2)/e^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/2*x*(-e^2*x^2+d^2)*(a+b
*ln(c*x^n))/e^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/2*d^3*(1-e^2*x^2/d^2)^(1/2)
*arcsin(e*x/d)*(a+b*ln(c*x^n))/e^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/4*I*b*d^
3*n*(1-e^2*x^2/d^2)^(1/2)*polylog(2,(I*e*x/d+(1-e^2*x^2/d^2)^(1/2))^2)/e^3
/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

Mathematica [A] (verified)

Time = 3.75 (sec) , antiderivative size = 316, normalized size of antiderivative = 0.78

$$\int \frac{x^2(a + b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

$$= \frac{-2ex\sqrt{d-ex}\sqrt{d+ex}(a - bn\log(x) + b\log(cx^n)) + 2d^2\arctan\left(\frac{ex}{\sqrt{d-ex}\sqrt{d+ex}}\right)(a - bn\log(x) + b\log(cx}{}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(-2*e*x*Sqrt[d - e*x]*Sqrt[d + e*x]*(a - b*n*Log[x] + b*Log[c*x^n]) + 2*d^
2*ArcTan[(e*x)/(Sqrt[d - e*x]*Sqrt[d + e*x])]*(a - b*n*Log[x] + b*Log[c*x^
n]) + (b*n*(d^3*Sqrt[1 - (e^2*x^2)/d^2]*ArcSin[(e*x)/d] + e*x*(-d^2 + e^2*
x^2)*(-1 + 2*Log[x]) + (e^3*Sqrt[1 - (e^2*x^2)/d^2]*(ArcSinh[Sqrt[-(e^2/d^
2)]*x]^2 + 2*ArcSinh[Sqrt[-(e^2/d^2)]*x]*Log[1 - E^(-2*ArcSinh[Sqrt[-(e^2/
d^2)]*x])] - 2*Log[x]*Log[Sqrt[-(e^2/d^2)]*x + Sqrt[1 - (e^2*x^2)/d^2]] -
PolyLog[2, E^(-2*ArcSinh[Sqrt[-(e^2/d^2)]*x])]))/(-(e^2/d^2))^(3/2)))/(Sqr
t[d - e*x]*Sqrt[d + e*x]))/(4*e^3)
```

Rubi [A] (verified)

Time = 0.91 (sec) , antiderivative size = 217, normalized size of antiderivative = 0.53, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.152, Rules used = {2787, 2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{2787}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{x^2(a+b\log(cx^n))}{\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{2792}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(-bn\int -\frac{d^2\left(ex\sqrt{\frac{d^2-e^2x^2}{d^2}}-d\arcsin\left(\frac{ex}{d}\right)\right)}{2e^3x}dx+\frac{d^3\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{2e^3}-\frac{d^2x\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{2e^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{27}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\int \frac{ex\sqrt{\frac{d^2-e^2x^2}{d^2}}-d\arcsin\left(\frac{ex}{d}\right)}{x}dx}{2e^3}+\frac{d^3\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{2e^3}-\frac{d^2x\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{2e^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{2010}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\int \left(e\sqrt{1-\frac{e^2x^2}{d^2}}-\frac{d\arcsin\left(\frac{ex}{d}\right)}{x}\right)dx}{2e^3}+\frac{d^3\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{2e^3}-\frac{d^2x\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{2e^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{2009}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d^3\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{2e^3}-\frac{d^2x\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{2e^2}+\frac{bd^2n\left(\frac{1}{2}id\operatorname{PolyLog}\left(2,e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)+\frac{1}{2}id\arcsin\left(\frac{ex}{d}\right)^2+\frac{1}{2}d\right.}{}\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(Sqrt[1 - (e^2*x^2)/d^2]*(-1/2*(d^2*x*Sqrt[1 - (e^2*x^2)/d^2]*(a + b*Log[c
*x^n]))/e^2 + (d^3*ArcSin[(e*x)/d]*(a + b*Log[c*x^n]))/(2*e^3) + (b*d^2*n*
((e*x*Sqrt[1 - (e^2*x^2)/d^2])/2 + (d*ArcSin[(e*x)/d])/2 + (I/2)*d*ArcSin[
(e*x)/d]^2 - d*ArcSin[(e*x)/d]*Log[1 - E^((2*I)*ArcSin[(e*x)/d])] + (I/2)*
d*PolyLog[2, E^((2*I)*ArcSin[(e*x)/d])]))/(2*e^3)))/(Sqrt[d - e*x]*Sqrt[d
+ e*x])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2787
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Simp[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q)   Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a
+ b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2
*e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{x^2 (a+b\ln(c\,x^n))}{\sqrt{-ex+d}\,\sqrt{ex+d}}dx$$

input
```
int(x^2*(a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
int(x^2*(a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{\sqrt{ex+d}\sqrt{-ex+d}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
fricas")
```

output
```
integral(-(sqrt(e*x + d)*sqrt(-e*x + d)*b*x^2*log(c*x^n) + sqrt(e*x + d)*s
qrt(-e*x + d)*a*x^2)/(e^2*x^2 - d^2), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \text{Timed out}$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

output
```
Timed out
```

Maxima [F]

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{\sqrt{ex+d}\sqrt{-ex+d}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
maxima")
```

output
```
1/2*a*(d^2*arcsin(e^2*x/(d*sqrt(e^2)))/(sqrt(e^2)*e^2) - sqrt(-e^2*x^2 + d
^2)*x/e^2) + b*integrate((x^2*log(c) + x^2*log(x^n))/(sqrt(e*x + d)*sqrt(-
e*x + d)), x)
```

Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{\sqrt{ex+d}\sqrt{-ex+d}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(sqrt(e*x + d)*sqrt(-e*x + d)), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{x^2\,(a+b\,\ln(c\,x^n))}{\sqrt{d+e\,x}\,\sqrt{d-e\,x}}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/((d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/((d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

Reduce [F]

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{-2asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\,\sqrt{2}}\right)a\,d^2-\sqrt{ex+d}\,\sqrt{-ex+d}\,aex+2\left(\int \frac{\log(x^n c)x^2}{\sqrt{ex+d}\,\sqrt{-ex+d}}dx\right)b\,e^3}{2e^3}$$

input
```
int(x^2*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
( - 2*asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))*a*d**2 - sqrt(d + e*x)*sqrt(d
- e*x)*a*e*x + 2*int((log(x**n*c)*x**2)/(sqrt(d + e*x)*sqrt(d - e*x)),x)*b
*e**3)/(2*e**3)
```

3.314 $\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$

Optimal result 2379
Mathematica [A] (verified) 2380
Rubi [A] (verified) 2380
Maple [F] 2383
Fricas [F] 2384
Sympy [F] 2384
Maxima [F] 2384
Giac [F] 2385
Mupad [F(-1)] 2385
Reduce [F] 2385

Optimal result

Integrand size = 30, antiderivative size = 248

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = & \frac{ibdn\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)^2}{2e\sqrt{d-ex}\sqrt{d+ex}} \\ & -\frac{bdn\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)\log\left(1-e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)}{e\sqrt{d-ex}\sqrt{d+ex}} \\ & +\frac{d\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e\sqrt{d-ex}\sqrt{d+ex}} \\ & +\frac{ibdn\sqrt{1-\frac{e^2x^2}{d^2}}\,\text{PolyLog}\left(2,e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)}{2e\sqrt{d-ex}\sqrt{d+ex}}\end{aligned}$$

output
```
1/2*I*b*d*n*(1-e^2*x^2/d^2)^(1/2)*arcsin(e*x/d)^2/e/(-e*x+d)^(1/2)/(e*x+d)
^(1/2)-b*d*n*(1-e^2*x^2/d^2)^(1/2)*arcsin(e*x/d)*ln(1-(I*e*x/d+(1-e^2*x^2/
d^2)^(1/2))^2)/e/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+d*(1-e^2*x^2/d^2)^(1/2)*arcs
in(e*x/d)*(a+b*ln(c*x^n))/e/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/2*I*b*d*n*(1-e^
2*x^2/d^2)^(1/2)*polylog(2,(I*e*x/d+(1-e^2*x^2/d^2)^(1/2))^2)/e/(-e*x+d)^(
1/2)/(e*x+d)^(1/2)
```

Mathematica [A] (verified)

Time = 0.69 (sec) , antiderivative size = 217, normalized size of antiderivative = 0.88

$$\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{\arctan\left(\frac{ex}{\sqrt{d-ex}\sqrt{d+ex}}\right)(a-bn\log(x)+b\log(cx^n))}{e} - \frac{bn\sqrt{1-\frac{e^2x^2}{d^2}}\left(\operatorname{arcsinh}\left(\sqrt{-\frac{e^2}{d^2}}x\right)^2+2\operatorname{arcsinh}\left(\sqrt{-\frac{e^2}{d^2}}x\right)\log\left(1-e^{-2\operatorname{arcsinh}\left(\sqrt{-\frac{e^2}{d^2}}x\right)}\right)-2\log(x)\log}{2\sqrt{-\frac{e^2}{d^2}}\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(ArcTan[(e*x)/(Sqrt[d - e*x]*Sqrt[d + e*x])]*(a - b*n*Log[x] + b*Log[c*x^n
]))/e - (b*n*Sqrt[1 - (e^2*x^2)/d^2]*(ArcSinh[Sqrt[-(e^2/d^2)]*x]^2 + 2*Ar
cSinh[Sqrt[-(e^2/d^2)]*x]*Log[1 - E^(-2*ArcSinh[Sqrt[-(e^2/d^2)]*x])] - 2*
Log[x]*Log[Sqrt[-(e^2/d^2)]*x + Sqrt[1 - (e^2*x^2)/d^2]] - PolyLog[2, E^(-
2*ArcSinh[Sqrt[-(e^2/d^2)]*x])]))/(2*Sqrt[-(e^2/d^2)]*Sqrt[d - e*x]*Sqrt[d
 + e*x])
```

Rubi [A] (verified)

Time = 0.70 (sec) , antiderivative size = 139, normalized size of antiderivative = 0.56, number of steps used = 11, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {2765, 2763, 5136, 3042, 25, 4200, 25, 2620, 2715, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

$$\Big\downarrow \text{2765}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{a+b\log(cx^n)}{\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 2763$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e}-\frac{bdn\int\frac{\arcsin\left(\frac{ex}{d}\right)}{x}dx}{e}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 5136$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e}-\frac{bdn\int\frac{d\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)}{ex}d\arcsin\left(\frac{ex}{d}\right)}{e}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 3042$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e}-\frac{bdn\int-\arcsin\left(\frac{ex}{d}\right)\tan\left(\arcsin\left(\frac{ex}{d}\right)+\frac{\pi}{2}\right)d\arcsin\left(\frac{ex}{d}\right)}{e}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 25$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bdn\int\arcsin\left(\frac{ex}{d}\right)\tan\left(\arcsin\left(\frac{ex}{d}\right)+\frac{\pi}{2}\right)d\arcsin\left(\frac{ex}{d}\right)}{e}+\frac{d\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 4200$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e}-\frac{bdn\left(2i\int-\frac{e^{2i\arcsin\left(\frac{ex}{d}\right)}\arcsin\left(\frac{ex}{d}\right)}{1-e^{2i\arcsin\left(\frac{ex}{d}\right)}}d\arcsin\left(\frac{ex}{d}\right)-\frac{1}{2}i\arcsin\left(\frac{ex}{d}\right)^2\right)}{e}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 25$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e}-\frac{bdn\left(-2i\int\frac{e^{2i\arcsin\left(\frac{ex}{d}\right)}\arcsin\left(\frac{ex}{d}\right)}{1-e^{2i\arcsin\left(\frac{ex}{d}\right)}}d\arcsin\left(\frac{ex}{d}\right)-\frac{1}{2}i\arcsin\left(\frac{ex}{d}\right)^2\right)}{e}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 2620$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e}-\frac{bdn\left(-2i\left(\frac{1}{2}i\arcsin\left(\frac{ex}{d}\right)\log\left(1-e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)-\frac{1}{2}i\int\log\left(1-e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)d\arcsin\left(\frac{ex}{d}\right)\right)-\frac{1}{2}\cdots\right.}{e}\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{2715}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e}-\frac{bdn\left(-2i\left(\frac{1}{2}i\arcsin\left(\frac{ex}{d}\right)\log\left(1-e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)-\frac{1}{4}\int e^{-2i\arcsin\left(\frac{ex}{d}\right)}\log\left(1-e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)de\right)\right)}{e}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e}-\frac{bdn\left(-2i\left(\frac{1}{4}\text{PolyLog}\left(2,e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)+\frac{1}{2}i\arcsin\left(\frac{ex}{d}\right)\log\left(1-e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)\right)-\frac{1}{2}i\arcsin\left(\frac{ex}{d}\right)\right)}{e}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Int[(a + b*Log[c*x^n])/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(Sqrt[1 - (e^2*x^2)/d^2]*((d*ArcSin[(e*x)/d]*(a + b*Log[c*x^n]))/e - (b*d*
n*((-1/2*I)*ArcSin[(e*x)/d]^2 - (2*I)*((I/2)*ArcSin[(e*x)/d]*Log[1 - E^((2
*I)*ArcSin[(e*x)/d])] + PolyLog[2, E^((2*I)*ArcSin[(e*x)/d])]/4)))/e))/(Sq
rt[d - e*x]*Sqrt[d + e*x])
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2620
```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Si
mp[d*(m/(b*f*g*n*Log[F]))   Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x
)))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

rule 2715
```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Simp[1/(d*e*n*Log[F])   Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x)
))^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

rule 2763
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Simp[ArcSin[Rt[-e, 2]*(x/Sqrt[d])]*((a + b*Log[c*x^n])/Rt[-e, 2]), x
] - Simp[b*(n/Rt[-e, 2])   Int[ArcSin[Rt[-e, 2]*(x/Sqrt[d])]/x, x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && GtQ[d, 0] && NegQ[e]
```

rule 2765
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(Sqrt[(d1_) + (e1_.)*(x_)]*Sqrt[(
d2_) + (e2_.)*(x_)]), x_Symbol] :> Simp[Sqrt[1 + e1*(e2/(d1*d2))*x^2]/(Sqrt
[d1 + e1*x]*Sqrt[d2 + e2*x])   Int[(a + b*Log[c*x^n])/Sqrt[1 + e1*(e2/(d1*d
2))*x^2], x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2*e1 + d
1*e2, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4200
```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (f_.)*(x_)], x_Symbol
] :> Simp[I*((c + d*x)^(m + 1)/(d*(m + 1))), x] - Simp[2*I   Int[(c + d*x)^
m*E^(2*I*k*Pi)*(E^(2*I*(e + f*x))/(1 + E^(2*I*k*Pi)*E^(2*I*(e + f*x)))), x]
, x] /; FreeQ[{c, d, e, f}, x] && IntegerQ[4*k] && IGtQ[m, 0]
```

rule 5136
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Subst[Int[(
a + b*x)^n*Cot[x], x], x, ArcSin[c*x]] /; FreeQ[{a, b, c}, x] && IGtQ[n, 0]
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{\sqrt{-ex+d}\,\sqrt{ex+d}}dx$$

input
```
int((a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{b\log(cx^n)+a}{\sqrt{ex+d}\sqrt{-ex+d}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="fric
as")
```

output
```
integral(-(sqrt(e*x + d)*sqrt(-e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*sqrt(
-e*x + d)*a)/(e^2*x^2 - d^2), x)
```

Sympy [F]

$$\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(sqrt(d - e*x)*sqrt(d + e*x)), x)
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{b\log(cx^n)+a}{\sqrt{ex+d}\sqrt{-ex+d}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="maxi
ma")
```

output
```
b*integrate((log(c) + log(x^n))/(sqrt(e*x + d)*sqrt(-e*x + d)), x) + a*arc
sin(e^2*x/(d*sqrt(e^2)))/sqrt(e^2)
```

Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\sqrt{ex+d}\sqrt{-ex+d}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="giac
")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x + d)*sqrt(-e*x + d)), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{\sqrt{d+e\,x}\,\sqrt{d-e\,x}}\,dx$$

input
```
int((a + b*log(c*x^n))/((d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/((d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

Reduce [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx=\frac{-2asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\,\sqrt{2}}\right)a+\left(\int \frac{\log\left(x^n c\right)}{\sqrt{ex+d}\,\sqrt{-ex+d}}dx\right)be}{e}$$

input
```
int((a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
( - 2*asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))*a + int(log(x**n*c)/(sqrt(d +
e*x)*sqrt(d - e*x)),x)*b*e)/e
```

3.315 $\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx$

Optimal result 2387
Mathematica [A] (verified) 2387
Rubi [A] (verified) 2388
Maple [F] 2390
Fricas [A] (verification not implemented) 2390
Sympy [F] 2390
Maxima [A] (verification not implemented) 2391
Giac [F] 2391
Mupad [F(-1)] 2392
Reduce [B] (verification not implemented) 2392

Optimal result

Integrand size = 33, antiderivative size = 142

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx = -\frac{bn(d^2-e^2x^2)}{d^2x\sqrt{d-ex}\sqrt{d+ex}} - \frac{ben\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)}{d\sqrt{d-ex}\sqrt{d+ex}} - \frac{(d^2-e^2x^2)\left(a+b\log(cx^n)\right)}{d^2x\sqrt{d-ex}\sqrt{d+ex}}$$

output
```
-b*n*(-e^2*x^2+d^2)/d^2/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-b*e*n*(1-e^2*x^2/d^
2)^(1/2)*arcsin(e*x/d)/d/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-(-e^2*x^2+d^2)*(a+b*
ln(c*x^n))/d^2/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 70, normalized size of antiderivative = 0.49

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx = -\frac{benx\arctan\left(\frac{ex}{\sqrt{d-ex}\sqrt{d+ex}}\right)+\sqrt{d-ex}\sqrt{d+ex}(a+bn+b\log(cx^n))}{d^2x}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
-((b*e*n*x*ArcTan[(e*x)/(Sqrt[d - e*x]*Sqrt[d + e*x])] + Sqrt[d - e*x]*Sqr
t[d + e*x]*(a + b*n + b*Log[c*x^n]))/(d^2*x))
```

Rubi [A] (verified)

Time = 0.62 (sec) , antiderivative size = 109, normalized size of antiderivative = 0.77, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.121$, Rules used = {2787, 2773, 247, 223}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{ 2787}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{a+b\log(cx^n)}{x^2\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 2773}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(bn\int \frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x^2}dx-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{x}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 247}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(bn\left(-\frac{e^2\int \frac{1}{\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{d^2}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x}\right)-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{x}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 223}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(bn\left(-\frac{e\arcsin\left(\frac{ex}{d}\right)}{d}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x}\right)-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{x}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(Sqrt[1 - (e^2*x^2)/d^2]*(b*n*(-(Sqrt[1 - (e^2*x^2)/d^2]/x) - (e*ArcSin[(e
*x)/d])/d) - (Sqrt[1 - (e^2*x^2)/d^2]*(a + b*Log[c*x^n]))/x))/(Sqrt[d - e*
x]*Sqrt[d + e*x])
```

Defintions of rubi rules used

rule 223
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSin[Rt[-b, 2]*(x/Sqrt
[a])]/Rt[-b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && NegQ[b]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

rule 2787
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Simp[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q)   Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a
+ b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2
*e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

Maple [F]

$$\int \frac{a+b\ln(c\,x^n)}{x^2\sqrt{-ex+d}\,\sqrt{ex+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 73, normalized size of antiderivative = 0.51

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{2\,benx\arctan\left(\frac{\sqrt{ex+d}\sqrt{-ex+d}-d}{ex}\right)-(bn\log(x)+bn+b\log(c)+a)\sqrt{ex+d}\sqrt{-ex+d}}{d^2x}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
fricas")
```

output
```
(2*b*e*n*x*arctan((sqrt(e*x + d)*sqrt(-e*x + d) - d)/(e*x)) - (b*n*log(x)
+ b*n + b*log(c) + a)*sqrt(e*x + d)*sqrt(-e*x + d))/(d^2*x)
```

Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*sqrt(d - e*x)*sqrt(d + e*x)), x)
```

Maxima [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 102, normalized size of antiderivative = 0.72

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx = -\frac{\left(\frac{e^2\arcsin\left(\frac{e^2x}{d\sqrt{e^2}}\right)}{\sqrt{e^2}}+\frac{\sqrt{-e^2x^2+d^2}}{x}\right)bn}{d^2} - \frac{\sqrt{-e^2x^2+d^2}b\log(cx^n)}{d^2x} - \frac{\sqrt{-e^2x^2+d^2}a}{d^2x}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
maxima")
```

output
```
-(e^2*arcsin(e^2*x/(d*sqrt(e^2)))/sqrt(e^2) + sqrt(-e^2*x^2 + d^2)/x)*b*n/
d^2 - sqrt(-e^2*x^2 + d^2)*b*log(c*x^n)/(d^2*x) - sqrt(-e^2*x^2 + d^2)*a/(
d^2*x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex+d}\sqrt{-ex+d}x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x + d)*sqrt(-e*x + d)*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{x^2\,\sqrt{d+e\,x}\,\sqrt{d-e\,x}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

Reduce [B] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 193, normalized size of antiderivative = 1.36

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx$$
$$=\frac{2asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\sqrt{2}}\right)benx-\sqrt{ex+d}\sqrt{-ex+d}\log\left(\frac{\left(\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\sqrt{2}}\right)}{2}\right)^4d-6\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\sqrt{2}}\right)}{2}\right)^2d+d\right)^nc}{e^n\left(\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\sqrt{2}}\right)}{2}\right)^4+2\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\sqrt{2}}\right)}{2}\right)^2+1\right)^n}\right)b-\sqrt{}}{d^2x}$$

input
```
int((a+b*log(c*x^n))/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
(2*asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))*b*e*n*x - sqrt(d + e*x)*sqrt(d -
e*x)*log(((tan(asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2)**4*d - 6*tan(asin(
sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2)**2*d + d)**n*c)/(e**n*(tan(asin(sqrt(d
 - e*x)/(sqrt(d)*sqrt(2)))/2)**4 + 2*tan(asin(sqrt(d - e*x)/(sqrt(d)*sqrt(
2)))/2)**2 + 1)**n))*b - sqrt(d + e*x)*sqrt(d - e*x)*a - sqrt(d + e*x)*sqr
t(d - e*x)*b*n)/(d**2*x)
```

3.316 $\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx$

Optimal result 2393
Mathematica [A] (verified) 2394
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Maple [F] 2397
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Mupad [F(-1)] 2398
Reduce [B] (verification not implemented) 2399

Optimal result

Integrand size = 33, antiderivative size = 252

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx = -\frac{2be^2n(d^2-e^2x^2)}{3d^4x\sqrt{d-ex}\sqrt{d+ex}} - \frac{bn(d^2-e^2x^2)^2}{9d^4x^3\sqrt{d-ex}\sqrt{d+ex}} - \frac{2be^3n\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)}{3d^3\sqrt{d-ex}\sqrt{d+ex}} - \frac{\left(d^2-e^2x^2\right)\left(a+b\log\left(cx^n\right)\right)}{3d^2x^3\sqrt{d-ex}\sqrt{d+ex}} - \frac{2e^2\left(d^2-e^2x^2\right)\left(a+b\log\left(cx^n\right)\right)}{3d^4x\sqrt{d-ex}\sqrt{d+ex}}$$

output
```
-2/3*b*e^2*n*(-e^2*x^2+d^2)/d^4/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/9*b*n*(-e
^2*x^2+d^2)^2/d^4/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-2/3*b*e^3*n*(1-e^2*x^2/
d^2)^(1/2)*arcsin(e*x/d)/d^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/3*(-e^2*x^2+d^
2)*(a+b*ln(c*x^n))/d^2/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-2/3*e^2*(-e^2*x^2+
d^2)*(a+b*ln(c*x^n))/d^4/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 116, normalized size of antiderivative = 0.46

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx = -\frac{6be^3nx^3\arctan\left(\frac{ex}{\sqrt{d-ex}\sqrt{d+ex}}\right)+\sqrt{d-ex}\sqrt{d+ex}(3a(d^2+2e^2x^2)+bn(d^2+5e^2x^2)+3b(d^2+2e^2x^2)}{9d^4x^3}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^4*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
-1/9*(6*b*e^3*n*x^3*ArcTan[(e*x)/(Sqrt[d - e*x]*Sqrt[d + e*x])] + Sqrt[d -
 e*x]*Sqrt[d + e*x]*(3*a*(d^2 + 2*e^2*x^2) + b*n*(d^2 + 5*e^2*x^2) + 3*b*(
d^2 + 2*e^2*x^2)*Log[c*x^n]))/(d^4*x^3)
```

Rubi [A] (verified)

Time = 0.73 (sec) , antiderivative size = 190, normalized size of antiderivative = 0.75, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182, Rules used = {2787, 2792, 27, 358, 247, 223}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{ 2787}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{a+b\log(cx^n)}{x^4\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 2792}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(-bn\int -\frac{(d^2+2e^2x^2)\sqrt{1-\frac{e^2x^2}{d^2}}}{3d^2x^4}dx-\frac{2e^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3x^3}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bn\int\frac{\left(d^2+2e^2x^2\right)\sqrt{1-\frac{e^2x^2}{d^2}}}{x^4}dx}{3d^2}-\frac{2e^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3x^3}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{358}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bn\left(2e^2\int\frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x^2}dx-\frac{d^2\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}}{3x^3}\right)}{3d^2}-\frac{2e^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3x^3}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{247}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bn\left(2e^2\left(-\frac{e^2\int\frac{1}{\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{d^2}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x}\right)-\frac{d^2\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}}{3x^3}\right)}{3d^2}-\frac{2e^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3x^3}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{223}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(-\frac{2e^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3x^3}+\frac{bn\left(2e^2\left(-\frac{e\arcsin\left(\frac{ex}{d}\right)}{d}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x}\right)-\frac{d^2\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}}{3x^3}\right)}{3d^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Int[(a + b*Log[c*x^n])/(x^4*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(Sqrt[1 - (e^2*x^2)/d^2]*((b*n*(-1/3*(d^2*(1 - (e^2*x^2)/d^2)^(3/2))/x^3 +
 2*e^2*(-(Sqrt[1 - (e^2*x^2)/d^2]/x) - (e*ArcSin[(e*x)/d])/d)))/(3*d^2) -
(Sqrt[1 - (e^2*x^2)/d^2]*(a + b*Log[c*x^n]))/(3*x^3) - (2*e^2*Sqrt[1 - (e^
2*x^2)/d^2]*(a + b*Log[c*x^n]))/(3*d^2*x)))/(Sqrt[d - e*x]*Sqrt[d + e*x])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 223
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSin[Rt[-b, 2]*(x/Sqrt
[a])]/Rt[-b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && NegQ[b]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 2787
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Simp[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q)   Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a
+ b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2
*e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [F]

$$\int \frac{a+b\ln(c\,x^n)}{x^4\sqrt{-ex+d}\,\sqrt{ex+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 135, normalized size of antiderivative = 0.54

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{12\,be^3nx^3\arctan\left(\frac{\sqrt{ex+d}\sqrt{-ex+d}-d}{ex}\right) - (bd^2n+3\,ad^2+(5\,be^2n+6\,ae^2)x^2+3\,(2\,be^2x^2+bd^2)\log(c)+3\,(}{9\,d^4x^3}$$

input
```
integrate((a+b*log(c*x^n))/x^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
fricas")
```

output
```
1/9*(12*b*e^3*n*x^3*arctan((sqrt(e*x + d)*sqrt(-e*x + d) - d)/(e*x)) - (b*
d^2*n + 3*a*d^2 + (5*b*e^2*n + 6*a*e^2)*x^2 + 3*(2*b*e^2*x^2 + b*d^2)*log(
c) + 3*(2*b*e^2*n*x^2 + b*d^2*n)*log(x))*sqrt(e*x + d)*sqrt(-e*x + d))/(d^
4*x^3)
```

Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**4/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**4*sqrt(d - e*x)*sqrt(d + e*x)), x)
```

Maxima [F]

$$\int \frac{a+b\log{(cx^n)}}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{b\log{(cx^n)}+a}{\sqrt{ex+d}\sqrt{-ex+d}x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
maxima")
```

output
```
-1/3*a*(2*sqrt(-e^2*x^2 + d^2)*e^2/(d^4*x) + sqrt(-e^2*x^2 + d^2)/(d^2*x^3
)) + b*integrate((log(c) + log(x^n))/(sqrt(e*x + d)*sqrt(-e*x + d)*x^4), x
)
```

Giac [F]

$$\int \frac{a+b\log{(cx^n)}}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{b\log{(cx^n)}+a}{\sqrt{ex+d}\sqrt{-ex+d}x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x + d)*sqrt(-e*x + d)*x^4), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log{(cx^n)}}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{a+b\,\ln{(c\,x^n)}}{x^4\,\sqrt{d+e\,x}\,\sqrt{d-e\,x}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^4*(d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^4*(d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

Reduce [B] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 387, normalized size of antiderivative = 1.54

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

$$= \frac{12asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\,\sqrt{2}}\right)b\,e^3n\,x^3 - 3\sqrt{ex+d}\,\sqrt{-ex+d}\log\left(\frac{\left(\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\,\sqrt{2}}\right)}{2}\right)^4 d-6\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\,\sqrt{2}}\right)}{2}\right)^2 d+d\right)^n c}{e^n\left(\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\,\sqrt{2}}\right)}{2}\right)^4+2\tan\left(\frac{asin\left(\frac{\sqrt{-ex+d}}{\sqrt{d}\,\sqrt{2}}\right)}{2}\right)^2+1\right)^n}\right)}{}$$

input
```
int((a+b*log(c*x^n))/x^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
(12*asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))*b*e**3*n*x**3 - 3*sqrt(d + e*x)*
sqrt(d - e*x)*log(((tan(asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2)**4*d - 6*
tan(asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2)**2*d + d)**n*c)/(e**n*(tan(as
in(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2)**4 + 2*tan(asin(sqrt(d - e*x)/(sqrt
(d)*sqrt(2)))/2)**2 + 1)**n))*b*d**2 - 6*sqrt(d + e*x)*sqrt(d - e*x)*log((
(tan(asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2)**4*d - 6*tan(asin(sqrt(d - e
*x)/(sqrt(d)*sqrt(2)))/2)**2*d + d)**n*c)/(e**n*(tan(asin(sqrt(d - e*x)/(s
qrt(d)*sqrt(2)))/2)**4 + 2*tan(asin(sqrt(d - e*x)/(sqrt(d)*sqrt(2)))/2)**2
 + 1)**n))*b*e**2*x**2 - 3*sqrt(d + e*x)*sqrt(d - e*x)*a*d**2 - 6*sqrt(d +
 e*x)*sqrt(d - e*x)*a*e**2*x**2 - sqrt(d + e*x)*sqrt(d - e*x)*b*d**2*n - 5
*sqrt(d + e*x)*sqrt(d - e*x)*b*e**2*n*x**2)/(9*d**4*x**3)
```

3.317 $\int \frac{x \log(x)}{\sqrt{-1+x^2}} \, dx$

Optimal result 2400
Mathematica [A] (verified) 2400
Rubi [A] (verified) 2401
Maple [C] (warning: unable to verify) 2403
Fricas [A] (verification not implemented) 2403
Sympy [A] (verification not implemented) 2404
Maxima [A] (verification not implemented) 2404
Giac [A] (verification not implemented) 2404
Mupad [F(-1)] 2405
Reduce [B] (verification not implemented) 2405

Optimal result

Integrand size = 13, antiderivative size = 34

$$\int \frac{x \log(x)}{\sqrt{-1+x^2}} \, dx = -\sqrt{-1+x^2} + \arctan\left(\sqrt{-1+x^2}\right) + \sqrt{-1+x^2} \log(x)$$

output
```
-(x^2-1)^(1/2)+arctan((x^2-1)^(1/2))+(x^2-1)^(1/2)*ln(x)
```

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.79

$$\int \frac{x \log(x)}{\sqrt{-1+x^2}} \, dx = -\arctan\left(\frac{1}{\sqrt{-1+x^2}}\right) + \sqrt{-1+x^2}(-1+\log(x))$$

input
```
Integrate[(x*Log[x])/Sqrt[-1 + x^2],x]
```

output
```
-ArcTan[1/Sqrt[-1 + x^2]] + Sqrt[-1 + x^2]*(-1 + Log[x])
```

Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.21, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.385, Rules used = {2776, 243, 60, 73, 216}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x\log(x)}{\sqrt{x^2-1}}dx$$

$$\Big\downarrow \text{2776}$$

$$\sqrt{x^2-1}\log(x)-\int \frac{\sqrt{x^2-1}}{x}dx$$

$$\Big\downarrow \text{243}$$

$$\sqrt{x^2-1}\log(x)-\frac{1}{2}\int \frac{\sqrt{x^2-1}}{x^2}dx^2$$

$$\Big\downarrow \text{60}$$

$$\frac{1}{2}\left(\int \frac{1}{x^2\sqrt{x^2-1}}dx^2-2\sqrt{x^2-1}\right)+\sqrt{x^2-1}\log(x)$$

$$\Big\downarrow \text{73}$$

$$\frac{1}{2}\left(2\int \frac{1}{x^4+1}d\sqrt{x^2-1}-2\sqrt{x^2-1}\right)+\sqrt{x^2-1}\log(x)$$

$$\Big\downarrow \text{216}$$

$$\frac{1}{2}\left(2\arctan\left(\sqrt{x^2-1}\right)-2\sqrt{x^2-1}\right)+\sqrt{x^2-1}\log(x)$$

input
```
Int[(x*Log[x])/Sqrt[-1 + x^2],x]
```

output
```
(-2*Sqrt[-1 + x^2] + 2*ArcTan[Sqrt[-1 + x^2]])/2 + Sqrt[-1 + x^2]*Log[x]
```

Defintions of rubi rules used

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 216
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[b, 2]))*A
rcTan[Rt[b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (GtQ[a
, 0] || GtQ[b, 0])
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 3.

Time = 0.33 (sec) , antiderivative size = 119, normalized size of antiderivative = 3.50

method	result
meijerg	$-\frac{\sqrt{-\operatorname{signum}(x^2-1)}\left(2-2\sqrt{-x^2+1}\right)}{4\sqrt{\operatorname{signum}(x^2-1)}}+\frac{\sqrt{-\operatorname{signum}(x^2-1)}\ln(x)\left(2-2\sqrt{-x^2+1}\right)}{2\sqrt{\operatorname{signum}(x^2-1)}}+\frac{\sqrt{-\operatorname{signum}(x^2-1)}\left(-16+16\sqrt{-x^2+1}-\right.}{32\sqrt{\operatorname{signum}(x^2-1)}}$

input
```
int(x*ln(x)/(x^2-1)^(1/2),x,method=_RETURNVERBOSE)
```

output
```
-1/4/signum(x^2-1)^(1/2)*(-signum(x^2-1))^(1/2)*(2-2*(-x^2+1)^(1/2))+1/2/s
ignum(x^2-1)^(1/2)*(-signum(x^2-1))^(1/2)*ln(x)*(2-2*(-x^2+1)^(1/2))+1/32/
signum(x^2-1)^(1/2)*(-signum(x^2-1))^(1/2)*(-16+16*(-x^2+1)^(1/2)-32*ln(1/
2+1/2*(-x^2+1)^(1/2)))
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.79

$$\int \frac{x\log(x)}{\sqrt{-1+x^2}}\,dx=\sqrt{x^2-1}(\log(x)-1)+2\arctan\left(-x+\sqrt{x^2-1}\right)$$

input
```
integrate(x*log(x)/(x^2-1)^(1/2),x, algorithm="fricas")
```

output
```
sqrt(x^2 - 1)*(log(x) - 1) + 2*arctan(-x + sqrt(x^2 - 1))
```

Sympy [A] (verification not implemented)

Time = 1.26 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.85

$$\int \frac{x\log(x)}{\sqrt{-1+x^2}}\,dx = \sqrt{x^2-1}\log(x) - \begin{cases} \sqrt{x^2-1} - \operatorname{acos}\left(\frac{1}{x}\right) & \text{for}\ x > -1 \wedge x < 1 \end{cases}$$

input
```
integrate(x*ln(x)/(x**2-1)**(1/2),x)
```

output
```
sqrt(x**2 - 1)*log(x) - Piecewise((sqrt(x**2 - 1) - acos(1/x), (x > -1) &
(x < 1)))
```

Maxima [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.79

$$\int \frac{x\log(x)}{\sqrt{-1+x^2}}\,dx = \sqrt{x^2-1}\log(x) - \sqrt{x^2-1} - \arcsin\left(\frac{1}{|x|}\right)$$

input
```
integrate(x*log(x)/(x^2-1)^(1/2),x, algorithm="maxima")
```

output
```
sqrt(x^2 - 1)*log(x) - sqrt(x^2 - 1) - arcsin(1/abs(x))
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.82

$$\int \frac{x\log(x)}{\sqrt{-1+x^2}}\,dx = \sqrt{x^2-1}\log(x) - \sqrt{x^2-1} + \arctan\left(\sqrt{x^2-1}\right)$$

input
```
integrate(x*log(x)/(x^2-1)^(1/2),x, algorithm="giac")
```

output
```
sqrt(x^2 - 1)*log(x) - sqrt(x^2 - 1) + arctan(sqrt(x^2 - 1))
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x\log(x)}{\sqrt{-1+x^2}}\,dx = \int \frac{x\,\ln(x)}{\sqrt{x^2-1}}\,dx$$

input
```
int((x*log(x))/(x^2 - 1)^(1/2),x)
```

output
```
int((x*log(x))/(x^2 - 1)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.85

$$\int \frac{x\log(x)}{\sqrt{-1+x^2}}\,dx = 2atan\left(\sqrt{x^2-1}+x\right)+\sqrt{x^2-1}\,\log(x)-\sqrt{x^2-1}$$

input
```
int(x*log(x)/(x^2-1)^(1/2),x)
```

output
```
2*atan(sqrt(x**2 - 1) + x) + sqrt(x**2 - 1)*log(x) - sqrt(x**2 - 1)
```

3.318 $\int (fx)^m \left(d+ex^2\right)^3 (a+b\log(cx^n)) \, dx$

Optimal result . . . 2406
Mathematica [A] (verified) . . . 2407
Rubi [A] (verified) . . . 2407
Maple [B] (verified) . . . 2409
Fricas [B] (verification not implemented) . . . 2410
Sympy [B] (verification not implemented) . . . 2411
Maxima [A] (verification not implemented) . . . 2412
Giac [B] (verification not implemented) . . . 2413
Mupad [F(-1)] . . . 2414
Reduce [B] (verification not implemented) . . . 2414

Optimal result

Integrand size = 25, antiderivative size = 211

$$\begin{aligned}\int (fx)^m \left(d+ex^2\right)^3 (a+b\log(cx^n)) \, dx = &-\frac{bd^3n(fx)^{1+m}}{f(1+m)^2} - \frac{3bd^2en(fx)^{3+m}}{f^3(3+m)^2} \\ &- \frac{3bde^2n(fx)^{5+m}}{f^5(5+m)^2} - \frac{be^3n(fx)^{7+m}}{f^7(7+m)^2} \\ &+ \frac{d^3(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)} \\ &+ \frac{3d^2e(fx)^{3+m}(a+b\log(cx^n))}{f^3(3+m)} \\ &+ \frac{3de^2(fx)^{5+m}(a+b\log(cx^n))}{f^5(5+m)} \\ &+ \frac{e^3(fx)^{7+m}(a+b\log(cx^n))}{f^7(7+m)}\end{aligned}$$

output

```
-b*d^3*n*(f*x)^(1+m)/f/(1+m)^2-3*b*d^2*e*n*(f*x)^(3+m)/f^3/(3+m)^2-3*b*d*e
^2*n*(f*x)^(5+m)/f^5/(5+m)^2-b*e^3*n*(f*x)^(7+m)/f^7/(7+m)^2+d^3*(f*x)^(1+
m)*(a+b*ln(c*x^n))/f/(1+m)+3*d^2*e*(f*x)^(3+m)*(a+b*ln(c*x^n))/f^3/(3+m)+3
*d*e^2*(f*x)^(5+m)*(a+b*ln(c*x^n))/f^5/(5+m)+e^3*(f*x)^(7+m)*(a+b*ln(c*x^n
))/f^7/(7+m)
```

Mathematica [A] (verified)

Time = 0.30 (sec) , antiderivative size = 156, normalized size of antiderivative = 0.74

$$\int (fx)^m \left(d+ex^2\right)^3 (a+b\log (cx^n))\, dx$$
$$= x(fx)^m \left(-\frac{bd^3n}{(1+m)^2}-\frac{3bd^2enx^2}{(3+m)^2}-\frac{3bde^2nx^4}{(5+m)^2}-\frac{be^3nx^6}{(7+m)^2}+\frac{d^3(a+b\log (cx^n))}{1+m}+\frac{3d^2ex^2(a+b\log (cx^n))}{3+m}+\frac{3de^2x^4(a+b\log (cx^n))}{5+m}+\frac{e^3x^6(a+b\log (cx^n))}{7+m}\right)$$

input
```
Integrate[(f*x)^m*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
x*(f*x)^m*(-((b*d^3*n)/(1 + m)^2) - (3*b*d^2*e*n*x^2)/(3 + m)^2 - (3*b*d*e
^2*n*x^4)/(5 + m)^2 - (b*e^3*n*x^6)/(7 + m)^2 + (d^3*(a + b*Log[c*x^n]))/(
1 + m) + (3*d^2*e*x^2*(a + b*Log[c*x^n]))/(3 + m) + (3*d*e^2*x^4*(a + b*Lo
g[c*x^n]))/(5 + m) + (e^3*x^6*(a + b*Log[c*x^n]))/(7 + m))
```

Rubi [A] (verified)

Time = 1.50 (sec) , antiderivative size = 206, normalized size of antiderivative = 0.98, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.120, Rules used = {2792, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d+ex^2\right)^3 (fx)^m (a+b\log (cx^n))\, dx$$

$$\Big\downarrow \text{ 2792}$$

$$-bn\int (fx)^m \left(\frac{e^3x^6}{m+7}+\frac{3de^2x^4}{m+5}+\frac{3d^2ex^2}{m+3}+\frac{d^3}{m+1}\right)dx+\frac{d^3(fx)^{m+1}(a+b\log (cx^n))}{f(m+1)}+\frac{3d^2e(fx)^{m+3}(a+b\log (cx^n))}{f^3(m+3)}+\frac{3de^2(fx)^{m+5}(a+b\log (cx^n))}{f^5(m+5)}+\frac{e^3(fx)^{m+7}(a+b\log (cx^n))}{f^7(m+7)}$$

$$\Big\downarrow \text{ 2010}$$

$$-bn\int\left(\frac{d^3(fx)^m}{m+1}+\frac{3d^2e(fx)^{m+2}}{f^2(m+3)}+\frac{3de^2(fx)^{m+4}}{f^4(m+5)}+\frac{e^3(fx)^{m+6}}{f^6(m+7)}\right)dx+\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2e(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{3de^2(fx)^{m+5}(a+b\log(cx^n))}{f^5(m+5)}+\frac{e^3(fx)^{m+7}(a+b\log(cx^n))}{f^7(m+7)}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2e(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{3de^2(fx)^{m+5}(a+b\log(cx^n))}{f^5(m+5)}+\frac{e^3(fx)^{m+7}(a+b\log(cx^n))}{f^7(m+7)}-bn\left(\frac{d^3(fx)^{m+1}}{f(m+1)^2}+\frac{3d^2e(fx)^{m+3}}{f^3(m+3)^2}+\frac{3de^2(fx)^{m+5}}{f^5(m+5)^2}+\frac{e^3(fx)^{m+7}}{f^7(m+7)^2}\right)$$

input
```
Int[(f*x)^m*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d^3*(f*x)^(1 + m))/(f*(1 + m)^2) + (3*d^2*e*(f*x)^(3 + m))/(f^3*(3
 + m)^2) + (3*d*e^2*(f*x)^(5 + m))/(f^5*(5 + m)^2) + (e^3*(f*x)^(7 + m))/(
f^7*(7 + m)^2))) + (d^3*(f*x)^(1 + m)*(a + b*Log[c*x^n]))/(f*(1 + m)) + (3
*d^2*e*(f*x)^(3 + m)*(a + b*Log[c*x^n]))/(f^3*(3 + m)) + (3*d*e^2*(f*x)^(5
 + m)*(a + b*Log[c*x^n]))/(f^5*(5 + m)) + (e^3*(f*x)^(7 + m)*(a + b*Log[c*
x^n]))/(f^7*(7 + m))
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1765 vs. $2(211) = 422$.

Time = 29.75 (sec) , antiderivative size = 1766, normalized size of antiderivative = 8.37

method	result	size
parallelrisch	Expression too large to display	1766
risch	Expression too large to display	5073

input
```
int((f*x)^m*(e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-11025*x*(f*x)^m*a*d^3-1575*e^3*b*ln(c*x^n)*(f*x)^m*x^7-x^7*(f*x)^m*a*e^
3*m^7-25*x^7*(f*x)^m*a*e^3*m^6-253*x^7*(f*x)^m*a*e^3*m^5-1333*x^7*(f*x)^m*
a*e^3*m^4-3907*x^7*(f*x)^m*a*e^3*m^3-6283*x^7*(f*x)^m*a*e^3*m^2-5055*x^7*(
f*x)^m*a*e^3*m+225*x^7*(f*x)^m*b*e^3*n-6615*x^5*(f*x)^m*a*d*e^2-11025*x^3*
(f*x)^m*a*d^2*e-20853*x^5*(f*x)^m*a*d*e^2*m+1323*x^5*(f*x)^m*b*d*e^2*n-209
85*x^3*(f*x)^m*a*d^2*e*m^3-37941*x^3*(f*x)^m*a*d^2*e*m^2-33285*x^3*(f*x)^m
*a*d^2*e*m+3675*x^3*(f*x)^m*b*d^2*e*n-253*x^7*(f*x)^m*ln(c*x^n)*b*e^3*m^5+
18*x^7*(f*x)^m*b*e^3*m^5*n-1333*x^7*(f*x)^m*ln(c*x^n)*b*e^3*m^4+127*x^7*(f
*x)^m*b*e^3*m^4*n-3*x^5*(f*x)^m*a*d*e^2*m^7-3907*x^7*(f*x)^m*ln(c*x^n)*b*e
^3*m^3+444*x^7*(f*x)^m*b*e^3*m^3*n-81*x^5*(f*x)^m*a*d*e^2*m^6-6283*x^7*(f*
x)^m*ln(c*x^n)*b*e^3*m^2+799*x^7*(f*x)^m*b*e^3*m^2*n-879*x^5*(f*x)^m*a*d*e
^2*m^5-3*x^3*(f*x)^m*a*d^2*e*m^7-5055*x^7*(f*x)^m*ln(c*x^n)*b*e^3*m+690*x^
7*(f*x)^m*b*e^3*m*n-4917*x^5*(f*x)^m*a*d*e^2*m^4-87*x^3*(f*x)^m*a*d^2*e*m^
6-15129*x^5*(f*x)^m*a*d*e^2*m^3-11025*x*(f*x)^m*ln(c*x^n)*b*d^3-23101*x*(f
*x)^m*a*d^3*m^2-25935*x*(f*x)^m*a*d^3*m+11025*x*(f*x)^m*b*d^3*n-x*(f*x)^m*
a*d^3*m^7-31*x*(f*x)^m*a*d^3*m^6-397*x*(f*x)^m*a*d^3*m^5-2707*x*(f*x)^m*a*
d^3*m^4-10531*x*(f*x)^m*a*d^3*m^3-20853*x^5*(f*x)^m*ln(c*x^n)*b*d*e^2*m+39
06*x^5*(f*x)^m*b*d*e^2*m*n-20985*x^3*(f*x)^m*ln(c*x^n)*b*d^2*e*m^3-87*x^3*
(f*x)^m*ln(c*x^n)*b*d^2*e*m^6+3876*x^3*(f*x)^m*b*d^2*e*m^3*n-37941*x^3*(f*
x)^m*ln(c*x^n)*b*d^2*e*m^2+9357*x^3*(f*x)^m*b*d^2*e*m^2*n-33285*x^3*(f*...
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1222 vs. $2(211) = 422$.

Time = 0.10 (sec) , antiderivative size = 1222, normalized size of antiderivative = 5.79

$$\int (fx)^m \left(d+ex^2\right)^3 (a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate((f*x)^m*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((a*e^3*m^7 + 25*a*e^3*m^6 + 253*a*e^3*m^5 + 1333*a*e^3*m^4 + 3907*a*e^3*m
^3 + 6283*a*e^3*m^2 + 5055*a*e^3*m + 1575*a*e^3 - (b*e^3*m^6 + 18*b*e^3*m^
5 + 127*b*e^3*m^4 + 444*b*e^3*m^3 + 799*b*e^3*m^2 + 690*b*e^3*m + 225*b*e^
3)*n)*x^7 + 3*(a*d*e^2*m^7 + 27*a*d*e^2*m^6 + 293*a*d*e^2*m^5 + 1639*a*d*e
^2*m^4 + 5043*a*d*e^2*m^3 + 8417*a*d*e^2*m^2 + 6951*a*d*e^2*m + 2205*a*d*e
^2 - (b*d*e^2*m^6 + 22*b*d*e^2*m^5 + 183*b*d*e^2*m^4 + 724*b*d*e^2*m^3 + 1
423*b*d*e^2*m^2 + 1302*b*d*e^2*m + 441*b*d*e^2)*n)*x^5 + 3*(a*d^2*e*m^7 +
29*a*d^2*e*m^6 + 341*a*d^2*e*m^5 + 2081*a*d^2*e*m^4 + 6995*a*d^2*e*m^3 + 1
2647*a*d^2*e*m^2 + 11095*a*d^2*e*m + 3675*a*d^2*e - (b*d^2*e*m^6 + 26*b*d^
2*e*m^5 + 263*b*d^2*e*m^4 + 1292*b*d^2*e*m^3 + 3119*b*d^2*e*m^2 + 3290*b*d
^2*e*m + 1225*b*d^2*e)*n)*x^3 + (a*d^3*m^7 + 31*a*d^3*m^6 + 397*a*d^3*m^5
+ 2707*a*d^3*m^4 + 10531*a*d^3*m^3 + 23101*a*d^3*m^2 + 25935*a*d^3*m + 110
25*a*d^3 - (b*d^3*m^6 + 30*b*d^3*m^5 + 367*b*d^3*m^4 + 2340*b*d^3*m^3 + 81
91*b*d^3*m^2 + 14910*b*d^3*m + 11025*b*d^3)*n)*x + ((b*e^3*m^7 + 25*b*e^3*
m^6 + 253*b*e^3*m^5 + 1333*b*e^3*m^4 + 3907*b*e^3*m^3 + 6283*b*e^3*m^2 + 5
055*b*e^3*m + 1575*b*e^3)*x^7 + 3*(b*d*e^2*m^7 + 27*b*d*e^2*m^6 + 293*b*d*
e^2*m^5 + 1639*b*d*e^2*m^4 + 5043*b*d*e^2*m^3 + 8417*b*d*e^2*m^2 + 6951*b*
d*e^2*m + 2205*b*d*e^2)*x^5 + 3*(b*d^2*e*m^7 + 29*b*d^2*e*m^6 + 341*b*d^2*
e*m^5 + 2081*b*d^2*e*m^4 + 6995*b*d^2*e*m^3 + 12647*b*d^2*e*m^2 + 11095*b*
d^2*e*m + 3675*b*d^2*e)*x^3 + (b*d^3*m^7 + 31*b*d^3*m^6 + 397*b*d^3*m^5...
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 6217 vs. $2(206) = 412$.

Time = 14.47 (sec) , antiderivative size = 6217, normalized size of antiderivative = 29.46

$$\int (fx)^m \left(d + ex^2\right)^3 (a + b\log(cx^n)) \, dx = \text{Too large to display}$$

input
```
integrate((f*x)**m*(e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise(((-a*d**3/(6*x**6) - 3*a*d**2*e/(4*x**4) - 3*a*d*e**2/(2*x**2) +
 a*e**3*log(x) + b*d**3*(-n/(36*x**6) - log(c*x**n)/(6*x**6)) + 3*b*d**2*e
*(-n/(16*x**4) - log(c*x**n)/(4*x**4)) + 3*b*d*e**2*(-n/(4*x**2) - log(c*x
**n)/(2*x**2)) - b*e**3*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n
)**2/(2*n), True)))/f**7, Eq(m, -7)), ((-a*d**3/(4*x**4) - 3*a*d**2*e/(2*x
**2) + 3*a*d*e**2*log(c*x**n)/n + a*e**3*x**2/2 - b*d**3*n/(16*x**4) - b*d
**3*log(c*x**n)/(4*x**4) - 3*b*d**2*e*n/(4*x**2) - 3*b*d**2*e*log(c*x**n)/
(2*x**2) + 3*b*d*e**2*log(c*x**n)**2/(2*n) - b*e**3*n*x**2/4 + b*e**3*x**2
*log(c*x**n)/2)/f**5, Eq(m, -5)), ((-a*d**3/(2*x**2) + 3*a*d**2*e*log(c*x*
*n)/n + 3*a*d*e**2*x**2/2 + a*e**3*x**4/4 - b*d**3*n/(4*x**2) - b*d**3*log
(c*x**n)/(2*x**2) + 3*b*d**2*e*log(c*x**n)**2/(2*n) - 3*b*d*e**2*n*x**2/4
+ 3*b*d*e**2*x**2*log(c*x**n)/2 - b*e**3*n*x**4/16 + b*e**3*x**4*log(c*x**
n)/4)/f**3, Eq(m, -3)), ((a*d**3*log(c*x**n)/n + 3*a*d**2*e*x**2/2 + 3*a*d
*e**2*x**4/4 + a*e**3*x**6/6 + b*d**3*log(c*x**n)**2/(2*n) - 3*b*d**2*e*n*
x**2/4 + 3*b*d**2*e*x**2*log(c*x**n)/2 - 3*b*d*e**2*n*x**4/16 + 3*b*d*e**2
*x**4*log(c*x**n)/4 - b*e**3*n*x**6/36 + b*e**3*x**6*log(c*x**n)/6)/f, Eq(
m, -1)), (a*d**3*m**7*x*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*m**5 +
13238*m**4 + 33632*m**3 + 49036*m**2 + 36960*m + 11025) + 31*a*d**3*m**6*x
*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*m**5 + 13238*m**4 + 33632*m**3
 + 49036*m**2 + 36960*m + 11025) + 397*a*d**3*m**5*x*(f*x)**m/(m**8 + 3...
```

Maxima [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 271, normalized size of antiderivative = 1.28

$$\int (fx)^m \left(d+ex^2\right)^3 (a+b\log(cx^n))\,dx = \frac{be^3f^mx^7x^m\log(cx^n)}{m+7} + \frac{ae^3f^mx^7x^m}{m+7} - \frac{be^3f^mnx^7x^m}{(m+7)^2} + \frac{3\,bde^2f^mx^5x^m\log(cx^n)}{m+5} + \frac{3\,ade^2f^mx^5x^m}{m+5} - \frac{3\,bde^2f^mnx^5x^m}{(m+5)^2} + \frac{3\,bd^2ef^mx^3x^m\log(cx^n)}{m+3} + \frac{3\,ad^2ef^mx^3x^m}{m+3} - \frac{3\,bd^2ef^mnx^3x^m}{(m+3)^2} - \frac{bd^3f^mnxx^m}{(m+1)^2} + \frac{(fx)^{m+1}\,bd^3\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1}\,ad^3}{f(m+1)}$$

input
```
integrate((f*x)^m*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
b*e^3*f^m*x^7*x^m*log(c*x^n)/(m + 7) + a*e^3*f^m*x^7*x^m/(m + 7) - b*e^3*f
^m*n*x^7*x^m/(m + 7)^2 + 3*b*d*e^2*f^m*x^5*x^m*log(c*x^n)/(m + 5) + 3*a*d*
e^2*f^m*x^5*x^m/(m + 5) - 3*b*d*e^2*f^m*n*x^5*x^m/(m + 5)^2 + 3*b*d^2*e*f^
m*x^3*x^m*log(c*x^n)/(m + 3) + 3*a*d^2*e*f^m*x^3*x^m/(m + 3) - 3*b*d^2*e*f
^m*n*x^3*x^m/(m + 3)^2 - b*d^3*f^m*n*x*x^m/(m + 1)^2 + (f*x)^(m + 1)*b*d^3
*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d^3/(f*(m + 1))
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 558 vs. $2(211) = 422$.

Time = 0.15 (sec) , antiderivative size = 558, normalized size of antiderivative = 2.64

$$\int (fx)^m \left(d+ex^2\right)^3 (a+b\log(cx^n))\,dx = \frac{be^3f^6f^mx^7x^m\log(c)}{f^6m+7f^6} + \frac{ae^3f^6f^mx^7x^m}{f^6m+7f^6} + \frac{3\,bde^2f^4f^mx^5x^m\log(c)}{f^4m+5f^4} + \frac{be^3f^mmnx^7x^m\log(x)}{m^2+14m+49} + \frac{3\,ade^2f^4f^mx^5x^m}{f^4m+5f^4} + \frac{7\,be^3f^mnx^7x^m\log(x)}{m^2+14m+49} - \frac{be^3f^mnx^7x^m}{m^2+14m+49} + \frac{3\,bde^2f^mmnx^5x^m\log(x)}{m^2+10m+25} + \frac{15\,bde^2f^mnx^5x^m\log(x)}{m^2+10m+25} - \frac{3\,bde^2f^mnx^5x^m}{m^2+10m+25} + \frac{3\,bd^2ef^2f^mx^3x^m\log(c)}{f^2m+3f^2} + \frac{3\,bd^2ef^mmnx^3x^m\log(x)}{m^2+6m+9} + \frac{3\,ad^2ef^2f^mx^3x^m}{f^2m+3f^2} + \frac{9\,bd^2ef^mnx^3x^m\log(x)}{m^2+6m+9} - \frac{3\,bd^2ef^mnx^3x^m}{m^2+6m+9} + \frac{bd^3f^mmnxx^m\log(x)}{m^2+2m+1} + \frac{bd^3f^mnxx^m\log(x)}{m^2+2m+1} - \frac{bd^3f^mnxx^m}{m^2+2m+1} + \frac{(fx)^m\,bd^3x\log(c)}{m+1} + \frac{(fx)^m\,ad^3x}{m+1}$$

input
```
integrate((f*x)^m*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e^3*f^6*f^m*x^7*x^m*log(c)/(f^6*m + 7*f^6) + a*e^3*f^6*f^m*x^7*x^m/(f^6*
m + 7*f^6) + 3*b*d*e^2*f^4*f^m*x^5*x^m*log(c)/(f^4*m + 5*f^4) + b*e^3*f^m*
m*n*x^7*x^m*log(x)/(m^2 + 14*m + 49) + 3*a*d*e^2*f^4*f^m*x^5*x^m/(f^4*m +
5*f^4) + 7*b*e^3*f^m*n*x^7*x^m*log(x)/(m^2 + 14*m + 49) - b*e^3*f^m*n*x^7*
x^m/(m^2 + 14*m + 49) + 3*b*d*e^2*f^m*m*n*x^5*x^m*log(x)/(m^2 + 10*m + 25)
 + 15*b*d*e^2*f^m*n*x^5*x^m*log(x)/(m^2 + 10*m + 25) - 3*b*d*e^2*f^m*n*x^5
*x^m/(m^2 + 10*m + 25) + 3*b*d^2*e*f^2*f^m*x^3*x^m*log(c)/(f^2*m + 3*f^2)
+ 3*b*d^2*e*f^m*m*n*x^3*x^m*log(x)/(m^2 + 6*m + 9) + 3*a*d^2*e*f^2*f^m*x^3
*x^m/(f^2*m + 3*f^2) + 9*b*d^2*e*f^m*n*x^3*x^m*log(x)/(m^2 + 6*m + 9) - 3*
b*d^2*e*f^m*n*x^3*x^m/(m^2 + 6*m + 9) + b*d^3*f^m*m*n*x*x^m*log(x)/(m^2 +
2*m + 1) + b*d^3*f^m*n*x*x^m*log(x)/(m^2 + 2*m + 1) - b*d^3*f^m*n*x*x^m/(m
^2 + 2*m + 1) + (f*x)^m*b*d^3*x*log(c)/(m + 1) + (f*x)^m*a*d^3*x/(m + 1)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^m \left(d+ex^2\right)^3 (a+b\log(cx^n))\,dx=\int (f\,x)^m\,\left(e\,x^2+d\right)^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int((f*x)^m*(d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^m*(d + e*x^2)^3*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 1286, normalized size of antiderivative = 6.09

$$\int (fx)^m \left(d+ex^2\right)^3 (a+b\log(cx^n))\,dx=\text{Too large to display}$$

input
```
int((f*x)^m*(e*x^2+d)^3*(a+b*log(c*x^n)),x)
```

output
```
(x**m*f**m*x*(log(x**n*c)*b*d**3*m**7 + 31*log(x**n*c)*b*d**3*m**6 + 397*l
og(x**n*c)*b*d**3*m**5 + 2707*log(x**n*c)*b*d**3*m**4 + 10531*log(x**n*c)*
b*d**3*m**3 + 23101*log(x**n*c)*b*d**3*m**2 + 25935*log(x**n*c)*b*d**3*m +
 11025*log(x**n*c)*b*d**3 + 3*log(x**n*c)*b*d**2*e*m**7*x**2 + 87*log(x**n
*c)*b*d**2*e*m**6*x**2 + 1023*log(x**n*c)*b*d**2*e*m**5*x**2 + 6243*log(x*
*n*c)*b*d**2*e*m**4*x**2 + 20985*log(x**n*c)*b*d**2*e*m**3*x**2 + 37941*lo
g(x**n*c)*b*d**2*e*m**2*x**2 + 33285*log(x**n*c)*b*d**2*e*m*x**2 + 11025*l
og(x**n*c)*b*d**2*e*x**2 + 3*log(x**n*c)*b*d*e**2*m**7*x**4 + 81*log(x**n*
c)*b*d*e**2*m**6*x**4 + 879*log(x**n*c)*b*d*e**2*m**5*x**4 + 4917*log(x**n
*c)*b*d*e**2*m**4*x**4 + 15129*log(x**n*c)*b*d*e**2*m**3*x**4 + 25251*log(
x**n*c)*b*d*e**2*m**2*x**4 + 20853*log(x**n*c)*b*d*e**2*m*x**4 + 6615*log(
x**n*c)*b*d*e**2*x**4 + log(x**n*c)*b*e**3*m**7*x**6 + 25*log(x**n*c)*b*e*
*3*m**6*x**6 + 253*log(x**n*c)*b*e**3*m**5*x**6 + 1333*log(x**n*c)*b*e**3*
m**4*x**6 + 3907*log(x**n*c)*b*e**3*m**3*x**6 + 6283*log(x**n*c)*b*e**3*m*
*2*x**6 + 5055*log(x**n*c)*b*e**3*m*x**6 + 1575*log(x**n*c)*b*e**3*x**6 +
a*d**3*m**7 + 31*a*d**3*m**6 + 397*a*d**3*m**5 + 2707*a*d**3*m**4 + 10531*
a*d**3*m**3 + 23101*a*d**3*m**2 + 25935*a*d**3*m + 11025*a*d**3 + 3*a*d**2
*e*m**7*x**2 + 87*a*d**2*e*m**6*x**2 + 1023*a*d**2*e*m**5*x**2 + 6243*a*d*
*2*e*m**4*x**2 + 20985*a*d**2*e*m**3*x**2 + 37941*a*d**2*e*m**2*x**2 + 332
85*a*d**2*e*m*x**2 + 11025*a*d**2*e*x**2 + 3*a*d*e**2*m**7*x**4 + 81*a*...
```

3.319 $\int (fx)^m (d+ex^2)^2 (a+b\log(cx^n))\,dx$

Optimal result 2416
Mathematica [A] (verified) 2417
Rubi [A] (verified) 2417
Maple [B] (verified) 2419
Fricas [B] (verification not implemented) 2420
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Giac [B] (verification not implemented) 2423
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Optimal result

Integrand size = 25, antiderivative size = 153

$$\int (fx)^m (d+ex^2)^2 (a+b\log(cx^n))\,dx = -\frac{bd^2n(fx)^{1+m}}{f(1+m)^2} - \frac{2bden(fx)^{3+m}}{f^3(3+m)^2} - \frac{be^2n(fx)^{5+m}}{f^5(5+m)^2} + \frac{d^2(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)} + \frac{2de(fx)^{3+m}(a+b\log(cx^n))}{f^3(3+m)} + \frac{e^2(fx)^{5+m}(a+b\log(cx^n))}{f^5(5+m)}$$

output
```
-b*d^2*n*(f*x)^(1+m)/f/(1+m)^2-2*b*d*e*n*(f*x)^(3+m)/f^3/(3+m)^2-b*e^2*n*(
f*x)^(5+m)/f^5/(5+m)^2+d^2*(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)+2*d*e*(f*x)
^(3+m)*(a+b*ln(c*x^n))/f^3/(3+m)+e^2*(f*x)^(5+m)*(a+b*ln(c*x^n))/f^5/(5+m)
```

Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 112, normalized size of antiderivative = 0.73

$$\int (fx)^m \left(d+ex^2\right)^2 (a+b\log (cx^n))\, dx = x(fx)^m \left(-\frac{bd^2n}{(1+m)^2}-\frac{2bdenx^2}{(3+m)^2}-\frac{be^2nx^4}{(5+m)^2}+\frac{d^2(a+b\log (cx^n))}{1+m}+\frac{2dex^2(a+b\log (cx^n))}{3+m}+\frac{e^2x^4(a+b\log (cx^n))}{5+m}\right)$$

input
```
Integrate[(f*x)^m*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
x*(f*x)^m*(-((b*d^2*n)/(1 + m)^2) - (2*b*d*e*n*x^2)/(3 + m)^2 - (b*e^2*n*x
^4)/(5 + m)^2 + (d^2*(a + b*Log[c*x^n]))/(1 + m) + (2*d*e*x^2*(a + b*Log[c
*x^n]))/(3 + m) + (e^2*x^4*(a + b*Log[c*x^n]))/(5 + m))
```

Rubi [A] (verified)

Time = 0.51 (sec) , antiderivative size = 183, normalized size of antiderivative = 1.20, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.160$, Rules used = {2792, 27, 1433, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d+ex^2\right)^2 (fx)^m (a+b\log (cx^n))\, dx$$

$$\Big\downarrow \text{ 2792}$$

$$-bn\int \frac{(fx)^m \left(e^2(m+1)(m+3)x^4+2de(m+1)(m+5)x^2+d^2(m+3)(m+5)\right)}{m^3+9m^2+23m+15}dx+\frac{d^2(fx)^{m+1} (a+b\log (cx^n))}{f(m+1)}+\frac{2de(fx)^{m+3} (a+b\log (cx^n))}{f^3(m+3)}+\frac{e^2(fx)^{m+5} (a+b\log (cx^n))}{f^5(m+5)}$$

$$\Big\downarrow \text{ 27}$$

$$-\frac{bn\int (fx)^m\left(e^2(m+1)(m+3)x^4+2de(m+1)(m+5)x^2+d^2(m+3)(m+5)\right)dx}{m^3+9m^2+23m+15}+\frac{d^2(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{2de(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{e^2(fx)^{m+5}(a+b\log(cx^n))}{f^5(m+5)}$$

$$\Big\downarrow \text{1433}$$

$$-\frac{bn\int \left(d^2(m+3)(m+5)(fx)^m+\frac{2de(m+1)(m+5)(fx)^{m+2}}{f^2}+\frac{e^2(m+1)(m+3)(fx)^{m+4}}{f^4}\right)dx}{m^3+9m^2+23m+15}+\frac{d^2(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{2de(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{e^2(fx)^{m+5}(a+b\log(cx^n))}{f^5(m+5)}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^2(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{2de(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{e^2(fx)^{m+5}(a+b\log(cx^n))}{f^5(m+5)}-\frac{bn\left(\frac{d^2(m+3)(m+5)(fx)^{m+1}}{f(m+1)}+\frac{2de(m+1)(m+5)(fx)^{m+3}}{f^3(m+3)}+\frac{e^2(m+1)(m+3)(fx)^{m+5}}{f^5(m+5)}\right)}{m^3+9m^2+23m+15}$$

input
```
Int[(f*x)^m*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
-((b*n*((d^2*(3 + m)*(5 + m)*(f*x)^(1 + m))/(f*(1 + m)) + (2*d*e*(1 + m)*(
5 + m)*(f*x)^(3 + m))/(f^3*(3 + m)) + (e^2*(1 + m)*(3 + m)*(f*x)^(5 + m))/
(f^5*(5 + m))))/(15 + 23*m + 9*m^2 + m^3)) + (d^2*(f*x)^(1 + m)*(a + b*Log
[c*x^n]))/(f*(1 + m)) + (2*d*e*(f*x)^(3 + m)*(a + b*Log[c*x^n]))/(f^3*(3 +
 m)) + (e^2*(f*x)^(5 + m)*(a + b*Log[c*x^n]))/(f^5*(5 + m))
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1433
```
Int[((d_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol]
 :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a,
b, c, d, m}, x] && IGtQ[p, 0] && (EqQ[p, 1] ||  !IntegerQ[(m + 1)/2])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 920 vs. $2(153) = 306$.

Time = 5.89 (sec) , antiderivative size = 921, normalized size of antiderivative = 6.02

method	result
parallelrisch	$-\frac{-225x(fx)^m a\,d^2 - x(fx)^m a\,d^2 m^5 - 17x(fx)^m a\,d^2 m^4 - 110x(fx)^m a\,d^2 m^3 - 150x^3(fx)^m ade - 334x(fx)^m a\,d^2 m^2 - 465x(f}{}$
risch	Expression too large to display

input
```
int((f*x)^m*(e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-225*x*(f*x)^m*a*d^2-x*(f*x)^m*a*d^2*m^5-17*x*(f*x)^m*a*d^2*m^4-110*x*(f
*x)^m*a*d^2*m^3-150*x^3*(f*x)^m*a*d*e-334*x*(f*x)^m*a*d^2*m^2-465*x*(f*x)^
m*a*d^2*m+225*x*(f*x)^m*b*d^2*n-225*x*(f*x)^m*ln(c*x^n)*b*d^2-45*x^5*(f*x)
^m*ln(c*x^n)*b*e^2-x^5*(f*x)^m*a*e^2*m^5-13*x^5*(f*x)^m*a*e^2*m^4-62*x^5*(
f*x)^m*a*e^2*m^3-134*x^5*(f*x)^m*a*e^2*m^2-129*x^5*(f*x)^m*a*e^2*m+9*x^5*(
f*x)^m*b*e^2*n-45*x^5*(f*x)^m*a*e^2-13*x^5*(f*x)^m*ln(c*x^n)*b*e^2*m^4+x^5
*(f*x)^m*b*e^2*m^4*n-62*x^5*(f*x)^m*ln(c*x^n)*b*e^2*m^3+8*x^5*(f*x)^m*b*e^
2*m^3*n-134*x^5*(f*x)^m*ln(c*x^n)*b*e^2*m^2+22*x^5*(f*x)^m*b*e^2*m^2*n-2*x
^3*(f*x)^m*a*d*e*m^5-129*x^5*(f*x)^m*ln(c*x^n)*b*e^2*m+24*x^5*(f*x)^m*b*e^
2*m*n-30*x^3*(f*x)^m*a*d*e*m^4-x*(f*x)^m*ln(c*x^n)*b*d^2*m^5-164*x^3*(f*x)
^m*a*d*e*m^3-17*x*(f*x)^m*ln(c*x^n)*b*d^2*m^4+x*(f*x)^m*b*d^2*m^4*n-396*x^
3*(f*x)^m*a*d*e*m^2-110*x*(f*x)^m*ln(c*x^n)*b*d^2*m^3+16*x*(f*x)^m*b*d^2*m
^3*n-410*x^3*(f*x)^m*a*d*e*m+50*x^3*(f*x)^m*b*d*e*n-334*x*(f*x)^m*ln(c*x^n
)*b*d^2*m^2+94*x*(f*x)^m*b*d^2*m^2*n-465*x*(f*x)^m*ln(c*x^n)*b*d^2*m+240*x
*(f*x)^m*b*d^2*m*n-x^5*(f*x)^m*ln(c*x^n)*b*e^2*m^5-150*x^3*(f*x)^m*ln(c*x^
n)*b*d*e-2*x^3*(f*x)^m*ln(c*x^n)*b*d*e*m^5-30*x^3*(f*x)^m*ln(c*x^n)*b*d*e*
m^4+2*x^3*(f*x)^m*b*d*e*m^4*n-164*x^3*(f*x)^m*ln(c*x^n)*b*d*e*m^3+24*x^3*(
f*x)^m*b*d*e*m^3*n-396*x^3*(f*x)^m*ln(c*x^n)*b*d*e*m^2+92*x^3*(f*x)^m*b*d*
e*m^2*n-410*x^3*(f*x)^m*ln(c*x^n)*b*d*e*m+120*x^3*(f*x)^m*b*d*e*m*n)/(m^2+
2*m+1)/(m^2+6*m+9)/(5+m)^2
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 633 vs. $2(153) = 306$.

Time = 0.10 (sec) , antiderivative size = 633, normalized size of antiderivative = 4.14

$$\int (fx)^m \left(d+ex^2\right)^2 \left(a+b\log\left(cx^n\right)\right)\,dx$$

$$= \frac{((ae^2m^5 + 13\,ae^2m^4 + 62\,ae^2m^3 + 134\,ae^2m^2 + 129\,ae^2m + 45\,ae^2 - (be^2m^4 + 8\,be^2m^3 + 22\,be^2m^2 + 24}{}$$

input
```
integrate((f*x)^m*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((a*e^2*m^5 + 13*a*e^2*m^4 + 62*a*e^2*m^3 + 134*a*e^2*m^2 + 129*a*e^2*m +
45*a*e^2 - (b*e^2*m^4 + 8*b*e^2*m^3 + 22*b*e^2*m^2 + 24*b*e^2*m + 9*b*e^2)
*n)*x^5 + 2*(a*d*e*m^5 + 15*a*d*e*m^4 + 82*a*d*e*m^3 + 198*a*d*e*m^2 + 205
*a*d*e*m + 75*a*d*e - (b*d*e*m^4 + 12*b*d*e*m^3 + 46*b*d*e*m^2 + 60*b*d*e*
m + 25*b*d*e)*n)*x^3 + (a*d^2*m^5 + 17*a*d^2*m^4 + 110*a*d^2*m^3 + 334*a*d
^2*m^2 + 465*a*d^2*m + 225*a*d^2 - (b*d^2*m^4 + 16*b*d^2*m^3 + 94*b*d^2*m^
2 + 240*b*d^2*m + 225*b*d^2)*n)*x + ((b*e^2*m^5 + 13*b*e^2*m^4 + 62*b*e^2*
m^3 + 134*b*e^2*m^2 + 129*b*e^2*m + 45*b*e^2)*x^5 + 2*(b*d*e*m^5 + 15*b*d*
e*m^4 + 82*b*d*e*m^3 + 198*b*d*e*m^2 + 205*b*d*e*m + 75*b*d*e)*x^3 + (b*d^
2*m^5 + 17*b*d^2*m^4 + 110*b*d^2*m^3 + 334*b*d^2*m^2 + 465*b*d^2*m + 225*b
*d^2)*x)*log(c) + ((b*e^2*m^5 + 13*b*e^2*m^4 + 62*b*e^2*m^3 + 134*b*e^2*m^
2 + 129*b*e^2*m + 45*b*e^2)*n*x^5 + 2*(b*d*e*m^5 + 15*b*d*e*m^4 + 82*b*d*e
*m^3 + 198*b*d*e*m^2 + 205*b*d*e*m + 75*b*d*e)*n*x^3 + (b*d^2*m^5 + 17*b*d
^2*m^4 + 110*b*d^2*m^3 + 334*b*d^2*m^2 + 465*b*d^2*m + 225*b*d^2)*n*x)*log
(x))*e^(m*log(f) + m*log(x))/(m^6 + 18*m^5 + 127*m^4 + 444*m^3 + 799*m^2 +
 690*m + 225)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 2820 vs. $2(146) = 292$.

Time = 6.07 (sec) , antiderivative size = 2820, normalized size of antiderivative = 18.43

$$\int (fx)^m \left(d+ex^2\right)^2 (a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate((f*x)**m*(e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise(((-a*d**2/(4*x**4) - a*d*e/x**2 + a*e**2*log(x) + b*d**2*(-n/(16
*x**4) - log(c*x**n)/(4*x**4)) + 2*b*d*e*(-n/(4*x**2) - log(c*x**n)/(2*x**
2)) - b*e**2*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n),
 True)))/f**5, Eq(m, -5)), ((-a*d**2/(2*x**2) + 2*a*d*e*log(c*x**n)/n + a*
e**2*x**2/2 - b*d**2*n/(4*x**2) - b*d**2*log(c*x**n)/(2*x**2) + b*d*e*log(
c*x**n)**2/n - b*e**2*n*x**2/4 + b*e**2*x**2*log(c*x**n)/2)/f**3, Eq(m, -3
)), ((a*d**2*log(c*x**n)/n + a*d*e*x**2 + a*e**2*x**4/4 + b*d**2*log(c*x**
n)**2/(2*n) - b*d*e*n*x**2/2 + b*d*e*x**2*log(c*x**n) - b*e**2*n*x**4/16 +
 b*e**2*x**4*log(c*x**n)/4)/f, Eq(m, -1)), (a*d**2*m**5*x*(f*x)**m/(m**6 +
 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 17*a*d**2*m**4*
x*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225)
 + 110*a*d**2*m**3*x*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*
m**2 + 690*m + 225) + 334*a*d**2*m**2*x*(f*x)**m/(m**6 + 18*m**5 + 127*m**
4 + 444*m**3 + 799*m**2 + 690*m + 225) + 465*a*d**2*m*x*(f*x)**m/(m**6 + 1
8*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 225*a*d**2*x*(f*x
)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 2*a
*d*e*m**5*x**3*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 +
 690*m + 225) + 30*a*d*e*m**4*x**3*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 4
44*m**3 + 799*m**2 + 690*m + 225) + 164*a*d*e*m**3*x**3*(f*x)**m/(m**6 + 1
8*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 396*a*d*e*m**2...
```

Maxima [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 195, normalized size of antiderivative = 1.27

$$\int (fx)^m \left(d+ex^2\right)^2 (a+b\log(cx^n))\,dx = \frac{be^2f^mx^5x^m\log(cx^n)}{m+5} + \frac{ae^2f^mx^5x^m}{m+5} - \frac{be^2f^mnx^5x^m}{(m+5)^2} + \frac{2\,bdef^mx^3x^m\log(cx^n)}{m+3} + \frac{2\,adef^mx^3x^m}{m+3} - \frac{2\,bdef^mnx^3x^m}{(m+3)^2} - \frac{bd^2f^mnxx^m}{(m+1)^2} + \frac{(fx)^{m+1}bd^2\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1}ad^2}{f(m+1)}$$

input
```
integrate((f*x)^m*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
b*e^2*f^m*x^5*x^m*log(c*x^n)/(m + 5) + a*e^2*f^m*x^5*x^m/(m + 5) - b*e^2*f
^m*n*x^5*x^m/(m + 5)^2 + 2*b*d*e*f^m*x^3*x^m*log(c*x^n)/(m + 3) + 2*a*d*e*
f^m*x^3*x^m/(m + 3) - 2*b*d*e*f^m*n*x^3*x^m/(m + 3)^2 - b*d^2*f^m*n*x*x^m/
(m + 1)^2 + (f*x)^(m + 1)*b*d^2*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d
^2/(f*(m + 1))
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 396 vs. $2(153) = 306$.

Time = 0.13 (sec) , antiderivative size = 396, normalized size of antiderivative = 2.59

$$\int (fx)^m \left(d+ex^2\right)^2 (a+b\log(cx^n))\,dx = \frac{be^2f^4f^mx^5x^m\log(c)}{f^4m+5f^4} + \frac{ae^2f^4f^mx^5x^m}{f^4m+5f^4} + \frac{be^2f^mmnx^5x^m\log(x)}{m^2+10m+25} + \frac{5be^2f^mnx^5x^m\log(x)}{m^2+10m+25} - \frac{be^2f^mnx^5x^m}{m^2+10m+25} + \frac{2bdef^2f^mx^3x^m\log(c)}{f^2m+3f^2} + \frac{2bdef^mmnx^3x^m\log(x)}{m^2+6m+9} + \frac{2adef^2f^mx^3x^m}{f^2m+3f^2} + \frac{6bdef^mnx^3x^m\log(x)}{m^2+6m+9} - \frac{2bdef^mnx^3x^m}{m^2+6m+9} + \frac{bd^2f^mmnxx^m\log(x)}{m^2+2m+1} + \frac{bd^2f^mnxx^m\log(x)}{m^2+2m+1} - \frac{bd^2f^mnxx^m}{m^2+2m+1} + \frac{(fx)^m bd^2x\log(c)}{m+1} + \frac{(fx)^m ad^2x}{m+1}$$

input
```
integrate((f*x)^m*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e^2*f^4*f^m*x^5*x^m*log(c)/(f^4*m + 5*f^4) + a*e^2*f^4*f^m*x^5*x^m/(f^4*
m + 5*f^4) + b*e^2*f^m*m*n*x^5*x^m*log(x)/(m^2 + 10*m + 25) + 5*b*e^2*f^m*
n*x^5*x^m*log(x)/(m^2 + 10*m + 25) - b*e^2*f^m*n*x^5*x^m/(m^2 + 10*m + 25)
 + 2*b*d*e*f^2*f^m*x^3*x^m*log(c)/(f^2*m + 3*f^2) + 2*b*d*e*f^m*m*n*x^3*x^
m*log(x)/(m^2 + 6*m + 9) + 2*a*d*e*f^2*f^m*x^3*x^m/(f^2*m + 3*f^2) + 6*b*d
*e*f^m*n*x^3*x^m*log(x)/(m^2 + 6*m + 9) - 2*b*d*e*f^m*n*x^3*x^m/(m^2 + 6*m
 + 9) + b*d^2*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + b*d^2*f^m*n*x*x^m*log
(x)/(m^2 + 2*m + 1) - b*d^2*f^m*n*x*x^m/(m^2 + 2*m + 1) + (f*x)^m*b*d^2*x*
log(c)/(m + 1) + (f*x)^m*a*d^2*x/(m + 1)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^m \left(d+ex^2\right)^2 (a+b\log(cx^n)) \, dx = \int (f\,x)^m \left(e\,x^2+d\right)^2 (a+b\,\ln(c\,x^n)) \, dx$$

input
```
int((f*x)^m*(d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^m*(d + e*x^2)^2*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 657, normalized size of antiderivative = 4.29

$$\int (fx)^m \left(d+ex^2\right)^2 (a+b\log(cx^n)) \, dx = \frac{x^m f^m x(17a\,d^2m^4+110a\,d^2m^3+334a\,d^2m^2+465a\,d^2m+150\log(x^nc)\,bde\,x^2-50bden\,x^2+45a\,e^2x^4+}{}$$

input
```
int((f*x)^m*(e*x^2+d)^2*(a+b*log(c*x^n)),x)
```

output
```
(x**m*f**m*x*(log(x**n*c)*b*d**2*m**5 + 17*log(x**n*c)*b*d**2*m**4 + 110*l
og(x**n*c)*b*d**2*m**3 + 334*log(x**n*c)*b*d**2*m**2 + 465*log(x**n*c)*b*d
**2*m + 225*log(x**n*c)*b*d**2 + 2*log(x**n*c)*b*d*e*m**5*x**2 + 30*log(x*
*n*c)*b*d*e*m**4*x**2 + 164*log(x**n*c)*b*d*e*m**3*x**2 + 396*log(x**n*c)*
b*d*e*m**2*x**2 + 410*log(x**n*c)*b*d*e*m*x**2 + 150*log(x**n*c)*b*d*e*x**
2 + log(x**n*c)*b*e**2*m**5*x**4 + 13*log(x**n*c)*b*e**2*m**4*x**4 + 62*lo
g(x**n*c)*b*e**2*m**3*x**4 + 134*log(x**n*c)*b*e**2*m**2*x**4 + 129*log(x*
*n*c)*b*e**2*m*x**4 + 45*log(x**n*c)*b*e**2*x**4 + a*d**2*m**5 + 17*a*d**2
*m**4 + 110*a*d**2*m**3 + 334*a*d**2*m**2 + 465*a*d**2*m + 225*a*d**2 + 2*
a*d*e*m**5*x**2 + 30*a*d*e*m**4*x**2 + 164*a*d*e*m**3*x**2 + 396*a*d*e*m**
2*x**2 + 410*a*d*e*m*x**2 + 150*a*d*e*x**2 + a*e**2*m**5*x**4 + 13*a*e**2*
m**4*x**4 + 62*a*e**2*m**3*x**4 + 134*a*e**2*m**2*x**4 + 129*a*e**2*m*x**4
 + 45*a*e**2*x**4 - b*d**2*m**4*n - 16*b*d**2*m**3*n - 94*b*d**2*m**2*n -
240*b*d**2*m*n - 225*b*d**2*n - 2*b*d*e*m**4*n*x**2 - 24*b*d*e*m**3*n*x**2
 - 92*b*d*e*m**2*n*x**2 - 120*b*d*e*m*n*x**2 - 50*b*d*e*n*x**2 - b*e**2*m*
*4*n*x**4 - 8*b*e**2*m**3*n*x**4 - 22*b*e**2*m**2*n*x**4 - 24*b*e**2*m*n*x
**4 - 9*b*e**2*n*x**4))/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 +
 690*m + 225)
```

3.320 $\int (fx)^m (d+ex^2) (a+b\log(cx^n)) \, dx$

Optimal result 2426
Mathematica [A] (verified) 2426
Rubi [A] (verified) 2427
Maple [B] (verified) 2428
Fricas [B] (verification not implemented) 2429
Sympy [B] (verification not implemented) 2429
Maxima [A] (verification not implemented) 2430
Giac [B] (verification not implemented) 2431
Mupad [F(-1)] 2431
Reduce [B] (verification not implemented) 2432

Optimal result

Integrand size = 23, antiderivative size = 95

$$\int (fx)^m (d+ex^2) (a+b\log(cx^n)) \, dx = -\frac{bdn(fx)^{1+m}}{f(1+m)^2} - \frac{ben(fx)^{3+m}}{f^3(3+m)^2} + \frac{d(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)} + \frac{e(fx)^{3+m}(a+b\log(cx^n))}{f^3(3+m)}$$

output
```
-b*d*n*(f*x)^(1+m)/f/(1+m)^2-b*e*n*(f*x)^(3+m)/f^3/(3+m)^2+d*(f*x)^(1+m)*(
a+b*ln(c*x^n))/f/(1+m)+e*(f*x)^(3+m)*(a+b*ln(c*x^n))/f^3/(3+m)
```

Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 68, normalized size of antiderivative = 0.72

$$\int (fx)^m (d+ex^2) (a+b\log(cx^n)) \, dx = x(fx)^m \left(-\frac{bdn}{(1+m)^2} - \frac{benx^2}{(3+m)^2} + \frac{d(a+b\log(cx^n))}{1+m} + \frac{ex^2(a+b\log(cx^n))}{3+m}\right)$$

input
```
Integrate[(f*x)^m*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
x*(f*x)^m*(-((b*d*n)/(1 + m)^2) - (b*e*n*x^2)/(3 + m)^2 + (d*(a + b*Log[c*
x^n]))/(1 + m) + (e*x^2*(a + b*Log[c*x^n]))/(3 + m))
```

Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 94, normalized size of antiderivative = 0.99, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {2792, 244, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex^2)(fx)^m(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \; 2792$$

$$-bn\int (fx)^m\left(\frac{ex^2}{m+3}+\frac{d}{m+1}\right)dx+\frac{d(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{e(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}$$

$$\Big\downarrow \; 244$$

$$-bn\int \left(\frac{d(fx)^m}{m+1}+\frac{e(fx)^{m+2}}{f^2(m+3)}\right)dx+\frac{d(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{e(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}$$

$$\Big\downarrow \; 2009$$

$$\frac{d(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{e(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}-bn\left(\frac{d(fx)^{m+1}}{f(m+1)^2}+\frac{e(fx)^{m+3}}{f^3(m+3)^2}\right)$$

input
```
Int[(f*x)^m*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d*(f*x)^(1 + m))/(f*(1 + m)^2) + (e*(f*x)^(3 + m))/(f^3*(3 + m)^2)
)) + (d*(f*x)^(1 + m)*(a + b*Log[c*x^n]))/(f*(1 + m)) + (e*(f*x)^(3 + m)*(
a + b*Log[c*x^n]))/(f^3*(3 + m))
```

Defintions of rubi rules used

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 352 vs. $2(95) = 190$.

Time = 0.93 (sec) , antiderivative size = 353, normalized size of antiderivative = 3.72

method	result
parallelrisch	$-\frac{-3x^3(fx)^m ae-9x(fx)^m ad-x(fx)^m ad\,m^3-x^3(fx)^m ae\,m^3-5x^3(fx)^m ae\,m^2-7x^3(fx)^m aem+x^3(fx)^m ben-7x(fx)^m a}{}$
risch	Expression too large to display

input
```
int((f*x)^m*(e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-3*x^3*(f*x)^m*a*e-9*x*(f*x)^m*a*d-x*(f*x)^m*a*d*m^3-x^3*(f*x)^m*a*e*m^3
-5*x^3*(f*x)^m*a*e*m^2-7*x^3*(f*x)^m*a*e*m+x^3*(f*x)^m*b*e*n-7*x*(f*x)^m*a
*d*m^2-15*x*(f*x)^m*a*d*m+9*x*(f*x)^m*b*d*n-9*x*(f*x)^m*ln(c*x^n)*b*d-3*x^
3*(f*x)^m*ln(c*x^n)*b*e-x*(f*x)^m*ln(c*x^n)*b*d*m^3-7*x*(f*x)^m*ln(c*x^n)*
b*d*m^2+x*(f*x)^m*b*d*m^2*n-15*x*(f*x)^m*ln(c*x^n)*b*d*m+6*x*(f*x)^m*b*d*m
*n-x^3*(f*x)^m*ln(c*x^n)*b*e*m^3-5*x^3*(f*x)^m*ln(c*x^n)*b*e*m^2+x^3*(f*x)
^m*b*e*m^2*n-7*x^3*(f*x)^m*ln(c*x^n)*b*e*m+2*x^3*(f*x)^m*b*e*m*n)/(m^2+6*m
+9)/(m^2+2*m+1)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 235 vs. $2(95) = 190$.

Time = 0.08 (sec) , antiderivative size = 235, normalized size of antiderivative = 2.47

$$\int (fx)^m \left(d+ex^2\right) (a+b\log (cx^n))\, dx = \frac{((aem^3+5\,aem^2+7\,aem+3\,ae-(bem^2+2\,bem+be)n)x^3+(adm^3+7\,adm^2+15\,adm+9\,ad-(bd}{}$$

input
```
integrate((f*x)^m*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((a*e*m^3 + 5*a*e*m^2 + 7*a*e*m + 3*a*e - (b*e*m^2 + 2*b*e*m + b*e)*n)*x^3
 + (a*d*m^3 + 7*a*d*m^2 + 15*a*d*m + 9*a*d - (b*d*m^2 + 6*b*d*m + 9*b*d)*n
)*x + ((b*e*m^3 + 5*b*e*m^2 + 7*b*e*m + 3*b*e)*x^3 + (b*d*m^3 + 7*b*d*m^2
+ 15*b*d*m + 9*b*d)*x)*log(c) + ((b*e*m^3 + 5*b*e*m^2 + 7*b*e*m + 3*b*e)*n
*x^3 + (b*d*m^3 + 7*b*d*m^2 + 15*b*d*m + 9*b*d)*n*x)*log(x))*e^(m*log(f) +
 m*log(x))/(m^4 + 8*m^3 + 22*m^2 + 24*m + 9)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 920 vs. $2(87) = 174$.

Time = 2.69 (sec) , antiderivative size = 920, normalized size of antiderivative = 9.68

$$\int (fx)^m \left(d+ex^2\right) (a+b\log (cx^n))\, dx = \text{Too large to display}$$

input
```
integrate((f*x)**m*(e*x**2+d)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise(((-a*d/(2*x**2) + a*e*log(x) + b*d*(-n/(4*x**2) - log(c*x**n)/(2
*x**2)) - b*e*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n)
, True)))/f**3, Eq(m, -3)), ((a*d*log(c*x**n)/n + a*e*x**2/2 + b*d*log(c*x
**n)**2/(2*n) - b*e*n*x**2/4 + b*e*x**2*log(c*x**n)/2)/f, Eq(m, -1)), (a*d
*m**3*x*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 7*a*d*m**2*x*(f*x)
**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 15*a*d*m*x*(f*x)**m/(m**4 + 8*m
**3 + 22*m**2 + 24*m + 9) + 9*a*d*x*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24
*m + 9) + a*e*m**3*x**3*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 5*
a*e*m**2*x**3*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 7*a*e*m*x**3
*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 3*a*e*x**3*(f*x)**m/(m**4
 + 8*m**3 + 22*m**2 + 24*m + 9) + b*d*m**3*x*(f*x)**m*log(c*x**n)/(m**4 +
8*m**3 + 22*m**2 + 24*m + 9) - b*d*m**2*n*x*(f*x)**m/(m**4 + 8*m**3 + 22*m
**2 + 24*m + 9) + 7*b*d*m**2*x*(f*x)**m*log(c*x**n)/(m**4 + 8*m**3 + 22*m*
*2 + 24*m + 9) - 6*b*d*m*n*x*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9)
 + 15*b*d*m*x*(f*x)**m*log(c*x**n)/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) -
9*b*d*n*x*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 9*b*d*x*(f*x)**m
*log(c*x**n)/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + b*e*m**3*x**3*(f*x)**m
*log(c*x**n)/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) - b*e*m**2*n*x**3*(f*x)*
*m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 5*b*e*m**2*x**3*(f*x)**m*log(c*x
**n)/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) - 2*b*e*m*n*x**3*(f*x)**m/(m*...
```

Maxima [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 119, normalized size of antiderivative = 1.25

$$\int (fx)^m (d+ex^2) (a+b\log(cx^n)) \, dx = \frac{bef^m x^3 x^m \log(cx^n)}{m+3} + \frac{aef^m x^3 x^m}{m+3} - \frac{bef^m n x^3 x^m}{(m+3)^2} - \frac{bdf^m n x x^m}{(m+1)^2} + \frac{(fx)^{m+1} bd \log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1} ad}{f(m+1)}$$

input
```
integrate((f*x)^m*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
b*e*f^m*x^3*x^m*log(c*x^n)/(m + 3) + a*e*f^m*x^3*x^m/(m + 3) - b*e*f^m*n*x
^3*x^m/(m + 3)^2 - b*d*f^m*n*x*x^m/(m + 1)^2 + (f*x)^(m + 1)*b*d*log(c*x^n
)/(f*(m + 1)) + (f*x)^(m + 1)*a*d/(f*(m + 1))
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 234 vs. $2(95) = 190$.

Time = 0.13 (sec) , antiderivative size = 234, normalized size of antiderivative = 2.46

$$\int (fx)^m (d+ex^2) (a+b\log(cx^n)) \, dx = \frac{bef^2f^mx^3x^m\log(c)}{f^2m+3f^2} + \frac{bef^mmnx^3x^m\log(x)}{m^2+6m+9} + \frac{aef^2f^mx^3x^m}{f^2m+3f^2} + \frac{3bef^mnx^3x^m\log(x)}{m^2+6m+9} - \frac{bef^mnx^3x^m}{m^2+6m+9} + \frac{bdf^mmnxx^m\log(x)}{m^2+2m+1} + \frac{bdf^mnxx^m\log(x)}{m^2+2m+1} - \frac{bdf^mnxx^m}{m^2+2m+1} + \frac{(fx)^m bdx\log(c)}{m+1} + \frac{(fx)^m adx}{m+1}$$

input
```
integrate((f*x)^m*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e*f^2*f^m*x^3*x^m*log(c)/(f^2*m + 3*f^2) + b*e*f^m*m*n*x^3*x^m*log(x)/(m
^2 + 6*m + 9) + a*e*f^2*f^m*x^3*x^m/(f^2*m + 3*f^2) + 3*b*e*f^m*n*x^3*x^m*
log(x)/(m^2 + 6*m + 9) - b*e*f^m*n*x^3*x^m/(m^2 + 6*m + 9) + b*d*f^m*m*n*x
*x^m*log(x)/(m^2 + 2*m + 1) + b*d*f^m*n*x*x^m*log(x)/(m^2 + 2*m + 1) - b*d
*f^m*n*x*x^m/(m^2 + 2*m + 1) + (f*x)^m*b*d*x*log(c)/(m + 1) + (f*x)^m*a*d*
x/(m + 1)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^m (d+ex^2) (a+b\log(cx^n)) \, dx = \int (f\,x)^m\,\left(e\,x^2+d\right)\,\left(a+b\,\ln\left(c\,x^n\right)\right) \,dx$$

input
```
int((f*x)^m*(d + e*x^2)*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^m*(d + e*x^2)*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 236, normalized size of antiderivative = 2.48

$$\int (fx)^m \left(d+ex^2\right)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$= \frac{x^m f^m x(\log(x^n c)\,bd\,m^3 + 7\log(x^n c)\,bd\,m^2 + 15\log(x^n c)\,bdm + 9\log(x^n c)\,bd + \log(x^n c)\,be\,m^3x^2 + 5\log(}{}$$

input
```
int((f*x)^m*(e*x^2+d)*(a+b*log(c*x^n)),x)
```

output
```
(x**m*f**m*x*(log(x**n*c)*b*d*m**3 + 7*log(x**n*c)*b*d*m**2 + 15*log(x**n*
c)*b*d*m + 9*log(x**n*c)*b*d + log(x**n*c)*b*e*m**3*x**2 + 5*log(x**n*c)*b
*e*m**2*x**2 + 7*log(x**n*c)*b*e*m*x**2 + 3*log(x**n*c)*b*e*x**2 + a*d*m**
3 + 7*a*d*m**2 + 15*a*d*m + 9*a*d + a*e*m**3*x**2 + 5*a*e*m**2*x**2 + 7*a*
e*m*x**2 + 3*a*e*x**2 - b*d*m**2*n - 6*b*d*m*n - 9*b*d*n - b*e*m**2*n*x**2
 - 2*b*e*m*n*x**2 - b*e*n*x**2))/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9)
```

3.321 $\int (fx)^m (a+b\log(cx^n))\,dx$

Optimal result 2433
Mathematica [A] (verified) 2433
Rubi [A] (verified) 2434
Maple [A] (verified) 2434
Fricas [A] (verification not implemented) 2435
Sympy [B] (verification not implemented) 2435
Maxima [A] (verification not implemented) 2436
Giac [B] (verification not implemented) 2436
Mupad [F(-1)] 2437
Reduce [B] (verification not implemented) 2437

Optimal result

Integrand size = 16, antiderivative size = 46

$$\int (fx)^m (a+b\log(cx^n))\,dx = -\frac{bn(fx)^{1+m}}{f(1+m)^2} + \frac{(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}$$

output
```
-b*n*(f*x)^(1+m)/f/(1+m)^2+(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.70

$$\int (fx)^m (a+b\log(cx^n))\,dx = \frac{x(fx)^m(a+am-bn+b(1+m)\log(cx^n))}{(1+m)^2}$$

input
```
Integrate[(f*x)^m*(a + b*Log[c*x^n]),x]
```

output
```
(x*(f*x)^m*(a + a*m - b*n + b*(1 + m)*Log[c*x^n]))/(1 + m)^2
```

Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.062, Rules used = {2741}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \; 2741$$

$$\frac{(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}-\frac{bn(fx)^{m+1}}{f(m+1)^2}$$

input
```
Int[(f*x)^m*(a + b*Log[c*x^n]),x]
```

output
```
-((b*n*(f*x)^(1 + m))/(f*(1 + m)^2)) + ((f*x)^(1 + m)*(a + b*Log[c*x^n]))/
(f*(1 + m))
```

Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 73, normalized size of antiderivative = 1.59

method	result
parallelrisch	$-\frac{-x(fx)^m\ln(cx^n)bm-x(fx)^m\ln(cx^n)b-x(fx)^m am+x(fx)^m bn-a(fx)^m x}{m^2+2m+1}$
risch	$\frac{bx\,x^m f^m \mathrm{e}^{\frac{i\,\mathrm{csgn}(ifx)\pi m(\mathrm{csgn}(ifx)-\mathrm{csgn}(ix))(-\mathrm{csgn}(ifx)+\mathrm{csgn}(if))}{2}}\ln(x^n)}{1+m}-\frac{\left(-i\pi b\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(icx^n)^2 m+i\pi b\ \mathrm{csgn}(ix^n)\right.}{}$

input
```
int((f*x)^m*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-x*(f*x)^m*ln(c*x^n)*b*m-x*(f*x)^m*ln(c*x^n)*b-x*(f*x)^m*a*m+x*(f*x)^m*b
*n-a*(f*x)^m*x)/(m^2+2*m+1)
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.13

$$\int (fx)^m (a + b\log(cx^n))\,dx = \frac{((bm+b)nx\log(x) + (bm+b)x\log(c) + (am-bn+a)x)e^{(m\log(f)+m\log(x))}}{m^2+2m+1}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((b*m + b)*n*x*log(x) + (b*m + b)*x*log(c) + (a*m - b*n + a)*x)*e^(m*log(f
) + m*log(x))/(m^2 + 2*m + 1)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 141 vs. 2(37) = 74.

Time = 2.23 (sec) , antiderivative size = 141, normalized size of antiderivative = 3.07

$$\int (fx)^m (a + b\log(cx^n))\,dx = \begin{cases} \frac{amx(fx)^m}{m^2+2m+1} + \frac{ax(fx)^m}{m^2+2m+1} + \frac{bmx(fx)^m\log(cx^n)}{m^2+2m+1} - \frac{bnx(fx)^m}{m^2+2m+1} + \frac{bx(fx)^m\log(cx^n)}{m^2+2m+1} & \text{for } m \neq -1 \\ \frac{\begin{cases} a\log(x) & \text{for } b = 0 \\ -(-a - b\log(c))\log(x) & \text{for } n = 0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}}{f} & \text{otherwise} \end{cases}$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*m*x*(f*x)**m/(m**2 + 2*m + 1) + a*x*(f*x)**m/(m**2 + 2*m + 1)
 + b*m*x*(f*x)**m*log(c*x**n)/(m**2 + 2*m + 1) - b*n*x*(f*x)**m/(m**2 + 2*
m + 1) + b*x*(f*x)**m*log(c*x**n)/(m**2 + 2*m + 1), Ne(m, -1)), (Piecewise
((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c
*x**n))**2/(2*b*n), True))/f, True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.24

$$\int (fx)^m (a + b\log(cx^n))\,dx = -\frac{bf^m nxx^m}{(m+1)^2} + \frac{(fx)^{m+1} b\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1} a}{f(m+1)}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-b*f^m*n*x*x^m/(m + 1)^2 + (f*x)^(m + 1)*b*log(c*x^n)/(f*(m + 1)) + (f*x)^
(m + 1)*a/(f*(m + 1))
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 95 vs. 2(46) = 92.

Time = 0.12 (sec) , antiderivative size = 95, normalized size of antiderivative = 2.07

$$\int (fx)^m (a + b\log(cx^n))\,dx = \frac{bf^m mnxx^m \log(x)}{m^2 + 2m + 1} + \frac{bf^m nxx^m \log(x)}{m^2 + 2m + 1} - \frac{bf^m nxx^m}{m^2 + 2m + 1} + \frac{(fx)^m bx\log(c)}{m+1} + \frac{(fx)^m ax}{m+1}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + b*f^m*n*x*x^m*log(x)/(m^2 + 2*m +
 1) - b*f^m*n*x*x^m/(m^2 + 2*m + 1) + (f*x)^m*b*x*log(c)/(m + 1) + (f*x)^m
*a*x/(m + 1)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^m (a + b\log(cx^n)) \, dx = \int (f\,x)^m \left(a + b\,\ln\left(c\,x^n\right)\right) \, dx$$

input
```
int((f*x)^m*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^m*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 44, normalized size of antiderivative = 0.96

$$\int (fx)^m (a + b\log(cx^n)) \, dx = \frac{x^m f^m x(\log(x^n c)\,bm + \log(x^n c)\,b + am + a - bn)}{m^2 + 2m + 1}$$

input
```
int((f*x)^m*(a+b*log(c*x^n)),x)
```

output
```
(x**m*f**m*x*(log(x**n*c)*b*m + log(x**n*c)*b + a*m + a - b*n))/(m**2 + 2*
m + 1)
```

3.322 $\int \frac{(fx)^m(a+b\log(cx^n))}{d+ex^2}\,dx$

Optimal result 2438
Mathematica [B] (verified) 2438
Rubi [N/A] 2439
Maple [N/A] 2440
Fricas [N/A] 2440
Sympy [N/A] 2440
Maxima [N/A] 2441
Giac [N/A] 2441
Mupad [N/A] 2441
Reduce [N/A] 2442

Optimal result

Integrand size = 25, antiderivative size = 25

$$\int \frac{(fx)^m(a+b\log(cx^n))}{d+ex^2}\,dx=\operatorname{Int}\left(\frac{(fx)^m(a+b\log(cx^n))}{d+ex^2},x\right)$$

output
```
Defer(Int)((f*x)^m*(a+b*ln(c*x^n))/(e*x^2+d),x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 108 vs. 2(28) = 56.

Time = 1.21 (sec) , antiderivative size = 108, normalized size of antiderivative = 4.32

$$\int \frac{(fx)^m(a+b\log(cx^n))}{d+ex^2}\,dx$$
$$=\frac{x(fx)^m\left(-bn\,{}_3F_2\left(1,\frac{1}{2}+\frac{m}{2},\frac{1}{2}+\frac{m}{2};\frac{3}{2}+\frac{m}{2},\frac{3}{2}+\frac{m}{2};-\frac{ex^2}{d}\right)+(1+m)\,\text{Hypergeometric2F1}\left(1,\frac{1+m}{2},\frac{3+m}{2},-\right.\right.}{d(1+m)^2}$$

input
```
Integrate[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
(x*(f*x)^m*(-(b*n*HypergeometricPFQ[{1, 1/2 + m/2, 1/2 + m/2}, {3/2 + m/2,
 3/2 + m/2}, -((e*x^2)/d)]) + (1 + m)*Hypergeometric2F1[1, (1 + m)/2, (3 +
 m)/2, -((e*x^2)/d)]*(a + b*Log[c*x^n])))/(d*(1 + m)^2)
```

Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^m (a+b\log(cx^n))}{d+ex^2} \, dx$$
$$\Big\downarrow \text{ 2796}$$
$$\int \frac{(fx)^m (a+b\log(cx^n))}{d+ex^2}dx$$

input
```
Int[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^m (a + b\ln(c\,x^n))}{e\,x^2 + d}dx$$

input
```
int((f*x)^m*(a+b*ln(c*x^n))/(e*x^2+d),x)
```

output
```
int((f*x)^m*(a+b*ln(c*x^n))/(e*x^2+d),x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.32

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex^2}\,dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{ex^2 + d}\,dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral(((f*x)^m*b*log(c*x^n) + (f*x)^m*a)/(e*x^2 + d), x)
```

Sympy [N/A]

Not integrable

Time = 7.99 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex^2}\,dx = \int \frac{(fx)^m (a + b\log(cx^n))}{d + ex^2}\,dx$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n))/(e*x**2+d),x)
```

output
```
Integral((f*x)**m*(a + b*log(c*x**n))/(d + e*x**2), x)
```

Maxima [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b\log{(cx^n)})}{d + ex^2} \, dx = \int \frac{(b\log{(cx^n)} + a)(fx)^m}{ex^2 + d} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x^2 + d), x)
```

Giac [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b\log{(cx^n)})}{d + ex^2} \, dx = \int \frac{(b\log{(cx^n)} + a)(fx)^m}{ex^2 + d} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x^2 + d), x)
```

Mupad [N/A]

Not integrable

Time = 26.77 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b\log{(cx^n)})}{d + ex^2} \, dx = \int \frac{(f\,x)^m\,(a + b\,\ln{(c\,x^n)})}{e\,x^2 + d} \, dx$$

input
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^2),x)
```

output
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^2), x)
```

Reduce [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.80

$$\int \frac{(fx)^m (a+b\log(cx^n))}{d+ex^2}\,dx = f^m\left(\left(\int \frac{x^m}{e\,x^2+d}dx\right)a+\left(\int \frac{x^m\log(x^n c)}{e\,x^2+d}dx\right)b\right)$$

input
```
int((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d),x)
```

output
```
f**m*(int(x**m/(d + e*x**2),x)*a + int((x**m*log(x**n*c))/(d + e*x**2),x)*
b)
```

3.323 $\int \frac{(fx)^m(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$

Optimal result 2443
Mathematica [B] (verified) 2443
Rubi [N/A] 2444
Maple [N/A] 2445
Fricas [N/A] 2445
Sympy [F(-1)] 2445
Maxima [N/A] 2446
Giac [N/A] 2446
Mupad [N/A] 2446
Reduce [N/A] 2447

Optimal result

Integrand size = 25, antiderivative size = 25

$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \text{Int}\left(\frac{(fx)^m (a+b\log(cx^n))}{(d+ex^2)^2},x\right)$$

output
```
Defer(Int)((f*x)^m*(a+b*ln(c*x^n))/(e*x^2+d)^2,x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 108 vs. 2(28) = 56.

Time = 0.25 (sec) , antiderivative size = 108, normalized size of antiderivative = 4.32

$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$
$$= \frac{x(fx)^m \left(-bn\,{}_3F_2\left(2,\frac{1}{2}+\frac{m}{2},\frac{1}{2}+\frac{m}{2};\frac{3}{2}+\frac{m}{2},\frac{3}{2}+\frac{m}{2};-\frac{ex^2}{d}\right)+(1+m)\,\text{Hypergeometric2F1}\left(2,\frac{1+m}{2},\frac{3+m}{2},-\right.\right.}{d^2(1+m)^2}$$

input
```
Integrate[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
(x*(f*x)^m*(-(b*n*HypergeometricPFQ[{2, 1/2 + m/2, 1/2 + m/2}, {3/2 + m/2,
 3/2 + m/2}, -((e*x^2)/d)]) + (1 + m)*Hypergeometric2F1[2, (1 + m)/2, (3 +
 m)/2, -((e*x^2)/d)]*(a + b*Log[c*x^n])))/(d^2*(1 + m)^2)
```

Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$

$$\Big\downarrow \text{ 2796}$$

$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex^2)^2}dx$$

input
```
Int[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^m (a + b\ln(c\,x^n))}{(e\,x^2 + d)^2} dx$$

input
```
int((f*x)^m*(a+b*ln(c*x^n))/(e*x^2+d)^2,x)
```

output
```
int((f*x)^m*(a+b*ln(c*x^n))/(e*x^2+d)^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.76

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex^2)^2}\, dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{(ex^2 + d)^2}\, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral(((f*x)^m*b*log(c*x^n) + (f*x)^m*a)/(e^2*x^4 + 2*d*e*x^2 + d^2), x
)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex^2)^2}\, dx = \text{Timed out}$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

output
```
Timed out
```

Maxima [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b \log (cx^n))}{(d + ex^2)^2} \, dx = \int \frac{(b \log (cx^n) + a)(fx)^m}{(ex^2 + d)^2} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x^2 + d)^2, x)
```

Giac [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b \log (cx^n))}{(d + ex^2)^2} \, dx = \int \frac{(b \log (cx^n) + a)(fx)^m}{(ex^2 + d)^2} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x^2 + d)^2, x)
```

Mupad [N/A]

Not integrable

Time = 25.28 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b \log (cx^n))}{(d + ex^2)^2} \, dx = \int \frac{(f\,x)^m\,(a + b\,\ln (c\,x^n))}{(e\,x^2 + d)^2} \, dx$$

input
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^2)^2,x)
```

output
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^2)^2, x)
```

Reduce [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.68

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex^2)^2} dx = f^m \left(\left(\int \frac{x^m}{e^2x^4 + 2de\,x^2 + d^2} dx \right) a + \left(\int \frac{x^m \log(x^n c)}{e^2x^4 + 2de\,x^2 + d^2} dx \right) b \right)$$

input
```
int((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d)^2,x)
```

output
```
f**m*(int(x**m/(d**2 + 2*d*e*x**2 + e**2*x**4),x)*a + int((x**m*log(x**n*c
))/(d**2 + 2*d*e*x**2 + e**2*x**4),x)*b)
```

3.324 $\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx$

Optimal result . . . 2448
Mathematica [A] (verified) . . . 2449
Rubi [A] (verified) . . . 2450
Maple [F] . . . 2454
Fricas [F] . . . 2454
Sympy [F(-1)] . . . 2454
Maxima [F(-2)] . . . 2455
Giac [F] . . . 2455
Mupad [F(-1)] . . . 2455
Reduce [F] . . . 2456

Optimal result

Integrand size = 22, antiderivative size = 1198

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx = \text{Too large to display}$$

output
```
1/9*x*(a+b*ln(c*x^n))^3/d^(5/3)/(d^(1/3)+e^(1/3)*x)-(-1)^(1/3)*x*(a+b*ln(c
*x^n))^3/(1+(-1)^(1/3))^4/d^(5/3)/((-1)^(2/3)*d^(1/3)+e^(1/3)*x)+1/9*x*(a+
b*ln(c*x^n))^3/d^(5/3)/(d^(1/3)+(-1)^(2/3)*e^(1/3)*x)-1/3*b*n*(a+b*ln(c*x^
n))^2*ln(1+e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+2/9*(a+b*ln(c*x^n))^3*ln(1+e
^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+3*(-1)^(1/3)*b*n*(a+b*ln(c*x^n))^2*ln(1-
(-1)^(1/3)*e^(1/3)*x/d^(1/3))/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)-6*I*3^(1/2)
*b*n*(a+b*ln(c*x^n))^2*polylog(2,(-1)^(1/3)*e^(1/3)*x/d^(1/3))/(1+(-1)^(1/
3))^5/d^(5/3)/e^(1/3)+1/3*(-1)^(1/3)*b*n*(a+b*ln(c*x^n))^2*ln(1+(-1)^(2/3)
*e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+2*(a+b*ln(c*x^n))^3*ln(1+(-1)^(2/3)*e^
(1/3)*x/d^(1/3))/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)-2/3*b^2*n^2*(a+b*ln(c*x^
n))*polylog(2,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+2/3*b*n*(a+b*ln(c*x^n))^
2*polylog(2,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+6*(-1)^(1/3)*b^2*n^2*(a+b*
ln(c*x^n))*polylog(2,(-1)^(1/3)*e^(1/3)*x/d^(1/3))/(1+(-1)^(1/3))^4/d^(5/3
)/e^(1/3)+12*I*3^(1/2)*b^2*n^2*(a+b*ln(c*x^n))*polylog(3,(-1)^(1/3)*e^(1/3
)*x/d^(1/3))/(1+(-1)^(1/3))^5/d^(5/3)/e^(1/3)+2/3*(-1)^(1/3)*b^2*n^2*(a+b*
ln(c*x^n))*polylog(2,-(-1)^(2/3)*e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+6*b*n*
(a+b*ln(c*x^n))^2*polylog(2,-(-1)^(2/3)*e^(1/3)*x/d^(1/3))/(1+(-1)^(1/3))^
4/d^(5/3)/e^(1/3)+2/3*b^3*n^3*polylog(3,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3
)-4/3*b^2*n^2*(a+b*ln(c*x^n))*polylog(3,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3
)-6*(-1)^(1/3)*b^3*n^3*polylog(3,(-1)^(1/3)*e^(1/3)*x/d^(1/3))/(1+(-1)^...
```

Mathematica [A] (verified)

Time = 8.39 (sec) , antiderivative size = 2215, normalized size of antiderivative = 1.85

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx = \text{Result too large to show}$$

input
```
Integrate[(a + b*Log[c*x^n])^3/(d + e*x^3)^2,x]
```

output
```
(x*(a + b*(-(n*Log[x]) + Log[c*x^n]))^3)/(3*d*(d + e*x^3)) + (2*ArcTan[(-d
^(1/3) + 2*e^(1/3)*x)/(Sqrt[3]*d^(1/3))]*(a + b*(-(n*Log[x]) + Log[c*x^n])
)^3)/(3*Sqrt[3]*d^(5/3)*e^(1/3)) + (2*(a + b*(-(n*Log[x]) + Log[c*x^n]))^3
*Log[d^(1/3) + e^(1/3)*x])/(9*d^(5/3)*e^(1/3)) - ((a + b*(-(n*Log[x]) + Lo
g[c*x^n]))^3*Log[d^(2/3) - d^(1/3)*e^(1/3)*x + e^(2/3)*x^2])/(9*d^(5/3)*e^
(1/3)) + 3*b*n*(a + b*(-(n*Log[x]) + Log[c*x^n]))^2*(-1/3*((-1 + (-1)^(1/3
))*((-((-1)^(1/3)/d^(1/3)) - ((-1)^(2/3)*d^(1/3) + e^(1/3)*x)^(-1))*Log[x]
 + ((-1)^(1/3)*Log[-((-1)^(2/3)*d^(1/3)) - e^(1/3)*x])/d^(1/3)))/((1 + (-1
)^(1/3))^2*d^(4/3)*e^(1/3)) + ((-1)^(1/3)*((d^(-1/3) - (d^(1/3) + e^(1/3)*
x)^(-1))*Log[x] - Log[d^(1/3) + e^(1/3)*x]/d^(1/3)))/(3*(1 + (-1)^(1/3))^2
*d^(4/3)*e^(1/3)) - (Log[x]/(e^(1/3)*((-1)^(1/3)*d^(1/3) - e^(1/3)*x)) - (
-(((-1)^(2/3)*Log[x])/d^(1/3)) + ((-1)^(2/3)*Log[d^(1/3) + (-1)^(2/3)*e^(1
/3)*x])/d^(1/3))/e^(1/3))/(3*(1 + (-1)^(1/3))^2*d^(4/3)) + (2*(-1)^(1/3)*(
Log[x]*Log[1 + (e^(1/3)*x)/d^(1/3)] + PolyLog[2, -((e^(1/3)*x)/d^(1/3))]))
/(3*(1 + (-1)^(1/3))^2*d^(5/3)*e^(1/3)) - (2*(Log[x]*Log[1 - ((-1)^(1/3)*e
^(1/3)*x)/d^(1/3)] + PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)]))/(3*(1 +
(-1)^(1/3))^2*d^(5/3)*e^(1/3)) - (2*(-1 + (-1)^(1/3))*(Log[x]*Log[1 + ((-1
)^(2/3)*e^(1/3)*x)/d^(1/3)] + PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))
]))/(3*(1 + (-1)^(1/3))^2*d^(5/3)*e^(1/3))) + 3*b^2*n^2*(a + b*(-(n*Log[x]
) + Log[c*x^n]))*(((-1)^(1/3)*(Log[x]*((e^(1/3)*x*Log[x])/(d^(1/3) + e^...
```

Rubi [A] (verified)

Time = 1.99 (sec) , antiderivative size = 1198, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx$$

$$\Big\downarrow \text{2767}$$

$$\int \left(\frac{2(a+b\log(cx^n))^3}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}x\right)}-\frac{2(-1)^{5/6}\sqrt{3}(a+b\log(cx^n))^3}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\left(\sqrt[3]{-1}\sqrt[3]{e}x-\sqrt[3]{d}\right)}+\frac{2(-1)^{2/3}(a+b\log(cx^n))^3}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}x\right)}+\frac{(a}{9d^4}\right.$$

↓ 2009

$$\frac{2b^3\operatorname{PolyLog}\left(3,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^3}{3d^{5/3}\sqrt[3]{e}}-\frac{6\sqrt[3]{-1}b^3\operatorname{PolyLog}\left(3,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^3}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\sqrt[3]{e}}-\frac{2\sqrt[3]{-1}b^3\operatorname{PolyLog}\left(3,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^3}{3d^{5/3}\sqrt[3]{e}}+\frac{4b^3\operatorname{PolyLog}\left(4,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^3}{3d^{5/3}\sqrt[3]{e}}-\frac{12i\sqrt{3}b^3\operatorname{PolyLog}\left(4,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^3}{\left(1+\sqrt[3]{-1}\right)^5d^{5/3}\sqrt[3]{e}}+\frac{12b^3\operatorname{PolyLog}\left(4,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^3}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\sqrt[3]{e}}-\frac{2b^2(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{3d^{5/3}\sqrt[3]{e}}+\frac{6\sqrt[3]{-1}b^2(a+b\log(cx^n))\operatorname{PolyLog}\left(2,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\sqrt[3]{e}}+\frac{2\sqrt[3]{-1}b^2(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{3d^{5/3}\sqrt[3]{e}}-\frac{4b^2(a+b\log(cx^n))\operatorname{PolyLog}\left(3,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{3d^{5/3}\sqrt[3]{e}}+\frac{12i\sqrt{3}b^2(a+b\log(cx^n))\operatorname{PolyLog}\left(3,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{\left(1+\sqrt[3]{-1}\right)^5d^{5/3}\sqrt[3]{e}}-\frac{12b^2(a+b\log(cx^n))\operatorname{PolyLog}\left(3,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\sqrt[3]{e}}-\frac{b(a+b\log(cx^n))^2\log\left(\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)n}{3d^{5/3}\sqrt[3]{e}}+\frac{3\sqrt[3]{-1}b(a+b\log(cx^n))^2\log\left(1-\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\sqrt[3]{e}}+\frac{\sqrt[3]{-1}b(a+b\log(cx^n))^2\log\left(\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)n}{3d^{5/3}\sqrt[3]{e}}+\frac{2b(a+b\log(cx^n))^2\operatorname{PolyLog}\left(2,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n}{3d^{5/3}\sqrt[3]{e}}-\frac{6i\sqrt{3}b(a+b\log(cx^n))^2\operatorname{PolyLog}\left(2,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n}{\left(1+\sqrt[3]{-1}\right)^5d^{5/3}\sqrt[3]{e}}+\frac{6b(a+b\log(cx^n))^2\operatorname{PolyLog}\left(2,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\sqrt[3]{e}}+\frac{x(a+b\log(cx^n))^3}{9d^{5/3}\left(\sqrt[3]{e}x+\sqrt[3]{d}\right)}-\frac{\sqrt[3]{-1}x(a+b\log(cx^n))^3}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\left(\sqrt[3]{e}x+(-1)^{2/3}\sqrt[3]{d}\right)}+\frac{x(a+b\log(cx^n))^3}{9d^{5/3}\left((-1)^{2/3}\sqrt[3]{e}x+\sqrt[3]{d}\right)}+\frac{2(a+b\log(cx^n))^3\log\left(\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)}{9d^{5/3}\sqrt[3]{e}}-\frac{2i\sqrt{3}(a+b\log(cx^n))^3\log\left(1-\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^5d^{5/3}\sqrt[3]{e}}+$$

input
```
Int[(a + b*Log[c*x^n])^3/(d + e*x^3)^2,x]
```

output
```
(x*(a + b*Log[c*x^n])^3)/(9*d^(5/3)*(d^(1/3) + e^(1/3)*x)) - ((-1)^(1/3)*x
*(a + b*Log[c*x^n])^3)/((1 + (-1)^(1/3))^4*d^(5/3)*((-1)^(2/3)*d^(1/3) + e
^(1/3)*x)) + (x*(a + b*Log[c*x^n])^3)/(9*d^(5/3)*(d^(1/3) + (-1)^(2/3)*e^(
1/3)*x)) - (b*n*(a + b*Log[c*x^n])^2*Log[1 + (e^(1/3)*x)/d^(1/3)])/(3*d^(5
/3)*e^(1/3)) + (2*(a + b*Log[c*x^n])^3*Log[1 + (e^(1/3)*x)/d^(1/3)])/(9*d^
(5/3)*e^(1/3)) + (3*(-1)^(1/3)*b*n*(a + b*Log[c*x^n])^2*Log[1 - ((-1)^(1/3
)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) - ((2*I)*Sqrt[
3]*(a + b*Log[c*x^n])^3*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1
)^(1/3))^5*d^(5/3)*e^(1/3)) + ((-1)^(1/3)*b*n*(a + b*Log[c*x^n])^2*Log[1 +
 ((-1)^(2/3)*e^(1/3)*x)/d^(1/3)])/(3*d^(5/3)*e^(1/3)) + (2*(a + b*Log[c*x^
n])^3*Log[1 + ((-1)^(2/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)
*e^(1/3)) - (2*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[2, -((e^(1/3)*x)/d^(1/3)
)])/(3*d^(5/3)*e^(1/3)) + (2*b*n*(a + b*Log[c*x^n])^2*PolyLog[2, -((e^(1/3
)*x)/d^(1/3))])/(3*d^(5/3)*e^(1/3)) + (6*(-1)^(1/3)*b^2*n^2*(a + b*Log[c*x
^n])*PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/
3)*e^(1/3)) - ((6*I)*Sqrt[3]*b*n*(a + b*Log[c*x^n])^2*PolyLog[2, ((-1)^(1/
3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^5*d^(5/3)*e^(1/3)) + (2*(-1)^(1/
3)*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))
])/(3*d^(5/3)*e^(1/3)) + (6*b*n*(a + b*Log[c*x^n])^2*PolyLog[2, -(((-1)^(2
/3)*e^(1/3)*x)/d^(1/3))])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) + (2*b^3...
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Maple [F]

$$\int \frac{(a+b\ln(c\,x^n))^3}{(e\,x^3+d)^2}dx$$

input
```
int((a+b*ln(c*x^n))^3/(e*x^3+d)^2,x)
```

output
```
int((a+b*ln(c*x^n))^3/(e*x^3+d)^2,x)
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex^3+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/(e*x^3+d)^2,x, algorithm="fricas")
```

output
```
integral((b^3*log(c*x^n)^3 + 3*a*b^2*log(c*x^n)^2 + 3*a^2*b*log(c*x^n) + a
^3)/(e^2*x^6 + 2*d*e*x^3 + d^2), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))**3/(e*x**3+d)**2,x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))^3/(e*x^3+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex^3+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/(e*x^3+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^3/(e*x^3 + d)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^3}{(e\,x^3+d)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^3/(d + e*x^3)^2,x)
```

output
```
int((a + b*log(c*x^n))^3/(d + e*x^3)^2, x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx$$
$$= \frac{-2d^{\frac{4}{3}}\sqrt{3}\,atan\left(\frac{d^{\frac{1}{3}}-2e^{\frac{1}{3}}x}{d^{\frac{1}{3}}\sqrt{3}}\right)a^3-2d^{\frac{1}{3}}\sqrt{3}\,atan\left(\frac{d^{\frac{1}{3}}-2e^{\frac{1}{3}}x}{d^{\frac{1}{3}}\sqrt{3}}\right)a^3e\,x^3-d^{\frac{4}{3}}\log\left(d^{\frac{2}{3}}-e^{\frac{1}{3}}d^{\frac{1}{3}}x+e^{\frac{2}{3}}x^2\right)a^3-d^{\frac{1}{3}}\log\left(\right.}{}$$

input
```
int((a+b*log(c*x^n))^3/(e*x^3+d)^2,x)
```

output
```
( - 2*d**(1/3)*sqrt(3)*atan((d**(1/3) - 2*e**(1/3)*x)/(d**(1/3)*sqrt(3)))*
a**3*d - 2*d**(1/3)*sqrt(3)*atan((d**(1/3) - 2*e**(1/3)*x)/(d**(1/3)*sqrt(
3)))*a**3*e*x**3 - d**(1/3)*log(d**(2/3) - e**(1/3)*d**(1/3)*x + e**(2/3)*
x**2)*a**3*d - d**(1/3)*log(d**(2/3) - e**(1/3)*d**(1/3)*x + e**(2/3)*x**2
)*a**3*e*x**3 + 2*d**(1/3)*log(d**(1/3) + e**(1/3)*x)*a**3*d + 2*d**(1/3)*
log(d**(1/3) + e**(1/3)*x)*a**3*e*x**3 + 9*e**(1/3)*int(log(x**n*c)**3/(d*
*2 + 2*d*e*x**3 + e**2*x**6),x)*b**3*d**3 + 9*e**(1/3)*int(log(x**n*c)**3/
(d**2 + 2*d*e*x**3 + e**2*x**6),x)*b**3*d**2*e*x**3 + 27*e**(1/3)*int(log(
x**n*c)**2/(d**2 + 2*d*e*x**3 + e**2*x**6),x)*a*b**2*d**3 + 27*e**(1/3)*in
t(log(x**n*c)**2/(d**2 + 2*d*e*x**3 + e**2*x**6),x)*a*b**2*d**2*e*x**3 + 2
7*e**(1/3)*int(log(x**n*c)/(d**2 + 2*d*e*x**3 + e**2*x**6),x)*a**2*b*d**3
+ 27*e**(1/3)*int(log(x**n*c)/(d**2 + 2*d*e*x**3 + e**2*x**6),x)*a**2*b*d*
*2*e*x**3 + 3*e**(1/3)*a**3*d*x)/(9*e**(1/3)*d**2*(d + e*x**3))
```

3.325 $\int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx$

Optimal result 2457
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Rubi [A] (verified) 2459
Maple [F] 2462
Fricas [F] 2462
Sympy [F] 2462
Maxima [F(-2)] 2463
Giac [F] 2463
Mupad [F(-1)] 2463
Reduce [F] 2464

Optimal result

Integrand size = 22, antiderivative size = 860

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx = \text{Too large to display}$$

output
```
1/9*x*(a+b*ln(c*x^n))^2/d^(5/3)/(d^(1/3)+e^(1/3)*x)-(-1)^(1/3)*x*(a+b*ln(c
*x^n))^2/(1+(-1)^(1/3))^4/d^(5/3)/((-1)^(2/3)*d^(1/3)+e^(1/3)*x)+1/9*x*(a+
b*ln(c*x^n))^2/d^(5/3)/(d^(1/3)+(-1)^(2/3)*e^(1/3)*x)-2/9*b*n*(a+b*ln(c*x^
n))*ln(1+e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+2/9*(a+b*ln(c*x^n))^2*ln(1+e^(
1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+2*(-1)^(1/3)*b*n*(a+b*ln(c*x^n))*ln(1-(-1)
^(1/3)*e^(1/3)*x/d^(1/3))/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)-2*I*3^(1/2)*(a+
b*ln(c*x^n))^2*ln(1-(-1)^(1/3)*e^(1/3)*x/d^(1/3))/(1+(-1)^(1/3))^5/d^(5/3)
/e^(1/3)+2/9*(-1)^(1/3)*b*n*(a+b*ln(c*x^n))*ln(1+(-1)^(2/3)*e^(1/3)*x/d^(1
/3))/d^(5/3)/e^(1/3)+2*(a+b*ln(c*x^n))^2*ln(1+(-1)^(2/3)*e^(1/3)*x/d^(1/3)
)/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)-2/9*b^2*n^2*polylog(2,-e^(1/3)*x/d^(1/3
))/d^(5/3)/e^(1/3)+4/9*b*n*(a+b*ln(c*x^n))*polylog(2,-e^(1/3)*x/d^(1/3))/d
^(5/3)/e^(1/3)+2*(-1)^(1/3)*b^2*n^2*polylog(2,(-1)^(1/3)*e^(1/3)*x/d^(1/3)
)/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)+4*I*3^(1/2)*b^2*n^2*polylog(3,(-1)^(1/3
)*e^(1/3)*x/d^(1/3))/(1+(-1)^(1/3))^5/d^(5/3)/e^(1/3)+2/9*(-1)^(1/3)*b^2*n
^2*polylog(2,-(-1)^(2/3)*e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+4*b*n*(a+b*ln(
c*x^n))*polylog(2,-(-1)^(2/3)*e^(1/3)*x/d^(1/3))/(1+(-1)^(1/3))^4/d^(5/3)/
e^(1/3)-4/9*b^2*n^2*polylog(3,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)-4*I*3^(1
/2)*b*n*(a+b*ln(c*x^n))*polylog(2,(-1)^(1/3)*e^(1/3)*x/d^(1/3))/(1+(-1)^(1
/3))^5/d^(5/3)/e^(1/3)-4*b^2*n^2*polylog(3,-(-1)^(2/3)*e^(1/3)*x/d^(1/3))/
(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)
```

Mathematica [A] (verified)

Time = 6.23 (sec) , antiderivative size = 1379, normalized size of antiderivative = 1.60

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx = \text{Too large to display}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(d + e*x^3)^2,x]
```

output
```
(x*(a + b*(-(n*Log[x]) + Log[c*x^n]))^2)/(3*d*(d + e*x^3)) + (2*ArcTan[(-d
^(1/3) + 2*e^(1/3)*x)/(Sqrt[3]*d^(1/3))]*(a + b*(-(n*Log[x]) + Log[c*x^n])
)^2)/(3*Sqrt[3]*d^(5/3)*e^(1/3)) + (2*(a + b*(-(n*Log[x]) + Log[c*x^n]))^2
*Log[d^(1/3) + e^(1/3)*x])/(9*d^(5/3)*e^(1/3)) - ((a + b*(-(n*Log[x]) + Lo
g[c*x^n]))^2*Log[d^(2/3) - d^(1/3)*e^(1/3)*x + e^(2/3)*x^2])/(9*d^(5/3)*e^
(1/3)) + 2*b*n*(a + b*(-(n*Log[x]) + Log[c*x^n]))*(-1/3*((-1 + (-1)^(1/3))
*((-((-1)^(1/3)/d^(1/3)) - ((-1)^(2/3)*d^(1/3) + e^(1/3)*x)^(-1))*Log[x] +
 ((-1)^(1/3)*Log[-((-1)^(2/3)*d^(1/3)) - e^(1/3)*x])/d^(1/3)))/((1 + (-1)^
(1/3))^2*d^(4/3)*e^(1/3)) + ((-1)^(1/3)*((d^(-1/3) - (d^(1/3) + e^(1/3)*x)
^(-1))*Log[x] - Log[d^(1/3) + e^(1/3)*x]/d^(1/3)))/(3*(1 + (-1)^(1/3))^2*d
^(4/3)*e^(1/3)) - (Log[x]/(e^(1/3)*((-1)^(1/3)*d^(1/3) - e^(1/3)*x)) - (-(
((-1)^(2/3)*Log[x])/d^(1/3)) + ((-1)^(2/3)*Log[d^(1/3) + (-1)^(2/3)*e^(1/3
)*x])/d^(1/3))/e^(1/3))/(3*(1 + (-1)^(1/3))^2*d^(4/3)) + (2*(-1)^(1/3)*(Lo
g[x]*Log[1 + (e^(1/3)*x)/d^(1/3)] + PolyLog[2, -((e^(1/3)*x)/d^(1/3))]))/(
3*(1 + (-1)^(1/3))^2*d^(5/3)*e^(1/3)) - (2*(Log[x]*Log[1 - ((-1)^(1/3)*e^(
1/3)*x)/d^(1/3)] + PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)]))/(3*(1 + (-
1)^(1/3))^2*d^(5/3)*e^(1/3)) - (2*(-1 + (-1)^(1/3))*(Log[x]*Log[1 + ((-1)^
(2/3)*e^(1/3)*x)/d^(1/3)] + PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))])
)/(3*(1 + (-1)^(1/3))^2*d^(5/3)*e^(1/3))) + b^2*n^2*(((-1)^(1/3)*(Log[x]*(
(e^(1/3)*x*Log[x])/(d^(1/3) + e^(1/3)*x) - 2*Log[1 + (e^(1/3)*x)/d^(1/3...
```

Rubi [A] (verified)

Time = 1.31 (sec) , antiderivative size = 860, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx$$

$$\Big\downarrow \text{2767}$$

$$\int \left(\frac{2(a+b\log(cx^n))^2}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}x\right)}-\frac{2(-1)^{5/6}\sqrt{3}(a+b\log(cx^n))^2}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\left(\sqrt[3]{-1}\sqrt[3]{e}x-\sqrt[3]{d}\right)}+\frac{2(-1)^{2/3}(a+b\log(cx^n))^2}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}x\right)}+\frac{(a}{9d^4}\right.$$

$\downarrow$ 2009

$$-\frac{2b^2\operatorname{PolyLog}\left(2,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{9d^{5/3}\sqrt[3]{e}}+\frac{2\sqrt[3]{-1}b^2\operatorname{PolyLog}\left(2,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\sqrt[3]{e}}+\frac{2\sqrt[3]{-1}b^2\operatorname{PolyLog}\left(2,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{9d^{5/3}\sqrt[3]{e}}-\frac{4b^2\operatorname{PolyLog}\left(3,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{9d^{5/3}\sqrt[3]{e}}+\frac{4i\sqrt{3}b^2\operatorname{PolyLog}\left(3,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{\left(1+\sqrt[3]{-1}\right)^5d^{5/3}\sqrt[3]{e}}-\frac{4b^2\operatorname{PolyLog}\left(3,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\sqrt[3]{e}}-\frac{2b(a+b\log(cx^n))\log\left(\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)n}{9d^{5/3}\sqrt[3]{e}}+\frac{2\sqrt[3]{-1}b(a+b\log(cx^n))\log\left(1-\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\sqrt[3]{e}}+\frac{2\sqrt[3]{-1}b(a+b\log(cx^n))\log\left(\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)n}{9d^{5/3}\sqrt[3]{e}}+\frac{4b(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n}{9d^{5/3}\sqrt[3]{e}}-\frac{4i\sqrt{3}b(a+b\log(cx^n))\operatorname{PolyLog}\left(2,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n}{\left(1+\sqrt[3]{-1}\right)^5d^{5/3}\sqrt[3]{e}}+\frac{4b(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\sqrt[3]{e}}+\frac{x(a+b\log(cx^n))^2}{9d^{5/3}\left(\sqrt[3]{e}x+\sqrt[3]{d}\right)}-\frac{\sqrt[3]{-1}x(a+b\log(cx^n))^2}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\left(\sqrt[3]{e}x+(-1)^{2/3}\sqrt[3]{d}\right)}+\frac{x(a+b\log(cx^n))^2}{9d^{5/3}\left((-1)^{2/3}\sqrt[3]{e}x+\sqrt[3]{d}\right)}+\frac{2(a+b\log(cx^n))^2\log\left(\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)}{9d^{5/3}\sqrt[3]{e}}-\frac{2i\sqrt{3}(a+b\log(cx^n))^2\log\left(1-\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^5d^{5/3}\sqrt[3]{e}}+\frac{2(a+b\log(cx^n))^2\log\left(\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\sqrt[3]{e}}$$

input
```
Int[(a + b*Log[c*x^n])^2/(d + e*x^3)^2,x]
```

output
```
(x*(a + b*Log[c*x^n])^2)/(9*d^(5/3)*(d^(1/3) + e^(1/3)*x)) - ((-1)^(1/3)*x
*(a + b*Log[c*x^n])^2)/((1 + (-1)^(1/3))^4*d^(5/3)*((-1)^(2/3)*d^(1/3) + e
^(1/3)*x)) + (x*(a + b*Log[c*x^n])^2)/(9*d^(5/3)*(d^(1/3) + (-1)^(2/3)*e^(
1/3)*x)) - (2*b*n*(a + b*Log[c*x^n])*Log[1 + (e^(1/3)*x)/d^(1/3)])/(9*d^(5
/3)*e^(1/3)) + (2*(a + b*Log[c*x^n])^2*Log[1 + (e^(1/3)*x)/d^(1/3)])/(9*d^
(5/3)*e^(1/3)) + (2*(-1)^(1/3)*b*n*(a + b*Log[c*x^n])*Log[1 - ((-1)^(1/3)*
e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) - ((2*I)*Sqrt[3]
*(a + b*Log[c*x^n])^2*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^
(1/3))^5*d^(5/3)*e^(1/3)) + (2*(-1)^(1/3)*b*n*(a + b*Log[c*x^n])*Log[1 + (
(-1)^(2/3)*e^(1/3)*x)/d^(1/3)])/(9*d^(5/3)*e^(1/3)) + (2*(a + b*Log[c*x^n]
)^2*Log[1 + ((-1)^(2/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)*e
^(1/3)) - (2*b^2*n^2*PolyLog[2, -((e^(1/3)*x)/d^(1/3))])/(9*d^(5/3)*e^(1/3
)) + (4*b*n*(a + b*Log[c*x^n])*PolyLog[2, -((e^(1/3)*x)/d^(1/3))])/(9*d^(5
/3)*e^(1/3)) + (2*(-1)^(1/3)*b^2*n^2*PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(
1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) - ((4*I)*Sqrt[3]*b*n*(a + b*Lo
g[c*x^n])*PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^5*
d^(5/3)*e^(1/3)) + (2*(-1)^(1/3)*b^2*n^2*PolyLog[2, -(((-1)^(2/3)*e^(1/3)*
x)/d^(1/3))])/(9*d^(5/3)*e^(1/3)) + (4*b*n*(a + b*Log[c*x^n])*PolyLog[2, -
(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) -
(4*b^2*n^2*PolyLog[3, -((e^(1/3)*x)/d^(1/3))])/(9*d^(5/3)*e^(1/3)) + ((...
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Maple [F]

$$\int \frac{(a+b\ln(cx^n))^2}{(e\,x^3+d)^2}dx$$

input
```
int((a+b*ln(c*x^n))^2/(e*x^3+d)^2,x)
```

output
```
int((a+b*ln(c*x^n))^2/(e*x^3+d)^2,x)
```

Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex^3+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x^3+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^2*x^6 + 2*d*e*x^3
+ d^2), x)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx = \int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/(e*x**3+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(d + e*x**3)**2, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(a + b\log(cx^n))^2}{(d + ex^3)^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x^3+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{(a + b\log(cx^n))^2}{(d + ex^3)^2}\,dx = \int \frac{(b\log(cx^n) + a)^2}{(ex^3 + d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x^3+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/(e*x^3 + d)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a + b\log(cx^n))^2}{(d + ex^3)^2}\,dx = \int \frac{(a + b\,\ln(c\,x^n))^2}{(e\,x^3 + d)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(d + e*x^3)^2,x)
```

output
```
int((a + b*log(c*x^n))^2/(d + e*x^3)^2, x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx$$
$$= \frac{-2d^{\frac{4}{3}}\sqrt{3}\,atan\left(\frac{d^{\frac{1}{3}}-2e^{\frac{1}{3}}x}{d^{\frac{1}{3}}\sqrt{3}}\right)a^2-2d^{\frac{1}{3}}\sqrt{3}\,atan\left(\frac{d^{\frac{1}{3}}-2e^{\frac{1}{3}}x}{d^{\frac{1}{3}}\sqrt{3}}\right)a^2e\,x^3-d^{\frac{4}{3}}\log\left(d^{\frac{2}{3}}-e^{\frac{1}{3}}d^{\frac{1}{3}}x+e^{\frac{2}{3}}x^2\right)a^2-d^{\frac{1}{3}}\log\left(d\right.}{}$$

input
```
int((a+b*log(c*x^n))^2/(e*x^3+d)^2,x)
```

output
```
( - 2*d**(1/3)*sqrt(3)*atan((d**(1/3) - 2*e**(1/3)*x)/(d**(1/3)*sqrt(3)))*
a**2*d - 2*d**(1/3)*sqrt(3)*atan((d**(1/3) - 2*e**(1/3)*x)/(d**(1/3)*sqrt(
3)))*a**2*e*x**3 - d**(1/3)*log(d**(2/3) - e**(1/3)*d**(1/3)*x + e**(2/3)*
x**2)*a**2*d - d**(1/3)*log(d**(2/3) - e**(1/3)*d**(1/3)*x + e**(2/3)*x**2
)*a**2*e*x**3 + 2*d**(1/3)*log(d**(1/3) + e**(1/3)*x)*a**2*d + 2*d**(1/3)*
log(d**(1/3) + e**(1/3)*x)*a**2*e*x**3 + 9*e**(1/3)*int(log(x**n*c)**2/(d*
*2 + 2*d*e*x**3 + e**2*x**6),x)*b**2*d**3 + 9*e**(1/3)*int(log(x**n*c)**2/
(d**2 + 2*d*e*x**3 + e**2*x**6),x)*b**2*d**2*e*x**3 + 18*e**(1/3)*int(log(
x**n*c)/(d**2 + 2*d*e*x**3 + e**2*x**6),x)*a*b*d**3 + 18*e**(1/3)*int(log(
x**n*c)/(d**2 + 2*d*e*x**3 + e**2*x**6),x)*a*b*d**2*e*x**3 + 3*e**(1/3)*a*
*2*d*x)/(9*e**(1/3)*d**2*(d + e*x**3))
```

3.326 $\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx$

Optimal result 2466
Mathematica [A] (verified) 2467
Rubi [A] (verified) 2468
Maple [C] (warning: unable to verify) 2470
Fricas [F] 2471
Sympy [F] 2471
Maxima [F(-2)] 2472
Giac [F] 2472
Mupad [F(-1)] 2472
Reduce [F] 2473

Optimal result

Integrand size = 20, antiderivative size = 520

$$\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx = \frac{x(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}x\right)} - \frac{\sqrt[3]{-1}x(a+b\log(cx^n))}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\left((-1)^{2/3}\sqrt[3]{d}+\sqrt[3]{e}x\right)} + \frac{x(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}x\right)} + \frac{\sqrt[3]{-1}bn\log\left(-(-1)^{2/3}\sqrt[3]{d}-\sqrt[3]{e}x\right)}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}} - \frac{bn\log\left(\sqrt[3]{d}+\sqrt[3]{e}x\right)}{9d^{5/3}\sqrt[3]{e}} + \frac{\sqrt[3]{-1}bn\log\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}x\right)}{9d^{5/3}\sqrt[3]{e}} + \frac{2(a+b\log(cx^n))\log\left(1+\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{9d^{5/3}\sqrt[3]{e}} - \frac{2i\sqrt{3}(a+b\log(cx^n))\log\left(1-\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\sqrt[3]{e}} + \frac{2(a+b\log(cx^n))\log\left(1+\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}} + \frac{2bn\,\mathrm{PolyLog}\left(2,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{9d^{5/3}\sqrt[3]{e}} - \frac{2i\sqrt{3}bn\,\mathrm{PolyLog}\left(2,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\sqrt[3]{e}} + \frac{2bn\,\mathrm{PolyLog}\left(2,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}}$$

output
```
1/9*x*(a+b*ln(c*x^n))/d^(5/3)/(d^(1/3)+e^(1/3)*x)-(-1)^(1/3)*x*(a+b*ln(c*x
^n))/(1+(-1)^(1/3))^4/d^(5/3)/((-1)^(2/3)*d^(1/3)+e^(1/3)*x)+1/9*x*(a+b*ln
(c*x^n))/d^(5/3)/(d^(1/3)+(-1)^(2/3)*e^(1/3)*x)+(-1)^(1/3)*b*n*ln(-(-1)^(2
/3)*d^(1/3)-e^(1/3)*x)/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)-1/9*b*n*ln(d^(1/3)
+e^(1/3)*x)/d^(5/3)/e^(1/3)+1/9*(-1)^(1/3)*b*n*ln(d^(1/3)+(-1)^(2/3)*e^(1/
3)*x)/d^(5/3)/e^(1/3)+2/9*(a+b*ln(c*x^n))*ln(1+e^(1/3)*x/d^(1/3))/d^(5/3)/
e^(1/3)-2*I*3^(1/2)*(a+b*ln(c*x^n))*ln(1-(-1)^(1/3)*e^(1/3)*x/d^(1/3))/(1+
(-1)^(1/3))^5/d^(5/3)/e^(1/3)+2*(a+b*ln(c*x^n))*ln(1+(-1)^(2/3)*e^(1/3)*x/
d^(1/3))/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)+2/9*b*n*polylog(2,-e^(1/3)*x/d^(
1/3))/d^(5/3)/e^(1/3)-2*I*3^(1/2)*b*n*polylog(2,(-1)^(1/3)*e^(1/3)*x/d^(1/
3))/(1+(-1)^(1/3))^5/d^(5/3)/e^(1/3)+2*b*n*polylog(2,-(-1)^(2/3)*e^(1/3)*x
/d^(1/3))/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)
```

Mathematica [A] (verified)

Time = 1.52 (sec) , antiderivative size = 571, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx$$

$$= \frac{\frac{3d^{2/3}x(a-bn\log(x)+b\log(cx^n))}{d+ex^3} - \frac{2\sqrt{3}\arctan\left(\frac{1-\frac{2\sqrt[3]{e}x}{\sqrt[3]{d}}}{\sqrt{3}}\right)(a-bn\log(x)+b\log(cx^n))}{\sqrt[3]{e}} + \frac{2(a-bn\log(x)+b\log(cx^n))\log\left(\sqrt[3]{d}+\sqrt[3]{e}x\right)}{\sqrt[3]{e}}}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x^3)^2,x]
```

output
```
((3*d^(2/3)*x*(a - b*n*Log[x] + b*Log[c*x^n]))/(d + e*x^3) - (2*Sqrt[3]*Ar
cTan[(1 - (2*e^(1/3)*x)/d^(1/3))/Sqrt[3]]*(a - b*n*Log[x] + b*Log[c*x^n]))
/e^(1/3) + (2*(a - b*n*Log[x] + b*Log[c*x^n])*Log[d^(1/3) + e^(1/3)*x])/e^
(1/3) - ((a - b*n*Log[x] + b*Log[c*x^n])*Log[d^(2/3) - d^(1/3)*e^(1/3)*x +
 e^(2/3)*x^2])/e^(1/3) + (3*b*n*(((-1 + (-1)^(1/3))*((-1)^(1/3)*e^(1/3)*x*
Log[x] + (d^(1/3) - (-1)^(1/3)*e^(1/3)*x)*Log[-((-1)^(2/3)*d^(1/3)) - e^(1
/3)*x]))/((-1)^(2/3)*d^(1/3)*e^(1/3) + e^(2/3)*x) + (-1)^(1/3)*((x*Log[x])
/(d^(1/3) + e^(1/3)*x) - Log[d^(1/3) + e^(1/3)*x]/e^(1/3)) + (-((-1)^(2/3)
*e^(1/3)*x*Log[x]) + (d^(1/3) + (-1)^(2/3)*e^(1/3)*x)*Log[d^(1/3) + (-1)^(
2/3)*e^(1/3)*x])/(-((-1)^(1/3)*d^(1/3)*e^(1/3)) + e^(2/3)*x) + (2*(-1)^(1/
3)*(Log[x]*Log[1 + (e^(1/3)*x)/d^(1/3)] + PolyLog[2, -((e^(1/3)*x)/d^(1/3)
)]))/e^(1/3) - (2*(Log[x]*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)] + PolyLo
g[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)]))/e^(1/3) - (2*(-1 + (-1)^(1/3))*(Log
[x]*Log[1 + ((-1)^(2/3)*e^(1/3)*x)/d^(1/3)] + PolyLog[2, -(((-1)^(2/3)*e^(
1/3)*x)/d^(1/3))]))/e^(1/3)))/(1 + (-1)^(1/3))^2)/(9*d^(5/3))
```

Rubi [A] (verified)

Time = 0.89 (sec) , antiderivative size = 520, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx$$

$$\Big\downarrow \text{2767}$$

$$\int \left(\frac{2(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}x\right)}-\frac{2(-1)^{5/6}\sqrt{3}(a+b\log(cx^n))}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\left(\sqrt[3]{-1}\sqrt[3]{e}x-\sqrt[3]{d}\right)}+\frac{2(-1)^{2/3}(a+b\log(cx^n))}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}x\right)}+\frac{a}{9d^4}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{2\log\left(\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)(a+b\log(cx^n))}{9d^{5/3}\sqrt[3]{e}}-\frac{2i\sqrt{3}\log\left(1-\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)(a+b\log(cx^n))}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\sqrt[3]{e}}+\frac{2\log\left(\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)(a+b\log(cx^n))}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}}+\frac{x(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}x\right)}-\frac{\sqrt[3]{-1}x(a+b\log(cx^n))}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\left((-1)^{2/3}\sqrt[3]{d}+\sqrt[3]{e}x\right)}+\frac{x(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}x\right)}+\frac{2bn\operatorname{PolyLog}\left(2,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{9d^{5/3}\sqrt[3]{e}}-\frac{2i\sqrt{3}bn\operatorname{PolyLog}\left(2,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\sqrt[3]{e}}+\frac{2bn\operatorname{PolyLog}\left(2,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}}+\frac{\sqrt[3]{-1}bn\log\left(-(-1)^{2/3}\sqrt[3]{d}-\sqrt[3]{e}x\right)}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}}-\frac{bn\log\left(\sqrt[3]{d}+\sqrt[3]{e}x\right)}{9d^{5/3}\sqrt[3]{e}}+\frac{\sqrt[3]{-1}bn\log\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}x\right)}{9d^{5/3}\sqrt[3]{e}}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x^3)^2,x]
```

output
```
(x*(a + b*Log[c*x^n]))/(9*d^(5/3)*(d^(1/3) + e^(1/3)*x)) - ((-1)^(1/3)*x*(
a + b*Log[c*x^n]))/((1 + (-1)^(1/3))^4*d^(5/3)*((-1)^(2/3)*d^(1/3) + e^(1/
3)*x)) + (x*(a + b*Log[c*x^n]))/(9*d^(5/3)*(d^(1/3) + (-1)^(2/3)*e^(1/3)*x
)) + ((-1)^(1/3)*b*n*Log[-((-1)^(2/3)*d^(1/3)) - e^(1/3)*x])/((1 + (-1)^(1
/3))^4*d^(5/3)*e^(1/3)) - (b*n*Log[d^(1/3) + e^(1/3)*x])/(9*d^(5/3)*e^(1/3
)) + ((-1)^(1/3)*b*n*Log[d^(1/3) + (-1)^(2/3)*e^(1/3)*x])/(9*d^(5/3)*e^(1/
3)) + (2*(a + b*Log[c*x^n])*Log[1 + (e^(1/3)*x)/d^(1/3)])/(9*d^(5/3)*e^(1/
3)) - ((2*I)*Sqrt[3]*(a + b*Log[c*x^n])*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(
1/3)])/((1 + (-1)^(1/3))^5*d^(5/3)*e^(1/3)) + (2*(a + b*Log[c*x^n])*Log[1
+ ((-1)^(2/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) +
(2*b*n*PolyLog[2, -((e^(1/3)*x)/d^(1/3))])/(9*d^(5/3)*e^(1/3)) - ((2*I)*Sq
rt[3]*b*n*PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^5*
d^(5/3)*e^(1/3)) + (2*b*n*PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))])/(
(1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3))
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.20 (sec) , antiderivative size = 598, normalized size of antiderivative = 1.15

method	result
risch	$\frac{bx\ln(x^n)}{3d(e\,x^3+d)}-\frac{2b\ln\left(x+\left(\frac{d}{e}\right)^{\frac{1}{3}}\right)n\ln(x)}{9e\left(\frac{d}{e}\right)^{\frac{2}{3}}d}+\frac{2b\ln\left(x+\left(\frac{d}{e}\right)^{\frac{1}{3}}\right)\ln(x^n)}{9e\left(\frac{d}{e}\right)^{\frac{2}{3}}d}+\frac{b\ln\left(x^2-\left(\frac{d}{e}\right)^{\frac{1}{3}}x+\left(\frac{d}{e}\right)^{\frac{2}{3}}\right)n\ln(x)}{9de\left(\frac{d}{e}\right)^{\frac{2}{3}}}-\frac{b\ln\left(x^2-\left(\frac{d}{e}\right)^{\frac{1}{3}}\right.}{9de}$

input
```
int((a+b*ln(c*x^n))/(e*x^3+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/3*b*x/d/(e*x^3+d)*ln(x^n)-2/9*b/e/(d/e)^(2/3)*ln(x+(d/e)^(1/3))/d*n*ln(x
)+2/9*b/e/(d/e)^(2/3)*ln(x+(d/e)^(1/3))/d*ln(x^n)+1/9*b/d/e/(d/e)^(2/3)*ln
(x^2-(d/e)^(1/3)*x+(d/e)^(2/3))*n*ln(x)-1/9*b/d/e/(d/e)^(2/3)*ln(x^2-(d/e)
^(1/3)*x+(d/e)^(2/3))*ln(x^n)-2/9*b/e/(d/e)^(2/3)*3^(1/2)*arctan(1/3*3^(1/
2)*(2/(d/e)^(1/3)*x-1))/d*n*ln(x)+2/9*b/e/(d/e)^(2/3)*3^(1/2)*arctan(1/3*3
^(1/2)*(2/(d/e)^(1/3)*x-1))/d*ln(x^n)-1/9*b*n/e/(d/e)^(2/3)*ln(x+(d/e)^(1/
3))/d+1/18*b*n/d/e/(d/e)^(2/3)*ln(x^2-(d/e)^(1/3)*x+(d/e)^(2/3))-1/9*b*n/e
/(d/e)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(d/e)^(1/3)*x-1))/d+2/9*b*n/e/d
*sum(1/_R1^2*(ln(x)*ln((_R1-x)/_R1)+dilog((_R1-x)/_R1)),_R1=RootOf(_Z^3*e+
d))+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*
c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csg
n(I*c)+b*ln(c)+a)*(1/3*x/d/(e*x^3+d)+2/3/d*(1/3/e/(d/e)^(2/3)*ln(x+(d/e)^(
1/3))-1/6/e/(d/e)^(2/3)*ln(x^2-(d/e)^(1/3)*x+(d/e)^(2/3))+1/3/e/(d/e)^(2/3
)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(d/e)^(1/3)*x-1))))
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^3\right)^2}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^3+d\right)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^3+d)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^6 + 2*d*e*x^3 + d^2), x)
```

Sympy [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^3\right)^2}\,dx=\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^3\right)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(e*x**3+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))/(d + e*x**3)**2, x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/(e*x^3+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex^3+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^3+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^3 + d)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{(e\,x^3+d)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x^3)^2,x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x^3)^2, x)
```

Reduce [F]

$$\int \frac{a + b\log(cx^n)}{(d + ex^3)^2}\,dx$$
$$= \frac{-2d^{\frac{4}{3}}\sqrt{3}\,atan\left(\frac{d^{\frac{1}{3}}-2e^{\frac{1}{3}}x}{d^{\frac{1}{3}}\sqrt{3}}\right)a - 2d^{\frac{1}{3}}\sqrt{3}\,atan\left(\frac{d^{\frac{1}{3}}-2e^{\frac{1}{3}}x}{d^{\frac{1}{3}}\sqrt{3}}\right)ae\,x^3 - d^{\frac{4}{3}}\log\left(d^{\frac{2}{3}} - e^{\frac{1}{3}}d^{\frac{1}{3}}x + e^{\frac{2}{3}}x^2\right)a - d^{\frac{1}{3}}\log\left(d^{\frac{2}{3}}\right.}{}$$

input
```
int((a+b*log(c*x^n))/(e*x^3+d)^2,x)
```

output
```
( - 2*d**(1/3)*sqrt(3)*atan((d**(1/3) - 2*e**(1/3)*x)/(d**(1/3)*sqrt(3)))*
a*d - 2*d**(1/3)*sqrt(3)*atan((d**(1/3) - 2*e**(1/3)*x)/(d**(1/3)*sqrt(3))
)*a*e*x**3 - d**(1/3)*log(d**(2/3) - e**(1/3)*d**(1/3)*x + e**(2/3)*x**2)*
a*d - d**(1/3)*log(d**(2/3) - e**(1/3)*d**(1/3)*x + e**(2/3)*x**2)*a*e*x**
3 + 2*d**(1/3)*log(d**(1/3) + e**(1/3)*x)*a*d + 2*d**(1/3)*log(d**(1/3) +
e**(1/3)*x)*a*e*x**3 + 9*e**(1/3)*int(log(x**n*c)/(d**2 + 2*d*e*x**3 + e**
2*x**6),x)*b*d**3 + 9*e**(1/3)*int(log(x**n*c)/(d**2 + 2*d*e*x**3 + e**2*x
**6),x)*b*d**2*e*x**3 + 3*e**(1/3)*a*d*x)/(9*e**(1/3)*d**2*(d + e*x**3))
```

3.327 $\int \frac{1}{(d+ex^3)^2(a+b\log(cx^n))}\,dx$

Optimal result 2474
Mathematica [N/A] 2474
Rubi [N/A] 2475
Maple [N/A] 2475
Fricas [N/A] 2476
Sympy [F(-1)] 2476
Maxima [N/A] 2477
Giac [N/A] 2477
Mupad [N/A] 2477
Reduce [N/A] 2478

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{1}{(d+ex^3)^2\,(a+b\log(cx^n))}\,dx = \mathrm{Int}\left(\frac{1}{(d+ex^3)^2\,(a+b\log(cx^n))},x\right)$$

output
```
Defer(Int)(1/(e*x^3+d)^2/(a+b*ln(c*x^n)),x)
```

Mathematica [N/A]

Not integrable

Time = 6.66 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^3)^2\,(a+b\log(cx^n))}\,dx = \int \frac{1}{(d+ex^3)^2\,(a+b\log(cx^n))}\,dx$$

input
```
Integrate[1/((d + e*x^3)^2*(a + b*Log[c*x^n])),x]
```

output
```
Integrate[1/((d + e*x^3)^2*(a + b*Log[c*x^n])), x]
```

Rubi [N/A]

Not integrable

Time = 0.20 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2768}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))} \, dx$$
$$\Big\downarrow \text{2768}$$
$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))} dx$$

input
```
Int[1/((d + e*x^3)^2*(a + b*Log[c*x^n])),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2768
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> Unintegrable[(d + e*x^r)^q*(a + b*Log[c*x^n])^p, x] /; F
reeQ[{a, b, c, d, e, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(e\,x^3+d)^2 \, (a+b\ln(c\,x^n))} dx$$

input
```
int(1/(e*x^3+d)^2/(a+b*ln(c*x^n)),x)
```

output
```
int(1/(e*x^3+d)^2/(a+b*ln(c*x^n)),x)
```

Fricas [N/A]

Not integrable

Time = 0.09 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.50

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))} \, dx = \int \frac{1}{(ex^3+d)^2 (b\log(cx^n)+a)} \, dx$$

input
```
integrate(1/(e*x^3+d)^2/(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral(1/(a*e^2*x^6 + 2*a*d*e*x^3 + a*d^2 + (b*e^2*x^6 + 2*b*d*e*x^3 + b
*d^2)*log(c*x^n)), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))} \, dx = \text{Timed out}$$

input
```
integrate(1/(e*x**3+d)**2/(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

Maxima [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))} \, dx = \int \frac{1}{(ex^3+d)^2 (b\log(cx^n)+a)} \, dx$$

input
```
integrate(1/(e*x^3+d)^2/(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
integrate(1/((e*x^3 + d)^2*(b*log(c*x^n) + a)), x)
```

Giac [N/A]

Not integrable

Time = 0.11 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))} \, dx = \int \frac{1}{(ex^3+d)^2 (b\log(cx^n)+a)} \, dx$$

input
```
integrate(1/(e*x^3+d)^2/(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(1/((e*x^3 + d)^2*(b*log(c*x^n) + a)), x)
```

Mupad [N/A]

Not integrable

Time = 25.26 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))} \, dx = \int \frac{1}{(e\,x^3+d)^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)} \, dx$$

input
```
int(1/((d + e*x^3)^2*(a + b*log(c*x^n))),x)
```

output
```
int(1/((d + e*x^3)^2*(a + b*log(c*x^n))), x)
```

Reduce [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.95

$$\int \frac{1}{(d+ex^3)^2(a+b\log(cx^n))}\,dx = \int \frac{1}{\log(x^nc)\,b\,d^2+2\log(x^nc)\,bde\,x^3+\log(x^nc)\,b\,e^2x^6+a\,d^2+2ade\,x^3+a\,e^2x^6}dx$$

input
```
int(1/(e*x^3+d)^2/(a+b*log(c*x^n)),x)
```

output
```
int(1/(log(x**n*c)*b*d**2 + 2*log(x**n*c)*b*d*e*x**3 + log(x**n*c)*b*e**2*
x**6 + a*d**2 + 2*a*d*e*x**3 + a*e**2*x**6),x)
```

3.328 $\int \frac{1}{(d+ex^3)^2(a+b\log(cx^n))^2}\,dx$

Optimal result 2479
Mathematica [N/A] 2479
Rubi [N/A] 2480
Maple [N/A] 2480
Fricas [N/A] 2481
Sympy [F(-1)] 2481
Maxima [N/A] 2482
Giac [N/A] 2482
Mupad [N/A] 2483
Reduce [N/A] 2483

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{1}{(d+ex^3)^2\,(a+b\log(cx^n))^2}\,dx = \text{Int}\left(\frac{1}{(d+ex^3)^2\,(a+b\log(cx^n))^2},x\right)$$

output
```
Defer(Int)(1/(e*x^3+d)^2/(a+b*ln(c*x^n))^2,x)
```

Mathematica [N/A]

Not integrable

Time = 30.43 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^3)^2\,(a+b\log(cx^n))^2}\,dx = \int \frac{1}{(d+ex^3)^2\,(a+b\log(cx^n))^2}\,dx$$

input
```
Integrate[1/((d + e*x^3)^2*(a + b*Log[c*x^n])^2),x]
```

output
```
Integrate[1/((d + e*x^3)^2*(a + b*Log[c*x^n])^2), x]
```

Rubi [N/A]

Not integrable

Time = 0.20 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2768}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))^2} dx$$

$$\Big\downarrow \text{2768}$$

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))^2} dx$$

input
```
Int[1/((d + e*x^3)^2*(a + b*Log[c*x^n])^2),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2768
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> Unintegrable[(d + e*x^r)^q*(a + b*Log[c*x^n])^p, x] /; F
reeQ[{a, b, c, d, e, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(e\,x^3+d)^2 (a+b\ln(c\,x^n))^2} dx$$

input
```
int(1/(e*x^3+d)^2/(a+b*ln(c*x^n))^2,x)
```

output
```
int(1/(e*x^3+d)^2/(a+b*ln(c*x^n))^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 102, normalized size of antiderivative = 4.64

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))^2}\,dx = \int \frac{1}{(ex^3+d)^2 (b\log(cx^n)+a)^2}\,dx$$

input
```
integrate(1/(e*x^3+d)^2/(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
integral(1/(a^2*e^2*x^6 + 2*a^2*d*e*x^3 + a^2*d^2 + (b^2*e^2*x^6 + 2*b^2*d
*e*x^3 + b^2*d^2)*log(c*x^n)^2 + 2*(a*b*e^2*x^6 + 2*a*b*d*e*x^3 + a*b*d^2)
*log(c*x^n)), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))^2}\,dx = \text{Timed out}$$

input
```
integrate(1/(e*x**3+d)**2/(a+b*ln(c*x**n))**2,x)
```

output
```
Timed out
```

Maxima [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 261, normalized size of antiderivative = 11.86

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))^2}\,dx = \int \frac{1}{(ex^3+d)^2(b\log(cx^n)+a)^2}\,dx$$

input
```
integrate(1/(e*x^3+d)^2/(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
-x/((b^2*e^2*n*log(c) + a*b*e^2*n)*x^6 + b^2*d^2*n*log(c) + a*b*d^2*n + 2*
(b^2*d*e*n*log(c) + a*b*d*e*n)*x^3 + (b^2*e^2*n*x^6 + 2*b^2*d*e*n*x^3 + b^
2*d^2*n)*log(x^n)) - integrate((5*e*x^3 - d)/((b^2*e^3*n*log(c) + a*b*e^3*
n)*x^9 + 3*(b^2*d*e^2*n*log(c) + a*b*d*e^2*n)*x^6 + b^2*d^3*n*log(c) + a*b
*d^3*n + 3*(b^2*d^2*e*n*log(c) + a*b*d^2*e*n)*x^3 + (b^2*e^3*n*x^9 + 3*b^2
*d*e^2*n*x^6 + 3*b^2*d^2*e*n*x^3 + b^2*d^3*n)*log(x^n)), x)
```

Giac [N/A]

Not integrable

Time = 0.13 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))^2}\,dx = \int \frac{1}{(ex^3+d)^2(b\log(cx^n)+a)^2}\,dx$$

input
```
integrate(1/(e*x^3+d)^2/(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
integrate(1/((e*x^3 + d)^2*(b*log(c*x^n) + a)^2), x)
```

Mupad [N/A]

Not integrable

Time = 25.41 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))^2} \, dx = \int \frac{1}{(e\,x^3+d)^2 \,(a+b\,\ln(c\,x^n))^2} \, dx$$

input
```
int(1/((d + e*x^3)^2*(a + b*log(c*x^n))^2),x)
```

output
```
int(1/((d + e*x^3)^2*(a + b*log(c*x^n))^2), x)
```

Reduce [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 127, normalized size of antiderivative = 5.77

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))^2} \, dx$$
$$= \int \frac{1}{\log(x^n c)^2 b^2 d^2 + 2\log(x^n c)^2 b^2 de\,x^3 + \log(x^n c)^2 b^2 e^2 x^6 + 2\log(x^n c)\,ab\,d^2 + 4\log(x^n c)\,abde\,x^3 + 2\log$$

input
```
int(1/(e*x^3+d)^2/(a+b*log(c*x^n))^2,x)
```

output
```
int(1/(log(x**n*c)**2*b**2*d**2 + 2*log(x**n*c)**2*b**2*d*e*x**3 + log(x**
n*c)**2*b**2*e**2*x**6 + 2*log(x**n*c)*a*b*d**2 + 4*log(x**n*c)*a*b*d*e*x*
*3 + 2*log(x**n*c)*a*b*e**2*x**6 + a**2*d**2 + 2*a**2*d*e*x**3 + a**2*e**2
*x**6),x)
```

3.329 $\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx$

Optimal result 2484
Mathematica [A] (verified) 2484
Rubi [A] (verified) 2485
Maple [C] (warning: unable to verify) 2486
Fricas [F] 2487
Sympy [A] (verification not implemented) 2488
Maxima [F] 2489
Giac [F] 2489
Mupad [F(-1)] 2489
Reduce [F] 2490

Optimal result

Integrand size = 23, antiderivative size = 148

$$\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \frac{ae^2x}{d^3}-\frac{be^2nx}{d^3}+\frac{benx^2}{4d^2}-\frac{bnx^3}{9d}+\frac{be^2x\log(cx^n)}{d^3} - \frac{ex^2(a+b\log(cx^n))}{2d^2}+\frac{x^3(a+b\log(cx^n))}{3d} - \frac{e^3(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{d^4}-\frac{be^3n\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^4}$$

output
```
a*e^2*x/d^3-b*e^2*n*x/d^3+1/4*b*e*n*x^2/d^2-1/9*b*n*x^3/d+b*e^2*x*ln(c*x^n
)/d^3-1/2*e*x^2*(a+b*ln(c*x^n))/d^2+1/3*x^3*(a+b*ln(c*x^n))/d-e^3*(a+b*ln(
c*x^n))*ln(1+d*x/e)/d^4-b*e^3*n*polylog(2,-d*x/e)/d^4
```

Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 142, normalized size of antiderivative = 0.96

$$\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \frac{36ade^2x-36bde^2nx-18ad^2ex^2+9bd^2enx^2+12ad^3x^3-4bd^3nx^3-36ae^3\log\left(1+\frac{dx}{e}\right)+6b\log(cx^n)\,(}{36d^4}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e/x),x]
```

output
```
(36*a*d*e^2*x - 36*b*d*e^2*n*x - 18*a*d^2*e*x^2 + 9*b*d^2*e*n*x^2 + 12*a*d
^3*x^3 - 4*b*d^3*n*x^3 - 36*a*e^3*Log[1 + (d*x)/e] + 6*b*Log[c*x^n]*(d*x*(
6*e^2 - 3*d*e*x + 2*d^2*x^2) - 6*e^3*Log[1 + (d*x)/e]) - 36*b*e^3*n*PolyLo
g[2, -((d*x)/e)])/(36*d^4)
```

Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 148, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.130$, Rules used = {2005, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}dx$$

$$\Big\downarrow \text{2005}$$

$$\int \frac{x^3(a+b\log(cx^n))}{dx+e}dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(-\frac{e^3(a+b\log(cx^n))}{d^3(dx+e)}+\frac{e^2(a+b\log(cx^n))}{d^3}-\frac{ex(a+b\log(cx^n))}{d^2}+\frac{x^2(a+b\log(cx^n))}{d}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{e^3\log\left(\frac{dx}{e}+1\right)(a+b\log(cx^n))}{d^4}-\frac{ex^2(a+b\log(cx^n))}{2d^2}+\frac{x^3(a+b\log(cx^n))}{3d}+\frac{ae^2x}{d^3}+\frac{be^2x\log(cx^n)}{d^3}-\frac{be^3n\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^4}-\frac{be^2nx}{d^3}+\frac{benx^2}{4d^2}-\frac{bnx^3}{9d}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e/x),x]
```

output
```
(a*e^2*x)/d^3 - (b*e^2*n*x)/d^3 + (b*e*n*x^2)/(4*d^2) - (b*n*x^3)/(9*d) +
(b*e^2*x*Log[c*x^n])/d^3 - (e*x^2*(a + b*Log[c*x^n]))/(2*d^2) + (x^3*(a +
b*Log[c*x^n]))/(3*d) - (e^3*(a + b*Log[c*x^n])*Log[1 + (d*x)/e])/d^4 - (b*
e^3*n*PolyLog[2, -((d*x)/e)])/d^4
```

Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.31 (sec) , antiderivative size = 272, normalized size of antiderivative = 1.84

method	result
risch	$\frac{b\ln(x^n)x^3}{3d}-\frac{b\ln(x^n)e\,x^2}{2d^2}+\frac{b\ln(x^n)x\,e^2}{d^3}-\frac{b\ln(x^n)e^3\ln(dx+e)}{d^4}-\frac{bn\,x^3}{9d}+\frac{ben\,x^2}{4d^2}-\frac{b\,e^2nx}{d^3}-\frac{49bn\,e^3}{36d^4}+\frac{bn\,e^3\ln(dx+}{d}$

input
```
int(x^2*(a+b*ln(c*x^n))/(d+e/x),x,method=_RETURNVERBOSE)
```

output
```
1/3*b*ln(x^n)/d*x^3-1/2*b*ln(x^n)/d^2*e*x^2+b*ln(x^n)/d^3*x*e^2-b*ln(x^n)*
e^3/d^4*ln(d*x+e)-1/9*b*n*x^3/d+1/4*b*e*n*x^2/d^2-b*e^2*n*x/d^3-49/36*b*n*
e^3/d^4+b*n*e^3/d^4*ln(d*x+e)*ln(-d*x/e)+b*n*e^3/d^4*dilog(-d*x/e)+(1/2*I*
Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn
(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln
(c)+a)*(1/d^3*(1/3*d^2*x^3-1/2*e*x^2*d+x*e^2)-e^3/d^4*ln(d*x+e))
```

Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx=\int \frac{(b\log(cx^n)+a)x^2}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(d+e/x),x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x^n) + a*x^3)/(d*x + e), x)
```

Sympy [A] (verification not implemented)

Time = 78.71 (sec) , antiderivative size = 267, normalized size of antiderivative = 1.80

$$\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \frac{ax^3}{3d} - \frac{aex^2}{2d^2} - \frac{ae^3\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{d^3} + \frac{ae^2x}{d^3} - \frac{bnx^3}{9d} + \frac{bx^3\log(cx^n)}{3d} + \frac{benx^2}{4d^2} - \frac{bex^2\log(cx^n)}{2d^2}$$
$$+ \frac{be^3n\left(\begin{cases}\frac{x}{e} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|< \\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1 \\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)}{d^3}$$
$$- \frac{be^3\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^3} - \frac{be^2nx}{d^3} + \frac{be^2x\log(cx^n)}{d^3}$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(d+e/x),x)
```

output
```
a*x**3/(3*d) - a*e*x**2/(2*d**2) - a*e**3*Piecewise((x/e, Eq(d, 0)), (log(
d*x + e)/d, True))/d**3 + a*e**2*x/d**3 - b*n*x**3/(9*d) + b*x**3*log(c*x*
*n)/(3*d) + b*e*n*x**2/(4*d**2) - b*e*x**2*log(c*x**n)/(2*d**2) + b*e**3*n
*Piecewise((x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e)
, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_pola
r(I*pi)/e), Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi
)/e), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + mei
jerg(((1, 1), ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi
)/e), True))/d, True))/d**3 - b*e**3*Piecewise((x/e, Eq(d, 0)), (log(d*x +
 e)/d, True))*log(c*x**n)/d**3 - b*e**2*n*x/d**3 + b*e**2*x*log(c*x**n)/d*
*3
```

Maxima [F]

$$\int \frac{x^2(a+b\log{(cx^n)})}{d+\frac{e}{x}}\,dx = \int \frac{(b\log{(cx^n)}+a)x^2}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(d+e/x),x, algorithm="maxima")
```

output
```
-1/6*a*(6*e^3*log(d*x + e)/d^4 - (2*d^2*x^3 - 3*d*e*x^2 + 6*e^2*x)/d^3) +
b*integrate((x^3*log(c) + x^3*log(x^n))/(d*x + e), x)
```

Giac [F]

$$\int \frac{x^2(a+b\log{(cx^n)})}{d+\frac{e}{x}}\,dx = \int \frac{(b\log{(cx^n)}+a)x^2}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(d+e/x),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(d + e/x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log{(cx^n)})}{d+\frac{e}{x}}\,dx = \int \frac{x^2\,(a+b\,\ln{(c\,x^n)})}{d+\frac{e}{x}}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e/x),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e/x), x)
```

Reduce [F]

$$\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx$$
$$= \frac{36\left(\int \frac{\log(x^n c)}{d\,x^2+ex}dx\right) b\,e^4 n - 36\log(dx+e)\,a\,e^3 n - 18\log(x^n c)^2\,b\,e^3 + 12\log(x^n c)\,b\,d^3 n\,x^3 - 18\log(x^n c)\,b\,d^2 e}{3}$$

input
```
int(x^2*(a+b*log(c*x^n))/(d+e/x),x)
```

output
```
(36*int(log(x**n*c)/(d*x**2 + e*x),x)*b*e**4*n - 36*log(d*x + e)*a*e**3*n
- 18*log(x**n*c)**2*b*e**3 + 12*log(x**n*c)*b*d**3*n*x**3 - 18*log(x**n*c)
*b*d**2*e*n*x**2 + 36*log(x**n*c)*b*d*e**2*n*x + 12*a*d**3*n*x**3 - 18*a*d
**2*e*n*x**2 + 36*a*d*e**2*n*x - 4*b*d**3*n**2*x**3 + 9*b*d**2*e*n**2*x**2
 - 36*b*d*e**2*n**2*x)/(36*d**4*n)
```

3.330 $\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx$

Optimal result 2491
Mathematica [A] (verified) 2491
Rubi [A] (verified) 2492
Maple [C] (warning: unable to verify) 2493
Fricas [F] 2494
Sympy [A] (verification not implemented) 2494
Maxima [F] 2495
Giac [F] 2495
Mupad [F(-1)] 2496
Reduce [F] 2496

Optimal result

Integrand size = 21, antiderivative size = 107

$$\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = -\frac{aex}{d^2}+\frac{benx}{d^2}-\frac{bnx^2}{4d}-\frac{bex\log(cx^n)}{d^2}+\frac{x^2(a+b\log(cx^n))}{2d}+\frac{e^2(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{d^3}+\frac{be^2n\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^3}$$

output
```
-a*e*x/d^2+b*e*n*x/d^2-1/4*b*n*x^2/d-b*e*x*ln(c*x^n)/d^2+1/2*x^2*(a+b*ln(c
*x^n))/d+e^2*(a+b*ln(c*x^n))*ln(1+d*x/e)/d^3+b*e^2*n*polylog(2,-d*x/e)/d^3
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 105, normalized size of antiderivative = 0.98

$$\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \frac{-4adex+4bdenx+2ad^2x^2-bd^2nx^2+4ae^2\log\left(1+\frac{dx}{e}\right)+2b\log(cx^n)\left(dx(-2e+dx)+2e^2\log(1+\right.}{4d^3}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e/x),x]
```

output
```
(-4*a*d*e*x + 4*b*d*e*n*x + 2*a*d^2*x^2 - b*d^2*n*x^2 + 4*a*e^2*Log[1 + (d
*x)/e] + 2*b*Log[c*x^n]*(d*x*(-2*e + d*x) + 2*e^2*Log[1 + (d*x)/e]) + 4*b*
e^2*n*PolyLog[2, -((d*x)/e)])/(4*d^3)
```

Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 107, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {2005, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}dx$$

$$\Big\downarrow \text{2005}$$

$$\int \frac{x^2(a+b\log(cx^n))}{dx+e}dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{e^2(a+b\log(cx^n))}{d^2(dx+e)}-\frac{e(a+b\log(cx^n))}{d^2}+\frac{x(a+b\log(cx^n))}{d}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{e^2\log\left(\frac{dx}{e}+1\right)(a+b\log(cx^n))}{d^3}+\frac{x^2(a+b\log(cx^n))}{2d}-\frac{aex}{d^2}-\frac{bex\log(cx^n)}{d^2}+\frac{be^2n\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^3}+\frac{benx}{d^2}-\frac{bnx^2}{4d}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e/x),x]
```

output
```
-((a*e*x)/d^2) + (b*e*n*x)/d^2 - (b*n*x^2)/(4*d) - (b*e*x*Log[c*x^n])/d^2
+ (x^2*(a + b*Log[c*x^n]))/(2*d) + (e^2*(a + b*Log[c*x^n])*Log[1 + (d*x)/e
])/d^3 + (b*e^2*n*PolyLog[2, -((d*x)/e)])/d^3
```

Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.26 (sec) , antiderivative size = 233, normalized size of antiderivative = 2.18

method	result
risch	$\frac{b\ln(x^n)x^2}{2d} - \frac{b\ln(x^n)ex}{d^2} + \frac{b\ln(x^n)e^2\ln(dx+e)}{d^3} - \frac{bn\,e^2\ln(dx+e)\ln\left(-\frac{dx}{e}\right)}{d^3} - \frac{bn\,e^2\,\mathrm{dilog}\left(-\frac{dx}{e}\right)}{d^3} - \frac{bn\,x^2}{4d} + \frac{benx}{d^2} + \frac{5bn}{4d}$

input
```
int(x*(a+b*ln(c*x^n))/(d+e/x),x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/d*x^2-b*ln(x^n)/d^2*e*x+b*ln(x^n)*e^2/d^3*ln(d*x+e)-b*n*e^2/
d^3*ln(d*x+e)*ln(-d*x/e)-b*n*e^2/d^3*dilog(-d*x/e)-1/4*b*n*x^2/d+b*e*n*x/d
^2+5/4*b*n*e^2/d^3+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn
(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn
(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(1/d^2*(1/2*d*x^2-e*x)+e^2/d^3*ln(d*x+e))
```

Fricas [F]

$$\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \int \frac{(b\log(cx^n)+a)x}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(d+e/x),x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x^n) + a*x^2)/(d*x + e), x)
```

Sympy [A] (verification not implemented)

Time = 52.59 (sec) , antiderivative size = 218, normalized size of antiderivative = 2.04

$$\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \frac{ax^2}{2d} + \frac{ae^2\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{d^2} - \frac{aex}{d^2} - \frac{bnx^2}{4d} + \frac{bx^2\log(cx^n)}{2d} - \frac{be^2n\left(\begin{cases}\frac{x}{e} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|< \\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right.}{d^2} + \frac{be^2\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^2} + \frac{benx}{d^2} - \frac{bex\log(cx^n)}{d^2}$$

input
```
integrate(x*(a+b*ln(c*x**n))/(d+e/x),x)
```

output
```
a*x**2/(2*d) + a*e**2*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/d
**2 - a*e*x/d**2 - b*n*x**2/(4*d) + b*x**2*log(c*x**n)/(2*d) - b*e**2*n*Pi
ecewise((x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (
Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I
*pi)/e), Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e
), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijer
g(((1, 1), ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e
), True))/d, True))/d**2 + b*e**2*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)
/d, True))*log(c*x**n)/d**2 + b*e*n*x/d**2 - b*e*x*log(c*x**n)/d**2
```

Maxima [F]

$$\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \int \frac{(b\log(cx^n)+a)x}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(d+e/x),x, algorithm="maxima")
```

output
```
1/2*a*(2*e^2*log(d*x + e)/d^3 + (d*x^2 - 2*e*x)/d^2) + b*integrate((x^2*lo
g(c) + x^2*log(x^n))/(d*x + e), x)
```

Giac [F]

$$\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \int \frac{(b\log(cx^n)+a)x}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(d+e/x),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(d + e/x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{d+\frac{e}{x}}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e/x),x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e/x), x)
```

Reduce [F]

$$\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx$$
$$= \frac{-4\left(\int \frac{\log(x^n c)}{d\,x^2+ex}dx\right) b\,e^3 n + 4\log(dx+e)\,a\,e^2 n + 2\log(x^n c)^2\,b\,e^2 + 2\log(x^n c)\,b\,d^2 n\,x^2 - 4\log(x^n c)\,bdenx +}{4d^3 n}$$

input
```
int(x*(a+b*log(c*x^n))/(d+e/x),x)
```

output
```
( - 4*int(log(x**n*c)/(d*x**2 + e*x),x)*b*e**3*n + 4*log(d*x + e)*a*e**2*n
 + 2*log(x**n*c)**2*b*e**2 + 2*log(x**n*c)*b*d**2*n*x**2 - 4*log(x**n*c)*b
*d*e*n*x + 2*a*d**2*n*x**2 - 4*a*d*e*n*x - b*d**2*n**2*x**2 + 4*b*d*e*n**2
*x)/(4*d**3*n)
```

3.331 $\int \frac{a+b\log(cx^n)}{d+\frac{e}{x}}\,dx$

Optimal result 2497
Mathematica [A] (verified) 2497
Rubi [A] (verified) 2498
Maple [C] (warning: unable to verify) 2499
Fricas [F] 2499
Sympy [A] (verification not implemented) 2500
Maxima [F] 2501
Giac [F] 2501
Mupad [F(-1)] 2501
Reduce [F] 2502

Optimal result

Integrand size = 20, antiderivative size = 69

$$\int \frac{a+b\log(cx^n)}{d+\frac{e}{x}}\,dx = \frac{ax}{d}-\frac{bnx}{d}+\frac{bx\log(cx^n)}{d} - \frac{e(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{d^2}-\frac{ben\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^2}$$

output
```
a*x/d-b*n*x/d+b*x*ln(c*x^n)/d-e*(a+b*ln(c*x^n))*ln(1+d*x/e)/d^2-b*e*n*poly
log(2,-d*x/e)/d^2
```

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 66, normalized size of antiderivative = 0.96

$$\int \frac{a+b\log(cx^n)}{d+\frac{e}{x}}\,dx = \frac{adx-bdnx-ae\log\left(1+\frac{dx}{e}\right)+b\log(cx^n)\left(dx-e\log\left(1+\frac{dx}{e}\right)\right)-ben\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e/x),x]
```

output
```
(a*d*x - b*d*n*x - a*e*Log[1 + (d*x)/e] + b*Log[c*x^n]*(d*x - e*Log[1 + (d
*x)/e]) - b*e*n*PolyLog[2, -((d*x)/e)])/d^2
```

Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{d+\frac{e}{x}}dx$$

$$\Big\downarrow \text{2767}$$

$$\int \left(\frac{a+b\log(cx^n)}{d}-\frac{e(a+b\log(cx^n))}{d(dx+e)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{e\log\left(\frac{dx}{e}+1\right)(a+b\log(cx^n))}{d^2}+\frac{ax}{d}+\frac{bx\log(cx^n)}{d}-\frac{ben\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^2}-\frac{bnx}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e/x),x]
```

output
```
(a*x)/d - (b*n*x)/d + (b*x*Log[c*x^n])/d - (e*(a + b*Log[c*x^n])*Log[1 + (
d*x)/e])/d^2 - (b*e*n*PolyLog[2, -((d*x)/e)])/d^2
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.23 (sec) , antiderivative size = 188, normalized size of antiderivative = 2.72

method	result
risch	$\frac{b\ln(x^n)x}{d}-\frac{b\ln(x^n)e\ln(dx+e)}{d^2}-\frac{bnx}{d}-\frac{bne}{d^2}+\frac{bne\ln(dx+e)\ln\left(-\frac{dx}{e}\right)}{d^2}+\frac{bne\,\mathrm{dilog}\left(-\frac{dx}{e}\right)}{d^2}+\left(\frac{ib\pi\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(icx^n)}{2}\right.$

input
```
int((a+b*ln(c*x^n))/(d+e/x),x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)/d*x-b*ln(x^n)*e/d^2*ln(d*x+e)-b*n*x/d-b*n*e/d^2+b*n*e/d^2*ln(d*x
+e)*ln(-d*x/e)+b*n*e/d^2*dilog(-d*x/e)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^
n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^
n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(x/d-e/d^2*ln(d*x+e))
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{d+\frac{e}{x}}\,dx=\int \frac{b\log(cx^n)+a}{d+\frac{e}{x}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x),x, algorithm="fricas")
```

output
```
integral((b*x*log(c*x^n) + a*x)/(d*x + e), x)
```

Sympy [A] (verification not implemented)

Time = 42.52 (sec) , antiderivative size = 163, normalized size of antiderivative = 2.36

$$\int \frac{a+b\log(cx^n)}{d+\frac{e}{x}}\,dx = -\frac{ae\left(\begin{cases}\frac{x}{e} & \text{for}\ d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{d}+\frac{ax}{d}+\frac{ben\left(\begin{cases}\frac{x}{e} & \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ \frac{1}{|x|}<1\wedge|x|<1\\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d} & \end{cases}\right)}{d}-\frac{be\left(\begin{cases}\frac{x}{e} & \text{for}\ d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d}-\frac{bnx}{d}+\frac{bx\log(cx^n)}{d}$$

input
```
integrate((a+b*ln(c*x**n))/(d+e/x),x)
```

output
```
-a*e*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/d + a*x/d + b*e*n*
Piecewise((x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e),
 (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar
(I*pi)/e), Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)
/e), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meij
erg(((1, 1), ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)
/e), True))/d, True))/d - b*e*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d,
True))*log(c*x**n)/d - b*n*x/d + b*x*log(c*x**n)/d
```

Maxima [F]

$$\int \frac{a + b\log(cx^n)}{d + \frac{e}{x}}\,dx = \int \frac{b\log(cx^n) + a}{d + \frac{e}{x}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x),x, algorithm="maxima")
```

output
```
a*(x/d - e*log(d*x + e)/d^2) + b*integrate((x*log(c) + x*log(x^n))/(d*x +
e), x)
```

Giac [F]

$$\int \frac{a + b\log(cx^n)}{d + \frac{e}{x}}\,dx = \int \frac{b\log(cx^n) + a}{d + \frac{e}{x}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(d + e/x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a + b\log(cx^n)}{d + \frac{e}{x}}\,dx = \int \frac{a + b\,\ln(c\,x^n)}{d + \frac{e}{x}}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e/x),x)
```

output
```
int((a + b*log(c*x^n))/(d + e/x), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{d+\frac{e}{x}}\,dx$$
$$= \frac{2\left(\int \frac{\log(x^n c)}{d\,x^2+ex}dx\right) b\,e^2 n - 2\log(dx+e)\,aen - \log(x^n c)^2\,be + 2\log(x^n c)\,bdnx + 2adnx - 2bd\,n^2 x}{2d^2 n}$$

input
```
int((a+b*log(c*x^n))/(d+e/x),x)
```

output
```
(2*int(log(x**n*c)/(d*x**2 + e*x),x)*b*e**2*n - 2*log(d*x + e)*a*e*n - log
(x**n*c)**2*b*e + 2*log(x**n*c)*b*d*n*x + 2*a*d*n*x - 2*b*d*n**2*x)/(2*d**
2*n)
```

3.332 $\int \frac{a+b\log(cx^n)}{(d+\frac{e}{x})x} dx$

Optimal result 2503
Mathematica [A] (verified) 2503
Rubi [A] (verified) 2504
Maple [C] (warning: unable to verify) 2505
Fricas [F] 2505
Sympy [F] 2506
Maxima [F] 2506
Giac [F] 2506
Mupad [F(-1)] 2507
Reduce [F] 2507

Optimal result

Integrand size = 23, antiderivative size = 39

$$\int \frac{a+b\log(cx^n)}{(d+\frac{e}{x})x} dx = \frac{(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{d}+\frac{bn\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d}$$

output
```
(a+b*ln(c*x^n))*ln(1+d*x/e)/d+b*n*polylog(2,-d*x/e)/d
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 37, normalized size of antiderivative = 0.95

$$\int \frac{a+b\log(cx^n)}{(d+\frac{e}{x})x} dx = \frac{(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)+bn\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d}$$

input
```
Integrate[(a + b*Log[c*x^n])/((d + e/x)*x),x]
```

output
```
((a + b*Log[c*x^n])*Log[1 + (d*x)/e] + b*n*PolyLog[2, -((d*x)/e)])/d
```

Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {2005, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x\left(d+\frac{e}{x}\right)}dx$$

$$\Big\downarrow \text{2005}$$

$$\int \frac{a+b\log(cx^n)}{dx+e}dx$$

$$\Big\downarrow \text{2754}$$

$$\frac{\log\left(\frac{dx}{e}+1\right)(a+b\log(cx^n))}{d}-\frac{bn\int \frac{\log\left(\frac{dx}{e}+1\right)}{x}dx}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\log\left(\frac{dx}{e}+1\right)(a+b\log(cx^n))}{d}+\frac{bn\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/((d + e/x)*x),x]
```

output
```
((a + b*Log[c*x^n])*Log[1 + (d*x)/e])/d + (b*n*PolyLog[2, -((d*x)/e)])/d
```

Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.18 (sec) , antiderivative size = 151, normalized size of antiderivative = 3.87

method	result
risch	$\frac{b\ln(x^n)\ln(dx+e)}{d} - \frac{bn\ln(dx+e)\ln\left(-\frac{dx}{e}\right)}{d} - \frac{bn\,\mathrm{dilog}\left(-\frac{dx}{e}\right)}{d} + \frac{\left(\frac{ib\pi\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2}{2} - \frac{ib\pi\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)\,\mathrm{csgn}(ic)}{2} -\right.}{}$

input
```
int((a+b*ln(c*x^n))/(d+e/x)/x,x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)*ln(d*x+e)/d-b/d*n*ln(d*x+e)*ln(-d*x/e)-b/d*n*dilog(-d*x/e)+(1/2*
I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*cs
gn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*
ln(c)+a)*ln(d*x+e)/d
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+\frac{e}{x}\right)x}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\left(d+\frac{e}{x}\right)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(d*x + e), x)
```

Sympy [F]

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x}\,dx=\int \frac{a+b\log(cx^n)}{dx+e}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(d+e/x)/x,x)
```

output
```
Integral((a + b*log(c*x**n))/(d*x + e), x)
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x}\,dx=\int \frac{b\log(cx^n)+a}{\left(d+\frac{e}{x}\right)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x,x, algorithm="maxima")
```

output
```
b*integrate((log(c) + log(x^n))/(d*x + e), x) + a*log(d*x + e)/d
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x}\,dx=\int \frac{b\log(cx^n)+a}{\left(d+\frac{e}{x}\right)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((d + e/x)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+\frac{e}{x}\right)x}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(d+\frac{e}{x}\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e/x)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e/x)), x)
```

Reduce [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+\frac{e}{x}\right)x}\,dx=\frac{-2\left(\int \frac{\log(x^n c)}{d\,x^2+ex}dx\right)ben+2\log(dx+e)\,an+\log(x^n c)^2\,b}{2dn}$$

input
```
int((a+b*log(c*x^n))/(d+e/x)/x,x)
```

output
```
( - 2*int(log(x**n*c)/(d*x**2 + e*x),x)*b*e*n + 2*log(d*x + e)*a*n + log(x
**n*c)**2*b)/(2*d*n)
```

3.333 $\int \frac{a+b\log(cx^n)}{(d+\frac{e}{x})x^2}\,dx$

Optimal result 2508
Mathematica [A] (verified) 2508
Rubi [A] (verified) 2509
Maple [C] (warning: unable to verify) 2510
Fricas [F] 2510
Sympy [C] (verification not implemented) 2511
Maxima [F] 2512
Giac [F] 2512
Mupad [F(-1)] 2512
Reduce [F] 2513

Optimal result

Integrand size = 23, antiderivative size = 44

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^2}\,dx = -\frac{\log\left(1+\frac{e}{dx}\right)(a+b\log(cx^n))}{e}+\frac{bn\,\text{PolyLog}\left(2,-\frac{e}{dx}\right)}{e}$$

output
```
-ln(1+e/d/x)*(a+b*ln(c*x^n))/e+b*n*polylog(2,-e/d/x)/e
```

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.43

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^2}\,dx = \frac{(a+b\log(cx^n))\left(a+b\log(cx^n)-2bn\log\left(1+\frac{dx}{e}\right)\right)}{2ben} - \frac{bn\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{e}$$

input
```
Integrate[(a + b*Log[c*x^n])/((d + e/x)*x^2),x]
```

output
```
((a + b*Log[c*x^n])*(a + b*Log[c*x^n] - 2*b*n*Log[1 + (d*x)/e]))/(2*b*e*n)
 - (b*n*PolyLog[2, -((d*x)/e)])/e
```

Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {2005, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2\left(d+\frac{e}{x}\right)}dx$$

$$\Big\downarrow \text{ 2005}$$

$$\int \frac{a+b\log(cx^n)}{x(dx+e)}dx$$

$$\Big\downarrow \text{ 2779}$$

$$\frac{bn\int \frac{\log\left(\frac{e}{dx}+1\right)}{x}dx}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx^n))}{e}$$

$$\Big\downarrow \text{ 2838}$$

$$\frac{bn\operatorname{PolyLog}\left(2,-\frac{e}{dx}\right)}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx^n))}{e}$$

input
```
Int[(a + b*Log[c*x^n])/((d + e/x)*x^2),x]
```

output
```
-((Log[1 + e/(d*x)]*(a + b*Log[c*x^n]))/e) + (b*n*PolyLog[2, -(e/(d*x))])/
e
```

Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.20 (sec) , antiderivative size = 181, normalized size of antiderivative = 4.11

method	result
risch	$-\frac{b\ln(x^n)\ln(dx+e)}{e}+\frac{b\ln(x^n)\ln(x)}{e}-\frac{bn\ln(x)^2}{2e}+\frac{bn\ln(dx+e)\ln\left(-\frac{dx}{e}\right)}{e}+\frac{bn\,\mathrm{dilog}\left(-\frac{dx}{e}\right)}{e}+\left(\frac{ib\pi\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n\right.$

input
```
int((a+b*ln(c*x^n))/(d+e/x)/x^2,x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)/e*ln(d*x+e)+b*ln(x^n)/e*ln(x)-1/2*b*n/e*ln(x)^2+b*n/e*ln(d*x+e)
*ln(-d*x/e)+b*n/e*dilog(-d*x/e)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/
2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/
2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(-1/e*ln(d*x+e)+1/e*ln(x))
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+\frac{e}{x}\right)x^2}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(d+\frac{e}{x}\right)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(d*x^2 + e*x), x)
```

Sympy [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 5.50 (sec) , antiderivative size = 173, normalized size of antiderivative = 3.93

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^2}\,dx$$

$$= \frac{2ad\left(\begin{cases}-\frac{x}{e}-\frac{1}{2d} & \text{for } d=0\\ \frac{\log(2dx)}{2d} & \text{otherwise}\end{cases}\right)}{e} - \frac{2ad\left(\begin{cases}\frac{x}{e}+\frac{1}{2d} & \text{for } d=0\\ \frac{\log(2dx+2e)}{2d} & \text{otherwise}\end{cases}\right)}{e}$$

$$+ bn\left(\begin{cases}-\frac{1}{dx} \\ \frac{\begin{cases}\operatorname{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(d)\log(x)+\operatorname{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)+\operatorname{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)+\operatorname{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{otherwise}\end{cases}}{e}\end{cases}\right)$$

$$- b\left(\begin{cases}\frac{1}{dx} & \text{for } e=0\\ \frac{\log\left(d+\frac{e}{x}\right)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((a+b*ln(c*x**n))/(d+e/x)/x**2,x)
```

output
```
2*a*d*Piecewise((-x/e - 1/(2*d), Eq(d, 0)), (log(2*d*x)/(2*d), True))/e -
2*a*d*Piecewise((x/e + 1/(2*d), Eq(d, 0)), (log(2*d*x + 2*e)/(2*d), True))
/e + b*n*Piecewise((-1/(d*x), Eq(e, 0)), (Piecewise((polylog(2, e*exp_pola
r(I*pi)/(d*x)), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) + polylog(2
, e*exp_polar(I*pi)/(d*x)), Abs(x) < 1), (-log(d)*log(1/x) + polylog(2, e*
exp_polar(I*pi)/(d*x)), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()
), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) + polylog(2,
e*exp_polar(I*pi)/(d*x)), True))/e, True)) - b*Piecewise((1/(d*x), Eq(e, 0
)), (log(d + e/x)/e, True))*log(c*x**n)
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^2}\,dx = \int \frac{b\log(cx^n)+a}{\left(d+\frac{e}{x}\right)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x^2,x, algorithm="maxima")
```

output
```
-a*(log(d*x + e)/e - log(x)/e) + b*integrate((log(c) + log(x^n))/(d*x^2 +
e*x), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^2}\,dx = \int \frac{b\log(cx^n)+a}{\left(d+\frac{e}{x}\right)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((d + e/x)*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^2}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^2\,\left(d+\frac{e}{x}\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e/x)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e/x)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^2}\,dx = \frac{\left(\int \frac{\log(x^n c)}{d\,x^2+ex}dx\right)be-\log(dx+e)\,a+\log(x)\,a}{e}$$

input
```
int((a+b*log(c*x^n))/(d+e/x)/x^2,x)
```

output
```
(int(log(x**n*c)/(d*x**2 + e*x),x)*b*e - log(d*x + e)*a + log(x)*a)/e
```

3.334 $\int \frac{a+b\log(cx^n)}{(d+\frac{e}{x})x^3}\,dx$

Optimal result . . . 2514
Mathematica [A] (verified) . . . 2514
Rubi [A] (verified) . . . 2515
Maple [C] (warning: unable to verify) . . . 2517
Fricas [F] . . . 2517
Sympy [A] (verification not implemented) . . . 2518
Maxima [F] . . . 2519
Giac [F] . . . 2519
Mupad [F(-1)] . . . 2519
Reduce [F] . . . 2520

Optimal result

Integrand size = 23, antiderivative size = 74

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^3}\,dx=-\frac{bn}{ex}-\frac{a+b\log(cx^n)}{ex}+\frac{d\log\left(1+\frac{e}{dx}\right)(a+b\log(cx^n))}{e^2}-\frac{bdn\,\text{PolyLog}\left(2,-\frac{e}{dx}\right)}{e^2}$$

output
```
-b*n/e/x-(a+b*ln(c*x^n))/e/x+d*ln(1+e/d/x)*(a+b*ln(c*x^n))/e^2-b*d*n*polyl
og(2,-e/d/x)/e^2
```

Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 88, normalized size of antiderivative = 1.19

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^3}\,dx=-\frac{\frac{2ben}{x}+\frac{2e(a+b\log(cx^n))}{x}+\frac{d(a+b\log(cx^n))^2}{bn}-2d(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)-2bdn\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{2e^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/((d + e/x)*x^3),x]
```

output
```
-1/2*((2*b*e*n)/x + (2*e*(a + b*Log[c*x^n]))/x + (d*(a + b*Log[c*x^n])^2)/
(b*n) - 2*d*(a + b*Log[c*x^n])*Log[1 + (d*x)/e] - 2*b*d*n*PolyLog[2, -((d*
x)/e)])/e^2
```

Rubi [A] (verified)

Time = 0.47 (sec) , antiderivative size = 78, normalized size of antiderivative = 1.05, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {2005, 2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3\left(d+\frac{e}{x}\right)}dx$$

$$\Big\downarrow \text{ 2005}$$

$$\int \frac{a+b\log(cx^n)}{x^2(dx+e)}dx$$

$$\Big\downarrow \text{ 2780}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x^2}dx}{e}-\frac{d\int \frac{a+b\log(cx^n)}{x(e+dx)}dx}{e}$$

$$\Big\downarrow \text{ 2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{e}-\frac{d\int \frac{a+b\log(cx^n)}{x(e+dx)}dx}{e}$$

$$\Big\downarrow \text{ 2779}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{e}-\frac{d\left(\frac{bn\int \frac{\log\left(\frac{e}{dx}+1\right)}{x}dx}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx^n))}{e}\right)}{e}$$

$$\Big\downarrow \text{ 2838}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{e}-\frac{d\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{e}{dx}\right)}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx^n))}{e}\right)}{e}$$

input
```
Int[(a + b*Log[c*x^n])/((d + e/x)*x^3),x]
```

output
```
(-((b*n)/x) - (a + b*Log[c*x^n])/x)/e - (d*(-((Log[1 + e/(d*x)]*(a + b*Log
[c*x^n]))/e) + (b*n*PolyLog[2, -(e/(d*x))])/e))/e
```

Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.24 (sec) , antiderivative size = 221, normalized size of antiderivative = 2.99

method	result
risch	$\frac{b\ln(x^n)d\ln(dx+e)}{e^2}-\frac{b\ln(x^n)}{ex}-\frac{b\ln(x^n)d\ln(x)}{e^2}-\frac{bnd\ln(dx+e)\ln\left(-\frac{dx}{e}\right)}{e^2}-\frac{bnd\operatorname{dilog}\left(-\frac{dx}{e}\right)}{e^2}-\frac{bn}{ex}+\frac{bnd\ln(x)^2}{2e^2}+\Big($

input
```
int((a+b*ln(c*x^n))/(d+e/x)/x^3,x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)*d/e^2*ln(d*x+e)-b*ln(x^n)/e/x-b*ln(x^n)*d/e^2*ln(x)-b*n*d/e^2*ln
(d*x+e)*ln(-d*x/e)-b*n*d/e^2*dilog(-d*x/e)-b*n/e/x+1/2*b*n*d/e^2*ln(x)^2+(
1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n
)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c
)+b*ln(c)+a)*(d/e^2*ln(d*x+e)-1/e/x-d/e^2*ln(x))
```

Fricas [F]

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^3}\,dx=\int \frac{b\log(cx^n)+a}{\left(d+\frac{e}{x}\right)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(d*x^3 + e*x^2), x)
```

Sympy [A] (verification not implemented)

Time = 35.59 (sec) , antiderivative size = 216, normalized size of antiderivative = 2.92

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^3}\,dx = \frac{ad^2\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{e^2} - \frac{ad\log(x)}{e^2} - \frac{a}{ex}$$

$$- \frac{bd^2n\left(\begin{cases}\frac{x}{e} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|< \\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1 \\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)}{e^2}$$

$$+ \frac{bd^2\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2}$$

$$+ \frac{bdn\log(x)^2}{2e^2} - \frac{bd\log(x)\log(cx^n)}{e^2} - \frac{bn}{ex} - \frac{b\log(cx^n)}{ex}$$

input
```
integrate((a+b*ln(c*x**n))/(d+e/x)/x**3,x)
```

output
```
a*d**2*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/e**2 - a*d*log(x
)/e**2 - a/(e*x) - b*d**2*n*Piecewise((x/e, Eq(d, 0)), (Piecewise((-polylo
g(2, d*x*exp_polar(I*pi)/e), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x
) - polylog(2, d*x*exp_polar(I*pi)/e), Abs(x) < 1), (-log(e)*log(1/x) - po
lylog(2, d*x*exp_polar(I*pi)/e), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((
0, 0), ()), x)*log(e) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(e) - po
lylog(2, d*x*exp_polar(I*pi)/e), True))/d, True))/e**2 + b*d**2*Piecewise(
(x/e, Eq(d, 0)), (log(d*x + e)/d, True))*log(c*x**n)/e**2 + b*d*n*log(x)**
2/(2*e**2) - b*d*log(x)*log(c*x**n)/e**2 - b*n/(e*x) - b*log(c*x**n)/(e*x)
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^3}\,dx = \int \frac{b\log(cx^n)+a}{\left(d+\frac{e}{x}\right)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x^3,x, algorithm="maxima")
```

output
```
a*(d*log(d*x + e)/e^2 - d*log(x)/e^2 - 1/(e*x)) + b*integrate((log(c) + lo
g(x^n))/(d*x^3 + e*x^2), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^3}\,dx = \int \frac{b\log(cx^n)+a}{\left(d+\frac{e}{x}\right)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((d + e/x)*x^3), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^3}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^3\,\left(d+\frac{e}{x}\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e/x)),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e/x)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^3}\,dx = \frac{\left(\int \frac{\log(x^n c)}{d\,x^3+e\,x^2}dx\right)b\,e^2x+\log(dx+e)\,adx-\log(x)\,adx-ae}{e^2x}$$

input
```
int((a+b*log(c*x^n))/(d+e/x)/x^3,x)
```

output
```
(int(log(x**n*c)/(d*x**3 + e*x**2),x)*b*e**2*x + log(d*x + e)*a*d*x - log(
x)*a*d*x - a*e)/(e**2*x)
```

3.335 $\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^4}\,dx$

Optimal result 2521
Mathematica [A] (verified) 2521
Rubi [A] (verified) 2522
Maple [C] (warning: unable to verify) 2524
Fricas [F] 2524
Sympy [A] (verification not implemented) 2525
Maxima [F] 2526
Giac [F] 2526
Mupad [F(-1)] 2527
Reduce [F] 2527

Optimal result

Integrand size = 23, antiderivative size = 110

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+\frac{e}{x}\right)x^4}\,dx=-\frac{bn}{4ex^2}+\frac{bdn}{e^2x}-\frac{a+b\log\left(cx^n\right)}{2ex^2}+\frac{d\left(a+b\log\left(cx^n\right)\right)}{e^2x}-\frac{d^2\log\left(1+\frac{e}{dx}\right)\left(a+b\log\left(cx^n\right)\right)}{e^3}+\frac{bd^2n\,\text{PolyLog}\left(2,-\frac{e}{dx}\right)}{e^3}$$

output
```
-1/4*b*n/e/x^2+b*d*n/e^2/x-1/2*(a+b*ln(c*x^n))/e/x^2+d*(a+b*ln(c*x^n))/e^2
/x-d^2*ln(1+e/d/x)*(a+b*ln(c*x^n))/e^3+b*d^2*n*polylog(2,-e/d/x)/e^3
```

Mathematica [A] (verified)

Time = 0.24 (sec) , antiderivative size = 124, normalized size of antiderivative = 1.13

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+\frac{e}{x}\right)x^4}\,dx=-\frac{\frac{be^2n}{x^2}-\frac{4bden}{x}+\frac{2e^2(a+b\log(cx^n))}{x^2}-\frac{4de(a+b\log(cx^n))}{x}-\frac{2d^2(a+b\log(cx^n))^2}{bn}+4d^2\left(a+b\log\left(cx^n\right)\right)\log\left(1+\frac{dx}{e}\right)+4\cdots}{4e^3}$$

input
```
Integrate[(a + b*Log[c*x^n])/((d + e/x)*x^4),x]
```

output
```
-1/4*((b*e^2*n)/x^2 - (4*b*d*e*n)/x + (2*e^2*(a + b*Log[c*x^n]))/x^2 - (4*
d*e*(a + b*Log[c*x^n]))/x - (2*d^2*(a + b*Log[c*x^n])^2)/(b*n) + 4*d^2*(a
+ b*Log[c*x^n])*Log[1 + (d*x)/e] + 4*b*d^2*n*PolyLog[2, -((d*x)/e)])/e^3
```

Rubi [A] (verified)

Time = 0.65 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.05, number of steps used = 7, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {2005, 2780, 2741, 2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^4\left(d+\frac{e}{x}\right)}dx$$

$$\Big\downarrow \text{ 2005}$$

$$\int \frac{a+b\log(cx^n)}{x^3(dx+e)}dx$$

$$\Big\downarrow \text{ 2780}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x^3}dx}{e}-\frac{d\int \frac{a+b\log(cx^n)}{x^2(e+dx)}dx}{e}$$

$$\Big\downarrow \text{ 2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{e}-\frac{d\int \frac{a+b\log(cx^n)}{x^2(e+dx)}dx}{e}$$

$$\Big\downarrow \text{ 2780}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{e}-\frac{d\left(\frac{\int \frac{a+b\log(cx^n)}{x^2}dx}{e}-\frac{d\int \frac{a+b\log(cx^n)}{x(e+dx)}dx}{e}\right)}{e}$$

$$\Big\downarrow \text{ 2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{e}-\frac{d\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{e}-\frac{d\int \frac{a+b\log(cx^n)}{x(e+dx)}dx}{e}\right)}{e}$$

$$\Big\downarrow \text{ 2779}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{e}-\frac{d\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{e}-\frac{d\left(\frac{bn\int\frac{\log\left(\frac{e}{dx}+1\right)}{x}dx}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx^n))}{e}\right)}{e}\right)}{e}$$

$$\Big\downarrow \text{2838}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{e}-\frac{d\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{e}-\frac{d\left(\frac{bn\,\mathrm{PolyLog}\left(2,-\frac{e}{dx}\right)}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx^n))}{e}\right)}{e}\right)}{e}$$

input
```
Int[(a + b*Log[c*x^n])/((d + e/x)*x^4),x]
```

output
```
(-1/4*(b*n)/x^2 - (a + b*Log[c*x^n])/(2*x^2))/e - (d*((-((b*n)/x) - (a + b
*Log[c*x^n])/x)/e - (d*(-((Log[1 + e/(d*x)]*(a + b*Log[c*x^n]))/e) + (b*n*
PolyLog[2, -(e/(d*x))])/e))/e))/e
```

Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.29 (sec) , antiderivative size = 264, normalized size of antiderivative = 2.40

method	result
risch	$-\frac{b\ln(x^n)d^2\ln(dx+e)}{e^3} - \frac{b\ln(x^n)}{2e\,x^2} + \frac{b\ln(x^n)d^2\ln(x)}{e^3} + \frac{b\ln(x^n)d}{e^2x} + \frac{bdn}{e^2x} - \frac{bn}{4e\,x^2} - \frac{bn\,d^2\ln(x)^2}{2e^3} + \frac{bn\,d^2\ln(dx+e)\ln\left(-\right.}{e^3}$

input
```
int((a+b*ln(c*x^n))/(d+e/x)/x^4,x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)*d^2/e^3*ln(d*x+e)-1/2*b*ln(x^n)/e/x^2+b*ln(x^n)*d^2/e^3*ln(x)+b
*ln(x^n)*d/e^2/x+b*d*n/e^2/x-1/4*b*n/e/x^2-1/2*b*n*d^2/e^3*ln(x)^2+b*n*d^2
/e^3*ln(d*x+e)*ln(-d*x/e)+b*n*d^2/e^3*dilog(-d*x/e)+(1/2*I*Pi*b*csgn(I*x^n
)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*
b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(-d^2/e^
3*ln(d*x+e)-1/2/e/x^2+d^2/e^3*ln(x)+d/e^2/x)
```

Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+\frac{e}{x}\right)x^4}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\left(d+\frac{e}{x}\right)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x^4,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(d*x^4 + e*x^3), x)
```

Sympy [A] (verification not implemented)

Time = 42.45 (sec) , antiderivative size = 265, normalized size of antiderivative = 2.41

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^4}\,dx = -\frac{ad^3\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{e^3} + \frac{ad^2\log(x)}{e^3} + \frac{ad}{e^2x} - \frac{a}{2ex^2}$$

$$+\frac{bd^3n\left(\begin{cases}\frac{x}{e} & \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|< \\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1 \\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d} & \end{cases}\right.}{e^3}$$

$$-\frac{bd^3\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^3} - \frac{bd^2n\log(x)^2}{2e^3}$$

$$+\frac{bd^2\log(x)\log(cx^n)}{e^3} + \frac{bdn}{e^2x} + \frac{bd\log(cx^n)}{e^2x} - \frac{bn}{4ex^2} - \frac{b\log(cx^n)}{2ex^2}$$

input
```
integrate((a+b*ln(c*x**n))/(d+e/x)/x**4,x)
```

output
```
-a*d**3*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/e**3 + a*d**2*l
og(x)/e**3 + a*d/(e**2*x) - a/(2*e*x**2) + b*d**3*n*Piecewise((x/e, Eq(d,
0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (Abs(x) < 1) & (1/Abs
(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I*pi)/e), Abs(x) < 1)
, (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e), 1/Abs(x) < 1), (-
meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1), ()), ((),
 (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e), True))/d, True))/
e**3 - b*d**3*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))*log(c*x**
n)/e**3 - b*d**2*n*log(x)**2/(2*e**3) + b*d**2*log(x)*log(c*x**n)/e**3 + b
*d*n/(e**2*x) + b*d*log(c*x**n)/(e**2*x) - b*n/(4*e*x**2) - b*log(c*x**n)/
(2*e*x**2)
```

Maxima [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+\frac{e}{x}\right)x^4}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\left(d+\frac{e}{x}\right)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x^4,x, algorithm="maxima")
```

output
```
-1/2*a*(2*d^2*log(d*x + e)/e^3 - 2*d^2*log(x)/e^3 - (2*d*x - e)/(e^2*x^2))
 + b*integrate((log(c) + log(x^n))/(d*x^4 + e*x^3), x)
```

Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+\frac{e}{x}\right)x^4}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\left(d+\frac{e}{x}\right)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((d + e/x)*x^4), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^4}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^4\,\left(d+\frac{e}{x}\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^4*(d + e/x)),x)
```

output
```
int((a + b*log(c*x^n))/(x^4*(d + e/x)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^4}\,dx$$
$$= \frac{2\left(\int \frac{\log(x^n c)}{d\,x^4+e\,x^3}dx\right)b\,e^3x^2-2\log(dx+e)\,a\,d^2x^2+2\log(x)\,a\,d^2x^2+2adex-a\,e^2}{2e^3x^2}$$

input
```
int((a+b*log(c*x^n))/(d+e/x)/x^4,x)
```

output
```
(2*int(log(x**n*c)/(d*x**4 + e*x**3),x)*b*e**3*x**2 - 2*log(d*x + e)*a*d**
2*x**2 + 2*log(x)*a*d**2*x**2 + 2*a*d*e*x - a*e**2)/(2*e**3*x**2)
```

3.336 $\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx$

Optimal result . . . 2528
Mathematica [A] (verified) . . . 2528
Rubi [A] (verified) . . . 2529
Maple [A] (verified) . . . 2530
Fricas [F] . . . 2531
Sympy [A] (verification not implemented) . . . 2532
Maxima [A] (verification not implemented) . . . 2533
Giac [F] . . . 2533
Mupad [F(-1)] . . . 2534
Reduce [F] . . . 2534

Optimal result

Integrand size = 21, antiderivative size = 136

$$\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx=\frac{ae^2x}{d^3}-\frac{be^2x}{d^3}+\frac{bex^2}{4d^2}-\frac{bx^3}{9d}+\frac{be^2x\log(cx)}{d^3}-\frac{ex^2(a+b\log(cx))}{2d^2}+\frac{x^3(a+b\log(cx))}{3d}-\frac{e^3(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{d^4}-\frac{be^3\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^4}$$

output
```
a*e^2*x/d^3-b*e^2*x/d^3+1/4*b*e*x^2/d^2-1/9*b*x^3/d+b*e^2*x*ln(c*x)/d^3-1/
2*e*x^2*(a+b*ln(c*x))/d^2+1/3*x^3*(a+b*ln(c*x))/d-e^3*(a+b*ln(c*x))*ln(1+d
*x/e)/d^4-b*e^3*polylog(2,-d*x/e)/d^4
```

Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 125, normalized size of antiderivative = 0.92

$$\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx$$
$$=\frac{36ade^2x-36bde^2x+9bd^2ex^2-4bd^3x^3+36bde^2x\log(cx)-18d^2ex^2(a+b\log(cx))+12d^3x^3(a+b\log(}{36d^4}$$

input
```
Integrate[(x^2*(a + b*Log[c*x]))/(d + e/x),x]
```

output
```
(36*a*d*e^2*x - 36*b*d*e^2*x + 9*b*d^2*e*x^2 - 4*b*d^3*x^3 + 36*b*d*e^2*x*
Log[c*x] - 18*d^2*e*x^2*(a + b*Log[c*x]) + 12*d^3*x^3*(a + b*Log[c*x]) - 3
6*e^3*(a + b*Log[c*x])*Log[1 + (d*x)/e] - 36*b*e^3*PolyLog[2, -((d*x)/e)])
/(36*d^4)
```

Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 136, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = $\{2005, 2793, 2009\}$

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx$$

$$\Big\downarrow \ 2005$$

$$\int \frac{x^3(a+b\log(cx))}{dx+e}dx$$

$$\Big\downarrow \ 2793$$

$$\int \left(-\frac{e^3(a+b\log(cx))}{d^3(dx+e)}+\frac{e^2(a+b\log(cx))}{d^3}-\frac{ex(a+b\log(cx))}{d^2}+\frac{x^2(a+b\log(cx))}{d}\right)dx$$

$$\Big\downarrow \ 2009$$

$$-\frac{e^3\log\left(\frac{dx}{e}+1\right)(a+b\log(cx))}{d^4}-\frac{ex^2(a+b\log(cx))}{2d^2}+\frac{x^3(a+b\log(cx))}{3d}+\frac{ae^2x}{d^3}+\frac{be^2x\log(cx)}{d^3}-\frac{be^3\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^4}-\frac{be^2x}{d^3}+\frac{bex^2}{4d^2}-\frac{bx^3}{9d}$$

input
```
Int[(x^2*(a + b*Log[c*x]))/(d + e/x),x]
```

output
```
(a*e^2*x)/d^3 - (b*e^2*x)/d^3 + (b*e*x^2)/(4*d^2) - (b*x^3)/(9*d) + (b*e^2
*x*Log[c*x])/d^3 - (e*x^2*(a + b*Log[c*x]))/(2*d^2) + (x^3*(a + b*Log[c*x]
))/(3*d) - (e^3*(a + b*Log[c*x])*Log[1 + (d*x)/e])/d^4 - (b*e^3*PolyLog[2,
 -((d*x)/e)])/d^4
```

Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [A] (verified)

Time = 0.39 (sec) , antiderivative size = 168, normalized size of antiderivative = 1.24

method	result
risch	$\frac{a\,x^3}{3d}-\frac{ae\,x^2}{2d^2}+\frac{a\,e^2x}{d^3}-\frac{a\,e^3\ln(dx+e)}{d^4}+\frac{b\,x^3\ln(xc)}{3d}-\frac{b\,x^3}{9d}-\frac{be\,x^2\ln(xc)}{2d^2}+\frac{be\,x^2}{4d^2}+\frac{b\,e^2x\ln(xc)}{d^3}-\frac{b\,e^2x}{d^3}$
parts	$\frac{a\,x^3}{3d}-\frac{ae\,x^2}{2d^2}+\frac{a\,e^2x}{d^3}-\frac{a\,e^3\ln(dx+e)}{d^4}+\frac{b\,x^3\ln(xc)}{3d}-\frac{b\,x^3}{9d}-\frac{be\,x^2\ln(xc)}{2d^2}+\frac{be\,x^2}{4d^2}+\frac{b\,e^2x\ln(xc)}{d^3}-\frac{b\,e^2x}{d^3}$
derivativedivides	$\frac{\frac{a\,c^3e^2x}{d^3}-\frac{a\,c^3e\,x^2}{2d^2}+\frac{a\,x^3c^3}{3d}-\frac{a\,c^3e^3\ln(cdx+ce)}{d^4}+b\left(\frac{\frac{x^3c^3\ln(xc)}{3}-\frac{x^3c^3}{9}}{d}-\frac{\left(\frac{x^2c^2\ln(xc)}{2}-\frac{c^2x^2}{4}\right)ce}{d^2}+\frac{(xc\ln(xc)-xc)c^2e^2}{d^3}-\right.}{c^3}$
default	$\frac{\frac{a\,c^3e^2x}{d^3}-\frac{a\,c^3e\,x^2}{2d^2}+\frac{a\,x^3c^3}{3d}-\frac{a\,c^3e^3\ln(cdx+ce)}{d^4}+b\left(\frac{\frac{x^3c^3\ln(xc)}{3}-\frac{x^3c^3}{9}}{d}-\frac{\left(\frac{x^2c^2\ln(xc)}{2}-\frac{c^2x^2}{4}\right)ce}{d^2}+\frac{(xc\ln(xc)-xc)c^2e^2}{d^3}-\right.}{c^3}$

input
```
int(x^2*(a+b*ln(x*c))/(d+e/x),x,method=_RETURNVERBOSE)
```

output
```
1/3*a/d*x^3-1/2*a/d^2*e*x^2+a*e^2*x/d^3-a*e^3/d^4*ln(d*x+e)+1/3*b/d*x^3*ln
(x*c)-1/9*b*x^3/d-1/2*b/d^2*e*x^2*ln(x*c)+1/4*b*e*x^2/d^2+b*e^2*x*ln(x*c)/
d^3-b*e^2*x/d^3-b*e^3/d^4*dilog((c*d*x+c*e)/e/c)-b*e^3/d^4*ln(x*c)*ln((c*d
*x+c*e)/e/c)
```

Fricas [F]

$$\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx=\int \frac{(b\log(cx)+a)x^2}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x))/(d+e/x),x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x) + a*x^3)/(d*x + e), x)
```

Sympy [A] (verification not implemented)

Time = 78.00 (sec) , antiderivative size = 253, normalized size of antiderivative = 1.86

$$\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \frac{ax^3}{3d} - \frac{aex^2}{2d^2} - \frac{ae^3\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{d^3} + \frac{ae^2x}{d^3} + \frac{bx^3\log(cx)}{3d} - \frac{bx^3}{9d} - \frac{bex^2\log(cx)}{2d^2} + \frac{bex^2}{4d^2} + \frac{be^3\left(\begin{cases}\frac{x}{e} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)}{d^3} - \frac{be^3\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx)}{d^3} + \frac{be^2x\log(cx)}{d^3} - \frac{be^2x}{d^3}$$

input
```
integrate(x**2*(a+b*ln(c*x))/(d+e/x),x)
```

output
```
a*x**3/(3*d) - a*e*x**2/(2*d**2) - a*e**3*Piecewise((x/e, Eq(d, 0)), (log(
d*x + e)/d, True))/d**3 + a*e**2*x/d**3 + b*x**3*log(c*x)/(3*d) - b*x**3/(
9*d) - b*e*x**2*log(c*x)/(2*d**2) + b*e*x**2/(4*d**2) + b*e**3*Piecewise((
x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (Abs(x) <
1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I*pi)/e),
Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e), 1/Abs(
x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1)
, ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e), True))
/d, True))/d**3 - b*e**3*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True)
)*log(c*x)/d**3 + b*e**2*x*log(c*x)/d**3 - b*e**2*x/d**3
```

Maxima [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 164, normalized size of antiderivative = 1.21

$$\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx = -\frac{\left(\log\left(\frac{dx}{e}+1\right)\log(x)+\mathrm{Li}_2\left(-\frac{dx}{e}\right)\right)be^3}{d^4} + \frac{4\,(3\,ad^2+(3\,d^2\log(c)-d^2)b)x^3-9\,(2\,ade+(2\,de\log(c)-de)b)x^2+36\,(ae^2+(e^2\log(c)-e^2)b)x+}{36\,d^3} - \frac{(be^3\log(c)+ae^3)\log(dx+e)}{d^4}$$

input
```
integrate(x^2*(a+b*log(c*x))/(d+e/x),x, algorithm="maxima")
```

output
```
-(log(d*x/e + 1)*log(x) + dilog(-d*x/e))*b*e^3/d^4 + 1/36*(4*(3*a*d^2 + (3
*d^2*log(c) - d^2)*b)*x^3 - 9*(2*a*d*e + (2*d*e*log(c) - d*e)*b)*x^2 + 36*
(a*e^2 + (e^2*log(c) - e^2)*b)*x + 6*(2*b*d^2*x^3 - 3*b*d*e*x^2 + 6*b*e^2*
x)*log(x))/d^3 - (b*e^3*log(c) + a*e^3)*log(d*x + e)/d^4
```

Giac [F]

$$\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \int \frac{(b\log(cx)+a)x^2}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x))/(d+e/x),x, algorithm="giac")
```

output
```
integrate((b*log(c*x) + a)*x^2/(d + e/x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx=\int \frac{x^2\,(a+b\,\ln(c\,x))}{d+\frac{e}{x}}\,dx$$

input
```
int((x^2*(a + b*log(c*x)))/(d + e/x),x)
```

output
```
int((x^2*(a + b*log(c*x)))/(d + e/x), x)
```

Reduce [F]

$$\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx$$
$$=\frac{36\left(\int \frac{\log(cx)}{d\,x^2+ex}dx\right) b\,e^4-36\log(dx+e)\,a\,e^3-18\log(cx)^2\,b\,e^3+12\log(cx)\,b\,d^3x^3-18\log(cx)\,b\,d^2e\,x^2+36}{36d^4}$$

input
```
int(x^2*(a+b*log(c*x))/(d+e/x),x)
```

output
```
(36*int(log(c*x)/(d*x**2 + e*x),x)*b*e**4 - 36*log(d*x + e)*a*e**3 - 18*lo
g(c*x)**2*b*e**3 + 12*log(c*x)*b*d**3*x**3 - 18*log(c*x)*b*d**2*e*x**2 + 3
6*log(c*x)*b*d*e**2*x + 12*a*d**3*x**3 - 18*a*d**2*e*x**2 + 36*a*d*e**2*x
- 4*b*d**3*x**3 + 9*b*d**2*e*x**2 - 36*b*d*e**2*x)/(36*d**4)
```

3.337 $\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx$

Optimal result 2535
Mathematica [A] (verified) 2535
Rubi [A] (verified) 2536
Maple [A] (verified) 2537
Fricas [F] 2538
Sympy [A] (verification not implemented) 2538
Maxima [A] (verification not implemented) 2539
Giac [F] 2540
Mupad [F(-1)] 2540
Reduce [F] 2540

Optimal result

Integrand size = 19, antiderivative size = 98

$$\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx = -\frac{aex}{d^2}+\frac{bex}{d^2}-\frac{bx^2}{4d}-\frac{bex\log(cx)}{d^2}+\frac{x^2(a+b\log(cx))}{2d}+\frac{e^2(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{d^3}+\frac{be^2\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^3}$$

output
```
-a*e*x/d^2+b*e*x/d^2-1/4*b*x^2/d-b*e*x*ln(c*x)/d^2+1/2*x^2*(a+b*ln(c*x))/d
+e^2*(a+b*ln(c*x))*ln(1+d*x/e)/d^3+b*e^2*polylog(2,-d*x/e)/d^3
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 99, normalized size of antiderivative = 1.01

$$\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx = -\frac{aex}{d^2}+\frac{bex}{d^2}-\frac{bx^2}{4d}-\frac{bex\log(cx)}{d^2}+\frac{x^2(a+b\log(cx))}{2d}+\frac{e^2(a+b\log(cx))\log\left(\frac{e+dx}{e}\right)}{d^3}+\frac{be^2\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^3}$$

input
```
Integrate[(x*(a + b*Log[c*x]))/(d + e/x),x]
```

output
```
-((a*e*x)/d^2) + (b*e*x)/d^2 - (b*x^2)/(4*d) - (b*e*x*Log[c*x])/d^2 + (x^2
*(a + b*Log[c*x]))/(2*d) + (e^2*(a + b*Log[c*x])*Log[(e + d*x)/e])/d^3 + (
b*e^2*PolyLog[2, -((d*x)/e)])/d^3
```

Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 98, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$, Rules used = {2005, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}dx$$

$$\Big\downarrow \text{2005}$$

$$\int \frac{x^2(a+b\log(cx))}{dx+e}dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{e^2(a+b\log(cx))}{d^2(dx+e)}-\frac{e(a+b\log(cx))}{d^2}+\frac{x(a+b\log(cx))}{d}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{e^2\log\left(\frac{dx}{e}+1\right)(a+b\log(cx))}{d^3}+\frac{x^2(a+b\log(cx))}{2d}-\frac{aex}{d^2}-\frac{bex\log(cx)}{d^2}+\frac{be^2\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^3}+\frac{bex}{d^2}-\frac{bx^2}{4d}$$

input
```
Int[(x*(a + b*Log[c*x]))/(d + e/x),x]
```

output
```
-((a*e*x)/d^2) + (b*e*x)/d^2 - (b*x^2)/(4*d) - (b*e*x*Log[c*x])/d^2 + (x^2
*(a + b*Log[c*x]))/(2*d) + (e^2*(a + b*Log[c*x])*Log[1 + (d*x)/e])/d^3 + (
b*e^2*PolyLog[2, -((d*x)/e)])/d^3
```

Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [A] (verified)

Time = 0.37 (sec) , antiderivative size = 126, normalized size of antiderivative = 1.29

method	result
risch	$\frac{a\,x^{2}}{2d}-\frac{aex}{d^{2}}+\frac{a\,e^{2}\ln(dx+e)}{d^{3}}+\frac{b\,x^{2}\ln(xc)}{2d}-\frac{b\,x^{2}}{4d}-\frac{bex\ln(xc)}{d^{2}}+\frac{bex}{d^{2}}+\frac{b\,e^{2}\operatorname{dilog}\left(\frac{cdx+ce}{ec}\right)}{d^{3}}+\frac{b\,e^{2}\ln(xc)\,\mathrm{l}}{d}$
parts	$\frac{a\,x^{2}}{2d}-\frac{aex}{d^{2}}+\frac{a\,e^{2}\ln(dx+e)}{d^{3}}+\frac{b\,x^{2}\ln(xc)}{2d}-\frac{b\,x^{2}}{4d}-\frac{bex\ln(xc)}{d^{2}}+\frac{bex}{d^{2}}+\frac{b\,e^{2}\operatorname{dilog}\left(\frac{cdx+ce}{ec}\right)}{d^{3}}+\frac{b\,e^{2}\ln(xc)\,\mathrm{l}}{d}$
derivativedivides	$\frac{-\frac{a\,c^{2}ex}{d^{2}}+\frac{a\,x^{2}c^{2}}{2d}+\frac{a\,c^{2}e^{2}\ln(cdx+ce)}{d^{3}}+b\left(\frac{\frac{x^{2}c^{2}\ln(xc)}{2}-\frac{c^{2}x^{2}}{4}}{d}-\frac{(xc\ln(xc)-xc)ec}{d^{2}}+\frac{\left(\frac{\operatorname{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d}\right)c^{2}}{d^{2}}\right.}{c^{2}}$
default	$\frac{-\frac{a\,c^{2}ex}{d^{2}}+\frac{a\,x^{2}c^{2}}{2d}+\frac{a\,c^{2}e^{2}\ln(cdx+ce)}{d^{3}}+b\left(\frac{\frac{x^{2}c^{2}\ln(xc)}{2}-\frac{c^{2}x^{2}}{4}}{d}-\frac{(xc\ln(xc)-xc)ec}{d^{2}}+\frac{\left(\frac{\operatorname{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d}\right)c^{2}}{d^{2}}\right.}{c^{2}}$

input
```
int(x*(a+b*ln(x*c))/(d+e/x),x,method=_RETURNVERBOSE)
```

output
```
1/2*a*x^2/d-a*e*x/d^2+a*e^2/d^3*ln(d*x+e)+1/2*b/d*x^2*ln(x*c)-1/4*b*x^2/d-
b*e*x*ln(x*c)/d^2+b*e*x/d^2+b*e^2/d^3*dilog((c*d*x+c*e)/e/c)+b*e^2/d^3*ln(
x*c)*ln((c*d*x+c*e)/e/c)
```

Fricas [F]

$$\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx=\int \frac{(b\log(cx)+a)x}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x*(a+b*log(c*x))/(d+e/x),x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x) + a*x^2)/(d*x + e), x)
```

Sympy [A] (verification not implemented)

Time = 51.41 (sec) , antiderivative size = 207, normalized size of antiderivative = 2.11

$$\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx=\frac{ax^2}{2d}+\frac{ae^2\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{d^2}-\frac{aex}{d^2}+\frac{bx^2\log(cx)}{2d}-\frac{bx^2}{4d}-\frac{be^2\left(\begin{cases}\frac{x}{e} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\wedge |x|<1\\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)}{d^2}+\frac{be^2\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx)}{d^2}-\frac{bex\log(cx)}{d^2}+\frac{bex}{d^2}$$

input
```
integrate(x*(a+b*ln(c*x))/(d+e/x),x)
```

output
```
a*x**2/(2*d) + a*e**2*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/d
**2 - a*e*x/d**2 + b*x**2*log(c*x)/(2*d) - b*x**2/(4*d) - b*e**2*Piecewise
((x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (Abs(x)
< 1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I*pi)/e)
, Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e), 1/Ab
s(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1,
1), ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e), True
))/d, True))/d**2 + b*e**2*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, Tru
e))*log(c*x)/d**2 - b*e*x*log(c*x)/d**2 + b*e*x/d**2
```

Maxima [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.14

$$\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \frac{\left(\log\left(\frac{dx}{e}+1\right)\log\left(x\right)+\mathrm{Li}_2\left(-\frac{dx}{e}\right)\right)be^2}{d^3} + \frac{((2\,d\log\left(c\right)-d)b+2\,ad)x^2-4\,((e\log\left(c\right)-e)b+ae)x+2\,(bdx^2-2\,bex)\log\left(x\right)}{4\,d^2} + \frac{(be^2\log\left(c\right)+ae^2)\log\left(dx+e\right)}{d^3}$$

input
```
integrate(x*(a+b*log(c*x))/(d+e/x),x, algorithm="maxima")
```

output
```
(log(d*x/e + 1)*log(x) + dilog(-d*x/e))*b*e^2/d^3 + 1/4*(((2*d*log(c) - d)
*b + 2*a*d)*x^2 - 4*((e*log(c) - e)*b + a*e)*x + 2*(b*d*x^2 - 2*b*e*x)*log
(x))/d^2 + (b*e^2*log(c) + a*e^2)*log(d*x + e)/d^3
```

Giac [F]

$$\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \int \frac{(b\log(cx)+a)x}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x*(a+b*log(c*x))/(d+e/x),x, algorithm="giac")
```

output
```
integrate((b*log(c*x) + a)*x/(d + e/x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \int \frac{x\,(a+b\,\ln(c\,x))}{d+\frac{e}{x}}\,dx$$

input
```
int((x*(a + b*log(c*x)))/(d + e/x),x)
```

output
```
int((x*(a + b*log(c*x)))/(d + e/x), x)
```

Reduce [F]

$$\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx$$
$$= \frac{-4\left(\int \frac{\log(cx)}{d\,x^2+ex}dx\right) b\,e^3 + 4\log(dx+e)\,a\,e^2 + 2\log(cx)^2\,b\,e^2 + 2\log(cx)\,b\,d^2x^2 - 4\log(cx)\,bdex + 2a\,d^2x^2}{4d^3}$$

input
```
int(x*(a+b*log(c*x))/(d+e/x),x)
```

output
```
( - 4*int(log(c*x)/(d*x**2 + e*x),x)*b*e**3 + 4*log(d*x + e)*a*e**2 + 2*lo
g(c*x)**2*b*e**2 + 2*log(c*x)*b*d**2*x**2 - 4*log(c*x)*b*d*e*x + 2*a*d**2*
x**2 - 4*a*d*e*x - b*d**2*x**2 + 4*b*d*e*x)/(4*d**3)
```

3.338 $\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx$

Optimal result . . . 2541
Mathematica [A] (verified) . . . 2541
Rubi [A] (verified) . . . 2542
Maple [A] (verified) . . . 2543
Fricas [F] . . . 2543
Sympy [A] (verification not implemented) . . . 2544
Maxima [A] (verification not implemented) . . . 2545
Giac [F] . . . 2545
Mupad [F(-1)] . . . 2545
Reduce [F] . . . 2546

Optimal result

Integrand size = 18, antiderivative size = 63

$$\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx=\frac{ax}{d}-\frac{bx}{d}+\frac{bx\log(cx)}{d}-\frac{e(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{d^2}-\frac{be\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^2}$$

output
```
a*x/d-b*x/d+b*x*ln(c*x)/d-e*(a+b*ln(c*x))*ln(1+d*x/e)/d^2-b*e*polylog(2,-d
*x/e)/d^2
```

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 64, normalized size of antiderivative = 1.02

$$\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx=\frac{ax}{d}-\frac{bx}{d}+\frac{bx\log(cx)}{d}-\frac{e(a+b\log(cx))\log\left(\frac{e+dx}{e}\right)}{d^2}-\frac{be\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^2}$$

input
```
Integrate[(a + b*Log[c*x])/(d + e/x),x]
```

output
```
(a*x)/d - (b*x)/d + (b*x*Log[c*x])/d - (e*(a + b*Log[c*x])*Log[(e + d*x)/e
])/d^2 - (b*e*PolyLog[2, -((d*x)/e)])/d^2
```

Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx)}{d+\frac{e}{x}}dx$$

$$\Big\downarrow \text{2767}$$

$$\int \left(\frac{a+b\log(cx)}{d}-\frac{e(a+b\log(cx))}{d(dx+e)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{e\log\left(\frac{dx}{e}+1\right)(a+b\log(cx))}{d^2}+\frac{ax}{d}+\frac{bx\log(cx)}{d}-\frac{be\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^2}-\frac{bx}{d}$$

input
```
Int[(a + b*Log[c*x])/(d + e/x),x]
```

output
```
(a*x)/d - (b*x)/d + (b*x*Log[c*x])/d - (e*(a + b*Log[c*x])*Log[1 + (d*x)/e
])/d^2 - (b*e*PolyLog[2, -((d*x)/e)])/d^2
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Maple [A] (verified)

Time = 0.32 (sec) , antiderivative size = 88, normalized size of antiderivative = 1.40

method	result	size
risch	$\frac{ax}{d}-\frac{ae\ln(dx+e)}{d^2}+\frac{bx\ln(xc)}{d}-\frac{bx}{d}-\frac{be\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d^2}-\frac{be\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d^2}$	88
parts	$\frac{ax}{d}-\frac{ae\ln(dx+e)}{d^2}+\frac{bx\ln(xc)}{d}-\frac{bx}{d}-\frac{be\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d^2}-\frac{be\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d^2}$	88
derivativedivides	$\frac{\frac{axc}{d}-\frac{aec\ln(cdx+ce)}{d^2}+b\left(\frac{xc\ln(xc)-xc}{d}-\frac{\left(\frac{\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d}\right)ec}{d}\right)}{c}$	101
default	$\frac{\frac{axc}{d}-\frac{aec\ln(cdx+ce)}{d^2}+b\left(\frac{xc\ln(xc)-xc}{d}-\frac{\left(\frac{\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d}\right)ec}{d}\right)}{c}$	101

input
```
int((a+b*ln(x*c))/(d+e/x),x,method=_RETURNVERBOSE)
```

output
```
a*x/d-a*e/d^2*ln(d*x+e)+b*x*ln(x*c)/d-b*x/d-b*e/d^2*dilog((c*d*x+c*e)/e/c)
-b*e/d^2*ln(x*c)*ln((c*d*x+c*e)/e/c)
```

Fricas [F]

$$\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx=\int \frac{b\log\left(cx\right)+a}{d+\frac{e}{x}}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x),x, algorithm="fricas")
```

output
```
integral((b*x*log(c*x) + a*x)/(d*x + e), x)
```

Sympy [A] (verification not implemented)

Time = 42.78 (sec) , antiderivative size = 156, normalized size of antiderivative = 2.48

$$\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx = -\frac{ae\left(\begin{cases}\frac{x}{e} & \text{for}\ d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{d}+\frac{ax}{d} + \frac{be\left(\begin{cases}\frac{x}{e} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ \frac{1}{|x|}<1\wedge|x|<1\\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)}{d} - \frac{be\left(\begin{cases}\frac{x}{e} & \text{for}\ d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx)}{d}+\frac{bx\log(cx)}{d}-\frac{bx}{d}$$

input
```
integrate((a+b*ln(c*x))/(d+e/x),x)
```

output
```
-a*e*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/d + a*x/d + b*e*Pi
ecewise((x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (
Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I
*pi)/e), Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e
), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijer
g(((1, 1), ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e
), True))/d, True))/d - b*e*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, Tr
ue))*log(c*x)/d + b*x*log(c*x)/d - b*x/d
```

Maxima [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx = -\frac{\left(\log\left(\frac{dx}{e}+1\right)\log(x)+\text{Li}_2\left(-\frac{dx}{e}\right)\right)be}{d^2} + \frac{bx\log(x)+(b(\log(c)-1)+a)x}{d} - \frac{(be\log(c)+ae)\log(dx+e)}{d^2}$$

input
```
integrate((a+b*log(c*x))/(d+e/x),x, algorithm="maxima")
```

output
```
-(log(d*x/e + 1)*log(x) + dilog(-d*x/e))*b*e/d^2 + (b*x*log(x) + (b*(log(c
) - 1) + a)*x)/d - (b*e*log(c) + a*e)*log(d*x + e)/d^2
```

Giac [F]

$$\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx = \int \frac{b\log(cx)+a}{d+\frac{e}{x}}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x),x, algorithm="giac")
```

output
```
integrate((b*log(c*x) + a)/(d + e/x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx = \int \frac{a+b\,\ln(c\,x)}{d+\frac{e}{x}}\,dx$$

input
```
int((a + b*log(c*x))/(d + e/x),x)
```

output
```
int((a + b*log(c*x))/(d + e/x), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx$$
$$=\frac{2\left(\int \frac{\log(cx)}{d\,x^2+ex}dx\right)b\,e^2-2\log(dx+e)\,ae-\log(cx)^2\,be+2\log(cx)\,bdx+2adx-2bdx}{2d^2}$$

input
```
int((a+b*log(c*x))/(d+e/x),x)
```

output
```
(2*int(log(c*x)/(d*x**2 + e*x),x)*b*e**2 - 2*log(d*x + e)*a*e - log(c*x)**
2*b*e + 2*log(c*x)*b*d*x + 2*a*d*x - 2*b*d*x)/(2*d**2)
```

3.339 $\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x}\,dx$

Optimal result 2547
Mathematica [A] (verified) 2547
Rubi [A] (verified) 2548
Maple [A] (verified) 2549
Fricas [F] 2549
Sympy [F] 2550
Maxima [A] (verification not implemented) 2550
Giac [F] 2550
Mupad [F(-1)] 2551
Reduce [F] 2551

Optimal result

Integrand size = 21, antiderivative size = 36

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x}\,dx=\frac{(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{d}+\frac{b\,\mathrm{PolyLog}\left(2,-\frac{dx}{e}\right)}{d}$$

output
```
(a+b*ln(c*x))*ln(1+d*x/e)/d+b*polylog(2,-d*x/e)/d
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 34, normalized size of antiderivative = 0.94

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x}\,dx=\frac{(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)+b\,\mathrm{PolyLog}\left(2,-\frac{dx}{e}\right)}{d}$$

input
```
Integrate[(a + b*Log[c*x])/((d + e/x)*x),x]
```

output
```
((a + b*Log[c*x])*Log[1 + (d*x)/e] + b*PolyLog[2, -((d*x)/e)])/d
```

Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {2005, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx)}{x\left(d+\frac{e}{x}\right)}dx$$

$$\Big\downarrow \text{2005}$$

$$\int \frac{a+b\log(cx)}{dx+e}dx$$

$$\Big\downarrow \text{2754}$$

$$\frac{\log\left(\frac{dx}{e}+1\right)(a+b\log(cx))}{d}-\frac{b\int \frac{\log\left(\frac{dx}{e}+1\right)}{x}dx}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\log\left(\frac{dx}{e}+1\right)(a+b\log(cx))}{d}+\frac{b\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d}$$

input
```
Int[(a + b*Log[c*x])/((d + e/x)*x),x]
```

output
```
((a + b*Log[c*x])*Log[1 + (d*x)/e])/d + (b*PolyLog[2, -((d*x)/e)])/d
```

Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [A] (verified)

Time = 0.32 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.64

method	result	size
risch	$\frac{a\ln(dx+e)}{d}+\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{b\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d}$	59
parts	$\frac{a\ln(dx+e)}{d}+\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{b\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d}$	59
derivativedivides	$\frac{a\ln(cdx+ce)}{d}+\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{b\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d}$	62
default	$\frac{a\ln(cdx+ce)}{d}+\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{b\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d}$	62

input
```
int((a+b*ln(x*c))/(d+e/x)/x,x,method=_RETURNVERBOSE)
```

output
```
a*ln(d*x+e)/d+b*dilog((c*d*x+c*e)/e/c)/d+b*ln(x*c)*ln((c*d*x+c*e)/e/c)/d
```

Fricas [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x}\,dx=\int \frac{b\log\left(cx\right)+a}{\left(d+\frac{e}{x}\right)x}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x,x, algorithm="fricas")
```

output
```
integral((b*log(c*x) + a)/(d*x + e), x)
```

Sympy [F]

$$\int \frac{a + b\log(cx)}{\left(d + \frac{e}{x}\right)x}\,dx = \int \frac{a + b\log{(cx)}}{dx + e}\,dx$$

input
```
integrate((a+b*ln(c*x))/(d+e/x)/x,x)
```

output
```
Integral((a + b*log(c*x))/(d*x + e), x)
```

Maxima [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.19

$$\int \frac{a + b\log(cx)}{\left(d + \frac{e}{x}\right)x}\,dx = \frac{\left(\log\left(\frac{dx}{e} + 1\right)\log{(x)} + \mathrm{Li}_2\left(-\frac{dx}{e}\right)\right)b}{d} + \frac{(b\log{(c)} + a)\log{(dx + e)}}{d}$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x,x, algorithm="maxima")
```

output
```
(log(d*x/e + 1)*log(x) + dilog(-d*x/e))*b/d + (b*log(c) + a)*log(d*x + e)/
d
```

Giac [F]

$$\int \frac{a + b\log(cx)}{\left(d + \frac{e}{x}\right)x}\,dx = \int \frac{b\log{(cx)} + a}{\left(d + \frac{e}{x}\right)x}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x,x, algorithm="giac")
```

output
```
integrate((b*log(c*x) + a)/((d + e/x)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x}\,dx=\int \frac{a+b\,\ln\left(c\,x\right)}{x\,\left(d+\frac{e}{x}\right)}\,dx$$

input
```
int((a + b*log(c*x))/(x*(d + e/x)),x)
```

output
```
int((a + b*log(c*x))/(x*(d + e/x)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x}\,dx=\frac{-2\left(\int \frac{\log(cx)}{d\,x^2+ex}dx\right)be+2\log(dx+e)\,a+\log(cx)^2\,b}{2d}$$

input
```
int((a+b*log(c*x))/(d+e/x)/x,x)
```

output
```
( - 2*int(log(c*x)/(d*x**2 + e*x),x)*b*e + 2*log(d*x + e)*a + log(c*x)**2*
b)/(2*d)
```

3.340 $\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx$

Optimal result 2552
Mathematica [A] (verified) 2552
Rubi [A] (verified) 2553
Maple [A] (verified) 2554
Fricas [F] 2554
Sympy [C] (verification not implemented) 2555
Maxima [A] (verification not implemented) 2556
Giac [F] 2556
Mupad [F(-1)] 2556
Reduce [F] 2557

Optimal result

Integrand size = 21, antiderivative size = 41

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx=-\frac{\log\left(1+\frac{e}{dx}\right)(a+b\log(cx))}{e}+\frac{b\operatorname{PolyLog}\left(2,-\frac{e}{dx}\right)}{e}$$

output
```
-ln(1+e/d/x)*(a+b*ln(c*x))/e+b*polylog(2,-e/d/x)/e
```

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.32

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx =\frac{(a+b\log(cx))\left(a+b\log(cx)-2b\log\left(1+\frac{dx}{e}\right)\right)-2b^2\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{2be}$$

input
```
Integrate[(a + b*Log[c*x])/((d + e/x)*x^2),x]
```

output
```
((a + b*Log[c*x])*(a + b*Log[c*x] - 2*b*Log[1 + (d*x)/e]) - 2*b^2*PolyLog[
2, -((d*x)/e)])/(2*b*e)
```

Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {2005, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx)}{x^2\left(d+\frac{e}{x}\right)}dx$$
$$\Big\downarrow \text{2005}$$
$$\int \frac{a+b\log(cx)}{x(dx+e)}dx$$
$$\Big\downarrow \text{2779}$$
$$\frac{b\int \frac{\log\left(\frac{e}{dx}+1\right)}{x}dx}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx))}{e}$$
$$\Big\downarrow \text{2838}$$
$$\frac{b\,\text{PolyLog}\left(2,-\frac{e}{dx}\right)}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx))}{e}$$

input
```
Int[(a + b*Log[c*x])/((d + e/x)*x^2),x]
```

output
```
-((Log[1 + e/(d*x)]*(a + b*Log[c*x]))/e) + (b*PolyLog[2, -(e/(d*x))])/e
```

Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [A] (verified)

Time = 0.34 (sec) , antiderivative size = 81, normalized size of antiderivative = 1.98

method	result	size
risch	$-\frac{a\ln(dx+e)}{e}+\frac{a\ln(x)}{e}+\frac{b\ln(xc)^2}{2e}-\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{e}-\frac{b\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{e}$	81
parts	$-\frac{a\ln(dx+e)}{e}+\frac{a\ln(x)}{e}+\frac{b\ln(xc)^2}{2e}-\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{e}-\frac{b\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{e}$	81
derivativedivides	$c\left(-\frac{a\ln(cdx+ce)}{ec}+\frac{a\ln(xc)}{ec}-\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{ec}-\frac{b\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{ec}+\frac{b\ln(xc)^2}{2ec}\right)$	103
default	$c\left(-\frac{a\ln(cdx+ce)}{ec}+\frac{a\ln(xc)}{ec}-\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{ec}-\frac{b\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{ec}+\frac{b\ln(xc)^2}{2ec}\right)$	103

input
```
int((a+b*ln(x*c))/(d+e/x)/x^2,x,method=_RETURNVERBOSE)
```

output
```
-a/e*ln(d*x+e)+a/e*ln(x)+1/2*b/e*ln(x*c)^2-b/e*dilog((c*d*x+c*e)/e/c)-b/e*
ln(x*c)*ln((c*d*x+c*e)/e/c)
```

Fricas [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx=\int \frac{b\log(cx)+a}{\left(d+\frac{e}{x}\right)x^2}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x) + a)/(d*x^2 + e*x), x)
```

Sympy [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 5.47 (sec) , antiderivative size = 170, normalized size of antiderivative = 4.15

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx = \frac{2ad\left(\begin{cases} -\frac{x}{e}-\frac{1}{2d} & \text{for}\ d=0 \\ \frac{\log(2dx)}{2d} & \text{otherwise} \end{cases}\right)}{e} - \frac{2ad\left(\begin{cases} \frac{x}{e}+\frac{1}{2d} & \text{for}\ d=0 \\ \frac{\log(2dx+2e)}{2d} & \text{otherwise} \end{cases}\right)}{e}$$
$$+b\left(\begin{cases} -\frac{1}{dx} \\ \frac{\begin{cases} \mathrm{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{for}\ \frac{1}{|x|}<1\wedge|x|<1 \\ \log(d)\log(x)+\mathrm{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{for}\ |x|<1 \\ -\log(d)\log\left(\frac{1}{x}\right)+\mathrm{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{for}\ \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)\log(d)+\mathrm{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{otherwise} \end{cases}}{e} \end{cases}\right)$$
$$-b\left(\begin{cases} \frac{1}{dx} & \text{for}\ e=0 \\ \frac{\log\left(d+\frac{e}{x}\right)}{e} & \text{otherwise} \end{cases}\right)\log(cx)$$

input
```
integrate((a+b*ln(c*x))/(d+e/x)/x**2,x)
```

output
```
2*a*d*Piecewise((-x/e - 1/(2*d), Eq(d, 0)), (log(2*d*x)/(2*d), True))/e -
2*a*d*Piecewise((x/e + 1/(2*d), Eq(d, 0)), (log(2*d*x + 2*e)/(2*d), True))
/e + b*Piecewise((-1/(d*x), Eq(e, 0)), (Piecewise((polylog(2, e*exp_polar(
I*pi)/(d*x)), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) + polylog(2,
e*exp_polar(I*pi)/(d*x)), Abs(x) < 1), (-log(d)*log(1/x) + polylog(2, e*ex
p_polar(I*pi)/(d*x)), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()),
 x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) + polylog(2, e*
exp_polar(I*pi)/(d*x)), True))/e, True)) - b*Piecewise((1/(d*x), Eq(e, 0))
, (log(d + e/x)/e, True))*log(c*x)
```

Maxima [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 67, normalized size of antiderivative = 1.63

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx = \frac{b\log\left(x\right)^2}{2\,e} - \frac{\left(\log\left(\frac{dx}{e}+1\right)\log\left(x\right)+\mathrm{Li}_2\left(-\frac{dx}{e}\right)\right)b}{e} - \frac{\left(b\log\left(c\right)+a\right)\log\left(dx+e\right)}{e} + \frac{\left(b\log\left(c\right)+a\right)\log\left(x\right)}{e}$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x^2,x, algorithm="maxima")
```

output
```
1/2*b*log(x)^2/e - (log(d*x/e + 1)*log(x) + dilog(-d*x/e))*b/e - (b*log(c)
 + a)*log(d*x + e)/e + (b*log(c) + a)*log(x)/e
```

Giac [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx = \int \frac{b\log\left(cx\right)+a}{\left(d+\frac{e}{x}\right)x^2}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x) + a)/((d + e/x)*x^2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx = \int \frac{a+b\,\ln\left(c\,x\right)}{x^2\,\left(d+\frac{e}{x}\right)}\,dx$$

input
```
int((a + b*log(c*x))/(x^2*(d + e/x)),x)
```

output
```
int((a + b*log(c*x))/(x^2*(d + e/x)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx = \frac{\left(\int \frac{\log(cx)}{d\,x^2+ex}dx\right)be-\log(dx+e)\,a+\log(x)\,a}{e}$$

input
```
int((a+b*log(c*x))/(d+e/x)/x^2,x)
```

output
```
(int(log(c*x)/(d*x**2 + e*x),x)*b*e - log(d*x + e)*a + log(x)*a)/e
```

3.341 $\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx$

Optimal result . . . 2558
Mathematica [A] (verified) . . . 2558
Rubi [A] (verified) . . . 2559
Maple [A] (verified) . . . 2561
Fricas [F] . . . 2561
Sympy [A] (verification not implemented) . . . 2562
Maxima [A] (verification not implemented) . . . 2563
Giac [F] . . . 2563
Mupad [F(-1)] . . . 2564
Reduce [F] . . . 2564

Optimal result

Integrand size = 21, antiderivative size = 68

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx=-\frac{b}{ex}-\frac{a+b\log(cx)}{ex}+\frac{d\log\left(1+\frac{e}{dx}\right)(a+b\log(cx))}{e^2}-\frac{bd\,\text{PolyLog}\left(2,-\frac{e}{dx}\right)}{e^2}$$

output
```
-b/e/x-(a+b*ln(c*x))/e/x+d*ln(1+e/d/x)*(a+b*ln(c*x))/e^2-b*d*polylog(2,-e/
d/x)/e^2
```

Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 77, normalized size of antiderivative = 1.13

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx=-\frac{\frac{2be}{x}+\frac{2e(a+b\log(cx))}{x}+\frac{d(a+b\log(cx))^2}{b}-2d(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)-2bd\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{2e^2}$$

input
```
Integrate[(a + b*Log[c*x])/((d + e/x)*x^3),x]
```

output
```
-1/2*((2*b*e)/x + (2*e*(a + b*Log[c*x]))/x + (d*(a + b*Log[c*x])^2)/b - 2*
d*(a + b*Log[c*x])*Log[1 + (d*x)/e] - 2*b*d*PolyLog[2, -((d*x)/e)])/e^2
```

Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 72, normalized size of antiderivative = 1.06, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.238$, Rules used = {2005, 2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx)}{x^3\left(d+\frac{e}{x}\right)}dx$$

$$\Big\downarrow \text{2005}$$

$$\int \frac{a+b\log(cx)}{x^2(dx+e)}dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{a+b\log(cx)}{x^2}dx}{e}-\frac{d\int \frac{a+b\log(cx)}{x(e+dx)}dx}{e}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx)}{x}-\frac{b}{x}}{e}-\frac{d\int \frac{a+b\log(cx)}{x(e+dx)}dx}{e}$$

$$\Big\downarrow \text{2779}$$

$$\frac{-\frac{a+b\log(cx)}{x}-\frac{b}{x}}{e}-\frac{d\left(\frac{b\int \frac{\log\left(\frac{e}{dx}+1\right)}{x}dx}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx))}{e}\right)}{e}$$

$$\Big\downarrow \text{2838}$$

$$\frac{-\frac{a+b\log(cx)}{x}-\frac{b}{x}}{e}-\frac{d\left(\frac{b\,\text{PolyLog}\left(2,-\frac{e}{dx}\right)}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx))}{e}\right)}{e}$$

input
```
Int[(a + b*Log[c*x])/((d + e/x)*x^3),x]
```

output
```
(-(b/x) - (a + b*Log[c*x])/x)/e - (d*(-((Log[1 + e/(d*x)]*(a + b*Log[c*x])
)/e) + (b*PolyLog[2, -(e/(d*x))])/e))/e
```

Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
 + n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [A] (verified)

Time = 0.35 (sec) , antiderivative size = 115, normalized size of antiderivative = 1.69

method	result
risch	$\frac{ad\ln(dx+e)}{e^2}-\frac{a}{ex}-\frac{ad\ln(x)}{e^2}-\frac{b\ln(xc)}{ex}-\frac{b}{ex}-\frac{b\ln(xc)^2 d}{2e^2}+\frac{bd\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{e^2}+\frac{bd\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{e^2}$
parts	$a\left(\frac{d\ln(dx+e)}{e^2}-\frac{1}{ex}-\frac{d\ln(x)}{e^2}\right)-\frac{b\ln(xc)}{ex}-\frac{b}{ex}-\frac{b\ln(xc)^2 d}{2e^2}+\frac{bd\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{e^2}+\frac{bd\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{e^2}$
derivativedivides	$c^2\left(a\left(-\frac{1}{e\,c^2x}-\frac{d\ln(xc)}{e^2c^2}+\frac{d\ln(cdx+ce)}{e^2c^2}\right)+b\left(-\frac{\ln(xc)^2 d}{2e^2c^2}+\frac{-\frac{\ln(xc)}{xc}-\frac{1}{cx}}{ec}+\frac{\left(\frac{\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{\ln(xc)\ln}{}\right.}{e^2c^2}\right.\right.$
default	$c^2\left(a\left(-\frac{1}{e\,c^2x}-\frac{d\ln(xc)}{e^2c^2}+\frac{d\ln(cdx+ce)}{e^2c^2}\right)+b\left(-\frac{\ln(xc)^2 d}{2e^2c^2}+\frac{-\frac{\ln(xc)}{xc}-\frac{1}{cx}}{ec}+\frac{\left(\frac{\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{\ln(xc)\ln}{}\right.}{e^2c^2}\right.\right.$

input
```
int((a+b*ln(x*c))/(d+e/x)/x^3,x,method=_RETURNVERBOSE)
```

output
```
a*d/e^2*ln(d*x+e)-a/e/x-a*d/e^2*ln(x)-b/e*ln(x*c)/x-b/e/x-1/2*b*ln(x*c)^2*
d/e^2+b/e^2*d*dilog((c*d*x+c*e)/e/c)+b/e^2*d*ln(x*c)*ln((c*d*x+c*e)/e/c)
```

Fricas [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx=\int \frac{b\log(cx)+a}{\left(d+\frac{e}{x}\right)x^3}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x) + a)/(d*x^3 + e*x^2), x)
```

Sympy [A] (verification not implemented)

Time = 36.06 (sec) , antiderivative size = 206, normalized size of antiderivative = 3.03

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx = \frac{ad^2\left(\begin{cases} \frac{x}{e} & \text{for}\ d=0 \\ \frac{\log(dx+e)}{d} & \text{otherwise} \end{cases}\right)}{e^2} - \frac{ad\log(x)}{e^2} - \frac{a}{ex}$$
$$- \frac{bd^2\left(\begin{cases} \frac{x}{e} \\ \frac{\begin{cases} -\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ \frac{1}{|x|}<1 \wedge |x|<1 \\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ |x|<1 \\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise} \end{cases}}{d} \end{cases}\right)}{e^2}$$
$$+ \frac{bd^2\left(\begin{cases} \frac{x}{e} & \text{for}\ d=0 \\ \frac{\log(dx+e)}{d} & \text{otherwise} \end{cases}\right)\log(cx)}{e^2}$$
$$+ \frac{bd\log(x)^2}{2e^2} - \frac{bd\log(x)\log(cx)}{e^2} - \frac{b\log(cx)}{ex} - \frac{b}{ex}$$

input
```
integrate((a+b*ln(c*x))/(d+e/x)/x**3,x)
```

output
```
a*d**2*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/e**2 - a*d*log(x
)/e**2 - a/(e*x) - b*d**2*Piecewise((x/e, Eq(d, 0)), (Piecewise((-polylog(
2, d*x*exp_polar(I*pi)/e), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x)
- polylog(2, d*x*exp_polar(I*pi)/e), Abs(x) < 1), (-log(e)*log(1/x) - poly
log(2, d*x*exp_polar(I*pi)/e), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0,
 0), ()), x)*log(e) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(e) - poly
log(2, d*x*exp_polar(I*pi)/e), True))/d, True))/e**2 + b*d**2*Piecewise((x
/e, Eq(d, 0)), (log(d*x + e)/d, True))*log(c*x)/e**2 + b*d*log(x)**2/(2*e*
*2) - b*d*log(x)*log(c*x)/e**2 - b*log(c*x)/(e*x) - b/(e*x)
```

Maxima [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.41

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx = \frac{\left(\log\left(\frac{dx}{e}+1\right)\log(x)+\text{Li}_2\left(-\frac{dx}{e}\right)\right)bd}{e^2} + \frac{(bd\log(c)+ad)\log(dx+e)}{e^2} - \frac{bdx\log(x)^2+2\,(e\log(c)+e)b+2\,ae+2\,(be+(bd\log(c)+ad)x)\log(x)}{2\,e^2x}$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x^3,x, algorithm="maxima")
```

output
```
(log(d*x/e + 1)*log(x) + dilog(-d*x/e))*b*d/e^2 + (b*d*log(c) + a*d)*log(d
*x + e)/e^2 - 1/2*(b*d*x*log(x)^2 + 2*(e*log(c) + e)*b + 2*a*e + 2*(b*e +
(b*d*log(c) + a*d)*x)*log(x))/(e^2*x)
```

Giac [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx = \int \frac{b\log(cx)+a}{\left(d+\frac{e}{x}\right)x^3}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x) + a)/((d + e/x)*x^3), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx=\int \frac{a+b\,\ln\left(c\,x\right)}{x^3\,\left(d+\frac{e}{x}\right)}\,dx$$

input
```
int((a + b*log(c*x))/(x^3*(d + e/x)),x)
```

output
```
int((a + b*log(c*x))/(x^3*(d + e/x)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx=\frac{\left(\int \frac{\log(cx)}{d\,x^3+e\,x^2}dx\right)b\,e^2x+\log(dx+e)\,adx-\log(x)\,adx-ae}{e^2x}$$

input
```
int((a+b*log(c*x))/(d+e/x)/x^3,x)
```

output
```
(int(log(c*x)/(d*x**3 + e*x**2),x)*b*e**2*x + log(d*x + e)*a*d*x - log(x)*
a*d*x - a*e)/(e**2*x)
```

3.342 $\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx$

Optimal result . . . 2565
Mathematica [A] (verified) . . . 2565
Rubi [A] (verified) . . . 2566
Maple [A] (verified) . . . 2568
Fricas [F] . . . 2569
Sympy [A] (verification not implemented) . . . 2569
Maxima [A] (verification not implemented) . . . 2570
Giac [F] . . . 2571
Mupad [F(-1)] . . . 2571
Reduce [F] . . . 2571

Optimal result

Integrand size = 21, antiderivative size = 101

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx=-\frac{b}{4ex^2}+\frac{bd}{e^2x}-\frac{a+b\log(cx)}{2ex^2}+\frac{d(a+b\log(cx))}{e^2x}-\frac{d^2\log\left(1+\frac{e}{dx}\right)(a+b\log(cx))}{e^3}+\frac{bd^2\operatorname{PolyLog}\left(2,-\frac{e}{dx}\right)}{e^3}$$

output
```
-1/4*b/e/x^2+b*d/e^2/x-1/2*(a+b*ln(c*x))/e/x^2+d*(a+b*ln(c*x))/e^2/x-d^2*l
n(1+e/d/x)*(a+b*ln(c*x))/e^3+b*d^2*polylog(2,-e/d/x)/e^3
```

Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 110, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx=-\frac{\frac{be^2}{x^2}-\frac{4bde}{x}+\frac{2e^2(a+b\log(cx))}{x^2}-\frac{4de(a+b\log(cx))}{x}-\frac{2d^2(a+b\log(cx))^2}{b}+4d^2(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)+4bd^2\operatorname{Po}}{4e^3}$$

input
```
Integrate[(a + b*Log[c*x])/((d + e/x)*x^4),x]
```

output
```
-1/4*((b*e^2)/x^2 - (4*b*d*e)/x + (2*e^2*(a + b*Log[c*x]))/x^2 - (4*d*e*(a
 + b*Log[c*x]))/x - (2*d^2*(a + b*Log[c*x])^2)/b + 4*d^2*(a + b*Log[c*x])*
Log[1 + (d*x)/e] + 4*b*d^2*PolyLog[2, -((d*x)/e)])/e^3
```

Rubi [A] (verified)

Time = 0.62 (sec) , antiderivative size = 107, normalized size of antiderivative = 1.06, number of steps used = 7, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {2005, 2780, 2741, 2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx)}{x^4\left(d+\frac{e}{x}\right)}dx$$

$$\Big\downarrow \text{2005}$$

$$\int \frac{a+b\log(cx)}{x^3(dx+e)}dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{a+b\log(cx)}{x^3}dx}{e}-\frac{d\int \frac{a+b\log(cx)}{x^2(e+dx)}dx}{e}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx)}{2x^2}-\frac{b}{4x^2}}{e}-\frac{d\int \frac{a+b\log(cx)}{x^2(e+dx)}dx}{e}$$

$$\Big\downarrow \text{2780}$$

$$\frac{-\frac{a+b\log(cx)}{2x^2}-\frac{b}{4x^2}}{e}-\frac{d\left(\frac{\int \frac{a+b\log(cx)}{x^2}dx}{e}-\frac{d\int \frac{a+b\log(cx)}{x(e+dx)}dx}{e}\right)}{e}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx)}{2x^2}-\frac{b}{4x^2}}{e}-\frac{d\left(\frac{-\frac{a+b\log(cx)}{x}-\frac{b}{x}}{e}-\frac{d\int \frac{a+b\log(cx)}{x(e+dx)}dx}{e}\right)}{e}$$

$$\Big\downarrow \text{2779}$$

$$\frac{-\frac{a+b\log(cx)}{2x^2}-\frac{b}{4x^2}}{e}-\frac{d\left(\frac{-\frac{a+b\log(cx)}{x}-\frac{b}{x}}{e}-\frac{d\left(\frac{b\int\frac{\log\left(\frac{e}{dx}+1\right)}{x}dx}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx))}{e}\right)}{e}\right)}{e}$$

$$\Big\downarrow \text{ 2838}$$

$$\frac{-\frac{a+b\log(cx)}{2x^2}-\frac{b}{4x^2}}{e}-\frac{d\left(\frac{-\frac{a+b\log(cx)}{x}-\frac{b}{x}}{e}-\frac{d\left(\frac{b\,\text{PolyLog}\left(2,-\frac{e}{dx}\right)}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx))}{e}\right)}{e}\right)}{e}$$

input
```
Int[(a + b*Log[c*x])/((d + e/x)*x^4),x]
```

output
```
(-1/4*b/x^2 - (a + b*Log[c*x])/(2*x^2))/e - (d*((-(b/x) - (a + b*Log[c*x])
/x)/e - (d*(-((Log[1 + e/(d*x)]*(a + b*Log[c*x]))/e) + (b*PolyLog[2, -(e/(
d*x))])/e))/e))/e
```

Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [A] (verified)

Time = 0.36 (sec) , antiderivative size = 157, normalized size of antiderivative = 1.55

method	result
parts	$a\left(-\frac{d^{2}\ln(dx+e)}{e^{3}}-\frac{1}{2e\,x^{2}}+\frac{d^{2}\ln(x)}{e^{3}}+\frac{d}{e^{2}x}\right)+\frac{b\ln(xc)d}{e^{2}x}+\frac{bd}{e^{2}x}+\frac{b\ln(xc)^{2}d^{2}}{2e^{3}}-\frac{b\,d^{2}\operatorname{dilog}\left(\frac{cdx+ce}{ec}\right)}{e^{3}}-$
risch	$-\frac{a\,d^{2}\ln(dx+e)}{e^{3}}-\frac{a}{2e\,x^{2}}+\frac{a\,d^{2}\ln(x)}{e^{3}}+\frac{ad}{e^{2}x}+\frac{b\ln(xc)d}{e^{2}x}+\frac{bd}{e^{2}x}+\frac{b\ln(xc)^{2}d^{2}}{2e^{3}}-\frac{b\,d^{2}\operatorname{dilog}\left(\frac{cdx+ce}{ec}\right)}{e^{3}}-$
derivativedivides	$c^{3}\left(a\left(-\frac{d^{2}\ln(cdx+ce)}{e^{3}c^{3}}-\frac{1}{2e\,c^{3}x^{2}}+\frac{d^{2}\ln(xc)}{e^{3}c^{3}}+\frac{d}{e^{2}c^{3}x}\right)+b\left(-\frac{\left(\frac{\operatorname{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d}\right)d^{3}}{e^{3}c^{3}}\right.\right.$
default	$c^{3}\left(a\left(-\frac{d^{2}\ln(cdx+ce)}{e^{3}c^{3}}-\frac{1}{2e\,c^{3}x^{2}}+\frac{d^{2}\ln(xc)}{e^{3}c^{3}}+\frac{d}{e^{2}c^{3}x}\right)+b\left(-\frac{\left(\frac{\operatorname{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d}\right)d^{3}}{e^{3}c^{3}}\right.\right.$

input
```
int((a+b*ln(x*c))/(d+e/x)/x^4,x,method=_RETURNVERBOSE)
```

output
```
a*(-d^2/e^3*ln(d*x+e)-1/2/e/x^2+d^2/e^3*ln(x)+d/e^2/x)+b*ln(x*c)*d/e^2/x+b
*d/e^2/x+1/2*b*ln(x*c)^2*d^2/e^3-b/e^3*d^2*dilog((c*d*x+c*e)/e/c)-b/e^3*d^
2*ln(x*c)*ln((c*d*x+c*e)/e/c)-1/2*b/e*ln(x*c)/x^2-1/4*b/e/x^2
```

Fricas [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx = \int \frac{b\log(cx)+a}{\left(d+\frac{e}{x}\right)x^4}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x^4,x, algorithm="fricas")
```

output
```
integral((b*log(c*x) + a)/(d*x^4 + e*x^3), x)
```

Sympy [A] (verification not implemented)

Time = 42.63 (sec) , antiderivative size = 252, normalized size of antiderivative = 2.50

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx = -\frac{ad^3\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{e^3} + \frac{ad^2\log(x)}{e^3} + \frac{ad}{e^2x} - \frac{a}{2ex^2}$$
$$+ \frac{bd^3\left(\begin{cases}\frac{x}{e} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)}{e^3}$$
$$-\frac{bd^3\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx)}{e^3} - \frac{bd^2\log(x)^2}{2e^3}$$
$$+\frac{bd^2\log(x)\log(cx)}{e^3} + \frac{bd\log(cx)}{e^2x} + \frac{bd}{e^2x} - \frac{b\log(cx)}{2ex^2} - \frac{b}{4ex^2}$$

input
```
integrate((a+b*ln(c*x))/(d+e/x)/x**4,x)
```

output
```
-a*d**3*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/e**3 + a*d**2*l
og(x)/e**3 + a*d/(e**2*x) - a/(2*e*x**2) + b*d**3*Piecewise((x/e, Eq(d, 0)
), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (Abs(x) < 1) & (1/Abs(x
) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I*pi)/e), Abs(x) < 1),
(-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e), 1/Abs(x) < 1), (-me
ijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1), ()), ((), (
0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e), True))/d, True))/e*
*3 - b*d**3*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))*log(c*x)/e*
*3 - b*d**2*log(x)**2/(2*e**3) + b*d**2*log(x)*log(c*x)/e**3 + b*d*log(c*x
)/(e**2*x) + b*d/(e**2*x) - b*log(c*x)/(2*e*x**2) - b/(4*e*x**2)
```

Maxima [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 151, normalized size of antiderivative = 1.50

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx$$
$$= -\frac{\left(\log\left(\frac{dx}{e}+1\right)\log\left(x\right)+\mathrm{Li}_2\left(-\frac{dx}{e}\right)\right)bd^2}{e^3} - \frac{\left(bd^2\log\left(c\right)+ad^2\right)\log\left(dx+e\right)}{e^3}$$
$$+ \frac{2\,bd^2x^2\log\left(x\right)^2 - 2\,ae^2 - \left(2\,e^2\log\left(c\right)+e^2\right)b + 4\left(ade + \left(de\log\left(c\right)+de\right)b\right)x + 2\left(2\,bdex - be^2 + 2\left(bd^2\right.\right.}{4\,e^3x^2}$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x^4,x, algorithm="maxima")
```

output
```
-(log(d*x/e + 1)*log(x) + dilog(-d*x/e))*b*d^2/e^3 - (b*d^2*log(c) + a*d^2
)*log(d*x + e)/e^3 + 1/4*(2*b*d^2*x^2*log(x)^2 - 2*a*e^2 - (2*e^2*log(c) +
 e^2)*b + 4*(a*d*e + (d*e*log(c) + d*e)*b)*x + 2*(2*b*d*e*x - b*e^2 + 2*(b
*d^2*log(c) + a*d^2)*x^2)*log(x))/(e^3*x^2)
```

Giac [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx = \int \frac{b\log\left(cx\right)+a}{\left(d+\frac{e}{x}\right)x^4}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x) + a)/((d + e/x)*x^4), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx = \int \frac{a+b\,\ln\left(c\,x\right)}{x^4\,\left(d+\frac{e}{x}\right)}\,dx$$

input
```
int((a + b*log(c*x))/(x^4*(d + e/x)),x)
```

output
```
int((a + b*log(c*x))/(x^4*(d + e/x)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx = \frac{2\left(\int \frac{\log(cx)}{d\,x^4+e\,x^3}dx\right)b\,e^3x^2-2\log(dx+e)\,a\,d^2x^2+2\log(x)\,a\,d^2x^2+2adex-a\,e^2}{2e^3x^2}$$

input
```
int((a+b*log(c*x))/(d+e/x)/x^4,x)
```

output
```
(2*int(log(c*x)/(d*x**4 + e*x**3),x)*b*e**3*x**2 - 2*log(d*x + e)*a*d**2*x
**2 + 2*log(x)*a*d**2*x**2 + 2*a*d*e*x - a*e**2)/(2*e**3*x**2)
```

3.343 $\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx$

Optimal result 2572
Mathematica [A] (verified) 2572
Rubi [A] (verified) 2573
Maple [A] (verified) 2574
Fricas [B] (verification not implemented) 2574
Sympy [F(-2)] 2575
Maxima [B] (verification not implemented) 2575
Giac [F] 2575
Mupad [B] (verification not implemented) 2576
Reduce [F] 2576

Optimal result

Integrand size = 22, antiderivative size = 17

$$\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx = \frac{\text{PolyLog}(2,1-ex^n)}{en}$$

output
```
polylog(2,1-e*x^n)/e/n
```

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx = \frac{\text{PolyLog}(2,1-ex^n)}{en}$$

input
```
Integrate[(x^(-1 + n)*Log[e*x^n])/(1 - e*x^n),x]
```

output
```
PolyLog[2, 1 - e*x^n]/(e*n)
```

Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$, Rules used = {2774, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^{n-1}\log(ex^n)}{1-ex^n}dx$$

$$\Big\downarrow \text{2774}$$

$$\frac{\int \frac{\log(ex^n)}{1-ex^n}dx^n}{n}$$

$$\Big\downarrow \text{2752}$$

$$\frac{\text{PolyLog}(2,1-ex^n)}{en}$$

input
```
Int[(x^(-1 + n)*Log[e*x^n])/(1 - e*x^n),x]
```

output
```
PolyLog[2, 1 - e*x^n]/(e*n)
```

Defintions of rubi rules used

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2774
```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m/n   Subst[Int[(d + e*x)^q*(a +
 b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
 && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

Maple [A] (verified)

Time = 0.77 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

method	result
default	$\frac{\mathrm{dilog}(e\,x^n)}{en}$
risch	$-\frac{\ln(1-e\,x^n)\ln(x^n)}{ne}+\frac{\ln(1-e\,x^n)\ln(e\,x^n)}{ne}+\frac{\mathrm{dilog}(e\,x^n)}{en}+\frac{\left(\frac{i\pi\ \mathrm{csgn}(ix^n)\ \mathrm{csgn}(ie)\ \mathrm{csgn}(ie\,x^n)}{2}-\frac{i\pi\ \mathrm{csgn}(ix^n)\ \mathrm{csgn}(ie\,x^n)^2}{2}-\frac{i\pi\ \mathrm{cs}}{}\right.}{ne}$
meijerg	$\frac{i(-1)^{\frac{\mathrm{csgn}(ie)}{2}-\frac{\mathrm{csgn}(ix^n)}{2}-\frac{\mathrm{csgn}(ix^n)\ \mathrm{csgn}(ie)}{2}-\frac{-1+n}{n}-\frac{1}{n}}\ln(e)\ln\left(1+ix^n e(-1)^{-\frac{\mathrm{csgn}(ie)}{2}+\frac{\mathrm{csgn}(ix^n)}{2}+\frac{\mathrm{csgn}(ix^n)\ \mathrm{csgn}(ie)}{2}}\right)}{en}-\frac{i(-1)^{\mathrm{c}}}{}$

input
```
int(x^(-1+n)*ln(e*x^n)/(1-e*x^n),x,method=_RETURNVERBOSE)
```

output
```
1/e/n*dilog(e*x^n)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. $2(16) = 32$.

Time = 0.08 (sec) , antiderivative size = 39, normalized size of antiderivative = 2.29

$$\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx = -\frac{n\log(-ex^n+1)\log(x)+\log(ex^n-1)\log(e)+\mathrm{Li}_2(ex^n)}{en}$$

input
```
integrate(x^(-1+n)*log(e*x^n)/(1-e*x^n),x, algorithm="fricas")
```

output
```
-(n*log(-e*x^n + 1)*log(x) + log(e*x^n - 1)*log(e) + dilog(e*x^n))/(e*n)
```

Sympy [F(-2)]

Exception generated.

$$\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(x**(-1+n)*ln(e*x**n)/(1-e*x**n),x)
```

output
```
Exception raised: TypeError >> Invalid comparison of non-real zoo
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 52 vs. $2(16) = 32$.

Time = 0.15 (sec) , antiderivative size = 52, normalized size of antiderivative = 3.06

$$\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx = -\frac{\log(e)\log\left(\frac{ex^n-1}{e}\right)}{en} - \frac{\log(-ex^n+1)\log(x^n) + \text{Li}_2(ex^n)}{en}$$

input
```
integrate(x^(-1+n)*log(e*x^n)/(1-e*x^n),x, algorithm="maxima")
```

output
```
-log(e)*log((e*x^n - 1)/e)/(e*n) - (log(-e*x^n + 1)*log(x^n) + dilog(e*x^n
))/(e*n)
```

Giac [F]

$$\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx = \int -\frac{x^{n-1}\log(ex^n)}{ex^n-1}\,dx$$

input
```
integrate(x^(-1+n)*log(e*x^n)/(1-e*x^n),x, algorithm="giac")
```

output
```
integrate(-x^(n - 1)*log(e*x^n)/(e*x^n - 1), x)
```

Mupad [B] (verification not implemented)

Time = 25.52 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.76

$$\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx = \frac{\mathrm{Li}_2(e\,x^n)}{e\,n}$$

input
```
int(-(x^(n - 1)*log(e*x^n))/(e*x^n - 1),x)
```

output
```
dilog(e*x^n)/(e*n)
```

Reduce [F]

$$\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx = \frac{-2\left(\int \frac{\log(x^n e)}{x^n ex-x}dx\right)n - \log(x^n e)^2}{2en}$$

input
```
int(x^(-1+n)*log(e*x^n)/(1-e*x^n),x)
```

output
```
( - 2*int(log(x**n*e)/(x**n*e*x - x),x)*n - log(x**n*e)**2)/(2*e*n)
```

3.344 $\int \frac{x^{-1+n} \log\left(\frac{x^n}{d}\right)}{d-x^n} dx$

Optimal result . . . 2577
Mathematica [A] (verified) . . . 2577
Rubi [A] (verified) . . . 2578
Maple [A] (verified) . . . 2579
Fricas [B] (verification not implemented) . . . 2579
Sympy [F(-2)] . . . 2580
Maxima [B] (verification not implemented) . . . 2580
Giac [F] . . . 2580
Mupad [B] (verification not implemented) . . . 2581
Reduce [F] . . . 2581

Optimal result

Integrand size = 23, antiderivative size = 16

$$\int \frac{x^{-1+n} \log\left(\frac{x^n}{d}\right)}{d-x^n} \, dx = \frac{\text{PolyLog}\left(2, 1-\frac{x^n}{d}\right)}{n}$$

output
```
polylog(2,1-x^n/d)/n
```

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.06

$$\int \frac{x^{-1+n} \log\left(\frac{x^n}{d}\right)}{d-x^n} \, dx = \frac{\text{PolyLog}\left(2, \frac{d-x^n}{d}\right)}{n}$$

input
```
Integrate[(x^(-1 + n)*Log[x^n/d])/(d - x^n),x]
```

output
```
PolyLog[2, (d - x^n)/d]/n
```

Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2774, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^{n-1}\log\left(\frac{x^n}{d}\right)}{d-x^n}dx$$

$$\Big\downarrow \text{2774}$$

$$\frac{\int \frac{\log\left(\frac{x^n}{d}\right)}{d-x^n}dx^n}{n}$$

$$\Big\downarrow \text{2752}$$

$$\frac{\text{PolyLog}\left(2,1-\frac{x^n}{d}\right)}{n}$$

input
```
Int[(x^(-1 + n)*Log[x^n/d])/(d - x^n),x]
```

output
```
PolyLog[2, 1 - x^n/d]/n
```

Defintions of rubi rules used

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2774
```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m/n   Subst[Int[(d + e*x)^q*(a +
 b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
 && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

Maple [A] (verified)

Time = 0.69 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

method	result
default	$\frac{\operatorname{dilog}\left(\frac{x^n}{d}\right)}{n}$
risch	$-\frac{\ln(x^n)\ln\left(-\frac{-d+x^n}{d}\right)}{n}-\frac{\operatorname{dilog}\left(-\frac{-d+x^n}{d}\right)}{n}+\frac{\left(\frac{i\pi\,\operatorname{csgn}(ix^n)\operatorname{csgn}\left(\frac{i}{d}\right)\operatorname{csgn}\left(\frac{ix^n}{d}\right)}{2}-\frac{i\pi\,\operatorname{csgn}(ix^n)\operatorname{csgn}\left(\frac{ix^n}{d}\right)^2}{2}-\frac{i\pi\,\operatorname{csgn}\left(\frac{i}{d}\right)\operatorname{csgn}\left(\frac{ix^n}{d}\right.}{2}\right.}{n}$

input
```
int(x^(-1+n)*ln(x^n/d)/(d-x^n),x,method=_RETURNVERBOSE)
```

output
```
1/n*dilog(x^n/d)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. 2(15) = 30.

Time = 0.08 (sec) , antiderivative size = 50, normalized size of antiderivative = 3.12

$$\int \frac{x^{-1+n}\log\left(\frac{x^n}{d}\right)}{d-x^n}\,dx=-\frac{n\log(x)\log\left(\frac{d-x^n}{d}\right)+\log(-d+x^n)\log\left(\frac{1}{d}\right)+\operatorname{Li}_2\left(-\frac{d-x^n}{d}+1\right)}{n}$$

input
```
integrate(x^(-1+n)*log(x^n/d)/(d-x^n),x, algorithm="fricas")
```

output
```
-(n*log(x)*log((d - x^n)/d) + log(-d + x^n)*log(1/d) + dilog(-(d - x^n)/d
+ 1))/n
```

Sympy [F(-2)]

Exception generated.

$$\int \frac{x^{-1+n}\log\left(\frac{x^n}{d}\right)}{d-x^n}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(x**(-1+n)*ln(x**n/d)/(d-x**n),x)
```

output
```
Exception raised: TypeError >> Invalid comparison of non-real zoo
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. $2(15) = 30$.

Time = 0.15 (sec) , antiderivative size = 45, normalized size of antiderivative = 2.81

$$\int \frac{x^{-1+n}\log\left(\frac{x^n}{d}\right)}{d-x^n}\,dx = \frac{\log(d)\log(-d+x^n)}{n} - \frac{\log(x^n)\log\left(-\frac{x^n}{d}+1\right)+\text{Li}_2\left(\frac{x^n}{d}\right)}{n}$$

input
```
integrate(x^(-1+n)*log(x^n/d)/(d-x^n),x, algorithm="maxima")
```

output
```
log(d)*log(-d + x^n)/n - (log(x^n)*log(-x^n/d + 1) + dilog(x^n/d))/n
```

Giac [F]

$$\int \frac{x^{-1+n}\log\left(\frac{x^n}{d}\right)}{d-x^n}\,dx = \int \frac{x^{n-1}\log\left(\frac{x^n}{d}\right)}{d-x^n}\,dx$$

input
```
integrate(x^(-1+n)*log(x^n/d)/(d-x^n),x, algorithm="giac")
```

output
```
integrate(x^(n - 1)*log(x^n/d)/(d - x^n), x)
```

Mupad [B] (verification not implemented)

Time = 25.40 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{x^{-1+n} \log \left(\frac{x^n}{d}\right)}{d-x^n} \, dx = \frac{\text{Li}_2\left(\frac{x^n}{d}\right)}{n}$$

input
```
int((x^(n - 1)*log(x^n/d))/(d - x^n),x)
```

output
```
dilog(x^n/d)/n
```

Reduce [F]

$$\int \frac{x^{-1+n} \log \left(\frac{x^n}{d}\right)}{d-x^n} \, dx = \frac{-2\left(\int \frac{\log\left(\frac{x^n}{d}\right)}{x^n x-dx} dx\right) dn - \log\left(\frac{x^n}{d}\right)^2}{2n}$$

input
```
int(x^(-1+n)*log(x^n/d)/(d-x^n),x)
```

output
```
( - 2*int(log(x**n/d)/(x**n*x - d*x),x)*d*n - log(x**n/d)**2)/(2*n)
```

3.345 $\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx$

Optimal result 2582
Mathematica [A] (verified) 2582
Rubi [A] (verified) 2583
Maple [A] (verified) 2584
Fricas [B] (verification not implemented) 2584
Sympy [F(-2)] 2585
Maxima [B] (verification not implemented) 2585
Giac [F] 2585
Mupad [B] (verification not implemented) 2586
Reduce [F] 2586

Optimal result

Integrand size = 25, antiderivative size = 20

$$\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx=-\frac{\text{PolyLog}\left(2,1+\frac{ex^n}{d}\right)}{en}$$

output
```
-polylog(2,1+e*x^n/d)/e/n
```

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx=-\frac{\text{PolyLog}\left(2,\frac{d+ex^n}{d}\right)}{en}$$

input
```
Integrate[(x^(-1 + n)*Log[-((e*x^n)/d)])/(d + e*x^n),x]
```

output
```
-(PolyLog[2, (d + e*x^n)/d]/(e*n))
```

Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.080$, Rules used = {2774, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^{n-1}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx$$
$$\Big\downarrow \; 2774$$
$$\frac{\int \frac{\log\left(-\frac{ex^n}{d}\right)}{ex^n+d}dx^n}{n}$$
$$\Big\downarrow \; 2752$$
$$-\frac{\text{PolyLog}\left(2,\frac{ex^n}{d}+1\right)}{en}$$

input
```
Int[(x^(-1 + n)*Log[-((e*x^n)/d)])/(d + e*x^n),x]
```

output
```
-(PolyLog[2, 1 + (e*x^n)/d]/(e*n))
```

Defintions of rubi rules used

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2774
```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m/n   Subst[Int[(d + e*x)^q*(a +
 b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
 && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

Maple [A] (verified)

Time = 0.69 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

method	result
default	$-\frac{\operatorname{dilog}\left(-\frac{e\,x^{n}}{d}\right)}{n e}$
risch	$\frac{\operatorname{dilog}\left(\frac{d+e\,x^{n}}{d}\right)}{n e}+\frac{\ln\left(x^{n}\right)\ln\left(\frac{d+e\,x^{n}}{d}\right)}{n e}+\frac{\left(-\frac{i\pi\,\operatorname{csgn}\left(i x^{n}\right)\operatorname{csgn}\left(i e\right)\operatorname{csgn}\left(i e\,x^{n}\right)}{2}+\frac{i\pi\,\operatorname{csgn}\left(i x^{n}\right)\operatorname{csgn}\left(i e\,x^{n}\right)^{2}}{2}+\frac{i\pi\,\operatorname{csgn}\left(i e\right)\operatorname{csgn}\left(i e\,x^{n}\right)^{2}}{2}-\right.}{}$

input
```
int(x^(-1+n)*ln(-e*x^n/d)/(d+e*x^n),x,method=_RETURNVERBOSE)
```

output
```
-1/n/e*dilog(-e*x^n/d)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. 2(19) = 38.

Time = 0.08 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.75

$$\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx = \frac{n\log(x)\log\left(\frac{ex^n+d}{d}\right)+\log(ex^n+d)\log\left(-\frac{e}{d}\right)+\mathrm{Li}_2\left(-\frac{ex^n+d}{d}+1\right)}{en}$$

input
```
integrate(x^(-1+n)*log(-e*x^n/d)/(d+e*x^n),x, algorithm="fricas")
```

output
```
(n*log(x)*log((e*x^n + d)/d) + log(e*x^n + d)*log(-e/d) + dilog(-(e*x^n +
d)/d + 1))/(e*n)
```

Sympy [F(-2)]

Exception generated.

$$\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(x**(-1+n)*ln(-e*x**n/d)/(d+e*x**n),x)
```

output
```
Exception raised: TypeError >> Invalid comparison of non-real zoo
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 64 vs. 2(19) = 38.

Time = 0.16 (sec) , antiderivative size = 64, normalized size of antiderivative = 3.20

$$\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx = -\frac{(\log(d)-\log(e))\log\left(\frac{ex^n+d}{e}\right)}{en} + \frac{\log\left(\frac{ex^n}{d}+1\right)\log(-x^n)+\mathrm{Li}_2\left(-\frac{ex^n}{d}\right)}{en}$$

input
```
integrate(x^(-1+n)*log(-e*x^n/d)/(d+e*x^n),x, algorithm="maxima")
```

output
```
-(log(d) - log(e))*log((e*x^n + d)/e)/(e*n) + (log(e*x^n/d + 1)*log(-x^n)
+ dilog(-e*x^n/d))/(e*n)
```

Giac [F]

$$\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx = \int \frac{x^{n-1}\log\left(-\frac{ex^n}{d}\right)}{ex^n+d}\,dx$$

input
```
integrate(x^(-1+n)*log(-e*x^n/d)/(d+e*x^n),x, algorithm="giac")
```

output
```
integrate(x^(n - 1)*log(-e*x^n/d)/(e*x^n + d), x)
```

Mupad [B] (verification not implemented)

Time = 25.29 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{x^{-1+n} \log \left(-\frac{ex^n}{d}\right)}{d+ex^n} \, dx = -\frac{\mathrm{Li}_2\left(-\frac{e\,x^n}{d}\right)}{e\,n}$$

input
```
int((x^(n - 1)*log(-(e*x^n)/d))/(d + e*x^n),x)
```

output
```
-dilog(-(e*x^n)/d)/(e*n)
```

Reduce [F]

$$\int \frac{x^{-1+n} \log \left(-\frac{ex^n}{d}\right)}{d+ex^n} \, dx = \frac{-2\left(\int \frac{\log\left(-\frac{x^n e}{d}\right)}{x^n e x+dx} dx\right) dn + \log\left(-\frac{x^n e}{d}\right)^2}{2en}$$

input
```
int(x^(-1+n)*log(-e*x^n/d)/(d+e*x^n),x)
```

output
```
( - 2*int(log(( - x**n*e)/d)/(x**n*e*x + d*x),x)*d*n + log(( - x**n*e)/d)*
*2)/(2*e*n)
```

3.346 $\int \frac{\log\left(\frac{a}{x}\right)}{ax-x^2} dx$

Optimal result 2587
Mathematica [A] (verified) 2587
Rubi [A] (verified) 2588
Maple [A] (verified) 2589
Fricas [A] (verification not implemented) 2590
Sympy [C] (verification not implemented) 2590
Maxima [B] (verification not implemented) 2591
Giac [F] 2591
Mupad [B] (verification not implemented) 2592
Reduce [F] 2592

Optimal result

Integrand size = 18, antiderivative size = 14

$$\int \frac{\log\left(\frac{a}{x}\right)}{ax-x^2} dx = \frac{\operatorname{PolyLog}\left(2, 1-\frac{a}{x}\right)}{a}$$

output
```
polylog(2,1-a/x)/a
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.14

$$\int \frac{\log\left(\frac{a}{x}\right)}{ax-x^2} dx = \frac{\operatorname{PolyLog}\left(2, -\frac{a-x}{x}\right)}{a}$$

input
```
Integrate[Log[a/x]/(a*x - x^2),x]
```

output
```
PolyLog[2, -((a - x)/x)]/a
```

Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.222$, Rules used = {2026, 2778, 2005, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log\left(\frac{a}{x}\right)}{ax-x^2}dx$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{\log\left(\frac{a}{x}\right)}{x(a-x)}dx$$

$$\Big\downarrow \text{ 2778}$$

$$-\int \frac{x\log\left(\frac{a}{x}\right)}{a-x}d\frac{1}{x}$$

$$\Big\downarrow \text{ 2005}$$

$$-\int \frac{\log\left(\frac{a}{x}\right)}{\frac{a}{x}-1}d\frac{1}{x}$$

$$\Big\downarrow \text{ 2752}$$

$$\frac{\text{PolyLog}\left(2,1-\frac{a}{x}\right)}{a}$$

input
```
Int[Log[a/x]/(a*x - x^2),x]
```

output
```
PolyLog[2, 1 - a/x]/a
```

Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2778
```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))/((x_)*((d_) + (e_.)*(x_)^(r_.))),
x_Symbol] :> Simp[1/n   Subst[Int[(a + b*Log[c*x])/(x*(d + e*x^(r/n))), x],
 x, x^n], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IntegerQ[r/n]
```

Maple [A] (verified)

Time = 0.40 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.79

method	result	size
derivativedivides	$\frac{\operatorname{dilog}\left(\frac{a}{x}\right)}{a}$	11
default	$\frac{\operatorname{dilog}\left(\frac{a}{x}\right)}{a}$	11
risch	$\frac{\operatorname{dilog}\left(\frac{a}{x}\right)}{a}$	11
parts	$-\frac{\ln\left(\frac{a}{x}\right)\ln(a-x)}{a}+\frac{\ln\left(\frac{a}{x}\right)\ln(x)}{a}+\frac{\ln(x)^{2}}{2a}-\frac{\ln(a-x)\ln\left(\frac{x}{a}\right)}{a}-\frac{\operatorname{dilog}\left(\frac{x}{a}\right)}{a}$	68

input
```
int(ln(a/x)/(a*x-x^2),x,method=_RETURNVERBOSE)
```

output
```
1/a*dilog(a/x)
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.93

$$\int \frac{\log\left(\frac{a}{x}\right)}{ax-x^2}\,dx=\frac{\mathrm{Li}_2\left(-\frac{a}{x}+1\right)}{a}$$

input
```
integrate(log(a/x)/(a*x-x^2),x, algorithm="fricas")
```

output
```
dilog(-a/x + 1)/a
```

Sympy [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 4.63 (sec) , antiderivative size = 82, normalized size of antiderivative = 5.86

$$\int \frac{\log\left(\frac{a}{x}\right)}{ax-x^2}\,dx=-\left(\begin{cases}-\frac{1}{x} & \text{for } a=0\\ \frac{\log\left(\frac{a}{x}-1\right)}{a} & \text{otherwise}\end{cases}\right)\log\left(\frac{a}{x}\right)-\begin{cases}\frac{1}{x} & \text{for } a=0\\ \frac{\begin{cases}\mathrm{Li}_2\left(\frac{a}{x}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ i\pi\log(x)+\mathrm{Li}_2\left(\frac{a}{x}\right) & \text{for } |x|<1\\ -i\pi\log\left(\frac{1}{x}\right)+\mathrm{Li}_2\left(\frac{a}{x}\right) & \text{for } \frac{1}{|x|}<1\\ -i\pi G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)+i\pi G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)+\mathrm{Li}_2\left(\frac{a}{x}\right) & \text{otherwise}\end{cases}}{a} & \text{otherwise}\end{cases}$$

input
```
integrate(ln(a/x)/(a*x-x**2),x)
```

output
```
-Piecewise((-1/x, Eq(a, 0)), (log(a/x - 1)/a, True))*log(a/x) - Piecewise(
(1/x, Eq(a, 0)), (Piecewise((polylog(2, a/x), (Abs(x) < 1) & (1/Abs(x) < 1
)), (I*pi*log(x) + polylog(2, a/x), Abs(x) < 1), (-I*pi*log(1/x) + polylog
(2, a/x), 1/Abs(x) < 1), (-I*pi*meijerg(((), (1, 1)), ((0, 0), ()), x) + I
*pi*meijerg(((1, 1), ()), ((), (0, 0)), x) + polylog(2, a/x), True))/a, Tr
ue))
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. $2(13) = 26$.

Time = 0.03 (sec) , antiderivative size = 72, normalized size of antiderivative = 5.14

$$\int \frac{\log\left(\frac{a}{x}\right)}{ax - x^2}\,dx = -\left(\frac{\log\left(-a + x\right)}{a} - \frac{\log\left(x\right)}{a}\right)\log\left(\frac{a}{x}\right) - \frac{2\,\log\left(-a + x\right)\log\left(x\right) - \log\left(x\right)^2}{2\,a} + \frac{\log\left(x\right)\log\left(-\frac{x}{a} + 1\right) + \mathrm{Li}_2\left(\frac{x}{a}\right)}{a}$$

input
```
integrate(log(a/x)/(a*x-x^2),x, algorithm="maxima")
```

output
```
-(log(-a + x)/a - log(x)/a)*log(a/x) - 1/2*(2*log(-a + x)*log(x) - log(x)^
2)/a + (log(x)*log(-x/a + 1) + dilog(x/a))/a
```

Giac [F]

$$\int \frac{\log\left(\frac{a}{x}\right)}{ax - x^2}\,dx = \int \frac{\log\left(\frac{a}{x}\right)}{ax - x^2}\,dx$$

input
```
integrate(log(a/x)/(a*x-x^2),x, algorithm="giac")
```

output
```
integrate(log(a/x)/(a*x - x^2), x)
```

Mupad [B] (verification not implemented)

Time = 25.28 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.71

$$\int \frac{\log\left(\frac{a}{x}\right)}{ax - x^2}\,dx = \frac{\mathrm{Li}_2\left(\frac{a}{x}\right)}{a}$$

input
```
int(log(a/x)/(a*x - x^2),x)
```

output
```
dilog(a/x)/a
```

Reduce [F]

$$\int \frac{\log\left(\frac{a}{x}\right)}{ax - x^2}\,dx = \int \frac{\log\left(\frac{a}{x}\right)}{ax - x^2}dx$$

input
```
int(log(a/x)/(a*x-x^2),x)
```

output
```
int(log(a/x)/(a*x - x**2),x)
```

3.347 $\int \frac{\log\left(\frac{a}{x^2}\right)}{ax-x^3}\,dx$

Optimal result 2593
Mathematica [A] (verified) 2593
Rubi [A] (verified) 2594
Maple [A] (verified) 2595
Fricas [A] (verification not implemented) 2596
Sympy [C] (verification not implemented) 2596
Maxima [B] (verification not implemented) 2597
Giac [F] 2597
Mupad [B] (verification not implemented) 2598
Reduce [F] 2598

Optimal result

Integrand size = 18, antiderivative size = 17

$$\int \frac{\log\left(\frac{a}{x^2}\right)}{ax-x^3}\,dx = \frac{\text{PolyLog}\left(2,1-\frac{a}{x^2}\right)}{2a}$$

output
```
1/2*polylog(2,1-a/x^2)/a
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.24

$$\int \frac{\log\left(\frac{a}{x^2}\right)}{ax-x^3}\,dx = \frac{\text{PolyLog}\left(2,-\frac{a-x^2}{x^2}\right)}{2a}$$

input
```
Integrate[Log[a/x^2]/(a*x - x^3),x]
```

output
```
PolyLog[2, -((a - x^2)/x^2)]/(2*a)
```

Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222, Rules used = {2026, 2778, 2005, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log \left(\frac{a}{x^2}\right)}{a x-x^3} \, dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{\log \left(\frac{a}{x^2}\right)}{x \left(a-x^2\right)}dx$$

$$\Big\downarrow \text{2778}$$

$$-\frac{1}{2} \int \frac{x^2 \log \left(\frac{a}{x^2}\right)}{a-x^2}d\frac{1}{x^2}$$

$$\Big\downarrow \text{2005}$$

$$-\frac{1}{2} \int \frac{\log \left(\frac{a}{x^2}\right)}{\frac{a}{x^2}-1}d\frac{1}{x^2}$$

$$\Big\downarrow \text{2752}$$

$$\frac{\text{PolyLog}\left(2,1-\frac{a}{x^2}\right)}{2 a}$$

input
```
Int[Log[a/x^2]/(a*x - x^3),x]
```

output
```
PolyLog[2, 1 - a/x^2]/(2*a)
```

Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2778
```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))/((x_)*((d_) + (e_.)*(x_)^(r_.))),
x_Symbol] :> Simp[1/n   Subst[Int[(a + b*Log[c*x])/(x*(d + e*x^(r/n))), x],
 x, x^n], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IntegerQ[r/n]
```

Maple [A] (verified)

Time = 0.42 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.71

method	result
derivativedivides	$\frac{\operatorname{dilog}\left(\frac{a}{x^2}\right)}{2a}$
default	$\frac{\operatorname{dilog}\left(\frac{a}{x^2}\right)}{2a}$
risch	$\frac{\operatorname{dilog}\left(\frac{a}{x^2}\right)}{2a}$
parts	$-\frac{\ln\left(\frac{a}{x^2}\right)\ln\left(-x^2+a\right)}{2a}+\frac{\ln\left(\frac{a}{x^2}\right)\ln(x)}{a}+\frac{\ln(x)^2}{a}-\frac{\ln(x)\ln\left(-x^2+a\right)-\ln(x)\ln\left(\frac{\sqrt{a}-x}{\sqrt{a}}\right)-\ln(x)\ln\left(\frac{\sqrt{a}+x}{\sqrt{a}}\right)-\operatorname{dilog}(}{a}$

input
```
int(ln(a/x^2)/(-x^3+a*x),x,method=_RETURNVERBOSE)
```

output
```
1/2/a*dilog(a/x^2)
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{\log\left(\frac{a}{x^2}\right)}{ax-x^3}\,dx=\frac{\mathrm{Li}_2\left(-\frac{a}{x^2}+1\right)}{2\,a}$$

input
```
integrate(log(a/x^2)/(-x^3+a*x),x, algorithm="fricas")
```

output
```
1/2*dilog(-a/x^2 + 1)/a
```

Sympy [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 5.00 (sec) , antiderivative size = 92, normalized size of antiderivative = 5.41

$$\int \frac{\log\left(\frac{a}{x^2}\right)}{ax-x^3}\,dx = -\frac{\begin{cases}\frac{\mathrm{Li}_2\left(\frac{a}{x^2}\right)}{2} & \text{for } \frac{1}{|x|}<1\wedge |x|<1\\ i\pi\log(x)+\frac{\mathrm{Li}_2\left(\frac{a}{x^2}\right)}{2} & \text{for } |x|<1\\ -i\pi\log\left(\frac{1}{x}\right)+\frac{\mathrm{Li}_2\left(\frac{a}{x^2}\right)}{2} & \text{for } \frac{1}{|x|}<1\\ -i\pi G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)+i\pi G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)+\frac{\mathrm{Li}_2\left(\frac{a}{x^2}\right)}{2} & \text{otherwise}\end{cases}}{a} - \frac{\log\left(\frac{a}{x^2}\right)\log\left(\frac{a}{x^2}-1\right)}{2a}$$

input
```
integrate(ln(a/x**2)/(-x**3+a*x),x)
```

output
```
-Piecewise((polylog(2, a/x**2)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (I*pi*lo
g(x) + polylog(2, a/x**2)/2, Abs(x) < 1), (-I*pi*log(1/x) + polylog(2, a/x
**2)/2, 1/Abs(x) < 1), (-I*pi*meijerg(((), (1, 1)), ((0, 0), ()), x) + I*p
i*meijerg(((1, 1), ()), ((), (0, 0)), x) + polylog(2, a/x**2)/2, True))/a
- log(a/x**2)*log(a/x**2 - 1)/(2*a)
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 81 vs. $2(14) = 28$.

Time = 0.03 (sec) , antiderivative size = 81, normalized size of antiderivative = 4.76

$$\int \frac{\log\left(\frac{a}{x^2}\right)}{ax-x^3}\,dx = -\frac{1}{2}\left(\frac{\log\left(x^2-a\right)}{a}-\frac{2\,\log\left(x\right)}{a}\right)\log\left(\frac{a}{x^2}\right) - \frac{\log\left(x^2-a\right)\log\left(x\right)-\log\left(x\right)^2}{a} + \frac{2\,\log\left(x\right)\log\left(-\frac{x^2}{a}+1\right)+\mathrm{Li}_2\left(\frac{x^2}{a}\right)}{2\,a}$$

input
```
integrate(log(a/x^2)/(-x^3+a*x),x, algorithm="maxima")
```

output
```
-1/2*(log(x^2 - a)/a - 2*log(x)/a)*log(a/x^2) - (log(x^2 - a)*log(x) - log
(x)^2)/a + 1/2*(2*log(x)*log(-x^2/a + 1) + dilog(x^2/a))/a
```

Giac [F]

$$\int \frac{\log\left(\frac{a}{x^2}\right)}{ax-x^3}\,dx = \int -\frac{\log\left(\frac{a}{x^2}\right)}{x^3-ax}\,dx$$

input
```
integrate(log(a/x^2)/(-x^3+a*x),x, algorithm="giac")
```

output
```
integrate(-log(a/x^2)/(x^3 - a*x), x)
```

Mupad [B] (verification not implemented)

Time = 25.31 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.65

$$\int \frac{\log\left(\frac{a}{x^2}\right)}{ax - x^3}\,dx = \frac{\mathrm{Li}_2\left(\frac{a}{x^2}\right)}{2\,a}$$

input
```
int(log(a/x^2)/(a*x - x^3),x)
```

output
```
dilog(a/x^2)/(2*a)
```

Reduce [F]

$$\int \frac{\log\left(\frac{a}{x^2}\right)}{ax - x^3}\,dx = \int \frac{\log\left(\frac{a}{x^2}\right)}{-x^3 + ax}dx$$

input
```
int(log(a/x^2)/(-x^3+a*x),x)
```

output
```
int(log(a/x**2)/(a*x - x**3),x)
```

3.348 $\int \frac{\log(ax^{1-n})}{ax-x^n}\,dx$

Optimal result 2599
Mathematica [A] (verified) 2599
Rubi [A] (verified) 2600
Maple [F] 2601
Fricas [B] (verification not implemented) 2601
Sympy [F] 2602
Maxima [F] 2602
Giac [F] 2603
Mupad [F(-1)] 2603
Reduce [F] 2603

Optimal result

Integrand size = 22, antiderivative size = 26

$$\int \frac{\log(ax^{1-n})}{ax-x^n}\,dx = -\frac{\text{PolyLog}(2,1-ax^{1-n})}{a(1-n)}$$

output
```
-polylog(2,1-a*x^(1-n))/a/(1-n)
```

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{\log(ax^{1-n})}{ax-x^n}\,dx = \frac{\text{PolyLog}(2,1-ax^{1-n})}{a(-1+n)}$$

input
```
Integrate[Log[a*x^(1 - n)]/(a*x - x^n),x]
```

output
```
PolyLog[2, 1 - a*x^(1 - n)]/(a*(-1 + n))
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.182$, Rules used = {2027, 2774, 25, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log\left(ax^{1-n}\right)}{ax-x^n}dx$$

$$\Big\downarrow \text{ 2027}$$

$$\int \frac{x^{-n}\log\left(ax^{1-n}\right)}{ax^{1-n}-1}dx$$

$$\Big\downarrow \text{ 2774}$$

$$\frac{\int -\frac{\log\left(ax^{1-n}\right)}{1-ax^{1-n}}dx^{1-n}}{1-n}$$

$$\Big\downarrow \text{ 25}$$

$$-\frac{\int \frac{\log\left(ax^{1-n}\right)}{1-ax^{1-n}}dx^{1-n}}{1-n}$$

$$\Big\downarrow \text{ 2752}$$

$$-\frac{\text{PolyLog}\left(2,1-ax^{1-n}\right)}{a(1-n)}$$

input
```
Int[Log[a*x^(1 - n)]/(a*x - x^n),x]
```

output
```
-(PolyLog[2, 1 - a*x^(1 - n)]/(a*(1 - n)))
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2027
```
Int[(Fx_.)*((a_.)*(x_)^(r_.) + (b_.)*(x_)^(s_.))^(p_.), x_Symbol] :> Int[x^
(p*r)*(a + b*x^(s - r))^p*Fx, x] /; FreeQ[{a, b, r, s}, x] && IntegerQ[p] &
& PosQ[s - r] &&  !(EqQ[p, 1] && EqQ[u, 1])
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2774
```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m/n   Subst[Int[(d + e*x)^q*(a +
 b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
 && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

Maple [F]

$$\int \frac{\ln \left(a\, x^{1-n}\right)}{ax - x^n} dx$$

input
```
int(ln(a*x^(1-n))/(a*x-x^n),x)
```

output
```
int(ln(a*x^(1-n))/(a*x-x^n),x)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 89 vs. 2(22) = 44.

Time = 0.08 (sec) , antiderivative size = 89, normalized size of antiderivative = 3.42

$$\int \frac{\log \left(a x^{1-n}\right)}{ax - x^n} \, dx = \frac{2\,(n-1)\log\left(a\right)\log\left(x\right) - \left(n^2 - 2\,n + 1\right)\log\left(x\right)^2 + 2\,(n-1)\log\left(x\right)\log\left(\frac{a - x^{n-1}}{a}\right) - 2\,\log\left(a\right)\log\left(-a + x\right.}{2\,(an - a)}$$

input
```
integrate(log(a*x^(1-n))/(a*x-x^n),x, algorithm="fricas")
```

output
```
1/2*(2*(n - 1)*log(a)*log(x) - (n^2 - 2*n + 1)*log(x)^2 + 2*(n - 1)*log(x)
*log((a - x^(n - 1))/a) - 2*log(a)*log(-a + x^(n - 1)) + 2*dilog(-(a - x^(
n - 1))/a + 1))/(a*n - a)
```

Sympy [F]

$$\int \frac{\log(ax^{1-n})}{ax - x^n} \, dx = \int \frac{\log(ax^{1-n})}{ax - x^n} \, dx$$

input
```
integrate(ln(a*x**(1-n))/(a*x-x**n),x)
```

output
```
Integral(log(a*x**(1 - n))/(a*x - x**n), x)
```

Maxima [F]

$$\int \frac{\log(ax^{1-n})}{ax - x^n} \, dx = \int \frac{\log(ax^{-n+1})}{ax - x^n} \, dx$$

input
```
integrate(log(a*x^(1-n))/(a*x-x^n),x, algorithm="maxima")
```

output
```
integrate(log(a*x^(-n + 1))/(a*x - x^n), x)
```

Giac [F]

$$\int \frac{\log(ax^{1-n})}{ax - x^n}\,dx = \int \frac{\log(ax^{-n+1})}{ax - x^n}\,dx$$

input
```
integrate(log(a*x^(1-n))/(a*x-x^n),x, algorithm="giac")
```

output
```
integrate(log(a*x^(-n + 1))/(a*x - x^n), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\log(ax^{1-n})}{ax - x^n}\,dx = \int \frac{\ln(a\,x^{1-n})}{a\,x - x^n}\,dx$$

input
```
int(log(a*x^(1 - n))/(a*x - x^n),x)
```

output
```
int(log(a*x^(1 - n))/(a*x - x^n), x)
```

Reduce [F]

$$\int \frac{\log(ax^{1-n})}{ax - x^n}\,dx = -\left(\int \frac{\log\left(\frac{ax}{x^n}\right)}{x^n - ax}dx\right)$$

input
```
int(log(a*x^(1-n))/(a*x-x^n),x)
```

output
```
- int(log((a*x)/x**n)/(x**n - a*x),x)
```

3.349 $\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n)) \, dx$

Optimal result 2604
Mathematica [A] (verified) 2605
Rubi [A] (verified) 2605
Maple [A] (verified) 2607
Fricas [A] (verification not implemented) 2608
Sympy [B] (verification not implemented) 2608
Maxima [A] (verification not implemented) 2609
Giac [B] (verification not implemented) 2610
Mupad [F(-1)] 2611
Reduce [B] (verification not implemented) 2611

Optimal result

Integrand size = 27, antiderivative size = 171

$$\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n)) \, dx = -\frac{bd^3nx(fx)^{-1+m}}{m^2} - \frac{3bd^2enx^{1+m}(fx)^{-1+m}}{4m^2} - \frac{bde^2nx^{1+2m}(fx)^{-1+m}}{3m^2} - \frac{be^3nx^{1+3m}(fx)^{-1+m}}{16m^2} - \frac{bd^4nx^{1-m}(fx)^{-1+m}\log(x)}{4em} + \frac{x^{1-m}(fx)^{-1+m}(d+ex^m)^4(a+b\log(cx^n))}{4em}$$

output
```
-b*d^3*n*x*(f*x)^(-1+m)/m^2-3/4*b*d^2*e*n*x^(1+m)*(f*x)^(-1+m)/m^2-1/3*b*d
*e^2*n*x^(1+2*m)*(f*x)^(-1+m)/m^2-1/16*b*e^3*n*x^(1+3*m)*(f*x)^(-1+m)/m^2-
1/4*b*d^4*n*x^(1-m)*(f*x)^(-1+m)*ln(x)/e/m+1/4*x^(1-m)*(f*x)^(-1+m)*(d+e*x
^m)^4*(a+b*ln(c*x^n))/e/m
```

Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 140, normalized size of antiderivative = 0.82

$$\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))\,dx$$
$$=\frac{(fx)^m\left(12am(4d^3+6d^2ex^m+4de^2x^{2m}+e^3x^{3m})-bn(48d^3+36d^2ex^m+16de^2x^{2m}+3e^3x^{3m})+12bm(\right.}{48fm^2}$$

input
```
Integrate[(f*x)^(-1 + m)*(d + e*x^m)^3*(a + b*Log[c*x^n]),x]
```

output
```
((f*x)^m*(12*a*m*(4*d^3 + 6*d^2*e*x^m + 4*d*e^2*x^(2*m) + e^3*x^(3*m)) - b
*n*(48*d^3 + 36*d^2*e*x^m + 16*d*e^2*x^(2*m) + 3*e^3*x^(3*m)) + 12*b*m*(4*
d^3 + 6*d^2*e*x^m + 4*d*e^2*x^(2*m) + e^3*x^(3*m))*Log[c*x^n]))/(48*f*m^2)
```

Rubi [A] (verified)

Time = 0.47 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.66, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.185$, Rules used = {2777, 2776, 798, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^{m-1}(d+ex^m)^3(a+b\log(cx^n))\,dx$$
$$\Big\downarrow \text{2777}$$
$$x^{1-m}(fx)^{m-1}\int x^{m-1}(ex^m+d)^3(a+b\log(cx^n))dx$$
$$\Big\downarrow \text{2776}$$
$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^4(a+b\log(cx^n))}{4em}-\frac{bn\int\frac{(ex^m+d)^4}{x}dx}{4em}\right)$$
$$\Big\downarrow \text{798}$$
$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^4(a+b\log(cx^n))}{4em}-\frac{bn\int x^{-m}(ex^m+d)^4dx^m}{4em^2}\right)$$

$$\Big\downarrow \text{49}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^4\,(a+b\log(cx^n))}{4em}-\frac{bn\int\left(d^4x^{-m}+6d^2e^2x^m+4de^3x^{2m}+e^4x^{3m}+4d^3e\right)dx^m}{4em^2}\right)$$

$$\Big\downarrow \text{2009}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^4\,(a+b\log(cx^n))}{4em}-\frac{bn\left(d^4\log(x^m)+4d^3ex^m+3d^2e^2x^{2m}+\frac{4}{3}de^3x^{3m}+\frac{1}{4}e^4x^{4m}\right)}{4em^2}\right)$$

input
```
Int[(f*x)^(-1 + m)*(d + e*x^m)^3*(a + b*Log[c*x^n]),x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(-1/4*(b*n*(4*d^3*e*x^m + 3*d^2*e^2*x^(2*m) + (4*
d*e^3*x^(3*m))/3 + (e^4*x^(4*m))/4 + d^4*Log[x^m]))/(e*m^2) + ((d + e*x^m)
^4*(a + b*Log[c*x^n]))/(4*e*m))
```

Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 798
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[1/n   Subst
[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a,
b, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Maple [A] (verified)

Time = 65.67 (sec) , antiderivative size = 256, normalized size of antiderivative = 1.50

method	result
parallelrisch	$-\frac{-12e^{3}b(fx)^{m-1}\ln(cx^{n})x^{3m}xm-12x\,x^{3m}(fx)^{m-1}a\,e^{3}m+3x\,x^{3m}(fx)^{m-1}b\,e^{3}n-48e^{2}db(fx)^{m-1}\ln(cx^{n})x^{2m}xm-48x\cdots}{\cdots}$
risch	$\frac{b(e^{3}x^{3m}+4d\,e^{2}x^{2m}+6d^{2}e\,x^{m}+4d^{3})x\,e^{\frac{(m-1)\left(-i\,\mathrm{csgn}(ifx)^{3}\pi+i\,\mathrm{csgn}(ifx)^{2}\mathrm{csgn}(if)\pi+i\,\mathrm{csgn}(ifx)^{2}\mathrm{csgn}(ix)\pi-i\,\mathrm{csgn}(ifx)\,\mathrm{csgn}(if)\,\mathrm{cs}\cdots\right.}{2}}}{4m}$

input
```
int((f*x)^(m-1)*(d+e*x^m)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/48*(-12*e^3*b*(f*x)^(m-1)*ln(c*x^n)*(x^m)^3*x*m-12*x*(x^m)^3*(f*x)^(m-1
)*a*e^3*m+3*x*(x^m)^3*(f*x)^(m-1)*b*e^3*n-48*e^2*d*b*(f*x)^(m-1)*ln(c*x^n)
*(x^m)^2*x*m-48*x*(x^m)^2*(f*x)^(m-1)*a*d*e^2*m+16*x*(x^m)^2*(f*x)^(m-1)*b
*d*e^2*n-72*e*d^2*b*(f*x)^(m-1)*ln(c*x^n)*x^m*x*m-72*x*x^m*(f*x)^(m-1)*a*d
^2*e*m+36*x*x^m*(f*x)^(m-1)*b*d^2*e*n-48*b*d^3*(f*x)^(m-1)*ln(c*x^n)*x*m-4
8*x*(f*x)^(m-1)*a*d^3*m+48*x*(f*x)^(m-1)*b*d^3*n)/m^2
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 193, normalized size of antiderivative = 1.13

$$\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))\,dx$$
$$= \frac{3\,(4\,be^3mn\log(x)+4\,be^3m\log(c)+4\,ae^3m-be^3n)f^{m-1}x^{4\,m}+16\,(3\,bde^2mn\log(x)+3\,bde^2m\log(c)+\cdots}{}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/48*(3*(4*b*e^3*m*n*log(x) + 4*b*e^3*m*log(c) + 4*a*e^3*m - b*e^3*n)*f^(m
 - 1)*x^(4*m) + 16*(3*b*d*e^2*m*n*log(x) + 3*b*d*e^2*m*log(c) + 3*a*d*e^2*
m - b*d*e^2*n)*f^(m - 1)*x^(3*m) + 36*(2*b*d^2*e*m*n*log(x) + 2*b*d^2*e*m*
log(c) + 2*a*d^2*e*m - b*d^2*e*n)*f^(m - 1)*x^(2*m) + 48*(b*d^3*m*n*log(x)
 + b*d^3*m*log(c) + a*d^3*m - b*d^3*n)*f^(m - 1)*x^m)/m^2
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 333 vs. 2(160) = 320.

Time = 8.09 (sec) , antiderivative size = 333, normalized size of antiderivative = 1.95

$$\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))\,dx$$
$$= \begin{cases} \frac{ad^3x(fx)^{m-1}}{m}+\frac{3ad^2exx^m(fx)^{m-1}}{2m}+\frac{ade^2xx^{2m}(fx)^{m-1}}{m}+\frac{ae^3xx^{3m}(fx)^{m-1}}{4m}+\frac{bd^3x(fx)^{m-1}\log(cx^n)}{m}-\frac{bd^3nx(fx)^{m-1}}{m^2}+\frac{3b\cdots}{} \\ \frac{(d+e)^3\left(\begin{cases} a\log(x) & \text{for}\ b=0 \\ -(-a-b\log(c))\log(x) & \text{for}\ n=0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}\right)}{f} \end{cases}$$

input
```
integrate((f*x)**(-1+m)*(d+e*x**m)**3*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*d**3*x*(f*x)**(m - 1)/m + 3*a*d**2*e*x*x**m*(f*x)**(m - 1)/(2
*m) + a*d*e**2*x*x**(2*m)*(f*x)**(m - 1)/m + a*e**3*x*x**(3*m)*(f*x)**(m -
 1)/(4*m) + b*d**3*x*(f*x)**(m - 1)*log(c*x**n)/m - b*d**3*n*x*(f*x)**(m -
 1)/m**2 + 3*b*d**2*e*x*x**m*(f*x)**(m - 1)*log(c*x**n)/(2*m) - 3*b*d**2*e
*n*x*x**m*(f*x)**(m - 1)/(4*m**2) + b*d*e**2*x*x**(2*m)*(f*x)**(m - 1)*log
(c*x**n)/m - b*d*e**2*n*x*x**(2*m)*(f*x)**(m - 1)/(3*m**2) + b*e**3*x*x**(
3*m)*(f*x)**(m - 1)*log(c*x**n)/(4*m) - b*e**3*n*x*x**(3*m)*(f*x)**(m - 1)
/(16*m**2), Ne(m, 0)), ((d + e)**3*Piecewise((a*log(x), Eq(b, 0)), (-(-a -
 b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*n), True))/f,
True))
```

Maxima [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 253, normalized size of antiderivative = 1.48

$$\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n)) \, dx = \frac{be^3f^{m-1}x^{4m}\log(cx^n)}{4m} + \frac{bde^2f^{m-1}x^{3m}\log(cx^n)}{m} + \frac{3\,bd^2ef^{m-1}x^{2m}\log(cx^n)}{2m} + \frac{ae^3f^{m-1}x^{4m}}{4m} - \frac{be^3f^{m-1}nx^{4m}}{16\,m^2} + \frac{ade^2f^{m-1}x^{3m}}{m} - \frac{bde^2f^{m-1}nx^{3m}}{3\,m^2} + \frac{3\,ad^2ef^{m-1}x^{2m}}{2m} - \frac{3\,bd^2ef^{m-1}nx^{2m}}{4\,m^2} - \frac{bd^3f^{m-1}nx^m}{m^2} + \frac{(fx)^m bd^3\log(cx^n)}{fm} + \frac{(fx)^m ad^3}{fm}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
1/4*b*e^3*f^(m - 1)*x^(4*m)*log(c*x^n)/m + b*d*e^2*f^(m - 1)*x^(3*m)*log(c
*x^n)/m + 3/2*b*d^2*e*f^(m - 1)*x^(2*m)*log(c*x^n)/m + 1/4*a*e^3*f^(m - 1)
*x^(4*m)/m - 1/16*b*e^3*f^(m - 1)*n*x^(4*m)/m^2 + a*d*e^2*f^(m - 1)*x^(3*m
)/m - 1/3*b*d*e^2*f^(m - 1)*n*x^(3*m)/m^2 + 3/2*a*d^2*e*f^(m - 1)*x^(2*m)/
m - 3/4*b*d^2*e*f^(m - 1)*n*x^(2*m)/m^2 - b*d^3*f^(m - 1)*n*x^m/m^2 + (f*x
)^m*b*d^3*log(c*x^n)/(f*m) + (f*x)^m*a*d^3/(f*m)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 339 vs. 2(161) = 322.

Time = 0.21 (sec) , antiderivative size = 339, normalized size of antiderivative = 1.98

$$\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))\,dx = \frac{be^3f^mnx^{4m}\log(x)}{4fm} + \frac{bde^2f^mnx^{3m}\log(x)}{fm} + \frac{3bd^2ef^mnx^{2m}\log(x)}{2fm} + \frac{bd^3f^mnx^m\log(x)}{fm} + \frac{be^3f^mx^{4m}\log(c)}{4fm} + \frac{bde^2f^mx^{3m}\log(c)}{fm} + \frac{3bd^2ef^mx^{2m}\log(c)}{2fm} + \frac{bd^3f^mx^m\log(c)}{fm} + \frac{ae^3f^mx^{4m}}{4fm} - \frac{be^3f^mnx^{4m}}{16fm^2} + \frac{ade^2f^mx^{3m}}{fm} - \frac{bde^2f^mnx^{3m}}{3fm^2} + \frac{3ad^2ef^mx^{2m}}{2fm} - \frac{3bd^2ef^mnx^{2m}}{4fm^2} + \frac{ad^3f^mx^m}{fm} - \frac{bd^3f^mnx^m}{fm^2}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/4*b*e^3*f^m*n*x^(4*m)*log(x)/(f*m) + b*d*e^2*f^m*n*x^(3*m)*log(x)/(f*m)
+ 3/2*b*d^2*e*f^m*n*x^(2*m)*log(x)/(f*m) + b*d^3*f^m*n*x^m*log(x)/(f*m) +
1/4*b*e^3*f^m*x^(4*m)*log(c)/(f*m) + b*d*e^2*f^m*x^(3*m)*log(c)/(f*m) + 3/
2*b*d^2*e*f^m*x^(2*m)*log(c)/(f*m) + b*d^3*f^m*x^m*log(c)/(f*m) + 1/4*a*e^
3*f^m*x^(4*m)/(f*m) - 1/16*b*e^3*f^m*n*x^(4*m)/(f*m^2) + a*d*e^2*f^m*x^(3*
m)/(f*m) - 1/3*b*d*e^2*f^m*n*x^(3*m)/(f*m^2) + 3/2*a*d^2*e*f^m*x^(2*m)/(f*
m) - 3/4*b*d^2*e*f^m*n*x^(2*m)/(f*m^2) + a*d^3*f^m*x^m/(f*m) - b*d^3*f^m*n
*x^m/(f*m^2)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n))\, dx = \int (f\,x)^{m-1} (d+e\,x^m)^3 (a+b\,\ln(c\,x^n))\, dx$$

input
```
int((f*x)^(m - 1)*(d + e*x^m)^3*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^(m - 1)*(d + e*x^m)^3*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 168, normalized size of antiderivative = 0.98

$$\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n))\, dx$$
$$= \frac{x^m f^m (12x^{3m}\log(x^n c)\, b\, e^3 m + 12x^{3m} a\, e^3 m - 3x^{3m} b\, e^3 n + 48x^{2m}\log(x^n c)\, bd\, e^2 m + 48x^{2m} ad\, e^2 m - 16x^{2m}}{48f}$$

input
```
int((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n)),x)
```

output
```
(x**m*f**m*(12*x**(3*m)*log(x**n*c)*b*e**3*m + 12*x**(3*m)*a*e**3*m - 3*x*
*(3*m)*b*e**3*n + 48*x**(2*m)*log(x**n*c)*b*d*e**2*m + 48*x**(2*m)*a*d*e**
2*m - 16*x**(2*m)*b*d*e**2*n + 72*x**m*log(x**n*c)*b*d**2*e*m + 72*x**m*a*
d**2*e*m - 36*x**m*b*d**2*e*n + 48*log(x**n*c)*b*d**3*m + 48*a*d**3*m - 48
*b*d**3*n))/(48*f*m**2)
```

3.350 $\int (fx)^{-1+m} \left(d+ex^m\right)^2 \left(a+b \log \left(cx^n\right)\right) \, dx$

Optimal result . . . 2612
Mathematica [A] (verified) . . . 2612
Rubi [A] (verified) . . . 2613
Maple [A] (verified) . . . 2615
Fricas [A] (verification not implemented) . . . 2615
Sympy [A] (verification not implemented) . . . 2616
Maxima [A] (verification not implemented) . . . 2616
Giac [A] (verification not implemented) . . . 2617
Mupad [F(-1)] . . . 2618
Reduce [B] (verification not implemented) . . . 2618

Optimal result

Integrand size = 27, antiderivative size = 142

$$\int (fx)^{-1+m} \left(d+ex^m\right)^2 \left(a+b \log \left(cx^n\right)\right) \, dx = -\frac{bd^2nx(fx)^{-1+m}}{m^2}-\frac{bdenx^{1+m}(fx)^{-1+m}}{2m^2}-\frac{be^2nx^{1+2m}(fx)^{-1+m}}{9m^2} -\frac{bd^3nx^{1-m}(fx)^{-1+m}\log(x)}{3em}+\frac{x^{1-m}(fx)^{-1+m}\left(d+ex^m\right)^3\left(a+b\log\left(cx^n\right)\right)}{3em}$$

output
```
-b*d^2*n*x*(f*x)^(-1+m)/m^2-1/2*b*d*e*n*x^(1+m)*(f*x)^(-1+m)/m^2-1/9*b*e^2
*n*x^(1+2*m)*(f*x)^(-1+m)/m^2-1/3*b*d^3*n*x^(1-m)*(f*x)^(-1+m)*ln(x)/e/m+1
/3*x^(1-m)*(f*x)^(-1+m)*(d+e*x^m)^3*(a+b*ln(c*x^n))/e/m
```

Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 101, normalized size of antiderivative = 0.71

$$\int (fx)^{-1+m} \left(d+ex^m\right)^2 \left(a+b \log \left(cx^n\right)\right) \, dx = \frac{(fx)^m \left(6am(3d^2+3dex^m+e^2x^{2m})-bn(18d^2+9dex^m+2e^2x^{2m})+6bm(3d^2+3dex^m+e^2x^{2m})\log\left(cx\right.\right.}{18fm^2}$$

input
```
Integrate[(f*x)^(-1 + m)*(d + e*x^m)^2*(a + b*Log[c*x^n]),x]
```

output
```
((f*x)^m*(6*a*m*(3*d^2 + 3*d*e*x^m + e^2*x^(2*m)) - b*n*(18*d^2 + 9*d*e*x^
m + 2*e^2*x^(2*m)) + 6*b*m*(3*d^2 + 3*d*e*x^m + e^2*x^(2*m))*Log[c*x^n]))/
(18*f*m^2)
```

Rubi [A] (verified)

Time = 0.46 (sec) , antiderivative size = 100, normalized size of antiderivative = 0.70, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185, Rules used = {2777, 2776, 798, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^{m-1} (d+ex^m)^2 (a+b\log(cx^n)) \, dx$$

$$\Big\downarrow \textbf{2777}$$

$$x^{1-m}(fx)^{m-1}\int x^{m-1}(ex^m+d)^2 (a+b\log(cx^n))dx$$

$$\Big\downarrow \textbf{2776}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^3 (a+b\log(cx^n))}{3em}-\frac{bn\int \frac{(ex^m+d)^3}{x}dx}{3em}\right)$$

$$\Big\downarrow \textbf{798}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^3 (a+b\log(cx^n))}{3em}-\frac{bn\int x^{-m}(ex^m+d)^3dx^m}{3em^2}\right)$$

$$\Big\downarrow \textbf{49}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^3 (a+b\log(cx^n))}{3em}-\frac{bn\int \left(d^3x^{-m}+3de^2x^m+e^3x^{2m}+3d^2e\right)dx^m}{3em^2}\right)$$

$$\Big\downarrow \textbf{2009}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^3 (a+b\log(cx^n))}{3em}-\frac{bn\left(d^3\log(x^m)+3d^2ex^m+\frac{3}{2}de^2x^{2m}+\frac{1}{3}e^3x^{3m}\right)}{3em^2}\right)$$

input
```
Int[(f*x)^(-1 + m)*(d + e*x^m)^2*(a + b*Log[c*x^n]),x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(-1/3*(b*n*(3*d^2*e*x^m + (3*d*e^2*x^(2*m))/2 + (
e^3*x^(3*m))/3 + d^3*Log[x^m]))/(e*m^2) + ((d + e*x^m)^3*(a + b*Log[c*x^n]
))/(3*e*m))
```

Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 798
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[1/n   Subst
[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a,
b, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Maple [A] (verified)

Time = 13.25 (sec) , antiderivative size = 181, normalized size of antiderivative = 1.27

method	result
parallelrisch	$-\frac{-6e^2b(fx)^{m-1}\ln(c\,x^n)x^{2m}xm-6x\,x^{2m}(fx)^{m-1}a\,e^2m+2x\,x^{2m}(fx)^{m-1}b\,e^2n-18bde(fx)^{m-1}\ln(c\,x^n)x^m xm-18x\,x^m(}{18m^2}$
risch	$\frac{b(e^2x^{2m}+3de\,x^m+3d^2)x\,e^{\frac{(m-1)\left(-i\,\mathrm{csgn}(ifx)^3\pi+i\,\mathrm{csgn}(ifx)^2\,\mathrm{csgn}(if)\pi+i\,\mathrm{csgn}(ifx)^2\,\mathrm{csgn}(ix)\pi-i\,\mathrm{csgn}(ifx)\,\mathrm{csgn}(if)\,\mathrm{csgn}(ix)\pi+2\ln}{2}}}{3m}$

input
```
int((f*x)^(m-1)*(d+e*x^m)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/18*(-6*e^2*b*(f*x)^(m-1)*ln(c*x^n)*(x^m)^2*x*m-6*x*(x^m)^2*(f*x)^(m-1)*
a*e^2*m+2*x*(x^m)^2*(f*x)^(m-1)*b*e^2*n-18*b*d*e*(f*x)^(m-1)*ln(c*x^n)*x^m
*x*m-18*x*x^m*(f*x)^(m-1)*a*d*e*m+9*x*x^m*(f*x)^(m-1)*b*d*e*n-18*b*d^2*(f*
x)^(m-1)*x*ln(c*x^n)*m-18*x*(f*x)^(m-1)*a*d^2*m+18*x*(f*x)^(m-1)*b*d^2*n)/
m^2
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 135, normalized size of antiderivative = 0.95

$$\int (fx)^{-1+m}\left(d+ex^m\right)^2\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$=\frac{2\left(3\,be^2mn\log\left(x\right)+3\,be^2m\log\left(c\right)+3\,ae^2m-be^2n\right)f^{m-1}x^{3\,m}+9\left(2\,bdemn\log\left(x\right)+2\,bdem\log\left(c\right)+2\,\right.}{18\,m^2}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/18*(2*(3*b*e^2*m*n*log(x) + 3*b*e^2*m*log(c) + 3*a*e^2*m - b*e^2*n)*f^(m
 - 1)*x^(3*m) + 9*(2*b*d*e*m*n*log(x) + 2*b*d*e*m*log(c) + 2*a*d*e*m - b*d
*e*n)*f^(m - 1)*x^(2*m) + 18*(b*d^2*m*n*log(x) + b*d^2*m*log(c) + a*d^2*m
 - b*d^2*n)*f^(m - 1)*x^m)/m^2
```

Sympy [A] (verification not implemented)

Time = 4.62 (sec) , antiderivative size = 241, normalized size of antiderivative = 1.70

$$\int (fx)^{-1+m}\left(d+ex^m\right)^2\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$=\begin{cases}\frac{ad^2x(fx)^{m-1}}{m}+\frac{adexx^m(fx)^{m-1}}{m}+\frac{ae^2xx^{2m}(fx)^{m-1}}{3m}+\frac{bd^2x(fx)^{m-1}\log\left(cx^n\right)}{m}-\frac{bd^2nx(fx)^{m-1}}{m^2}+\frac{bdexx^m(fx)^{m-1}\log\left(cx^n\right)}{m} \\ \frac{(d+e)^2\left(\begin{cases}a\log(x) & \text{for } b=0\\ -(-a-b\log(c))\log(x) & \text{for } n=0\\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise}\end{cases}\right)}{f}\end{cases}$$

input
```
integrate((f*x)**(-1+m)*(d+e*x**m)**2*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*d**2*x*(f*x)**(m - 1)/m + a*d*e*x*x**m*(f*x)**(m - 1)/m + a*e
**2*x*x**(2*m)*(f*x)**(m - 1)/(3*m) + b*d**2*x*(f*x)**(m - 1)*log(c*x**n)/
m - b*d**2*n*x*(f*x)**(m - 1)/m**2 + b*d*e*x*x**m*(f*x)**(m - 1)*log(c*x**
n)/m - b*d*e*n*x*x**m*(f*x)**(m - 1)/(2*m**2) + b*e**2*x*x**(2*m)*(f*x)**(
m - 1)*log(c*x**n)/(3*m) - b*e**2*n*x*x**(2*m)*(f*x)**(m - 1)/(9*m**2), Ne
(m, 0)), ((d + e)**2*Piecewise((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log
(x), Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*n), True))/f, True))
```

Maxima [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 180, normalized size of antiderivative = 1.27

$$\int (fx)^{-1+m}\left(d+ex^m\right)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{be^2f^{m-1}x^{3m}\log\left(cx^n\right)}{3m}+\frac{bdef^{m-1}x^{2m}\log\left(cx^n\right)}{m}+\frac{ae^2f^{m-1}x^{3m}}{3m}-\frac{be^2f^{m-1}nx^{3m}}{9m^2}+\frac{adef^{m-1}x^{2m}}{m}-\frac{bdef^{m-1}nx^{2m}}{2m^2}-\frac{bd^2f^{m-1}nx^m}{m^2}+\frac{(fx)^m bd^2\log\left(cx^n\right)}{fm}+\frac{(fx)^m ad^2}{fm}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
1/3*b*e^2*f^(m - 1)*x^(3*m)*log(c*x^n)/m + b*d*e*f^(m - 1)*x^(2*m)*log(c*x
^n)/m + 1/3*a*e^2*f^(m - 1)*x^(3*m)/m - 1/9*b*e^2*f^(m - 1)*n*x^(3*m)/m^2
+ a*d*e*f^(m - 1)*x^(2*m)/m - 1/2*b*d*e*f^(m - 1)*n*x^(2*m)/m^2 - b*d^2*f^
(m - 1)*n*x^m/m^2 + (f*x)^m*b*d^2*log(c*x^n)/(f*m) + (f*x)^m*a*d^2/(f*m)
```

Giac [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 241, normalized size of antiderivative = 1.70

$$\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))\,dx = \frac{be^2f^mnx^{3\,m}\log(x)}{3\,fm} + \frac{bdef^mnx^{2\,m}\log(x)}{fm} + \frac{bd^2f^mnx^m\log(x)}{fm} + \frac{be^2f^mx^{3\,m}\log(c)}{3\,fm} + \frac{bdef^mx^{2\,m}\log(c)}{fm} + \frac{bd^2f^mx^m\log(c)}{fm} + \frac{ae^2f^mx^{3\,m}}{3\,fm} - \frac{be^2f^mnx^{3\,m}}{9\,fm^2} + \frac{adef^mx^{2\,m}}{fm} - \frac{bdef^mnx^{2\,m}}{2\,fm^2} + \frac{ad^2f^mx^m}{fm} - \frac{bd^2f^mnx^m}{fm^2}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/3*b*e^2*f^m*n*x^(3*m)*log(x)/(f*m) + b*d*e*f^m*n*x^(2*m)*log(x)/(f*m) +
b*d^2*f^m*n*x^m*log(x)/(f*m) + 1/3*b*e^2*f^m*x^(3*m)*log(c)/(f*m) + b*d*e*
f^m*x^(2*m)*log(c)/(f*m) + b*d^2*f^m*x^m*log(c)/(f*m) + 1/3*a*e^2*f^m*x^(3
*m)/(f*m) - 1/9*b*e^2*f^m*n*x^(3*m)/(f*m^2) + a*d*e*f^m*x^(2*m)/(f*m) - 1/
2*b*d*e*f^m*n*x^(2*m)/(f*m^2) + a*d^2*f^m*x^m/(f*m) - b*d^2*f^m*n*x^m/(f*m
^2)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))\,dx = \int (f\,x)^{m-1} (d+e\,x^m)^2 (a+b\,\ln(c\,x^n))\,dx$$

input
```
int((f*x)^(m - 1)*(d + e*x^m)^2*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^(m - 1)*(d + e*x^m)^2*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 117, normalized size of antiderivative = 0.82

$$\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))\,dx$$
$$= \frac{x^m f^m (6x^{2m}\log(x^n c)\,b\,e^2 m + 6x^{2m} a\,e^2 m - 2x^{2m} b\,e^2 n + 18x^m \log(x^n c)\,bdem + 18x^m adem - 9x^m bden +}{18 f\,m^2}$$

input
```
int((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n)),x)
```

output
```
(x**m*f**m*(6*x**(2*m)*log(x**n*c)*b*e**2*m + 6*x**(2*m)*a*e**2*m - 2*x**(
2*m)*b*e**2*n + 18*x**m*log(x**n*c)*b*d*e*m + 18*x**m*a*d*e*m - 9*x**m*b*d
*e*n + 18*log(x**n*c)*b*d**2*m + 18*a*d**2*m - 18*b*d**2*n))/(18*f*m**2)
```

3.351 $\int (fx)^{-1+m} (d+ex^m) (a+b\log(cx^n)) \, dx$

Optimal result 2619
Mathematica [A] (verified) 2619
Rubi [A] (verified) 2620
Maple [A] (verified) 2622
Fricas [A] (verification not implemented) 2622
Sympy [A] (verification not implemented) 2623
Maxima [A] (verification not implemented) 2623
Giac [A] (verification not implemented) 2624
Mupad [F(-1)] 2624
Reduce [B] (verification not implemented) 2625

Optimal result

Integrand size = 25, antiderivative size = 90

$$\int (fx)^{-1+m} (d+ex^m) (a+b\log(cx^n)) \, dx = -\frac{bdn(fx)^m}{fm^2} - \frac{benx^m(fx)^m}{4fm^2} + \frac{d(fx)^m (a+b\log(cx^n))}{fm} + \frac{ex^m(fx)^m (a+b\log(cx^n))}{2fm}$$

output
```
-b*d*n*(f*x)^m/f/m^2-1/4*b*e*n*x^m*(f*x)^m/f/m^2+d*(f*x)^m*(a+b*ln(c*x^n))
/f/m+1/2*e*x^m*(f*x)^m*(a+b*ln(c*x^n))/f/m
```

Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 61, normalized size of antiderivative = 0.68

$$\int (fx)^{-1+m} (d+ex^m) (a+b\log(cx^n)) \, dx = \frac{(fx)^m (2am(2d+ex^m) - bn(4d+ex^m) + 2bm(2d+ex^m) \log(cx^n))}{4fm^2}$$

input
```
Integrate[(f*x)^(-1 + m)*(d + e*x^m)*(a + b*Log[c*x^n]),x]
```

output
```
((f*x)^m*(2*a*m*(2*d + e*x^m) - b*n*(4*d + e*x^m) + 2*b*m*(2*d + e*x^m)*Lo
g[c*x^n]))/(4*f*m^2)
```

Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 85, normalized size of antiderivative = 0.94, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {2777, 2776, 798, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^{m-1} (d+ex^m) (a+b\log (cx^n)) \, dx$$

$$\Big\downarrow \text{ 2777}$$

$$x^{1-m}(fx)^{m-1}\int x^{m-1}(ex^m+d) (a+b\log (cx^n))dx$$

$$\Big\downarrow \text{ 2776}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^2 (a+b\log (cx^n))}{2em}-\frac{bn\int \frac{(ex^m+d)^2}{x}dx}{2em}\right)$$

$$\Big\downarrow \text{ 798}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^2 (a+b\log (cx^n))}{2em}-\frac{bn\int x^{-m}(ex^m+d)^2dx^m}{2em^2}\right)$$

$$\Big\downarrow \text{ 49}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^2 (a+b\log (cx^n))}{2em}-\frac{bn\int \left(d^2x^{-m}+e^2x^m+2de\right)dx^m}{2em^2}\right)$$

$$\Big\downarrow \text{ 2009}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^2 (a+b\log (cx^n))}{2em}-\frac{bn\left(d^2\log (x^m)+2dex^m+\frac{1}{2}e^2x^{2m}\right)}{2em^2}\right)$$

input
```
Int[(f*x)^(-1 + m)*(d + e*x^m)*(a + b*Log[c*x^n]),x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(-1/2*(b*n*(2*d*e*x^m + (e^2*x^(2*m))/2 + d^2*Log
[x^m]))/(e*m^2) + ((d + e*x^m)^2*(a + b*Log[c*x^n]))/(2*e*m))
```

Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 798
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[1/n   Subst
[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a,
b, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Maple [A] (verified)

Time = 2.07 (sec) , antiderivative size = 105, normalized size of antiderivative = 1.17

method	result
parallelrisch	$-\frac{-2x\,x^{m}\ln(c\,x^{n})(fx)^{m-1}bem-2x\,x^{m}(fx)^{m-1}aem+x\,x^{m}(fx)^{m-1}ben-4x\ln(c\,x^{n})(fx)^{m-1}bdm-4x(fx)^{m-1}adm+4x(f}{4m^{2}}$
risch	$\frac{b(e\,x^{m}+2d)x\,\mathrm{e}^{\frac{(m-1)\left(-i\,\mathrm{csgn}(ifx)^{3}\pi+i\,\mathrm{csgn}(ifx)^{2}\,\mathrm{csgn}(if)\pi+i\,\mathrm{csgn}(ifx)^{2}\,\mathrm{csgn}(ix)\pi-i\,\mathrm{csgn}(ifx)\,\mathrm{csgn}(if)\,\mathrm{csgn}(ix)\pi+2\ln(x)+2\ln(f)\right)}{2}}}{2m}$

input
```
int((f*x)^(m-1)*(d+e*x^m)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/4*(-2*x*x^m*ln(c*x^n)*(f*x)^(m-1)*b*e*m-2*x*x^m*(f*x)^(m-1)*a*e*m+x*x^m
*(f*x)^(m-1)*b*e*n-4*x*ln(c*x^n)*(f*x)^(m-1)*b*d*m-4*x*(f*x)^(m-1)*a*d*m+4
*x*(f*x)^(m-1)*b*d*n)/m^2
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 76, normalized size of antiderivative = 0.84

$$\int (fx)^{-1+m}\left(d+ex^{m}\right)\left(a+b\log\left(cx^{n}\right)\right)\,dx$$
$$=\frac{(2\,bemn\log(x)+2\,bem\log(c)+2\,aem-ben)f^{m-1}x^{2\,m}+4\,(bdmn\log(x)+bdm\log(c)+adm-bdn)f}{4\,m^{2}}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/4*((2*b*e*m*n*log(x) + 2*b*e*m*log(c) + 2*a*e*m - b*e*n)*f^(m - 1)*x^(2*
m) + 4*(b*d*m*n*log(x) + b*d*m*log(c) + a*d*m - b*d*n)*f^(m - 1)*x^m)/m^2
```

Sympy [A] (verification not implemented)

Time = 3.02 (sec) , antiderivative size = 156, normalized size of antiderivative = 1.73

$$\int (fx)^{-1+m}(d+ex^m)(a+b\log(cx^n))\,dx = \begin{cases} \frac{adx(fx)^{m-1}}{m} + \frac{aexx^m(fx)^{m-1}}{2m} + \frac{bdx(fx)^{m-1}\log(cx^n)}{m} - \frac{bdnx(fx)^{m-1}}{m^2} + \frac{bexx^m(fx)^{m-1}\log(cx^n)}{2m} - \frac{benxx^m(fx)^{m-1}}{4m^2} & \text{for } n \\ \frac{(d+e)\left(\begin{cases} a\log(x) & \text{for } b=0 \\ -(-a-b\log(c))\log(x) & \text{for } n=0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}\right)}{f} & \text{othe} \end{cases}$$

input
```
integrate((f*x)**(-1+m)*(d+e*x**m)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*d*x*(f*x)**(m - 1)/m + a*e*x*x**m*(f*x)**(m - 1)/(2*m) + b*d*
x*(f*x)**(m - 1)*log(c*x**n)/m - b*d*n*x*(f*x)**(m - 1)/m**2 + b*e*x*x**m*
(f*x)**(m - 1)*log(c*x**n)/(2*m) - b*e*n*x*x**m*(f*x)**(m - 1)/(4*m**2), N
e(m, 0)), ((d + e)*Piecewise((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x
), Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*n), True))/f, True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.21

$$\int (fx)^{-1+m}(d+ex^m)(a+b\log(cx^n))\,dx = \frac{bef^{m-1}x^{2m}\log(cx^n)}{2m} + \frac{aef^{m-1}x^{2m}}{2m} - \frac{bef^{m-1}nx^{2m}}{4m^2} - \frac{bdf^{m-1}nx^m}{m^2} + \frac{(fx)^m bd\log(cx^n)}{fm} + \frac{(fx)^m ad}{fm}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
1/2*b*e*f^(m - 1)*x^(2*m)*log(c*x^n)/m + 1/2*a*e*f^(m - 1)*x^(2*m)/m - 1/4
*b*e*f^(m - 1)*n*x^(2*m)/m^2 - b*d*f^(m - 1)*n*x^m/m^2 + (f*x)^m*b*d*log(c
*x^n)/(f*m) + (f*x)^m*a*d/(f*m)
```

Giac [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 146, normalized size of antiderivative = 1.62

$$\int (fx)^{-1+m}(d+ex^m)(a+b\log(cx^n))\,dx = \frac{bef^mnx^{2m}\log(x)}{2fm} + \frac{bdf^mnx^m\log(x)}{fm} + \frac{bef^mx^{2m}\log(c)}{2fm} + \frac{bdf^mx^m\log(c)}{fm} + \frac{aef^mx^{2m}}{2fm} - \frac{bef^mnx^{2m}}{4fm^2} + \frac{adf^mx^m}{fm} - \frac{bdf^mnx^m}{fm^2}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/2*b*e*f^m*n*x^(2*m)*log(x)/(f*m) + b*d*f^m*n*x^m*log(x)/(f*m) + 1/2*b*e*
f^m*x^(2*m)*log(c)/(f*m) + b*d*f^m*x^m*log(c)/(f*m) + 1/2*a*e*f^m*x^(2*m)/
(f*m) - 1/4*b*e*f^m*n*x^(2*m)/(f*m^2) + a*d*f^m*x^m/(f*m) - b*d*f^m*n*x^m/
(f*m^2)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^{-1+m}(d+ex^m)(a+b\log(cx^n))\,dx = \int (f\,x)^{m-1}\,(d+e\,x^m)\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int((f*x)^(m - 1)*(d + e*x^m)*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^(m - 1)*(d + e*x^m)*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 66, normalized size of antiderivative = 0.73

$$\int (fx)^{-1+m}(d+ex^m)(a+b\log(cx^n))\,dx = \frac{x^m f^m (2x^m\log(x^n c)\,bem + 2x^m aem - x^m ben + 4\log(x^n c)\,bdm + 4adm - 4bdn)}{4f\,m^2}$$

input
```
int((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n)),x)
```

output
```
(x**m*f**m*(2*x***m*log(x***n*c)*b*e*m + 2*x**m*a*e*m - x**m*b*e*n + 4*log(x
**n*c)*b*d*m + 4*a*d*m - 4*b*d*n))/(4*f*m**2)
```

3.352 $\int (fx)^{-1+m} (a + b \log (cx^n)) \, dx$

Optimal result 2626
Mathematica [A] (verified) 2626
Rubi [A] (verified) 2627
Maple [A] (verified) 2627
Fricas [A] (verification not implemented) 2628
Sympy [B] (verification not implemented) 2628
Maxima [A] (verification not implemented) 2629
Giac [A] (verification not implemented) 2629
Mupad [F(-1)] 2630
Reduce [B] (verification not implemented) 2630

Optimal result

Integrand size = 18, antiderivative size = 38

$$\int (fx)^{-1+m} (a + b \log (cx^n)) \, dx = -\frac{bn(fx)^m}{fm^2} + \frac{(fx)^m (a + b \log (cx^n))}{fm}$$

output
```
-b*n*(f*x)^m/f/m^2+(f*x)^m*(a+b*ln(c*x^n))/f/m
```

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.76

$$\int (fx)^{-1+m} (a + b \log (cx^n)) \, dx = \frac{(fx)^m (am - bn + bm \log (cx^n))}{fm^2}$$

input
```
Integrate[(f*x)^(-1 + m)*(a + b*Log[c*x^n]),x]
```

output
```
((f*x)^m*(a*m - b*n + b*m*Log[c*x^n]))/(f*m^2)
```

Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$, Rules used = {2741}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^{m-1}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \ 2741$$

$$\frac{(fx)^m(a+b\log(cx^n))}{fm}-\frac{bn(fx)^m}{fm^2}$$

input
```
Int[(f*x)^(-1 + m)*(a + b*Log[c*x^n]),x]
```

output
```
-((b*n*(f*x)^m)/(f*m^2)) + ((f*x)^m*(a + b*Log[c*x^n]))/(f*m)
```

Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.26

method	result
parallelrisch	$-\frac{-x\ln(c\,x^n)(fx)^{m-1}bm-x(fx)^{m-1}am+x(fx)^{m-1}bn}{m^2}$
risch	$\frac{bx\,\mathrm{e}^{\frac{(m-1)\left(-i\,\mathrm{csgn}(ifx)^3\pi+i\,\mathrm{csgn}(ifx)^2\,\mathrm{csgn}(if)\pi+i\,\mathrm{csgn}(ifx)^2\,\mathrm{csgn}(ix)\pi-i\,\mathrm{csgn}(ifx)\,\mathrm{csgn}(if)\,\mathrm{csgn}(ix)\pi+2\ln(x)+2\ln(f)\right)}{2}}\ln(x^n)}{m}+$

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-x*ln(c*x^n)*(f*x)^(m-1)*b*m-x*(f*x)^(m-1)*a*m+x*(f*x)^(m-1)*b*n)/m^2
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.11

$$\int (fx)^{-1+m}(a+b\log(cx^n))\,dx = \frac{(bmnx\log(x)+bmx\log(c)+(am-bn)x)e^{((m-1)\log(f)+(m-1)\log(x))}}{m^2}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
(b*m*n*x*log(x) + b*m*x*log(c) + (a*m - b*n)*x)*e^((m - 1)*log(f) + (m - 1
)*log(x))/m^2
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 82 vs. $2(31) = 62$.

Time = 2.05 (sec) , antiderivative size = 82, normalized size of antiderivative = 2.16

$$\int (fx)^{-1+m}(a+b\log(cx^n))\,dx = \begin{cases} \frac{ax(fx)^{m-1}}{m} + \frac{bx(fx)^{m-1}\log(cx^n)}{m} - \frac{bnx(fx)^{m-1}}{m^2} & \text{for } m \neq 0 \\ \frac{\begin{cases} a\log(x) & \text{for } b = 0 \\ -(-a-b\log(c))\log(x) & \text{for } n = 0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}}{f} & \text{otherwise} \end{cases}$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*x*(f*x)**(m - 1)/m + b*x*(f*x)**(m - 1)*log(c*x**n)/m - b*n*x
*(f*x)**(m - 1)/m**2, Ne(m, 0)), (Piecewise((a*log(x), Eq(b, 0)), (-(-a -
b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*n), True))/f, T
rue))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.26

$$\int (fx)^{-1+m}(a+b\log(cx^n))\,dx = -\frac{bf^{m-1}nx^m}{m^2}+\frac{(fx)^m b\log(cx^n)}{fm}+\frac{(fx)^m a}{fm}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-b*f^(m - 1)*n*x^m/m^2 + (f*x)^m*b*log(c*x^n)/(f*m) + (f*x)^m*a/(f*m)
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 64, normalized size of antiderivative = 1.68

$$\int (fx)^{-1+m}(a+b\log(cx^n))\,dx = \frac{bf^m nx^m\log(x)}{fm}+\frac{bf^m x^m\log(c)}{fm}+\frac{af^m x^m}{fm}-\frac{bf^m nx^m}{fm^2}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*f^m*n*x^m*log(x)/(f*m) + b*f^m*x^m*log(c)/(f*m) + a*f^m*x^m/(f*m) - b*f^
m*n*x^m/(f*m^2)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^{-1+m}(a+b\log(cx^n))\,dx=\int (f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int((f*x)^(m - 1)*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^(m - 1)*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.79

$$\int (fx)^{-1+m}(a+b\log(cx^n))\,dx=\frac{x^m f^m(\log(x^n c)\,bm+am-bn)}{f\,m^2}$$

input
```
int((f*x)^(-1+m)*(a+b*log(c*x^n)),x)
```

output
```
(x**m*f**m*(log(x**n*c)*b*m + a*m - b*n))/(f*m**2)
```

3.353 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx$

Optimal result 2631
Mathematica [A] (warning: unable to verify) 2631
Rubi [A] (verified) 2632
Maple [F] 2633
Fricas [A] (verification not implemented) 2633
Sympy [F] 2634
Maxima [F] 2634
Giac [F] 2634
Mupad [F(-1)] 2635
Reduce [F] 2635

Optimal result

Integrand size = 27, antiderivative size = 77

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx = \frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))\log\left(1+\frac{ex^m}{d}\right)}{em} + \frac{bnx^{1-m}(fx)^{-1+m}\operatorname{PolyLog}\left(2,-\frac{ex^m}{d}\right)}{em^2}$$

output
```
x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))*ln(1+e*x^m/d)/e/m+b*n*x^(1-m)*(f*x)^(
-1+m)*polylog(2,-e*x^m/d)/e/m^2
```

Mathematica [A] (warning: unable to verify)

Time = 0.56 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.83

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx = \frac{x^{-m}(fx)^m\left(-bm^2n\log^2(x)+am\log(d-dx^m)+bm\log(cx^n)\log(d-dx^m)-bn\log\left(-\frac{ex^m}{d}\right)\log(d+e\right.}{efr}$$

input
```
Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m),x]
```

output
```
((f*x)^m*(-(b*m^2*n*Log[x]^2) + a*m*Log[d - d*x^m] + b*m*Log[c*x^n]*Log[d
- d*x^m] - b*n*Log[-((e*x^m)/d)]*Log[d + e*x^m] + m*Log[x]*(a*m + b*m*Log[
c*x^n] - b*n*Log[d - d*x^m] + b*n*Log[d + e*x^m]) - b*n*PolyLog[2, 1 + (e*
x^m)/d]))/(e*f*m^2*x^m)
```

Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 64, normalized size of antiderivative = 0.83, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2777, 2775, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^{m-1}(a+b\log(cx^n))}{d+ex^m}dx$$

$$\Big\downarrow \text{2777}$$

$$x^{1-m}(fx)^{m-1}\int \frac{x^{m-1}(a+b\log(cx^n))}{ex^m+d}dx$$

$$\Big\downarrow \text{2775}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{\log\left(\frac{ex^m}{d}+1\right)(a+b\log(cx^n))}{em}-\frac{bn\int \frac{\log\left(\frac{ex^m}{d}+1\right)}{x}dx}{em}\right)$$

$$\Big\downarrow \text{2838}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{\log\left(\frac{ex^m}{d}+1\right)(a+b\log(cx^n))}{em}+\frac{bn\,\text{PolyLog}\left(2,-\frac{ex^m}{d}\right)}{em^2}\right)$$

input
```
Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m),x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(((a + b*Log[c*x^n])*Log[1 + (e*x^m)/d])/(e*m) +
(b*n*PolyLog[2, -((e*x^m)/d)])/(e*m^2))
```

Defintions of rubi rules used

rule 2775
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.))/((d_)
+ (e_.)*(x_)^(r_)), x_Symbol] :> Simp[f^m*Log[1 + e*(x^r/d)]*((a + b*Log[c*
x^n])^p/(e*r)), x] - Simp[b*f^m*n*(p/(e*r))   Int[Log[1 + e*(x^r/d)]*((a +
b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && NeQ[r, n]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [F]

$$\int \frac{(fx)^{m-1} (a+b\ln(c\,x^n))}{d+e\,x^m}dx$$

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))/(d+e*x^m),x)
```

output
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))/(d+e*x^m),x)
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 77, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^{-1+m} (a+b\log(cx^n))}{d+ex^m}\,dx = \frac{bf^{m-1}mn\log(x)\log\left(\frac{ex^m+d}{d}\right)+bf^{m-1}n\mathrm{Li}_2\left(-\frac{ex^m+d}{d}+1\right)+(bm\log(c)+am)f^{m-1}\log(ex^m+d)}{em^2}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m),x, algorithm="fricas")
```

output
```
(b*f^(m - 1)*m*n*log(x)*log((e*x^m + d)/d) + b*f^(m - 1)*n*dilog(-(e*x^m +
d)/d + 1) + (b*m*log(c) + a*m)*f^(m - 1)*log(e*x^m + d))/(e*m^2)
```

Sympy [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx=\int \frac{(fx)^{m-1}(a+b\log(cx^n))}{d+ex^m}\,dx$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))/(d+e*x**m),x)
```

output
```
Integral((f*x)**(m - 1)*(a + b*log(c*x**n))/(d + e*x**m), x)
```

Maxima [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx=\int \frac{(b\log(cx^n)+a)(fx)^{m-1}}{ex^m+d}\,dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m),x, algorithm="maxima")
```

output
```
b*integrate((f^m*x^m*log(c) + f^m*x^m*log(x^n))/(e*f*x*x^m + d*f*x), x) +
a*f^(m - 1)*log((e*x^m + d)/e)/(e*m)
```

Giac [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx=\int \frac{(b\log(cx^n)+a)(fx)^{m-1}}{ex^m+d}\,dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^(m - 1)/(e*x^m + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx = \int \frac{(f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))}{d+e\,x^m}\,dx$$

input
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m),x)
```

output
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m), x)
```

Reduce [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx = \frac{f^m\left(-2\left(\int \frac{\log(x^n c)}{x^m ex+dx}dx\right)bdmn+2\log(x^m e+d)\,an+\log(x^n c)^2\,bm\right)}{2efmn}$$

input
```
int((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m),x)
```

output
```
(f**m*( - 2*int(log(x**n*c)/(x**m*e*x + d*x),x)*b*d*m*n + 2*log(x**m*e + d
)*a*n + log(x**n*c)**2*b*m))/(2*e*f*m*n)
```

3.354 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^2}\,dx$

Optimal result 2636
Mathematica [A] (verified) 2636
Rubi [A] (verified) 2637
Maple [F] 2638
Fricas [A] (verification not implemented) 2638
Sympy [F] 2639
Maxima [A] (verification not implemented) 2639
Giac [B] (verification not implemented) 2639
Mupad [F(-1)] 2640
Reduce [B] (verification not implemented) 2640

Optimal result

Integrand size = 27, antiderivative size = 69

$$\int \frac{(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)}{\left(d+ex^m\right)^2}\,dx=\frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{dfm\left(d+ex^m\right)}-\frac{bnx^{-m}(fx)^m\log\left(d+ex^m\right)}{defm^2}$$

output
```
(f*x)^m*(a+b*ln(c*x^n))/d/f/m/(d+e*x^m)-b*n*(f*x)^m*ln(d+e*x^m)/d/e/f/m^2/
(x^m)
```

Mathematica [A] (verified)

Time = 0.57 (sec) , antiderivative size = 89, normalized size of antiderivative = 1.29

$$\int \frac{(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)}{\left(d+ex^m\right)^2}\,dx = -\frac{x^{-m}(fx)^m\left(adm-bmn(d+ex^m)\log(x)+bdm\log\left(cx^n\right)+bdn\log\left(d+ex^m\right)+benx^m\log\left(d+ex^m\right)\right)}{defm^2\left(d+ex^m\right)}$$

input
```
Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m)^2,x]
```

output
```
-(((f*x)^m*(a*d*m - b*m*n*(d + e*x^m)*Log[x] + b*d*m*Log[c*x^n] + b*d*n*Lo
g[d + e*x^m] + b*e*n*x^m*Log[d + e*x^m]))/(d*e*f*m^2*x^m*(d + e*x^m)))
```

Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2773, 800, 792}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^{m-1}(a+b\log(cx^n))}{(d+ex^m)^2}dx$$

$$\Big\downarrow \text{2773}$$

$$\frac{(fx)^m(a+b\log(cx^n))}{dfm(d+ex^m)}-\frac{bn\int\frac{(fx)^{m-1}}{ex^m+d}dx}{dm}$$

$$\Big\downarrow \text{800}$$

$$\frac{(fx)^m(a+b\log(cx^n))}{dfm(d+ex^m)}-\frac{bnx^{-m}(fx)^m\int\frac{x^{m-1}}{ex^m+d}dx}{dfm}$$

$$\Big\downarrow \text{792}$$

$$\frac{(fx)^m(a+b\log(cx^n))}{dfm(d+ex^m)}-\frac{bnx^{-m}(fx)^m\log(d+ex^m)}{defm^2}$$

input
```
Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m)^2,x]
```

output
```
((f*x)^m*(a + b*Log[c*x^n]))/(d*f*m*(d + e*x^m)) - (b*n*(f*x)^m*Log[d + e*
x^m])/(d*e*f*m^2*x^m)
```

Defintions of rubi rules used

rule 792
```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

rule 800
```
Int[((c_)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^Int
Part[m]*((c*x)^FracPart[m]/x^FracPart[m])   Int[x^m*(a + b*x^n)^p, x], x] /
; FreeQ[{a, b, c, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Maple [F]

$$\int \frac{(fx)^{m-1} (a+b\ln(c\,x^n))}{(d+e\,x^m)^2}dx$$

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))/(d+e*x^m)^2,x)
```

output
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))/(d+e*x^m)^2,x)
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 89, normalized size of antiderivative = 1.29

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^2}\,dx = \frac{bef^{m-1}mnx^m\log(x) - (bdm\log(c)+adm)f^{m-1} - (bef^{m-1}nx^m + bdf^{m-1}n)\log(ex^m+d)}{de^2m^2x^m + d^2em^2}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^2,x, algorithm="fricas")
```

output
```
(b*e*f^(m - 1)*m*n*x^m*log(x) - (b*d*m*log(c) + a*d*m)*f^(m - 1) - (b*e*f^
(m - 1)*n*x^m + b*d*f^(m - 1)*n)*log(e*x^m + d))/(d*e^2*m^2*x^m + d^2*e*m^
2)
```

Sympy [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^2}\,dx = \int \frac{(fx)^{m-1}(a+b\log(cx^n))}{(d+ex^m)^2}\,dx$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))/(d+e*x**m)**2,x)
```

output
```
Integral((f*x)**(m - 1)*(a + b*log(c*x**n))/(d + e*x**m)**2, x)
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 97, normalized size of antiderivative = 1.41

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^2}\,dx = bf^m n\left(\frac{\log(x)}{defm} - \frac{\log(ex^m+d)}{defm^2}\right) - \frac{bf^m\log(cx^n)}{e^2fmx^m+defm} - \frac{af^m}{e^2fmx^m+defm}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^2,x, algorithm="maxima")
```

output
```
b*f^m*n*(log(x)/(d*e*f*m) - log(e*x^m + d)/(d*e*f*m^2)) - b*f^m*log(c*x^n)
/(e^2*f*m*x^m + d*e*f*m) - a*f^m/(e^2*f*m*x^m + d*e*f*m)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 187 vs. 2(69) = 138.

Time = 0.13 (sec) , antiderivative size = 187, normalized size of antiderivative = 2.71

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^2}\,dx = \frac{bef^m mnx^m\log(x)}{de^2fm^2x^m+d^2efm^2} - \frac{bef^m nx^m\log(ex^m+d)}{de^2fm^2x^m+d^2efm^2} - \frac{bdf^m n\log(ex^m+d)}{de^2fm^2x^m+d^2efm^2} - \frac{bdf^m m\log(c)}{de^2fm^2x^m+d^2efm^2} - \frac{adf^m m}{de^2fm^2x^m+d^2efm^2}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^2,x, algorithm="giac")
```

output
```
b*e*f^m*m*n*x^m*log(x)/(d*e^2*f*m^2*x^m + d^2*e*f*m^2) - b*e*f^m*n*x^m*log
(e*x^m + d)/(d*e^2*f*m^2*x^m + d^2*e*f*m^2) - b*d*f^m*n*log(e*x^m + d)/(d*
e^2*f*m^2*x^m + d^2*e*f*m^2) - b*d*f^m*m*log(c)/(d*e^2*f*m^2*x^m + d^2*e*f
*m^2) - a*d*f^m*m/(d*e^2*f*m^2*x^m + d^2*e*f*m^2)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^2}\,dx=\int \frac{(f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))}{(d+e\,x^m)^2}\,dx$$

input
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m)^2,x)
```

output
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m)^2, x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 75, normalized size of antiderivative = 1.09

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^2}\,dx = \frac{f^m(-x^m\log(x^me+d)\,ben+x^m\log(x^nc)\,bem+x^maem-\log(x^me+d)\,bdn)}{def\,m^2\,(x^me+d)}$$

input
```
int((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^2,x)
```

output
```
(f**m*( - x**m*log(x**m*e + d)*b*e*n + x**m*log(x**n*c)*b*e*m + x**m*a*e*m
 - log(x**m*e + d)*b*d*n))/(d*e*f*m**2*(x**m*e + d))
```

3.355 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^3}\,dx$

Optimal result 2641
Mathematica [A] (verified) 2641
Rubi [A] (verified) 2642
Maple [F] 2644
Fricas [A] (verification not implemented) 2644
Sympy [F] 2644
Maxima [A] (verification not implemented) 2645
Giac [B] (verification not implemented) 2645
Mupad [F(-1)] 2647
Reduce [B] (verification not implemented) 2647

Optimal result

Integrand size = 27, antiderivative size = 150

$$\int \frac{(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)}{\left(d+ex^m\right)^3}\,dx = \frac{bnx^{1-m}(fx)^{-1+m}}{2dem^2\left(d+ex^m\right)}+\frac{bnx^{1-m}(fx)^{-1+m}\log(x)}{2d^2em} - \frac{x^{1-m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)}{2em\left(d+ex^m\right)^2} - \frac{bnx^{1-m}(fx)^{-1+m}\log\left(d+ex^m\right)}{2d^2em^2}$$

output
```
1/2*b*n*x^(1-m)*(f*x)^(-1+m)/d/e/m^2/(d+e*x^m)+1/2*b*n*x^(1-m)*(f*x)^(-1+m
)*ln(x)/d^2/e/m-1/2*x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/e/m/(d+e*x^m)^2-1
/2*b*n*x^(1-m)*(f*x)^(-1+m)*ln(d+e*x^m)/d^2/e/m^2
```

Mathematica [A] (verified)

Time = 0.53 (sec) , antiderivative size = 137, normalized size of antiderivative = 0.91

$$\int \frac{(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)}{\left(d+ex^m\right)^3}\,dx = \frac{x^{-m}(fx)^m\left(-ad^2m+bd^2n+bdenx^m+bmn(d+ex^m)^2\log(x)-bd^2m\log\left(cx^n\right)-bd^2n\log\left(d+ex^m\right)-\right.}{2d^2efm^2\left(d+ex^m\right)^2}$$

input
```
Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m)^3,x]
```

output
```
((f*x)^m*(-(a*d^2*m) + b*d^2*n + b*d*e*n*x^m + b*m*n*(d + e*x^m)^2*Log[x]
- b*d^2*m*Log[c*x^n] - b*d^2*n*Log[d + e*x^m] - 2*b*d*e*n*x^m*Log[d + e*x^
m] - b*e^2*n*x^(2*m)*Log[d + e*x^m]))/(2*d^2*e*f*m^2*x^m*(d + e*x^m)^2)
```

Rubi [A] (verified)

Time = 0.45 (sec) , antiderivative size = 92, normalized size of antiderivative = 0.61, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.185$, Rules used = {2777, 2776, 798, 54, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^{m-1}(a+b\log(cx^n))}{(d+ex^m)^3}dx$$

$$\Big\downarrow \text{2777}$$

$$x^{1-m}(fx)^{m-1}\int \frac{x^{m-1}(a+b\log(cx^n))}{(ex^m+d)^3}dx$$

$$\Big\downarrow \text{2776}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\int \frac{1}{x(ex^m+d)^2}dx}{2em}-\frac{a+b\log(cx^n)}{2em(d+ex^m)^2}\right)$$

$$\Big\downarrow \text{798}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\int \frac{x^{-m}}{(ex^m+d)^2}dx^m}{2em^2}-\frac{a+b\log(cx^n)}{2em(d+ex^m)^2}\right)$$

$$\Big\downarrow \text{54}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\int \left(\frac{x^{-m}}{d^2}-\frac{e}{d^2(ex^m+d)}-\frac{e}{d(ex^m+d)^2}\right)dx^m}{2em^2}-\frac{a+b\log(cx^n)}{2em(d+ex^m)^2}\right)$$

$$\Big\downarrow \text{2009}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\left(-\frac{\log(d+ex^m)}{d^2}+\frac{\log(x^m)}{d^2}+\frac{1}{d(d+ex^m)}\right)}{2em^2}-\frac{a+b\log(cx^n)}{2em(d+ex^m)^2}\right)$$

input
```
Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m)^3,x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(-1/2*(a + b*Log[c*x^n])/(e*m*(d + e*x^m)^2) + (b
*n*(1/(d*(d + e*x^m)) + Log[x^m]/d^2 - Log[d + e*x^m]/d^2))/(2*e*m^2))
```

Defintions of rubi rules used

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 798
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[1/n   Subst
[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a,
b, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Maple [F]

$$\int \frac{(fx)^{m-1}\left(a+b\ln\left(c\,x^{n}\right)\right)}{\left(d+e\,x^{m}\right)^{3}}dx$$

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))/(d+e*x^m)^3,x)
```

output
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))/(d+e*x^m)^3,x)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.11

$$\int \frac{(fx)^{-1+m}\left(a+b\log\left(cx^{n}\right)\right)}{\left(d+ex^{m}\right)^{3}}\,dx = \frac{be^{2}f^{m-1}mnx^{2\,m}\log\left(x\right)+\left(2\,bdemn\log\left(x\right)+bden\right)f^{m-1}x^{m}-\left(bd^{2}m\log\left(c\right)+ad^{2}m-bd^{2}n\right)f^{m-1}-\left(be^{2}\right.}{2\left(d^{2}e^{3}m^{2}x^{2\,m}+2\,d^{3}e^{2}m^{2}x^{m}+d^{4}em^{2}\right)}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^3,x, algorithm="fricas")
```

output
```
1/2*(b*e^2*f^(m - 1)*m*n*x^(2*m)*log(x) + (2*b*d*e*m*n*log(x) + b*d*e*n)*f
^(m - 1)*x^m - (b*d^2*m*log(c) + a*d^2*m - b*d^2*n)*f^(m - 1) - (b*e^2*f^(
m - 1)*n*x^(2*m) + 2*b*d*e*f^(m - 1)*n*x^m + b*d^2*f^(m - 1)*n)*log(e*x^m
+ d))/(d^2*e^3*m^2*x^(2*m) + 2*d^3*e^2*m^2*x^m + d^4*e*m^2)
```

Sympy [F]

$$\int \frac{(fx)^{-1+m}\left(a+b\log\left(cx^{n}\right)\right)}{\left(d+ex^{m}\right)^{3}}\,dx = \int \frac{(fx)^{m-1}\left(a+b\log\left(cx^{n}\right)\right)}{\left(d+ex^{m}\right)^{3}}\,dx$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))/(d+e*x**m)**3,x)
```

output
```
Integral((f*x)**(m - 1)*(a + b*log(c*x**n))/(d + e*x**m)**3, x)
```

Maxima [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 152, normalized size of antiderivative = 1.01

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^3}\,dx$$
$$=\frac{1}{2}bf^mn\left(\frac{1}{(de^2fmx^m+d^2efm)m}+\frac{\log(x)}{d^2efm}-\frac{\log(ex^m+d)}{d^2efm^2}\right)$$
$$-\frac{bf^m\log(cx^n)}{2\,(e^3fmx^{2\,m}+2\,de^2fmx^m+d^2efm)}-\frac{af^m}{2\,(e^3fmx^{2\,m}+2\,de^2fmx^m+d^2efm)}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^3,x, algorithm="maxima")
```

output
```
1/2*b*f^m*n*(1/((d*e^2*f*m*x^m + d^2*e*f*m)*m) + log(x)/(d^2*e*f*m) - log(
e*x^m + d)/(d^2*e*f*m^2)) - 1/2*b*f^m*log(c*x^n)/(e^3*f*m*x^(2*m) + 2*d*e^
2*f*m*x^m + d^2*e*f*m) - 1/2*a*f^m/(e^3*f*m*x^(2*m) + 2*d*e^2*f*m*x^m + d^
2*e*f*m)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 525 vs. $2(142) = 284$.

Time = 0.14 (sec) , antiderivative size = 525, normalized size of antiderivative = 3.50

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^3}\,dx = \frac{be^2f^mmnx^{2m}\log(x)}{2(d^2e^3fm^2x^{2m}+2d^3e^2fm^2x^m+d^4efm^2)} + \frac{bdef^mmnx^m\log(x)}{d^2e^3fm^2x^{2m}+2d^3e^2fm^2x^m+d^4efm^2} - \frac{be^2f^mnx^{2m}\log(ex^m+d)}{2(d^2e^3fm^2x^{2m}+2d^3e^2fm^2x^m+d^4efm^2)} - \frac{bdef^mnx^m\log(ex^m+d)}{d^2e^3fm^2x^{2m}+2d^3e^2fm^2x^m+d^4efm^2} + \frac{bdef^mnx^m}{2(d^2e^3fm^2x^{2m}+2d^3e^2fm^2x^m+d^4efm^2)} - \frac{bd^2f^mn\log(ex^m+d)}{2(d^2e^3fm^2x^{2m}+2d^3e^2fm^2x^m+d^4efm^2)} - \frac{bd^2f^mm\log(c)}{2(d^2e^3fm^2x^{2m}+2d^3e^2fm^2x^m+d^4efm^2)} - \frac{ad^2f^mm}{2(d^2e^3fm^2x^{2m}+2d^3e^2fm^2x^m+d^4efm^2)} + \frac{bd^2f^mn}{2(d^2e^3fm^2x^{2m}+2d^3e^2fm^2x^m+d^4efm^2)}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^3,x, algorithm="giac")
```

output
```
1/2*b*e^2*f^m*m*n*x^(2*m)*log(x)/(d^2*e^3*f*m^2*x^(2*m) + 2*d^3*e^2*f*m^2*
x^m + d^4*e*f*m^2) + b*d*e*f^m*m*n*x^m*log(x)/(d^2*e^3*f*m^2*x^(2*m) + 2*d
^3*e^2*f*m^2*x^m + d^4*e*f*m^2) - 1/2*b*e^2*f^m*n*x^(2*m)*log(e*x^m + d)/(
d^2*e^3*f*m^2*x^(2*m) + 2*d^3*e^2*f*m^2*x^m + d^4*e*f*m^2) - b*d*e*f^m*n*x
^m*log(e*x^m + d)/(d^2*e^3*f*m^2*x^(2*m) + 2*d^3*e^2*f*m^2*x^m + d^4*e*f*m
^2) + 1/2*b*d*e*f^m*n*x^m/(d^2*e^3*f*m^2*x^(2*m) + 2*d^3*e^2*f*m^2*x^m + d
^4*e*f*m^2) - 1/2*b*d^2*f^m*n*log(e*x^m + d)/(d^2*e^3*f*m^2*x^(2*m) + 2*d^
3*e^2*f*m^2*x^m + d^4*e*f*m^2) - 1/2*b*d^2*f^m*m*log(c)/(d^2*e^3*f*m^2*x^(
2*m) + 2*d^3*e^2*f*m^2*x^m + d^4*e*f*m^2) - 1/2*a*d^2*f^m*m/(d^2*e^3*f*m^2
*x^(2*m) + 2*d^3*e^2*f*m^2*x^m + d^4*e*f*m^2) + 1/2*b*d^2*f^m*n/(d^2*e^3*f
*m^2*x^(2*m) + 2*d^3*e^2*f*m^2*x^m + d^4*e*f*m^2)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)}{(d+ex^m)^3}\,dx=\int \frac{(f\,x)^{m-1}\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{(d+e\,x^m)^3}\,dx$$

input
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m)^3,x)
```

output
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m)^3, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 150, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)}{(d+ex^m)^3}\,dx$$
$$=\frac{f^m(-2x^{2m}\log(x^me+d)\,b\,e^2n+2x^{2m}\log(x^nc)\,b\,e^2m-x^{2m}b\,e^2n-4x^m\log(x^me+d)\,bden+4x^m\log(x^nc)}{4d^2ef\,m^2\,(x^{2m}e^2+2x^mde+d^2)}$$

input
```
int((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^3,x)
```

output
```
(f**m*( - 2*x**(2*m)*log(x**m*e + d)*b*e**2*n + 2*x**(2*m)*log(x**n*c)*b*e
**2*m - x**(2*m)*b*e**2*n - 4*x**m*log(x**m*e + d)*b*d*e*n + 4*x**m*log(x*
*n*c)*b*d*e*m - 2*log(x**m*e + d)*b*d**2*n - 2*a*d**2*m + b*d**2*n))/(4*d*
*2*e*f*m**2*(x**(2*m)*e**2 + 2*x**m*d*e + d**2))
```

3.356 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4} dx$

Optimal result 2648
Mathematica [A] (verified) 2649
Rubi [A] (verified) 2649
Maple [F] 2651
Fricas [A] (verification not implemented) 2651
Sympy [F(-1)] 2652
Maxima [A] (verification not implemented) 2652
Giac [B] (verification not implemented) 2653
Mupad [F(-1)] 2654
Reduce [B] (verification not implemented) 2654

Optimal result

Integrand size = 27, antiderivative size = 188

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4} dx = \frac{bnx^{1-m}(fx)^{-1+m}}{6dem^2(d+ex^m)^2} + \frac{bnx^{1-m}(fx)^{-1+m}}{3d^2em^2(d+ex^m)} + \frac{bnx^{1-m}(fx)^{-1+m}\log(x)}{3d^3em} - \frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))}{3em(d+ex^m)^3} - \frac{bnx^{1-m}(fx)^{-1+m}\log(d+ex^m)}{3d^3em^2}$$

output
```
1/6*b*n*x^(1-m)*(f*x)^(-1+m)/d/e/m^2/(d+e*x^m)^2+1/3*b*n*x^(1-m)*(f*x)^(-1
+m)/d^2/e/m^2/(d+e*x^m)+1/3*b*n*x^(1-m)*(f*x)^(-1+m)*ln(x)/d^3/e/m-1/3*x^(
1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/e/m/(d+e*x^m)^3-1/3*b*n*x^(1-m)*(f*x)^(-
1+m)*ln(d+e*x^m)/d^3/e/m^2
```

Mathematica [A] (verified)

Time = 0.59 (sec) , antiderivative size = 178, normalized size of antiderivative = 0.95

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx$$
$$= \frac{x^{-m}(fx)^m\left(-2ad^3m+3bd^3n+5bd^2enx^m+2bde^2nx^{2m}+2bmn(d+ex^m)^3\log(x)-2bd^3m\log(cx^n)-2\right.}{6d^3efm^2\,(d}$$

input
```
Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m)^4,x]
```

output
```
((f*x)^m*(-2*a*d^3*m + 3*b*d^3*n + 5*b*d^2*e*n*x^m + 2*b*d*e^2*n*x^(2*m) +
 2*b*m*n*(d + e*x^m)^3*Log[x] - 2*b*d^3*m*Log[c*x^n] - 2*b*d^3*n*Log[d + e
*x^m] - 6*b*d^2*e*n*x^m*Log[d + e*x^m] - 6*b*d*e^2*n*x^(2*m)*Log[d + e*x^m
] - 2*b*e^3*n*x^(3*m)*Log[d + e*x^m]))/(6*d^3*e*f*m^2*x^m*(d + e*x^m)^3)
```

Rubi [A] (verified)

Time = 0.46 (sec) , antiderivative size = 108, normalized size of antiderivative = 0.57, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.185$, Rules used = {2777, 2776, 798, 54, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^{m-1}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx$$
$$\Big\downarrow \text{2777}$$
$$x^{1-m}(fx)^{m-1}\int \frac{x^{m-1}(a+b\log(cx^n))}{(ex^m+d)^4}dx$$
$$\Big\downarrow \text{2776}$$
$$x^{1-m}(fx)^{m-1}\left(\frac{bn\int \frac{1}{x(ex^m+d)^3}dx}{3em}-\frac{a+b\log(cx^n)}{3em(d+ex^m)^3}\right)$$
$$\Big\downarrow \text{798}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\int \frac{x^{-m}}{(ex^m+d)^3}dx^m}{3em^2}-\frac{a+b\log(cx^n)}{3em(d+ex^m)^3}\right)$$

$$\Big\downarrow \textbf{54}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\int \left(\frac{x^{-m}}{d^3}-\frac{e}{d^3(ex^m+d)}-\frac{e}{d^2(ex^m+d)^2}-\frac{e}{d(ex^m+d)^3}\right)dx^m}{3em^2}-\frac{a+b\log(cx^n)}{3em(d+ex^m)^3}\right)$$

$$\Big\downarrow \textbf{2009}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\left(-\frac{\log(d+ex^m)}{d^3}+\frac{\log(x^m)}{d^3}+\frac{1}{d^2(d+ex^m)}+\frac{1}{2d(d+ex^m)^2}\right)}{3em^2}-\frac{a+b\log(cx^n)}{3em(d+ex^m)^3}\right)$$

input
```
Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m)^4,x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(-1/3*(a + b*Log[c*x^n])/(e*m*(d + e*x^m)^3) + (b
*n*(1/(2*d*(d + e*x^m)^2) + 1/(d^2*(d + e*x^m)) + Log[x^m]/d^3 - Log[d + e
*x^m]/d^3))/(3*e*m^2))
```

Defintions of rubi rules used

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 798
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[1/n   Subst
[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a,
b, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Maple [F]

$$\int \frac{(fx)^{m-1} (a + b\ln(c\,x^n))}{(d + e\,x^m)^4} dx$$

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))/(d+e*x^m)^4,x)
```

output
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))/(d+e*x^m)^4,x)
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 242, normalized size of antiderivative = 1.29

$$\int \frac{(fx)^{-1+m} (a + b\log(cx^n))}{(d + ex^m)^4} dx = \frac{2\,be^3 f^{m-1} mnx^{3\,m}\log(x) + 2\,(3\,bde^2mn\log(x) + bde^2n) f^{m-1}x^{2\,m} + (6\,bd^2emn\log(x) + 5\,bd^2en) f^{m-1}x^{m} \cdots}{6\,(d^3e^4m^2x^{3\,m} \cdots}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^4,x, algorithm="fricas")
```

output
```
1/6*(2*b*e^3*f^(m - 1)*m*n*x^(3*m)*log(x) + 2*(3*b*d*e^2*m*n*log(x) + b*d*
e^2*n)*f^(m - 1)*x^(2*m) + (6*b*d^2*e*m*n*log(x) + 5*b*d^2*e*n)*f^(m - 1)*
x^m - (2*b*d^3*m*log(c) + 2*a*d^3*m - 3*b*d^3*n)*f^(m - 1) - 2*(b*e^3*f^(m
 - 1)*n*x^(3*m) + 3*b*d*e^2*f^(m - 1)*n*x^(2*m) + 3*b*d^2*e*f^(m - 1)*n*x^
m + b*d^3*f^(m - 1)*n)*log(e*x^m + d))/(d^3*e^4*m^2*x^(3*m) + 3*d^4*e^3*m^
2*x^(2*m) + 3*d^5*e^2*m^2*x^m + d^6*e*m^2)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx = \text{Timed out}$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))/(d+e*x**m)**4,x)
```

output
```
Timed out
```

Maxima [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 210, normalized size of antiderivative = 1.12

$$\begin{aligned}
&\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx \\
&= \frac{1}{6}\,bf^m n\left(\frac{2\,ex^m+3\,d}{(d^2e^3fmx^{2\,m}+2\,d^3e^2fmx^m+d^4efm)m}+\frac{2\,\log(x)}{d^3efm}-\frac{2\,\log(ex^m+d)}{d^3efm^2}\right) \\
&\quad-\frac{bf^m\log(cx^n)}{3\,(e^4fmx^{3\,m}+3\,de^3fmx^{2\,m}+3\,d^2e^2fmx^m+d^3efm)} \\
&\quad-\frac{af^m}{3\,(e^4fmx^{3\,m}+3\,de^3fmx^{2\,m}+3\,d^2e^2fmx^m+d^3efm)}
\end{aligned}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^4,x, algorithm="maxima")
```

output
```
1/6*b*f^m*n*((2*e*x^m + 3*d)/((d^2*e^3*f*m*x^(2*m) + 2*d^3*e^2*f*m*x^m + d
^4*e*f*m)*m) + 2*log(x)/(d^3*e*f*m) - 2*log(e*x^m + d)/(d^3*e*f*m^2)) - 1/
3*b*f^m*log(c*x^n)/(e^4*f*m*x^(3*m) + 3*d*e^3*f*m*x^(2*m) + 3*d^2*e^2*f*m*
x^m + d^3*e*f*m) - 1/3*a*f^m/(e^4*f*m*x^(3*m) + 3*d*e^3*f*m*x^(2*m) + 3*d^
2*e^2*f*m*x^m + d^3*e*f*m)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 922 vs. $2(178) = 356$.

Time = 0.15 (sec) , antiderivative size = 922, normalized size of antiderivative = 4.90

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx = \text{Too large to display}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^4,x, algorithm="giac")
```

output
```
1/3*b*e^3*f^m*m*n*x^(3*m)*log(x)/(d^3*e^4*f*m^2*x^(3*m) + 3*d^4*e^3*f*m^2*
x^(2*m) + 3*d^5*e^2*f*m^2*x^m + d^6*e*f*m^2) + b*d*e^2*f^m*m*n*x^(2*m)*log
(x)/(d^3*e^4*f*m^2*x^(3*m) + 3*d^4*e^3*f*m^2*x^(2*m) + 3*d^5*e^2*f*m^2*x^m
 + d^6*e*f*m^2) + b*d^2*e*f^m*m*n*x^m*log(x)/(d^3*e^4*f*m^2*x^(3*m) + 3*d^
4*e^3*f*m^2*x^(2*m) + 3*d^5*e^2*f*m^2*x^m + d^6*e*f*m^2) - 1/3*b*e^3*f^m*n
*x^(3*m)*log(e*x^m + d)/(d^3*e^4*f*m^2*x^(3*m) + 3*d^4*e^3*f*m^2*x^(2*m) +
 3*d^5*e^2*f*m^2*x^m + d^6*e*f*m^2) - b*d*e^2*f^m*n*x^(2*m)*log(e*x^m + d)
/(d^3*e^4*f*m^2*x^(3*m) + 3*d^4*e^3*f*m^2*x^(2*m) + 3*d^5*e^2*f*m^2*x^m +
d^6*e*f*m^2) - b*d^2*e*f^m*n*x^m*log(e*x^m + d)/(d^3*e^4*f*m^2*x^(3*m) + 3
*d^4*e^3*f*m^2*x^(2*m) + 3*d^5*e^2*f*m^2*x^m + d^6*e*f*m^2) + 1/3*b*d*e^2*
f^m*n*x^(2*m)/(d^3*e^4*f*m^2*x^(3*m) + 3*d^4*e^3*f*m^2*x^(2*m) + 3*d^5*e^2
*f*m^2*x^m + d^6*e*f*m^2) + 5/6*b*d^2*e*f^m*n*x^m/(d^3*e^4*f*m^2*x^(3*m) +
 3*d^4*e^3*f*m^2*x^(2*m) + 3*d^5*e^2*f*m^2*x^m + d^6*e*f*m^2) - 1/3*b*d^3*
f^m*n*log(e*x^m + d)/(d^3*e^4*f*m^2*x^(3*m) + 3*d^4*e^3*f*m^2*x^(2*m) + 3*
d^5*e^2*f*m^2*x^m + d^6*e*f*m^2) - 1/3*b*d^3*f^m*m*log(c)/(d^3*e^4*f*m^2*x
^(3*m) + 3*d^4*e^3*f*m^2*x^(2*m) + 3*d^5*e^2*f*m^2*x^m + d^6*e*f*m^2) - 1/
3*a*d^3*f^m*m/(d^3*e^4*f*m^2*x^(3*m) + 3*d^4*e^3*f*m^2*x^(2*m) + 3*d^5*e^2
*f*m^2*x^m + d^6*e*f*m^2) + 1/2*b*d^3*f^m*n/(d^3*e^4*f*m^2*x^(3*m) + 3*d^4
*e^3*f*m^2*x^(2*m) + 3*d^5*e^2*f*m^2*x^m + d^6*e*f*m^2)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx = \int \frac{(f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))}{(d+e\,x^m)^4}\,dx$$

input
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m)^4,x)
```

output
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m)^4, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 219, normalized size of antiderivative = 1.16

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx = \frac{f^m(-6x^{3m}\log(x^m e+d)\,b\,e^3n+6x^{3m}\log(x^n c)\,b\,e^3m-2x^{3m}b\,e^3n-18x^{2m}\log(x^m e+d)\,bd\,e^2n+18x^{2m}\text{lo}}{18d^3ef\,m^2\,(x^3}$$

input
```
int((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^4,x)
```

output
```
(f**m*( - 6*x**(3*m)*log(x**m*e + d)*b*e**3*n + 6*x**(3*m)*log(x**n*c)*b*e
**3*m - 2*x**(3*m)*b*e**3*n - 18*x**(2*m)*log(x**m*e + d)*b*d*e**2*n + 18*
x**(2*m)*log(x**n*c)*b*d*e**2*m - 18*x**m*log(x**m*e + d)*b*d**2*e*n + 18*
x**m*log(x**n*c)*b*d**2*e*m + 9*x**m*b*d**2*e*n - 6*log(x**m*e + d)*b*d**3
*n - 6*a*d**3*m + 7*b*d**3*n))/(18*d**3*e*f*m**2*(x**(3*m)*e**3 + 3*x**(2*
m)*d*e**2 + 3*x**m*d**2*e + d**3))
```

3.357 $\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n))^2 \, dx$

Optimal result . . . 2655
Mathematica [A] (verified) . . . 2656
Rubi [A] (verified) . . . 2656
Maple [A] (verified) . . . 2658
Fricas [A] (verification not implemented) . . . 2659
Sympy [B] (verification not implemented) . . . 2660
Maxima [A] (verification not implemented) . . . 2662
Giac [B] (verification not implemented) . . . 2663
Mupad [F(-1)] . . . 2664
Reduce [B] (verification not implemented) . . . 2664

Optimal result

Integrand size = 29, antiderivative size = 372

$$\begin{aligned}\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n))^2 \, dx &= \frac{2b^2d^3n^2x(fx)^{-1+m}}{m^3} + \frac{3b^2d^2en^2x^{1+m}(fx)^{-1+m}}{4m^3} + \frac{2b^2de^2n^2x^{1+2m}(fx)^{-1+m}}{9m^3} \\ &\quad + \frac{b^2e^3n^2x^{1+3m}(fx)^{-1+m}}{32m^3} + \frac{b^2d^4n^2x^{1-m}(fx)^{-1+m}\log^2(x)}{4em} \\ &\quad - \frac{2bd^3nx(fx)^{-1+m}(a+b\log(cx^n))}{m^2} - \frac{3bd^2enx^{1+m}(fx)^{-1+m}(a+b\log(cx^n))}{2m^2} \\ &\quad - \frac{2bde^2nx^{1+2m}(fx)^{-1+m}(a+b\log(cx^n))}{3m^2} - \frac{be^3nx^{1+3m}(fx)^{-1+m}(a+b\log(cx^n))}{8m^2} \\ &\quad - \frac{bd^4nx^{1-m}(fx)^{-1+m}\log(x)(a+b\log(cx^n))}{2em} \\ &\quad + \frac{x^{1-m}(fx)^{-1+m}(d+ex^m)^4(a+b\log(cx^n))^2}{4em}\end{aligned}$$

output
```
2*b^2*d^3*n^2*x*(f*x)^(-1+m)/m^3+3/4*b^2*d^2*e*n^2*x^(1+m)*(f*x)^(-1+m)/m^
3+2/9*b^2*d*e^2*n^2*x^(1+2*m)*(f*x)^(-1+m)/m^3+1/32*b^2*e^3*n^2*x^(1+3*m)*
(f*x)^(-1+m)/m^3+1/4*b^2*d^4*n^2*x^(1-m)*(f*x)^(-1+m)*ln(x)^2/e/m-2*b*d^3*
n*x*(f*x)^(-1+m)*(a+b*ln(c*x^n))/m^2-3/2*b*d^2*e*n*x^(1+m)*(f*x)^(-1+m)*(a
+b*ln(c*x^n))/m^2-2/3*b*d*e^2*n*x^(1+2*m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/m^2
-1/8*b*e^3*n*x^(1+3*m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/m^2-1/2*b*d^4*n*x^(1-m
)*(f*x)^(-1+m)*ln(x)*(a+b*ln(c*x^n))/e/m+1/4*x^(1-m)*(f*x)^(-1+m)*(d+e*x^m
)^4*(a+b*ln(c*x^n))^2/e/m
```

Mathematica [A] (verified)

Time = 0.35 (sec) , antiderivative size = 285, normalized size of antiderivative = 0.77

$$\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n))^2 \, dx$$
$$= \frac{(fx)^m \left(72a^2m^2(4d^3+6d^2ex^m+4de^2x^{2m}+e^3x^{3m}) - 12abmn(48d^3+36d^2ex^m+16de^2x^{2m}+3e^3x^{3m}) + \right.}{}$$

input
```
Integrate[(f*x)^(-1 + m)*(d + e*x^m)^3*(a + b*Log[c*x^n])^2,x]
```

output
```
((f*x)^m*(72*a^2*m^2*(4*d^3 + 6*d^2*e*x^m + 4*d*e^2*x^(2*m) + e^3*x^(3*m))
 - 12*a*b*m*n*(48*d^3 + 36*d^2*e*x^m + 16*d*e^2*x^(2*m) + 3*e^3*x^(3*m)) +
 b^2*n^2*(576*d^3 + 216*d^2*e*x^m + 64*d*e^2*x^(2*m) + 9*e^3*x^(3*m)) + 12
*b*m*(12*a*m*(4*d^3 + 6*d^2*e*x^m + 4*d*e^2*x^(2*m) + e^3*x^(3*m)) - b*n*(
48*d^3 + 36*d^2*e*x^m + 16*d*e^2*x^(2*m) + 3*e^3*x^(3*m)))*Log[c*x^n] + 72
*b^2*m^2*(4*d^3 + 6*d^2*e*x^m + 4*d*e^2*x^(2*m) + e^3*x^(3*m))*Log[c*x^n]^
2))/(288*f*m^3)
```

Rubi [A] (verified)

Time = 0.79 (sec) , antiderivative size = 252, normalized size of antiderivative = 0.68, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.138$, Rules used = {2777, 2776, 2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^{m-1} (d+ex^m)^3 (a+b\log(cx^n))^2 \, dx$$

$$\Big\downarrow \textbf{2777}$$

$$x^{1-m}(fx)^{m-1} \int x^{m-1}(ex^m+d)^3 (a+b\log(cx^n))^2 \, dx$$

$$\Big\downarrow \textbf{2776}$$

$$x^{1-m}(fx)^{m-1} \left(\frac{(d+ex^m)^4 (a+b\log(cx^n))^2}{4em} - \frac{bn\int \frac{(ex^m+d)^4(a+b\log(cx^n))}{x}dx}{2em} \right)$$

$$\Big\downarrow \textbf{2772}$$

$$x^{1-m}(fx)^{m-1} \left(\frac{(d+ex^m)^4 (a+b\log(cx^n))^2}{4em} - \frac{bn\left(-bn\int \left(\frac{e(36d^2ex^m+16de^2x^{2m}+3e^3x^{3m}+48d^3)x^{m-1}}{12m} + \frac{d^4\log(x)}{x}\right) dx \right.}{\quad} \right.$$

$$\Big\downarrow \textbf{2009}$$

$$x^{1-m}(fx)^{m-1} \left(\frac{(d+ex^m)^4 (a+b\log(cx^n))^2}{4em} - \frac{bn\left(d^4\log(x)(a+b\log(cx^n)) + \frac{4d^3ex^m(a+b\log(cx^n))}{m} + \frac{3d^2e^2x^{2m}(a\cdots}{m\cdots}\right.}{\quad} \right.$$

input
```
Int[(f*x)^(-1 + m)*(d + e*x^m)^3*(a + b*Log[c*x^n])^2,x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(((d + e*x^m)^4*(a + b*Log[c*x^n])^2)/(4*e*m) - (
b*n*(-(b*n*((4*d^3*e*x^m)/m^2 + (3*d^2*e^2*x^(2*m))/(2*m^2) + (4*d*e^3*x^(
3*m))/(9*m^2) + (e^4*x^(4*m))/(16*m^2) + (d^4*Log[x]^2)/2)) + (4*d^3*e*x^m
*(a + b*Log[c*x^n]))/m + (3*d^2*e^2*x^(2*m)*(a + b*Log[c*x^n]))/m + (4*d*e
^3*x^(3*m)*(a + b*Log[c*x^n]))/(3*m) + (e^4*x^(4*m)*(a + b*Log[c*x^n]))/(4
*m) + d^4*Log[x]*(a + b*Log[c*x^n])))/(2*e*m))
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Maple [A] (verified)

Time = 247.97 (sec) , antiderivative size = 617, normalized size of antiderivative = 1.66

method	result
parallelrisch	$-\frac{-72x\,x^{3m}(fx)^{m-1}a^2e^3m^2-9x\,x^{3m}(fx)^{m-1}b^2e^3n^2-288b^2d^3(fx)^{m-1}\ln(c\,x^n)^2x\,m^2-288x(fx)^{m-1}a^2d^3m^2-576x(fx)}{}$
risch	Expression too large to display

input
```
int((f*x)^(m-1)*(d+e*x^m)^3*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
-1/288*(-72*x*(x^m)^3*(f*x)^(m-1)*a^2*e^3*m^2-9*x*(x^m)^3*(f*x)^(m-1)*b^2*
e^3*n^2-288*b^2*d^3*(f*x)^(m-1)*ln(c*x^n)^2*x*m^2-288*x*(f*x)^(m-1)*a^2*d^
3*m^2-576*x*(f*x)^(m-1)*b^2*d^3*n^2-288*b^2*d*e^2*(f*x)^(m-1)*ln(c*x^n)^2*
(x^m)^2*x*m^2+36*x*(x^m)^3*(f*x)^(m-1)*a*b*e^3*m*n-144*x*(x^m)^3*ln(c*x^n)
*(f*x)^(m-1)*a*b*e^3*m^2+36*x*(x^m)^3*ln(c*x^n)*(f*x)^(m-1)*b^2*e^3*m*n-43
2*b^2*d^2*e*(f*x)^(m-1)*ln(c*x^n)^2*x^m*x*m^2-864*x*x^m*ln(c*x^n)*(f*x)^(m
-1)*a*b*d^2*e*m^2+432*x*x^m*ln(c*x^n)*(f*x)^(m-1)*b^2*d^2*e*m*n+432*x*x^m*
(f*x)^(m-1)*a*b*d^2*e*m*n+192*x*(x^m)^2*(f*x)^(m-1)*a*b*d*e^2*m*n-576*x*(x
^m)^2*ln(c*x^n)*(f*x)^(m-1)*a*b*d*e^2*m^2+192*x*(x^m)^2*ln(c*x^n)*(f*x)^(m
-1)*b^2*d*e^2*m*n-72*b^2*e^3*(f*x)^(m-1)*ln(c*x^n)^2*(x^m)^3*x*m^2-576*x*l
n(c*x^n)*(f*x)^(m-1)*a*b*d^3*m^2+576*x*ln(c*x^n)*(f*x)^(m-1)*b^2*d^3*m*n-4
32*x*x^m*(f*x)^(m-1)*a^2*d^2*e*m^2-216*x*x^m*(f*x)^(m-1)*b^2*d^2*e*n^2-288
*x*(x^m)^2*(f*x)^(m-1)*a^2*d*e^2*m^2-64*x*(x^m)^2*(f*x)^(m-1)*b^2*d*e^2*n^
2+576*x*(f*x)^(m-1)*a*b*d^3*m*n)/m^3
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 592, normalized size of antiderivative = 1.59

$$\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n))^2 \, dx$$
$$= \frac{9\left(8\,b^2e^3m^2n^2\log(x)^2 + 8\,b^2e^3m^2\log(c)^2 + 8\,a^2e^3m^2 - 4\,abe^3mn + b^2e^3n^2 + 4\,(4\,abe^3m^2 - b^2e^3mn)\log\right.}{}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n))^2,x, algorithm="fricas
")
```

output
```
1/288*(9*(8*b^2*e^3*m^2*n^2*log(x)^2 + 8*b^2*e^3*m^2*log(c)^2 + 8*a^2*e^3*
m^2 - 4*a*b*e^3*m*n + b^2*e^3*n^2 + 4*(4*a*b*e^3*m^2 - b^2*e^3*m*n)*log(c)
 + 4*(4*b^2*e^3*m^2*n*log(c) + 4*a*b*e^3*m^2*n - b^2*e^3*m*n^2)*log(x))*f^
(m - 1)*x^(4*m) + 32*(9*b^2*d*e^2*m^2*n^2*log(x)^2 + 9*b^2*d*e^2*m^2*log(c
)^2 + 9*a^2*d*e^2*m^2 - 6*a*b*d*e^2*m*n + 2*b^2*d*e^2*n^2 + 6*(3*a*b*d*e^2
*m^2 - b^2*d*e^2*m*n)*log(c) + 6*(3*b^2*d*e^2*m^2*n*log(c) + 3*a*b*d*e^2*m
^2*n - b^2*d*e^2*m*n^2)*log(x))*f^(m - 1)*x^(3*m) + 216*(2*b^2*d^2*e*m^2*n
^2*log(x)^2 + 2*b^2*d^2*e*m^2*log(c)^2 + 2*a^2*d^2*e*m^2 - 2*a*b*d^2*e*m*n
 + b^2*d^2*e*n^2 + 2*(2*a*b*d^2*e*m^2 - b^2*d^2*e*m*n)*log(c) + 2*(2*b^2*d
^2*e*m^2*n*log(c) + 2*a*b*d^2*e*m^2*n - b^2*d^2*e*m*n^2)*log(x))*f^(m - 1)
*x^(2*m) + 288*(b^2*d^3*m^2*n^2*log(x)^2 + b^2*d^3*m^2*log(c)^2 + a^2*d^3*
m^2 - 2*a*b*d^3*m*n + 2*b^2*d^3*n^2 + 2*(a*b*d^3*m^2 - b^2*d^3*m*n)*log(c)
 + 2*(b^2*d^3*m^2*n*log(c) + a*b*d^3*m^2*n - b^2*d^3*m*n^2)*log(x))*f^(m -
 1)*x^m)/m^3
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 760 vs. $2(364) = 728$.

Time = 20.85 (sec) , antiderivative size = 760, normalized size of antiderivative = 2.04

$$\int (fx)^{-1+m} (d + ex^m)^3 (a + b\log(cx^n))^2 \, dx = \text{Too large to display}$$

input
```
integrate((f*x)**(-1+m)*(d+e*x**m)**3*(a+b*ln(c*x**n))**2,x)
```

output

```
Piecewise((a**2*d**3*x*(f*x)**(m - 1)/m + 3*a**2*d**2*e*x*x**m*(f*x)**(m -
 1)/(2*m) + a**2*d*e**2*x*x**(2*m)*(f*x)**(m - 1)/m + a**2*e**3*x*x**(3*m)
*(f*x)**(m - 1)/(4*m) + 2*a*b*d**3*x*(f*x)**(m - 1)*log(c*x**n)/m - 2*a*b*
d**3*n*x*(f*x)**(m - 1)/m**2 + 3*a*b*d**2*e*x*x**m*(f*x)**(m - 1)*log(c*x*
*n)/m - 3*a*b*d**2*e*n*x*x**m*(f*x)**(m - 1)/(2*m**2) + 2*a*b*d*e**2*x*x**
(2*m)*(f*x)**(m - 1)*log(c*x**n)/m - 2*a*b*d*e**2*n*x*x**(2*m)*(f*x)**(m -
 1)/(3*m**2) + a*b*e**3*x*x**(3*m)*(f*x)**(m - 1)*log(c*x**n)/(2*m) - a*b*
e**3*n*x*x**(3*m)*(f*x)**(m - 1)/(8*m**2) + b**2*d**3*x*(f*x)**(m - 1)*log
(c*x**n)**2/m - 2*b**2*d**3*n*x*(f*x)**(m - 1)*log(c*x**n)/m**2 + 2*b**2*d
**3*n**2*x*(f*x)**(m - 1)/m**3 + 3*b**2*d**2*e*x*x**m*(f*x)**(m - 1)*log(c
*x**n)**2/(2*m) - 3*b**2*d**2*e*n*x*x**m*(f*x)**(m - 1)*log(c*x**n)/(2*m**
2) + 3*b**2*d**2*e*n**2*x*x**m*(f*x)**(m - 1)/(4*m**3) + b**2*d*e**2*x*x**
(2*m)*(f*x)**(m - 1)*log(c*x**n)**2/m - 2*b**2*d*e**2*n*x*x**(2*m)*(f*x)**
(m - 1)*log(c*x**n)/(3*m**2) + 2*b**2*d*e**2*n**2*x*x**(2*m)*(f*x)**(m - 1
)/(9*m**3) + b**2*e**3*x*x**(3*m)*(f*x)**(m - 1)*log(c*x**n)**2/(4*m) - b*
*2*e**3*n*x*x**(3*m)*(f*x)**(m - 1)*log(c*x**n)/(8*m**2) + b**2*e**3*n**2*
x*x**(3*m)*(f*x)**(m - 1)/(32*m**3), Ne(m, 0)), ((d + e)**3*Piecewise(((a*
*2*log(c*x**n) + a*b*log(c*x**n)**2 + b**2*log(c*x**n)**3/3)/n, Ne(n, 0)),
 ((a**2 + 2*a*b*log(c) + b**2*log(c)**2)*log(x), True))/f, True))
```

Maxima [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 578, normalized size of antiderivative = 1.55

$$\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))^2\,dx$$
$$= \frac{b^2e^3f^{m-1}x^{4m}\log(cx^n)^2}{4m} + \frac{b^2de^2f^{m-1}x^{3m}\log(cx^n)^2}{m} + \frac{3b^2d^2ef^{m-1}x^{2m}\log(cx^n)^2}{2m} + \frac{abe^3f^{m-1}x^{4m}\log(cx^n)}{2m} + \frac{2abde^2f^{m-1}x^{3m}\log(cx^n)}{m} + \frac{3abd^2ef^{m-1}x^{2m}\log(cx^n)}{m} - 2\left(\frac{f^{m-1}nx^m\log(cx^n)}{m^2} - \frac{f^{m-1}n^2x^m}{m^3}\right)b^2d^3 - \frac{3}{4}\left(\frac{2f^{m-1}nx^{2m}\log(cx^n)}{m^2} - \frac{f^{m-1}n^2x^{2m}}{m^3}\right)b^2d^2e - \frac{2}{9}\left(\frac{3f^{m-1}nx^{3m}\log(cx^n)}{m^2} - \frac{f^{m-1}n^2x^{3m}}{m^3}\right)b^2de^2 - \frac{1}{32}\left(\frac{4f^{m-1}nx^{4m}\log(cx^n)}{m^2} - \frac{f^{m-1}n^2x^{4m}}{m^3}\right)b^2e^3 + \frac{a^2e^3f^{m-1}x^{4m}}{4m} - \frac{abe^3f^{m-1}nx^{4m}}{8m^2} + \frac{a^2de^2f^{m-1}x^{3m}}{m} - \frac{2abde^2f^{m-1}nx^{3m}}{3m^2} + \frac{3a^2d^2ef^{m-1}x^{2m}}{2m} - \frac{3abd^2ef^{m-1}nx^{2m}}{2m^2} - \frac{2abd^3f^{m-1}nx^m}{m^2} + \frac{(fx)^mb^2d^3\log(cx^n)^2}{fm} + \frac{2(fx)^mabd^3\log(cx^n)}{fm} + \frac{(fx)^ma^2d^3}{fm}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n))^2,x, algorithm="maxima
")
```

output
```
1/4*b^2*e^3*f^(m - 1)*x^(4*m)*log(c*x^n)^2/m + b^2*d*e^2*f^(m - 1)*x^(3*m)
*log(c*x^n)^2/m + 3/2*b^2*d^2*e*f^(m - 1)*x^(2*m)*log(c*x^n)^2/m + 1/2*a*b
*e^3*f^(m - 1)*x^(4*m)*log(c*x^n)/m + 2*a*b*d*e^2*f^(m - 1)*x^(3*m)*log(c*
x^n)/m + 3*a*b*d^2*e*f^(m - 1)*x^(2*m)*log(c*x^n)/m - 2*(f^(m - 1)*n*x^m*l
og(c*x^n)/m^2 - f^(m - 1)*n^2*x^m/m^3)*b^2*d^3 - 3/4*(2*f^(m - 1)*n*x^(2*m
)*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^(2*m)/m^3)*b^2*d^2*e - 2/9*(3*f^(m - 1)
*n*x^(3*m)*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^(3*m)/m^3)*b^2*d*e^2 - 1/32*(4
*f^(m - 1)*n*x^(4*m)*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^(4*m)/m^3)*b^2*e^3 +
 1/4*a^2*e^3*f^(m - 1)*x^(4*m)/m - 1/8*a*b*e^3*f^(m - 1)*n*x^(4*m)/m^2 + a
^2*d*e^2*f^(m - 1)*x^(3*m)/m - 2/3*a*b*d*e^2*f^(m - 1)*n*x^(3*m)/m^2 + 3/2
*a^2*d^2*e*f^(m - 1)*x^(2*m)/m - 3/2*a*b*d^2*e*f^(m - 1)*n*x^(2*m)/m^2 - 2
*a*b*d^3*f^(m - 1)*n*x^m/m^2 + (f*x)^m*b^2*d^3*log(c*x^n)^2/(f*m) + 2*(f*x
)^m*a*b*d^3*log(c*x^n)/(f*m) + (f*x)^m*a^2*d^3/(f*m)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 995 vs. $2(354) = 708$.

Time = 0.32 (sec) , antiderivative size = 995, normalized size of antiderivative = 2.67

$$\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))^2\,dx = \text{Too large to display}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
1/4*b^2*e^3*f^m*n^2*x^(4*m)*log(x)^2/(f*m) + b^2*d*e^2*f^m*n^2*x^(3*m)*log
(x)^2/(f*m) + 3/2*b^2*d^2*e*f^m*n^2*x^(2*m)*log(x)^2/(f*m) + b^2*d^3*f^m*n
^2*x^m*log(x)^2/(f*m) + 1/2*b^2*e^3*f^m*n*x^(4*m)*log(c)*log(x)/(f*m) + 2*
b^2*d*e^2*f^m*n*x^(3*m)*log(c)*log(x)/(f*m) + 3*b^2*d^2*e*f^m*n*x^(2*m)*lo
g(c)*log(x)/(f*m) + 2*b^2*d^3*f^m*n*x^m*log(c)*log(x)/(f*m) + 1/4*b^2*e^3*
f^m*x^(4*m)*log(c)^2/(f*m) + b^2*d*e^2*f^m*x^(3*m)*log(c)^2/(f*m) + 3/2*b^
2*d^2*e*f^m*x^(2*m)*log(c)^2/(f*m) + b^2*d^3*f^m*x^m*log(c)^2/(f*m) + 1/2*
a*b*e^3*f^m*n*x^(4*m)*log(x)/(f*m) - 1/8*b^2*e^3*f^m*n^2*x^(4*m)*log(x)/(f
*m^2) + 2*a*b*d*e^2*f^m*n*x^(3*m)*log(x)/(f*m) - 2/3*b^2*d*e^2*f^m*n^2*x^(
3*m)*log(x)/(f*m^2) + 3*a*b*d^2*e*f^m*n*x^(2*m)*log(x)/(f*m) - 3/2*b^2*d^2
*e*f^m*n^2*x^(2*m)*log(x)/(f*m^2) + 2*a*b*d^3*f^m*n*x^m*log(x)/(f*m) - 2*b
^2*d^3*f^m*n^2*x^m*log(x)/(f*m^2) + 1/2*a*b*e^3*f^m*x^(4*m)*log(c)/(f*m) -
 1/8*b^2*e^3*f^m*n*x^(4*m)*log(c)/(f*m^2) + 2*a*b*d*e^2*f^m*x^(3*m)*log(c)
/(f*m) - 2/3*b^2*d*e^2*f^m*n*x^(3*m)*log(c)/(f*m^2) + 3*a*b*d^2*e*f^m*x^(2
*m)*log(c)/(f*m) - 3/2*b^2*d^2*e*f^m*n*x^(2*m)*log(c)/(f*m^2) + 2*a*b*d^3*
f^m*x^m*log(c)/(f*m) - 2*b^2*d^3*f^m*n*x^m*log(c)/(f*m^2) + 1/4*a^2*e^3*f^
m*x^(4*m)/(f*m) - 1/8*a*b*e^3*f^m*n*x^(4*m)/(f*m^2) + 1/32*b^2*e^3*f^m*n^2
*x^(4*m)/(f*m^3) + a^2*d*e^2*f^m*x^(3*m)/(f*m) - 2/3*a*b*d*e^2*f^m*n*x^(3*
m)/(f*m^2) + 2/9*b^2*d*e^2*f^m*n^2*x^(3*m)/(f*m^3) + 3/2*a^2*d^2*e*f^m*x^(
2*m)/(f*m) - 3/2*a*b*d^2*e*f^m*n*x^(2*m)/(f*m^2) + 3/4*b^2*d^2*e*f^m*n^...
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))^2\,dx = \int (f\,x)^{m-1}\,(d+e\,x^m)^3\,(a+b\,\ln(c\,x^n))^2\,dx$$

input
```
int((f*x)^(m - 1)*(d + e*x^m)^3*(a + b*log(c*x^n))^2,x)
```

output
```
int((f*x)^(m - 1)*(d + e*x^m)^3*(a + b*log(c*x^n))^2, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 433, normalized size of antiderivative = 1.16

$$\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))^2\,dx$$
$$= \frac{x^m f^m \left(72x^{3m}\log(x^n c)^2 b^2 e^3 m^2 + 144x^{3m}\log(x^n c)\,ab\,e^3 m^2 - 36x^{3m}\log(x^n c)\,b^2 e^3 mn + 72x^{3m}a^2 e^3 m^2 - 36\right.}{}$$

input
```
int((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n))^2,x)
```

output
```
(x**m*f**m*(72*x**(3*m)*log(x**n*c)**2*b**2*e**3*m**2 + 144*x**(3*m)*log(x
**n*c)*a*b*e**3*m**2 - 36*x**(3*m)*log(x**n*c)*b**2*e**3*m*n + 72*x**(3*m)
*a**2*e**3*m**2 - 36*x**(3*m)*a*b*e**3*m*n + 9*x**(3*m)*b**2*e**3*n**2 + 2
88*x**(2*m)*log(x**n*c)**2*b**2*d*e**2*m**2 + 576*x**(2*m)*log(x**n*c)*a*b
*d*e**2*m**2 - 192*x**(2*m)*log(x**n*c)*b**2*d*e**2*m*n + 288*x**(2*m)*a**
2*d*e**2*m**2 - 192*x**(2*m)*a*b*d*e**2*m*n + 64*x**(2*m)*b**2*d*e**2*n**2
 + 432*x**m*log(x**n*c)**2*b**2*d**2*e*m**2 + 864*x**m*log(x**n*c)*a*b*d**
2*e*m**2 - 432*x**m*log(x**n*c)*b**2*d**2*e*m*n + 432*x**m*a**2*d**2*e*m**
2 - 432*x**m*a*b*d**2*e*m*n + 216*x**m*b**2*d**2*e*n**2 + 288*log(x**n*c)*
*2*b**2*d**3*m**2 + 576*log(x**n*c)*a*b*d**3*m**2 - 576*log(x**n*c)*b**2*d
**3*m*n + 288*a**2*d**3*m**2 - 576*a*b*d**3*m*n + 576*b**2*d**3*n**2))/(28
8*f*m**3)
```

3.358 $\int (fx)^{-1+m}(d+ex^m)^2(a+b\log(cx^n))^2\,dx$

Optimal result . . . 2665
Mathematica [A] (verified) . . . 2666
Rubi [A] (verified) . . . 2666
Maple [A] (verified) . . . 2669
Fricas [A] (verification not implemented) . . . 2669
Sympy [A] (verification not implemented) . . . 2670
Maxima [A] (verification not implemented) . . . 2671
Giac [B] (verification not implemented) . . . 2672
Mupad [F(-1)] . . . 2673
Reduce [B] (verification not implemented) . . . 2674

Optimal result

Integrand size = 29, antiderivative size = 298

$$\begin{aligned}
&\int (fx)^{-1+m}(d+ex^m)^2(a+b\log(cx^n))^2\,dx \\
&= \frac{2b^2d^2n^2x(fx)^{-1+m}}{m^3}+\frac{b^2den^2x^{1+m}(fx)^{-1+m}}{2m^3}+\frac{2b^2e^2n^2x^{1+2m}(fx)^{-1+m}}{27m^3} \\
&\quad+\frac{b^2d^3n^2x^{1-m}(fx)^{-1+m}\log^2(x)}{3em}-\frac{2bd^2nx(fx)^{-1+m}(a+b\log(cx^n))}{m^2} \\
&\quad-\frac{bdenx^{1+m}(fx)^{-1+m}(a+b\log(cx^n))}{m^2}-\frac{2be^2nx^{1+2m}(fx)^{-1+m}(a+b\log(cx^n))}{9m^2} \\
&\quad-\frac{2bd^3nx^{1-m}(fx)^{-1+m}\log(x)(a+b\log(cx^n))}{3em} \\
&\quad+\frac{x^{1-m}(fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))^2}{3em}
\end{aligned}$$

output
```
2*b^2*d^2*n^2*x*(f*x)^(-1+m)/m^3+1/2*b^2*d*e*n^2*x^(1+m)*(f*x)^(-1+m)/m^3+
2/27*b^2*e^2*n^2*x^(1+2*m)*(f*x)^(-1+m)/m^3+1/3*b^2*d^3*n^2*x^(1-m)*(f*x)^
(-1+m)*ln(x)^2/e/m-2*b*d^2*n*x*(f*x)^(-1+m)*(a+b*ln(c*x^n))/m^2-b*d*e*n*x^
(1+m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/m^2-2/9*b*e^2*n*x^(1+2*m)*(f*x)^(-1+m)*
(a+b*ln(c*x^n))/m^2-2/3*b*d^3*n*x^(1-m)*(f*x)^(-1+m)*ln(x)*(a+b*ln(c*x^n))
/e/m+1/3*x^(1-m)*(f*x)^(-1+m)*(d+e*x^m)^3*(a+b*ln(c*x^n))^2/e/m
```

Mathematica [A] (verified)

Time = 0.27 (sec) , antiderivative size = 207, normalized size of antiderivative = 0.69

$$\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))^2 \, dx$$
$$= \frac{(fx)^m \left(18a^2m^2(3d^2+3dex^m+e^2x^{2m})-6abmn(18d^2+9dex^m+2e^2x^{2m})+b^2n^2(108d^2+27dex^m+4e\right.}{}$$

input
```
Integrate[(f*x)^(-1 + m)*(d + e*x^m)^2*(a + b*Log[c*x^n])^2,x]
```

output
```
((f*x)^m*(18*a^2*m^2*(3*d^2 + 3*d*e*x^m + e^2*x^(2*m)) - 6*a*b*m*n*(18*d^2
 + 9*d*e*x^m + 2*e^2*x^(2*m)) + b^2*n^2*(108*d^2 + 27*d*e*x^m + 4*e^2*x^(2
*m)) + 6*b*m*(6*a*m*(3*d^2 + 3*d*e*x^m + e^2*x^(2*m)) - b*n*(18*d^2 + 9*d*
e*x^m + 2*e^2*x^(2*m)))*Log[c*x^n] + 18*b^2*m^2*(3*d^2 + 3*d*e*x^m + e^2*x
^(2*m))*Log[c*x^n]^2))/(54*f*m^3)
```

Rubi [A] (verified)

Time = 0.80 (sec) , antiderivative size = 212, normalized size of antiderivative = 0.71, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.207$, Rules used = {2777, 2776, 2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^{m-1} (d+ex^m)^2 (a+b\log(cx^n))^2 \, dx$$

$$\Big\downarrow \text{2777}$$

$$x^{1-m}(fx)^{m-1} \int x^{m-1}(ex^m+d)^2 (a+b\log(cx^n))^2 dx$$

$$\Big\downarrow \text{2776}$$

$$x^{1-m}(fx)^{m-1} \left(\frac{(d+ex^m)^3 (a+b\log(cx^n))^2}{3em} - \frac{2bn\int \frac{(ex^m+d)^3(a+b\log(cx^n))}{x}dx}{3em}\right)$$

$$\Big\downarrow \text{2772}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^3\,(a+b\log(cx^n))^2}{3em}-\frac{2bn\left(-bn\int\frac{e(9dex^m+2e^2x^{2m}+18d^2)x^m+6d^3m\log(x)}{6mx}dx+d^3\log(x)\,(a\right.}{}\right.$$

$\big\downarrow$ 27

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^3\,(a+b\log(cx^n))^2}{3em}-\frac{2bn\left(-\frac{bn\int\frac{e\left(9dex^m+2e^2x^{2m}+18d^2\right)x^m+6d^3m\log(x)}{x}dx}{6m}+d^3\log(x)\,(a+b\right.}{}\right.$$

$\big\downarrow$ 2010

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^3\,(a+b\log(cx^n))^2}{3em}-\frac{2bn\left(-\frac{bn\int\left(18d^2ex^{m-1}+9de^2x^{2m-1}+2e^3x^{3m-1}+\frac{6d^3m\log(x)}{x}\right)dx}{6m}+d^3\log\right.}{}\right.$$

$\big\downarrow$ 2009

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^3\,(a+b\log(cx^n))^2}{3em}-\frac{2bn\left(d^3\log(x)\,(a+b\log(cx^n))+\frac{3d^2ex^m(a+b\log(cx^n))}{m}+\frac{3de^2x^{2m}(\right.}{}\right.$$

input
```
Int[(f*x)^(-1 + m)*(d + e*x^m)^2*(a + b*Log[c*x^n])^2,x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(((d + e*x^m)^3*(a + b*Log[c*x^n])^2)/(3*e*m) - (
2*b*n*(-1/6*(b*n*((18*d^2*e*x^m)/m + (9*d*e^2*x^(2*m))/(2*m) + (2*e^3*x^(3
*m))/(3*m) + 3*d^3*m*Log[x]^2))/m + (3*d^2*e*x^m*(a + b*Log[c*x^n]))/m + (
3*d*e^2*x^(2*m)*(a + b*Log[c*x^n]))/(2*m) + (e^3*x^(3*m)*(a + b*Log[c*x^n]
))/(3*m) + d^3*Log[x]*(a + b*Log[c*x^n])))/(3*e*m))
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Maple [A] (verified)

Time = 67.29 (sec) , antiderivative size = 439, normalized size of antiderivative = 1.47

method	result
parallelrisch	$-\frac{-18b^2e^2(fx)^{m-1}\ln(c\,x^n)^2x^{2m}x\,m^2-36x\,x^{2m}\ln(c\,x^n)(fx)^{m-1}ab\,e^2m^2+12x\,x^{2m}\ln(c\,x^n)(fx)^{m-1}b^2e^2mn-54de\,b^2(fx)}{}$
risch	Expression too large to display

input
```
int((f*x)^(m-1)*(d+e*x^m)^2*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
-1/54*(-18*b^2*e^2*(f*x)^(m-1)*ln(c*x^n)^2*(x^m)^2*x*m^2-36*x*(x^m)^2*ln(c
*x^n)*(f*x)^(m-1)*a*b*e^2*m^2+12*x*(x^m)^2*ln(c*x^n)*(f*x)^(m-1)*b^2*e^2*m
*n-54*d*e*b^2*(f*x)^(m-1)*ln(c*x^n)^2*x^m*x*m^2-18*x*(x^m)^2*(f*x)^(m-1)*a
^2*e^2*m^2+12*x*(x^m)^2*(f*x)^(m-1)*a*b*e^2*m*n-4*x*(x^m)^2*(f*x)^(m-1)*b^
2*e^2*n^2-108*x*x^m*ln(c*x^n)*(f*x)^(m-1)*a*b*d*e*m^2+54*x*x^m*ln(c*x^n)*(
f*x)^(m-1)*b^2*d*e*m*n-54*b^2*d^2*(f*x)^(m-1)*ln(c*x^n)^2*x*m^2-54*x*x^m*(
f*x)^(m-1)*a^2*d*e*m^2+54*x*x^m*(f*x)^(m-1)*a*b*d*e*m*n-27*x*x^m*(f*x)^(m-
1)*b^2*d*e*n^2-108*x*ln(c*x^n)*(f*x)^(m-1)*a*b*d^2*m^2+108*x*ln(c*x^n)*(f*
x)^(m-1)*b^2*d^2*m*n-54*x*(f*x)^(m-1)*a^2*d^2*m^2+108*x*(f*x)^(m-1)*a*b*d^
2*m*n-108*x*(f*x)^(m-1)*b^2*d^2*n^2)/m^3
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 419, normalized size of antiderivative = 1.41

$$\int (fx)^{-1+m}\,(d+ex^m)^2\,(a+b\log{(cx^n)})^2\,dx$$
$$=\frac{2\left(9\,b^2e^2m^2n^2\log{(x)}^2+9\,b^2e^2m^2\log{(c)}^2+9\,a^2e^2m^2-6\,abe^2mn+2\,b^2e^2n^2+6\left(3\,abe^2m^2-b^2e^2mn\right)\mathrm{lo}\right.}{}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n))^2,x, algorithm="fricas
")
```

output
```
1/54*(2*(9*b^2*e^2*m^2*n^2*log(x)^2 + 9*b^2*e^2*m^2*log(c)^2 + 9*a^2*e^2*m
^2 - 6*a*b*e^2*m*n + 2*b^2*e^2*n^2 + 6*(3*a*b*e^2*m^2 - b^2*e^2*m*n)*log(c
) + 6*(3*b^2*e^2*m^2*n*log(c) + 3*a*b*e^2*m^2*n - b^2*e^2*m*n^2)*log(x))*f
^(m - 1)*x^(3*m) + 27*(2*b^2*d*e*m^2*n^2*log(x)^2 + 2*b^2*d*e*m^2*log(c)^2
 + 2*a^2*d*e*m^2 - 2*a*b*d*e*m*n + b^2*d*e*n^2 + 2*(2*a*b*d*e*m^2 - b^2*d*
e*m*n)*log(c) + 2*(2*b^2*d*e*m^2*n*log(c) + 2*a*b*d*e*m^2*n - b^2*d*e*m*n^
2)*log(x))*f^(m - 1)*x^(2*m) + 54*(b^2*d^2*m^2*n^2*log(x)^2 + b^2*d^2*m^2*
log(c)^2 + a^2*d^2*m^2 - 2*a*b*d^2*m*n + 2*b^2*d^2*n^2 + 2*(a*b*d^2*m^2 -
b^2*d^2*m*n)*log(c) + 2*(b^2*d^2*m^2*n*log(c) + a*b*d^2*m^2*n - b^2*d^2*m*
n^2)*log(x))*f^(m - 1)*x^m)/m^3
```

Sympy [A] (verification not implemented)

Time = 12.83 (sec) , antiderivative size = 552, normalized size of antiderivative = 1.85

$$\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))^2 \, dx$$

$$= \begin{cases} \frac{a^2d^2x(fx)^{m-1}}{m} + \frac{a^2dexx^m(fx)^{m-1}}{m} + \frac{a^2e^2xx^{2m}(fx)^{m-1}}{3m} + \frac{2abd^2x(fx)^{m-1}\log(cx^n)}{m} - \frac{2abd^2nx(fx)^{m-1}}{m^2} + \frac{2abdexx^m(fx)^{m-1}}{m} \\ \frac{(d+e)^2\left(\begin{cases} \frac{a^2\log(cx^n)+ab\log(cx^n)^2+\frac{b^2\log(cx^n)^3}{3}}{n} & \text{for } n \neq 0 \\ \left(a^2+2ab\log(c)+b^2\log(c)^2\right)\log(x) & \text{otherwise} \end{cases}\right)}{f} \end{cases}$$

input
```
integrate((f*x)**(-1+m)*(d+e*x**m)**2*(a+b*ln(c*x**n))**2,x)
```

output
```
Piecewise((a**2*d**2*x*(f*x)**(m - 1)/m + a**2*d*e*x*x**m*(f*x)**(m - 1)/m
 + a**2*e**2*x*x**(2*m)*(f*x)**(m - 1)/(3*m) + 2*a*b*d**2*x*(f*x)**(m - 1)
*log(c*x**n)/m - 2*a*b*d**2*n*x*(f*x)**(m - 1)/m**2 + 2*a*b*d*e*x*x**m*(f*
x)**(m - 1)*log(c*x**n)/m - a*b*d*e*n*x*x**m*(f*x)**(m - 1)/m**2 + 2*a*b*e
**2*x*x**(2*m)*(f*x)**(m - 1)*log(c*x**n)/(3*m) - 2*a*b*e**2*n*x*x**(2*m)*
(f*x)**(m - 1)/(9*m**2) + b**2*d**2*x*(f*x)**(m - 1)*log(c*x**n)**2/m - 2*
b**2*d**2*n*x*(f*x)**(m - 1)*log(c*x**n)/m**2 + 2*b**2*d**2*n**2*x*(f*x)**
(m - 1)/m**3 + b**2*d*e*x*x**m*(f*x)**(m - 1)*log(c*x**n)**2/m - b**2*d*e*
n*x*x**m*(f*x)**(m - 1)*log(c*x**n)/m**2 + b**2*d*e*n**2*x*x**m*(f*x)**(m
- 1)/(2*m**3) + b**2*e**2*x*x**(2*m)*(f*x)**(m - 1)*log(c*x**n)**2/(3*m) -
 2*b**2*e**2*n*x*x**(2*m)*(f*x)**(m - 1)*log(c*x**n)/(9*m**2) + 2*b**2*e**
2*n**2*x*x**(2*m)*(f*x)**(m - 1)/(27*m**3), Ne(m, 0)), ((d + e)**2*Piecewi
se(((a**2*log(c*x**n) + a*b*log(c*x**n)**2 + b**2*log(c*x**n)**3/3)/n, Ne(
n, 0)), ((a**2 + 2*a*b*log(c) + b**2*log(c)**2)*log(x), True))/f, True))
```

Maxima [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 417, normalized size of antiderivative = 1.40

$$\begin{aligned}
&\int (fx)^{-1+m}(d+ex^m)^2(a+b\log(cx^n))^2\,dx \\
&= \frac{b^2e^2f^{m-1}x^{3m}\log(cx^n)^2}{3m} + \frac{b^2def^{m-1}x^{2m}\log(cx^n)^2}{m} + \frac{2abe^2f^{m-1}x^{3m}\log(cx^n)}{3m} \\
&+ \frac{2abdef^{m-1}x^{2m}\log(cx^n)}{m} - 2\left(\frac{f^{m-1}nx^m\log(cx^n)}{m^2} - \frac{f^{m-1}n^2x^m}{m^3}\right)b^2d^2 \\
&- \frac{1}{2}\left(\frac{2f^{m-1}nx^{2m}\log(cx^n)}{m^2} - \frac{f^{m-1}n^2x^{2m}}{m^3}\right)b^2de \\
&- \frac{2}{27}\left(\frac{3f^{m-1}nx^{3m}\log(cx^n)}{m^2} - \frac{f^{m-1}n^2x^{3m}}{m^3}\right)b^2e^2 + \frac{a^2e^2f^{m-1}x^{3m}}{3m} \\
&- \frac{2abe^2f^{m-1}nx^{3m}}{9m^2} + \frac{a^2def^{m-1}x^{2m}}{m} - \frac{abdef^{m-1}nx^{2m}}{m^2} - \frac{2abd^2f^{m-1}nx^m}{m^2} \\
&+ \frac{(fx)^m b^2d^2\log(cx^n)^2}{fm} + \frac{2(fx)^m abd^2\log(cx^n)}{fm} + \frac{(fx)^m a^2d^2}{fm}
\end{aligned}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n))^2,x, algorithm="maxima
")
```

output
```
1/3*b^2*e^2*f^(m - 1)*x^(3*m)*log(c*x^n)^2/m + b^2*d*e*f^(m - 1)*x^(2*m)*l
og(c*x^n)^2/m + 2/3*a*b*e^2*f^(m - 1)*x^(3*m)*log(c*x^n)/m + 2*a*b*d*e*f^(
m - 1)*x^(2*m)*log(c*x^n)/m - 2*(f^(m - 1)*n*x^m*log(c*x^n)/m^2 - f^(m - 1
)*n^2*x^m/m^3)*b^2*d^2 - 1/2*(2*f^(m - 1)*n*x^(2*m)*log(c*x^n)/m^2 - f^(m
- 1)*n^2*x^(2*m)/m^3)*b^2*d*e - 2/27*(3*f^(m - 1)*n*x^(3*m)*log(c*x^n)/m^2
 - f^(m - 1)*n^2*x^(3*m)/m^3)*b^2*e^2 + 1/3*a^2*e^2*f^(m - 1)*x^(3*m)/m -
2/9*a*b*e^2*f^(m - 1)*n*x^(3*m)/m^2 + a^2*d*e*f^(m - 1)*x^(2*m)/m - a*b*d*
e*f^(m - 1)*n*x^(2*m)/m^2 - 2*a*b*d^2*f^(m - 1)*n*x^m/m^2 + (f*x)^m*b^2*d^
2*log(c*x^n)^2/(f*m) + 2*(f*x)^m*a*b*d^2*log(c*x^n)/(f*m) + (f*x)^m*a^2*d^
2/(f*m)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 715 vs. $2(286) = 572$.

Time = 0.26 (sec) , antiderivative size = 715, normalized size of antiderivative = 2.40

$$\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))^2 \, dx = \frac{b^2e^2f^mn^2x^{3m}\log(x)^2}{3fm} + \frac{b^2def^mn^2x^{2m}\log(x)^2}{fm} + \frac{b^2d^2f^mn^2x^m\log(x)^2}{fm} + \frac{2b^2e^2f^mnx^{3m}\log(c)\log(x)}{3fm} + \frac{2b^2def^mnx^{2m}\log(c)\log(x)}{fm} + \frac{2b^2d^2f^mnx^m\log(c)\log(x)}{fm} + \frac{b^2e^2f^mx^{3m}\log(c)^2}{3fm} + \frac{b^2def^mx^{2m}\log(c)^2}{fm} + \frac{b^2d^2f^mx^m\log(c)^2}{fm} + \frac{2abe^2f^mnx^{3m}\log(x)}{3fm} - \frac{2b^2e^2f^mn^2x^{3m}\log(x)}{9fm^2} + \frac{2abdef^mnx^{2m}\log(x)}{fm} - \frac{b^2def^mn^2x^{2m}\log(x)}{fm^2} + \frac{2abd^2f^mnx^m\log(x)}{fm} - \frac{2b^2d^2f^mn^2x^m\log(x)}{fm^2} + \frac{2abe^2f^mx^{3m}\log(c)}{3fm} - \frac{2b^2e^2f^mnx^{3m}\log(c)}{9fm^2} + \frac{2abdef^mx^{2m}\log(c)}{fm} - \frac{b^2def^mnx^{2m}\log(c)}{fm^2} + \frac{2abd^2f^mx^m\log(c)}{fm} - \frac{2b^2d^2f^mnx^m\log(c)}{fm^2} + \frac{a^2e^2f^mx^{3m}}{3fm} - \frac{2abe^2f^mnx^{3m}}{9fm^2} + \frac{2b^2e^2f^mn^2x^{3m}}{27fm^3} + \frac{a^2def^mx^{2m}}{fm} - \frac{abdef^mnx^{2m}}{fm^2} + \frac{b^2def^mn^2x^{2m}}{2fm^3} + \frac{a^2d^2f^mx^m}{fm} - \frac{2abd^2f^mnx^m}{fm^2} + \frac{2b^2d^2f^mn^2x^m}{fm^3}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
1/3*b^2*e^2*f^m*n^2*x^(3*m)*log(x)^2/(f*m) + b^2*d*e*f^m*n^2*x^(2*m)*log(x
)^2/(f*m) + b^2*d^2*f^m*n^2*x^m*log(x)^2/(f*m) + 2/3*b^2*e^2*f^m*n*x^(3*m)
*log(c)*log(x)/(f*m) + 2*b^2*d*e*f^m*n*x^(2*m)*log(c)*log(x)/(f*m) + 2*b^2
*d^2*f^m*n*x^m*log(c)*log(x)/(f*m) + 1/3*b^2*e^2*f^m*x^(3*m)*log(c)^2/(f*m
) + b^2*d*e*f^m*x^(2*m)*log(c)^2/(f*m) + b^2*d^2*f^m*x^m*log(c)^2/(f*m) +
2/3*a*b*e^2*f^m*n*x^(3*m)*log(x)/(f*m) - 2/9*b^2*e^2*f^m*n^2*x^(3*m)*log(x
)/(f*m^2) + 2*a*b*d*e*f^m*n*x^(2*m)*log(x)/(f*m) - b^2*d*e*f^m*n^2*x^(2*m)
*log(x)/(f*m^2) + 2*a*b*d^2*f^m*n*x^m*log(x)/(f*m) - 2*b^2*d^2*f^m*n^2*x^m
*log(x)/(f*m^2) + 2/3*a*b*e^2*f^m*x^(3*m)*log(c)/(f*m) - 2/9*b^2*e^2*f^m*n
*x^(3*m)*log(c)/(f*m^2) + 2*a*b*d*e*f^m*x^(2*m)*log(c)/(f*m) - b^2*d*e*f^m
*n*x^(2*m)*log(c)/(f*m^2) + 2*a*b*d^2*f^m*x^m*log(c)/(f*m) - 2*b^2*d^2*f^m
*n*x^m*log(c)/(f*m^2) + 1/3*a^2*e^2*f^m*x^(3*m)/(f*m) - 2/9*a*b*e^2*f^m*n*
x^(3*m)/(f*m^2) + 2/27*b^2*e^2*f^m*n^2*x^(3*m)/(f*m^3) + a^2*d*e*f^m*x^(2*
m)/(f*m) - a*b*d*e*f^m*n*x^(2*m)/(f*m^2) + 1/2*b^2*d*e*f^m*n^2*x^(2*m)/(f*
m^3) + a^2*d^2*f^m*x^m/(f*m) - 2*a*b*d^2*f^m*n*x^m/(f*m^2) + 2*b^2*d^2*f^m
*n^2*x^m/(f*m^3)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^{-1+m}\,(d+ex^m)^2\,(a+b\log(cx^n))^2\,dx = \int (f\,x)^{m-1}\,(d+e\,x^m)^2\,(a+b\,\ln(c\,x^n))^2\,dx$$

input
```
int((f*x)^(m - 1)*(d + e*x^m)^2*(a + b*log(c*x^n))^2,x)
```

output
```
int((f*x)^(m - 1)*(d + e*x^m)^2*(a + b*log(c*x^n))^2, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 303, normalized size of antiderivative = 1.02

$$\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))^2 \, dx$$
$$= \frac{x^m f^m \left(18x^{2m}\log(x^n c)^2 b^2e^2m^2 + 36x^{2m}\log(x^n c)\, ab\, e^2m^2 - 12x^{2m}\log(x^n c)\, b^2e^2mn + 18x^{2m}a^2e^2m^2 - 12x\right.}{}$$

input
```
int((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n))^2,x)
```

output
```
(x**m*f**m*(18*x**(2*m)*log(x**n*c)**2*b**2*e**2*m**2 + 36*x**(2*m)*log(x*
*n*c)*a*b*e**2*m**2 - 12*x**(2*m)*log(x**n*c)*b**2*e**2*m*n + 18*x**(2*m)*
a**2*e**2*m**2 - 12*x**(2*m)*a*b*e**2*m*n + 4*x**(2*m)*b**2*e**2*n**2 + 54
*x**m*log(x**n*c)**2*b**2*d*e*m**2 + 108*x**m*log(x**n*c)*a*b*d*e*m**2 - 5
4*x**m*log(x**n*c)*b**2*d*e*m*n + 54*x**m*a**2*d*e*m**2 - 54*x**m*a*b*d*e*
m*n + 27*x**m*b**2*d*e*n**2 + 54*log(x**n*c)**2*b**2*d**2*m**2 + 108*log(x
**n*c)*a*b*d**2*m**2 - 108*log(x**n*c)*b**2*d**2*m*n + 54*a**2*d**2*m**2 -
 108*a*b*d**2*m*n + 108*b**2*d**2*n**2))/(54*f*m**3)
```

3.359 $\int (fx)^{-1+m}\left(d+ex^m\right)\left(a+b\log\left(cx^n\right)\right)^2\,dx$

Optimal result . . . 2675
Mathematica [A] (verified) . . . 2676
Rubi [A] (verified) . . . 2676
Maple [A] (verified) . . . 2679
Fricas [A] (verification not implemented) . . . 2679
Sympy [A] (verification not implemented) . . . 2680
Maxima [A] (verification not implemented) . . . 2680
Giac [A] (verification not implemented) . . . 2681
Mupad [F(-1)] . . . 2682
Reduce [B] (verification not implemented) . . . 2682

Optimal result

Integrand size = 27, antiderivative size = 226

$$\begin{aligned}\int (fx)^{-1+m}\left(d+ex^m\right)\left(a+b\log\left(cx^n\right)\right)^2\,dx &= \frac{2b^2dn^2x(fx)^{-1+m}}{m^3}+\frac{b^2en^2x^{1+m}(fx)^{-1+m}}{4m^3}+\frac{b^2d^2n^2x^{1-m}(fx)^{-1+m}\log^2(x)}{2em}\\ &\quad-\frac{2bdnx(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)}{m^2}-\frac{benx^{1+m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)}{2m^2}\\ &\quad-\frac{bd^2nx^{1-m}(fx)^{-1+m}\log(x)\left(a+b\log\left(cx^n\right)\right)}{em}\\ &\quad+\frac{x^{1-m}(fx)^{-1+m}\left(d+ex^m\right)^2\left(a+b\log\left(cx^n\right)\right)^2}{2em}\end{aligned}$$

output
```
2*b^2*d*n^2*x*(f*x)^(-1+m)/m^3+1/4*b^2*e*n^2*x^(1+m)*(f*x)^(-1+m)/m^3+1/2*
b^2*d^2*n^2*x^(1-m)*(f*x)^(-1+m)*ln(x)^2/e/m-2*b*d*n*x*(f*x)^(-1+m)*(a+b*l
n(c*x^n))/m^2-1/2*b*e*n*x^(1+m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/m^2-b*d^2*n*x
^(1-m)*(f*x)^(-1+m)*ln(x)*(a+b*ln(c*x^n))/e/m+1/2*x^(1-m)*(f*x)^(-1+m)*(d+
e*x^m)^2*(a+b*ln(c*x^n))^2/e/m
```

Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 125, normalized size of antiderivative = 0.55

$$\int (fx)^{-1+m} (d+ex^m) (a+b\log (cx^n))^2 \, dx$$
$$= \frac{(fx)^m \left(2a^2m^2(2d+ex^m)-2abmn(4d+ex^m)+b^2n^2(8d+ex^m)-2bm(-2am(2d+ex^m)+bn(4d+e\right.}{4fm^3}$$

input
```
Integrate[(f*x)^(-1 + m)*(d + e*x^m)*(a + b*Log[c*x^n])^2,x]
```

output
```
((f*x)^m*(2*a^2*m^2*(2*d + e*x^m) - 2*a*b*m*n*(4*d + e*x^m) + b^2*n^2*(8*d
 + e*x^m) - 2*b*m*(-2*a*m*(2*d + e*x^m) + b*n*(4*d + e*x^m))*Log[c*x^n] +
2*b^2*m^2*(2*d + e*x^m)*Log[c*x^n]^2))/(4*f*m^3)
```

Rubi [A] (verified)

Time = 0.64 (sec) , antiderivative size = 163, normalized size of antiderivative = 0.72, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222, Rules used = {2777, 2776, 2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^{m-1} (d+ex^m) (a+b\log (cx^n))^2 \, dx$$

$$\Big\downarrow \; 2777$$

$$x^{1-m}(fx)^{m-1}\int x^{m-1}(ex^m+d) (a+b\log (cx^n))^2 dx$$

$$\Big\downarrow \; 2776$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^2 (a+b\log (cx^n))^2}{2em}-\frac{bn\int \frac{(ex^m+d)^2(a+b\log(cx^n))}{x}dx}{em}\right)$$

$$\Big\downarrow \; 2772$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^2(a+b\log(cx^n))^2}{2em}-\frac{bn\left(-bn\int\frac{e(ex^m+4d)x^m+2d^2m\log(x)}{2mx}dx+d^2\log(x)(a+b\log(cx^n)\right.}{em}\right.$$

$\big\downarrow$ 27

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^2(a+b\log(cx^n))^2}{2em}-\frac{bn\left(-\frac{bn\int\frac{e(ex^m+4d)x^m+2d^2m\log(x)}{x}dx}{2m}+d^2\log(x)(a+b\log(cx^n))+\right.}{em}\right.$$

$\big\downarrow$ 2010

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^2(a+b\log(cx^n))^2}{2em}-\frac{bn\left(-\frac{bn\int\left(4dex^{m-1}+e^2x^{2m-1}+\frac{2d^2m\log(x)}{x}\right)dx}{2m}+d^2\log(x)(a+b\log\right.}{em}\right.$$

$\big\downarrow$ 2009

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^2(a+b\log(cx^n))^2}{2em}-\frac{bn\left(d^2\log(x)(a+b\log(cx^n))+\frac{2dex^m(a+b\log(cx^n))}{m}+\frac{e^2x^{2m}(a+b\log\right.}{2m}}{em}\right.$$

input
```
Int[(f*x)^(-1 + m)*(d + e*x^m)*(a + b*Log[c*x^n])^2,x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(((d + e*x^m)^2*(a + b*Log[c*x^n])^2)/(2*e*m) - (
b*n*(-1/2*(b*n*((4*d*e*x^m)/m + (e^2*x^(2*m))/(2*m) + d^2*m*Log[x]^2))/m +
 (2*d*e*x^m*(a + b*Log[c*x^n]))/m + (e^2*x^(2*m)*(a + b*Log[c*x^n]))/(2*m)
 + d^2*Log[x]*(a + b*Log[c*x^n])))/(e*m))
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Maple [A] (verified)

Time = 14.12 (sec) , antiderivative size = 261, normalized size of antiderivative = 1.15

method	result
parallelrisch	$-\frac{-2b^2e(fx)^{m-1}\ln(c\,x^n)^2x^m x\,m^2-4x\,x^m\ln(c\,x^n)(fx)^{m-1}abe\,m^2+2x\,x^m\ln(c\,x^n)(fx)^{m-1}b^2emn-4b^2d(fx)^{m-1}\ln(c\,x^n)}{}$
risch	Expression too large to display

input
```
int((f*x)^(m-1)*(d+e*x^m)*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
-1/4*(-2*b^2*e*(f*x)^(m-1)*ln(c*x^n)^2*x^m*x*m^2-4*x*x^m*ln(c*x^n)*(f*x)^(
m-1)*a*b*e*m^2+2*x*x^m*ln(c*x^n)*(f*x)^(m-1)*b^2*e*m*n-4*b^2*d*(f*x)^(m-1)
*ln(c*x^n)^2*x*m^2-2*x*x^m*(f*x)^(m-1)*a^2*e*m^2+2*x*x^m*(f*x)^(m-1)*a*b*e
*m*n-x*x^m*(f*x)^(m-1)*b^2*e*n^2-8*x*ln(c*x^n)*(f*x)^(m-1)*a*b*d*m^2+8*x*l
n(c*x^n)*(f*x)^(m-1)*b^2*d*m*n-4*x*(f*x)^(m-1)*a^2*d*m^2+8*x*(f*x)^(m-1)*a
*b*d*m*n-8*x*(f*x)^(m-1)*b^2*d*n^2)/m^3
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 244, normalized size of antiderivative = 1.08

$$\int (fx)^{-1+m}\left(d+ex^m\right)\left(a+b\log\left(cx^n\right)\right)^2\,dx$$
$$=\frac{\left(2\,b^2em^2n^2\log\left(x\right)^2+2\,b^2em^2\log\left(c\right)^2+2\,a^2em^2-2\,abemn+b^2en^2+2\left(2\,abem^2-b^2emn\right)\log\left(c\right)+2\,(\right.}{}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
1/4*((2*b^2*e*m^2*n^2*log(x)^2 + 2*b^2*e*m^2*log(c)^2 + 2*a^2*e*m^2 - 2*a*
b*e*m*n + b^2*e*n^2 + 2*(2*a*b*e*m^2 - b^2*e*m*n)*log(c) + 2*(2*b^2*e*m^2*
n*log(c) + 2*a*b*e*m^2*n - b^2*e*m*n^2)*log(x))*f^(m - 1)*x^(2*m) + 4*(b^2
*d*m^2*n^2*log(x)^2 + b^2*d*m^2*log(c)^2 + a^2*d*m^2 - 2*a*b*d*m*n + 2*b^2
*d*n^2 + 2*(a*b*d*m^2 - b^2*d*m*n)*log(c) + 2*(b^2*d*m^2*n*log(c) + a*b*d*
m^2*n - b^2*d*m*n^2)*log(x))*f^(m - 1)*x^m)/m^3
```

Sympy [A] (verification not implemented)

Time = 9.22 (sec) , antiderivative size = 352, normalized size of antiderivative = 1.56

$$\int (fx)^{-1+m}\,(d+ex^m)\,(a+b\log{(cx^n)})^2\;dx$$
$$= \begin{cases} \frac{a^2dx(fx)^{m-1}}{m} + \frac{a^2exx^m(fx)^{m-1}}{2m} + \frac{2abdx(fx)^{m-1}\log{(cx^n)}}{m} - \frac{2abdnx(fx)^{m-1}}{m^2} + \frac{abexx^m(fx)^{m-1}\log{(cx^n)}}{m} - \frac{abenxx^m(fx)^{m-\cdots}}{2m^2} \cdots \\ \frac{(d+e)\left(\begin{cases} \frac{a^2\log{(cx^n)}+ab\log{(cx^n)}^2+\frac{b^2\log{(cx^n)}^3}{3}}{n} & \text{for}\ n\neq 0 \\ \left(a^2+2ab\log{(c)}+b^2\log{(c)}^2\right)\log{(x)} & \text{otherwise} \end{cases}\right)}{f} \end{cases}$$

input
```
integrate((f*x)**(-1+m)*(d+e*x**m)*(a+b*ln(c*x**n))**2,x)
```

output
```
Piecewise((a**2*d*x*(f*x)**(m - 1)/m + a**2*e*x*x**m*(f*x)**(m - 1)/(2*m)
+ 2*a*b*d*x*(f*x)**(m - 1)*log(c*x**n)/m - 2*a*b*d*n*x*(f*x)**(m - 1)/m**2
 + a*b*e*x*x**m*(f*x)**(m - 1)*log(c*x**n)/m - a*b*e*n*x*x**m*(f*x)**(m -
1)/(2*m**2) + b**2*d*x*(f*x)**(m - 1)*log(c*x**n)**2/m - 2*b**2*d*n*x*(f*x
)**(m - 1)*log(c*x**n)/m**2 + 2*b**2*d*n**2*x*(f*x)**(m - 1)/m**3 + b**2*e
*x*x**m*(f*x)**(m - 1)*log(c*x**n)**2/(2*m) - b**2*e*n*x*x**m*(f*x)**(m -
1)*log(c*x**n)/(2*m**2) + b**2*e*n**2*x*x**m*(f*x)**(m - 1)/(4*m**3), Ne(m
, 0)), ((d + e)*Piecewise(((a**2*log(c*x**n) + a*b*log(c*x**n)**2 + b**2*l
og(c*x**n)**3/3)/n, Ne(n, 0)), ((a**2 + 2*a*b*log(c) + b**2*log(c)**2)*log
(x), True))/f, True))
```

Maxima [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 257, normalized size of antiderivative = 1.14

$$\int (fx)^{-1+m}\,(d+ex^m)\,(a+b\log{(cx^n)})^2\;dx$$
$$= \frac{b^2ef^{m-1}x^{2\,m}\log{(cx^n)}^2}{2\,m} + \frac{abef^{m-1}x^{2\,m}\log{(cx^n)}}{m} - 2\left(\frac{f^{m-1}nx^m\log{(cx^n)}}{m^2} - \frac{f^{m-1}n^2x^m}{m^3}\right)b^2d - \frac{1}{4}\left(\frac{2\,f^{m-1}nx^{2\,m}\log{(cx^n)}}{m^2} - \frac{f^{m-1}n^2x^{2\,m}}{m^3}\right)b^2e + \frac{a^2ef^{m-1}x^{2\,m}}{2\,m} - \frac{abef^{m-1}nx^{2\,m}}{2\,m^2} - \frac{2\,abdf^{m-1}nx^m}{m^2} + \frac{(fx)^m\,b^2d\log{(cx^n)}^2}{fm} + \frac{2\,(fx)^m\,abd\log{(cx^n)}}{fm} + \frac{(fx)^m\,a^2d}{fm}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
1/2*b^2*e*f^(m - 1)*x^(2*m)*log(c*x^n)^2/m + a*b*e*f^(m - 1)*x^(2*m)*log(c
*x^n)/m - 2*(f^(m - 1)*n*x^m*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^m/m^3)*b^2*d
 - 1/4*(2*f^(m - 1)*n*x^(2*m)*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^(2*m)/m^3)*
b^2*e + 1/2*a^2*e*f^(m - 1)*x^(2*m)/m - 1/2*a*b*e*f^(m - 1)*n*x^(2*m)/m^2
- 2*a*b*d*f^(m - 1)*n*x^m/m^2 + (f*x)^m*b^2*d*log(c*x^n)^2/(f*m) + 2*(f*x)
^m*a*b*d*log(c*x^n)/(f*m) + (f*x)^m*a^2*d/(f*m)
```

Giac [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 435, normalized size of antiderivative = 1.92

$$\begin{aligned}
\int (fx)^{-1+m}(d+ex^m)(a+b\log(cx^n))^2\,dx
&= \frac{b^2ef^mn^2x^{2m}\log(x)^2}{2fm}+\frac{b^2df^mn^2x^m\log(x)^2}{fm}+\frac{b^2ef^mnx^{2m}\log(c)\log(x)}{fm}\\
&\quad+\frac{2b^2df^mnx^m\log(c)\log(x)}{fm}+\frac{b^2ef^mx^{2m}\log(c)^2}{2fm}+\frac{b^2df^mx^m\log(c)^2}{fm}\\
&\quad+\frac{abef^mnx^{2m}\log(x)}{fm}-\frac{b^2ef^mn^2x^{2m}\log(x)}{2fm^2}+\frac{2abdf^mnx^m\log(x)}{fm}\\
&\quad-\frac{2b^2df^mn^2x^m\log(x)}{fm^2}+\frac{abef^mx^{2m}\log(c)}{fm}-\frac{b^2ef^mnx^{2m}\log(c)}{2fm^2}\\
&\quad+\frac{2abdf^mx^m\log(c)}{fm}-\frac{2b^2df^mnx^m\log(c)}{fm^2}+\frac{a^2ef^mx^{2m}}{2fm}-\frac{abef^mnx^{2m}}{2fm^2}\\
&\quad+\frac{b^2ef^mn^2x^{2m}}{4fm^3}+\frac{a^2df^mx^m}{fm}-\frac{2abdf^mnx^m}{fm^2}+\frac{2b^2df^mn^2x^m}{fm^3}
\end{aligned}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
1/2*b^2*e*f^m*n^2*x^(2*m)*log(x)^2/(f*m) + b^2*d*f^m*n^2*x^m*log(x)^2/(f*m
) + b^2*e*f^m*n*x^(2*m)*log(c)*log(x)/(f*m) + 2*b^2*d*f^m*n*x^m*log(c)*log
(x)/(f*m) + 1/2*b^2*e*f^m*x^(2*m)*log(c)^2/(f*m) + b^2*d*f^m*x^m*log(c)^2/
(f*m) + a*b*e*f^m*n*x^(2*m)*log(x)/(f*m) - 1/2*b^2*e*f^m*n^2*x^(2*m)*log(x
)/(f*m^2) + 2*a*b*d*f^m*n*x^m*log(x)/(f*m) - 2*b^2*d*f^m*n^2*x^m*log(x)/(f
*m^2) + a*b*e*f^m*x^(2*m)*log(c)/(f*m) - 1/2*b^2*e*f^m*n*x^(2*m)*log(c)/(f
*m^2) + 2*a*b*d*f^m*x^m*log(c)/(f*m) - 2*b^2*d*f^m*n*x^m*log(c)/(f*m^2) +
1/2*a^2*e*f^m*x^(2*m)/(f*m) - 1/2*a*b*e*f^m*n*x^(2*m)/(f*m^2) + 1/4*b^2*e*
f^m*n^2*x^(2*m)/(f*m^3) + a^2*d*f^m*x^m/(f*m) - 2*a*b*d*f^m*n*x^m/(f*m^2)
+ 2*b^2*d*f^m*n^2*x^m/(f*m^3)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^{-1+m}(d+ex^m)(a+b\log(cx^n))^2\,dx=\int (f\,x)^{m-1}\,(d+e\,x^m)\,(a+b\,\ln(c\,x^n))^2\,dx$$

input
```
int((f*x)^(m - 1)*(d + e*x^m)*(a + b*log(c*x^n))^2,x)
```

output
```
int((f*x)^(m - 1)*(d + e*x^m)*(a + b*log(c*x^n))^2, x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 172, normalized size of antiderivative = 0.76

$$\int (fx)^{-1+m}(d+ex^m)(a+b\log(cx^n))^2\,dx$$
$$=\frac{x^m f^m\left(2x^m\log(x^nc)^2b^2e\,m^2+4x^m\log(x^nc)\,abe\,m^2-2x^m\log(x^nc)\,b^2emn+2x^m a^2e\,m^2-2x^m abemn+x\right.}{4f\,n}$$

input
```
int((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n))^2,x)
```

output
```
(x**m*f**m*(2*x**m*log(x**n*c)**2*b**2*e*m**2 + 4*x**m*log(x**n*c)*a*b*e*m
**2 - 2*x**m*log(x**n*c)*b**2*e*m*n + 2*x**m*a**2*e*m**2 - 2*x**m*a*b*e*m*
n + x**m*b**2*e*n**2 + 4*log(x**n*c)**2*b**2*d*m**2 + 8*log(x**n*c)*a*b*d*
m**2 - 8*log(x**n*c)*b**2*d*m*n + 4*a**2*d*m**2 - 8*a*b*d*m*n + 8*b**2*d*n
**2))/(4*f*m**3)
```

3.360 $\int (fx)^{-1+m} (a + b\log(cx^n))^2 \, dx$

Optimal result 2684
Mathematica [A] (verified) 2684
Rubi [A] (verified) 2685
Maple [A] (verified) 2686
Fricas [A] (verification not implemented) 2686
Sympy [B] (verification not implemented) 2687
Maxima [A] (verification not implemented) 2687
Giac [B] (verification not implemented) 2688
Mupad [F(-1)] 2689
Reduce [B] (verification not implemented) 2689

Optimal result

Integrand size = 20, antiderivative size = 69

$$\int (fx)^{-1+m} (a + b\log(cx^n))^2 \, dx = \frac{2b^2n^2(fx)^m}{fm^3} - \frac{2bn(fx)^m (a + b\log(cx^n))}{fm^2} + \frac{(fx)^m (a + b\log(cx^n))^2}{fm}$$

output
```
2*b^2*n^2*(f*x)^m/f/m^3-2*b*n*(f*x)^m*(a+b*ln(c*x^n))/f/m^2+(f*x)^m*(a+b*l
n(c*x^n))^2/f/m
```

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 67, normalized size of antiderivative = 0.97

$$\int (fx)^{-1+m} (a + b\log(cx^n))^2 \, dx = \frac{(fx)^m (a^2m^2 - 2abmn + 2b^2n^2 + 2bm(am - bn)\log(cx^n) + b^2m^2\log^2(cx^n))}{fm^3}$$

input
```
Integrate[(f*x)^(-1 + m)*(a + b*Log[c*x^n])^2,x]
```

output
```
((f*x)^m*(a^2*m^2 - 2*a*b*m*n + 2*b^2*n^2 + 2*b*m*(a*m - b*n)*Log[c*x^n] +
 b^2*m^2*Log[c*x^n]^2))/(f*m^3)
```

Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 70, normalized size of antiderivative = 1.01, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {2742, 2741}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^{m-1} (a+b\log(cx^n))^2 \, dx$$

$$\Big\downarrow \text{ 2742}$$

$$\frac{(fx)^m (a+b\log(cx^n))^2}{fm} - \frac{2bn\int (fx)^{m-1} (a+b\log(cx^n)) \, dx}{m}$$

$$\Big\downarrow \text{ 2741}$$

$$\frac{(fx)^m (a+b\log(cx^n))^2}{fm} - \frac{2bn\left(\frac{(fx)^m(a+b\log(cx^n))}{fm} - \frac{bn(fx)^m}{fm^2}\right)}{m}$$

input
```
Int[(f*x)^(-1 + m)*(a + b*Log[c*x^n])^2,x]
```

output
```
((f*x)^m*(a + b*Log[c*x^n])^2)/(f*m) - (2*b*n*(-((b*n*(f*x)^m)/(f*m^2)) +
((f*x)^m*(a + b*Log[c*x^n]))/(f*m)))/m
```

Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2742
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Simp[b*n*
(p/(m + 1))   Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b
, c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Maple [A] (verified)

Time = 0.55 (sec) , antiderivative size = 119, normalized size of antiderivative = 1.72

method	result
parallelrisch	$-\frac{-x\ln(cx^n)^2(fx)^{m-1}b^2m^2-2x\ln(cx^n)(fx)^{m-1}ab\,m^2+2x\ln(cx^n)(fx)^{m-1}b^2mn-x(fx)^{m-1}a^2m^2+2x(fx)^{m-1}abmn-}{m^3}$
risch	Expression too large to display

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
-(-x*ln(c*x^n)^2*(f*x)^(m-1)*b^2*m^2-2*x*ln(c*x^n)*(f*x)^(m-1)*a*b*m^2+2*x
*ln(c*x^n)*(f*x)^(m-1)*b^2*m*n-x*(f*x)^(m-1)*a^2*m^2+2*x*(f*x)^(m-1)*a*b*m
*n-2*x*(f*x)^(m-1)*b^2*n^2)/m^3
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 124, normalized size of antiderivative = 1.80

$$\int (fx)^{-1+m}\left(a+b\log\left(cx^{n}\right)\right)^{2}\,dx$$
$$=\frac{\left(b^{2}m^{2}n^{2}x\log\left(x\right)^{2}+b^{2}m^{2}x\log\left(c\right)^{2}+2\left(abm^{2}-b^{2}mn\right)x\log\left(c\right)+\left(a^{2}m^{2}-2\,abmn+2\,b^{2}n^{2}\right)x+2\left(b^{2}m^{2}\right.\right.}{m^{3}}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
(b^2*m^2*n^2*x*log(x)^2 + b^2*m^2*x*log(c)^2 + 2*(a*b*m^2 - b^2*m*n)*x*log
(c) + (a^2*m^2 - 2*a*b*m*n + 2*b^2*n^2)*x + 2*(b^2*m^2*n*x*log(c) + (a*b*m
^2*n - b^2*m*n^2)*x)*log(x))*e^((m - 1)*log(f) + (m - 1)*log(x))/m^3
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 184 vs. $2(63) = 126$.

Time = 6.81 (sec) , antiderivative size = 184, normalized size of antiderivative = 2.67

$$\int (fx)^{-1+m} (a + b\log(cx^n))^2 \, dx$$
$$= \begin{cases} \frac{a^2x(fx)^{m-1}}{m} + \frac{2abx(fx)^{m-1}\log(cx^n)}{m} - \frac{2abnx(fx)^{m-1}}{m^2} + \frac{b^2x(fx)^{m-1}\log(cx^n)^2}{m} - \frac{2b^2nx(fx)^{m-1}\log(cx^n)}{m^2} + \frac{2b^2n^2x(fx)^{m-1}}{m^3} \\ \frac{\begin{cases} \frac{a^2\log(cx^n) + ab\log(cx^n)^2 + \frac{b^2\log(cx^n)^3}{3}}{n} & \text{for } n \neq 0 \\ (a^2 + 2ab\log(c) + b^2\log(c)^2)\log(x) & \text{otherwise} \end{cases}}{f} \end{cases}$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))**2,x)
```

output
```
Piecewise((a**2*x*(f*x)**(m - 1)/m + 2*a*b*x*(f*x)**(m - 1)*log(c*x**n)/m
- 2*a*b*n*x*(f*x)**(m - 1)/m**2 + b**2*x*(f*x)**(m - 1)*log(c*x**n)**2/m -
 2*b**2*n*x*(f*x)**(m - 1)*log(c*x**n)/m**2 + 2*b**2*n**2*x*(f*x)**(m - 1)
/m**3, Ne(m, 0)), (Piecewise(((a**2*log(c*x**n) + a*b*log(c*x**n)**2 + b**
2*log(c*x**n)**3/3)/n, Ne(n, 0)), ((a**2 + 2*a*b*log(c) + b**2*log(c)**2)*
log(x), True))/f, True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 117, normalized size of antiderivative = 1.70

$$\int (fx)^{-1+m} (a + b\log(cx^n))^2 \, dx = -2\left(\frac{f^{m-1}nx^m\log(cx^n)}{m^2} - \frac{f^{m-1}n^2x^m}{m^3}\right)b^2 - \frac{2\,abf^{m-1}nx^m}{m^2} + \frac{(fx)^m\,b^2\log(cx^n)^2}{fm} + \frac{2\,(fx)^m\,ab\log(cx^n)}{fm} + \frac{(fx)^m\,a^2}{fm}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
-2*(f^(m - 1)*n*x^m*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^m/m^3)*b^2 - 2*a*b*f^
(m - 1)*n*x^m/m^2 + (f*x)^m*b^2*log(c*x^n)^2/(f*m) + 2*(f*x)^m*a*b*log(c*x
^n)/(f*m) + (f*x)^m*a^2/(f*m)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 198 vs. $2(69) = 138$.

Time = 0.14 (sec) , antiderivative size = 198, normalized size of antiderivative = 2.87

$$\int (fx)^{-1+m}(a+b\log(cx^n))^2\,dx = \frac{b^2f^mn^2x^m\log(x)^2}{fm} + \frac{2\,b^2f^mnx^m\log(c)\log(x)}{fm} + \frac{b^2f^mx^m\log(c)^2}{fm} + \frac{2\,abf^mnx^m\log(x)}{fm} - \frac{2\,b^2f^mn^2x^m\log(x)}{fm^2} + \frac{2\,abf^mx^m\log(c)}{fm} - \frac{2\,b^2f^mnx^m\log(c)}{fm^2} + \frac{a^2f^mx^m}{fm} - \frac{2\,abf^mnx^m}{fm^2} + \frac{2\,b^2f^mn^2x^m}{fm^3}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
b^2*f^m*n^2*x^m*log(x)^2/(f*m) + 2*b^2*f^m*n*x^m*log(c)*log(x)/(f*m) + b^2
*f^m*x^m*log(c)^2/(f*m) + 2*a*b*f^m*n*x^m*log(x)/(f*m) - 2*b^2*f^m*n^2*x^m
*log(x)/(f*m^2) + 2*a*b*f^m*x^m*log(c)/(f*m) - 2*b^2*f^m*n*x^m*log(c)/(f*m
^2) + a^2*f^m*x^m/(f*m) - 2*a*b*f^m*n*x^m/(f*m^2) + 2*b^2*f^m*n^2*x^m/(f*m
^3)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)^2\,dx=\int (f\,x)^{m-1}\left(a+b\,\ln\left(c\,x^n\right)\right)^2dx$$

input
```
int((f*x)^(m - 1)*(a + b*log(c*x^n))^2,x)
```

output
```
int((f*x)^(m - 1)*(a + b*log(c*x^n))^2, x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 76, normalized size of antiderivative = 1.10

$$\int (fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)^2\,dx = \frac{x^m f^m\left(\log(x^n c)^2\,b^2m^2+2\log(x^n c)\,ab\,m^2-2\log(x^n c)\,b^2mn+a^2m^2-2abmn+2b^2n^2\right)}{f\,m^3}$$

input
```
int((f*x)^(-1+m)*(a+b*log(c*x^n))^2,x)
```

output
```
(x**m*f**m*(log(x**n*c)**2*b**2*m**2 + 2*log(x**n*c)*a*b*m**2 - 2*log(x**n
*c)*b**2*m*n + a**2*m**2 - 2*a*b*m*n + 2*b**2*n**2))/(f*m**3)
```

3.361 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m} dx$

Optimal result 2690
Mathematica [B] (warning: unable to verify) 2691
Rubi [A] (verified) 2691
Maple [F] 2693
Fricas [A] (verification not implemented) 2694
Sympy [F] 2694
Maxima [F] 2694
Giac [F] 2695
Mupad [F(-1)] 2695
Reduce [F] 2695

Optimal result

Integrand size = 29, antiderivative size = 129

$$\begin{aligned}\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m} dx &= \frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))^2\log\left(1+\frac{ex^m}{d}\right)}{em}\\ &+\frac{2bnx^{1-m}(fx)^{-1+m}(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex^m}{d}\right)}{em^2}\\ &-\frac{2b^2n^2x^{1-m}(fx)^{-1+m}\operatorname{PolyLog}\left(3,-\frac{ex^m}{d}\right)}{em^3}\end{aligned}$$

output
```
x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))^2*ln(1+e*x^m/d)/e/m+2*b*n*x^(1-m)*(f*
x)^(-1+m)*(a+b*ln(c*x^n))*polylog(2,-e*x^m/d)/e/m^2-2*b^2*n^2*x^(1-m)*(f*x
)^(-1+m)*polylog(3,-e*x^m/d)/e/m^3
```

Mathematica [B] (warning: unable to verify)

Leaf count is larger than twice the leaf count of optimal. 502 vs. $2(129) = 258$.

Time = 0.83 (sec) , antiderivative size = 502, normalized size of antiderivative = 3.89

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m}\,dx$$
$$= \frac{x^{-m}(fx)^m\left(3a^2m^3\log(x)-6abm^3n\log^2(x)+4b^2m^3n^2\log^3(x)+6abm^3\log(x)\log(cx^n)-6b^2m^3n\log^2(\right.}{}$$

input
```
Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m),x]
```

output
```
((f*x)^m*(3*a^2*m^3*Log[x] - 6*a*b*m^3*n*Log[x]^2 + 4*b^2*m^3*n^2*Log[x]^3
 + 6*a*b*m^3*Log[x]*Log[c*x^n] - 6*b^2*m^3*n*Log[x]^2*Log[c*x^n] + 3*b^2*m
^3*Log[x]*Log[c*x^n]^2 + 3*b^2*m^2*n^2*Log[x]^2*Log[1 + d/(e*x^m)] + 3*a^2
*m^2*Log[d - d*x^m] - 6*a*b*m^2*n*Log[x]*Log[d - d*x^m] + 3*b^2*m^2*n^2*Lo
g[x]^2*Log[d - d*x^m] + 6*a*b*m^2*Log[c*x^n]*Log[d - d*x^m] - 6*b^2*m^2*n*
Log[x]*Log[c*x^n]*Log[d - d*x^m] + 3*b^2*m^2*Log[c*x^n]^2*Log[d - d*x^m] +
 6*a*b*m^2*n*Log[x]*Log[d + e*x^m] - 6*b^2*m^2*n^2*Log[x]^2*Log[d + e*x^m]
 - 6*a*b*m*n*Log[-((e*x^m)/d)]*Log[d + e*x^m] + 6*b^2*m*n^2*Log[x]*Log[-((
e*x^m)/d)]*Log[d + e*x^m] + 6*b^2*m^2*n*Log[x]*Log[c*x^n]*Log[d + e*x^m] -
 6*b^2*m*n*Log[-((e*x^m)/d)]*Log[c*x^n]*Log[d + e*x^m] - 6*b^2*m*n^2*Log[x
]*PolyLog[2, -(d/(e*x^m))] - 6*b*m*n*(a - b*n*Log[x] + b*Log[c*x^n])*PolyL
og[2, 1 + (e*x^m)/d] - 6*b^2*n^2*PolyLog[3, -(d/(e*x^m))]))/(3*e*f*m^3*x^m
)
```

Rubi [A] (verified)

Time = 0.62 (sec) , antiderivative size = 100, normalized size of antiderivative = 0.78, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.138$, Rules used = {2777, 2775, 2821, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^{m-1} (a + b\log(cx^n))^2}{d + ex^m} dx$$

$$\Big\downarrow \textbf{2777}$$

$$x^{1-m}(fx)^{m-1} \int \frac{x^{m-1}(a + b\log(cx^n))^2}{ex^m + d} dx$$

$$\Big\downarrow \textbf{2775}$$

$$x^{1-m}(fx)^{m-1} \left(\frac{\log\left(\frac{ex^m}{d} + 1\right)(a + b\log(cx^n))^2}{em} - \frac{2bn \int \frac{(a+b\log(cx^n))\log\left(\frac{ex^m}{d}+1\right)}{x} dx}{em} \right)$$

$$\Big\downarrow \textbf{2821}$$

$$x^{1-m}(fx)^{m-1} \left(\frac{\log\left(\frac{ex^m}{d} + 1\right)(a + b\log(cx^n))^2}{em} - \frac{2bn \left(\frac{bn \int \frac{\text{PolyLog}\left(2,-\frac{ex^m}{d}\right)}{x} dx}{m} - \frac{\text{PolyLog}\left(2,-\frac{ex^m}{d}\right)(a+b\log(cx^n))}{m} \right)}{em} \right)$$

$$\Big\downarrow \textbf{7143}$$

$$x^{1-m}(fx)^{m-1} \left(\frac{\log\left(\frac{ex^m}{d} + 1\right)(a + b\log(cx^n))^2}{em} - \frac{2bn \left(\frac{bn\,\text{PolyLog}\left(3,-\frac{ex^m}{d}\right)}{m^2} - \frac{\text{PolyLog}\left(2,-\frac{ex^m}{d}\right)(a+b\log(cx^n))}{m} \right)}{em} \right)$$

input
```
Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m),x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(((a + b*Log[c*x^n])^2*Log[1 + (e*x^m)/d])/(e*m)
- (2*b*n*(-(((a + b*Log[c*x^n])*PolyLog[2, -((e*x^m)/d)])/m) + (b*n*PolyLo
g[3, -((e*x^m)/d)])/m^2))/(e*m))
```

Defintions of rubi rules used

rule 2775
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.))/((d_)
+ (e_.)*(x_)^(r_)), x_Symbol] :> Simp[f^m*Log[1 + e*(x^r/d)]*((a + b*Log[c*
x^n])^p/(e*r)), x] - Simp[b*f^m*n*(p/(e*r))   Int[Log[1 + e*(x^r/d)]*((a +
b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && NeQ[r, n]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Maple [F]

$$\int \frac{(fx)^{m-1} (a+b\ln(c\,x^n))^2}{d+e\,x^m}dx$$

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))^2/(d+e*x^m),x)
```

output
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))^2/(d+e*x^m),x)
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 178, normalized size of antiderivative = 1.38

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m}\,dx = -\frac{2\,b^2f^{m-1}n^2\mathrm{polylog}\left(3,-\frac{ex^m}{d}\right)-2\left(b^2mn^2\log(x)+b^2mn\log(c)+abmn\right)f^{m-1}\mathrm{Li}_2\left(-\frac{ex^m+d}{d}+1\right)-\left(b^2m\right.}{}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m),x, algorithm="fricas")
```

output
```
-(2*b^2*f^(m - 1)*n^2*polylog(3, -e*x^m/d) - 2*(b^2*m*n^2*log(x) + b^2*m*n
*log(c) + a*b*m*n)*f^(m - 1)*dilog(-(e*x^m + d)/d + 1) - (b^2*m^2*log(c)^2
 + 2*a*b*m^2*log(c) + a^2*m^2)*f^(m - 1)*log(e*x^m + d) - (b^2*m^2*n^2*log
(x)^2 + 2*(b^2*m^2*n*log(c) + a*b*m^2*n)*log(x))*f^(m - 1)*log((e*x^m + d)
/d))/(e*m^3)
```

Sympy [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m}\,dx = \int \frac{(fx)^{m-1}(a+b\log(cx^n))^2}{d+ex^m}\,dx$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))**2/(d+e*x**m),x)
```

output
```
Integral((f*x)**(m - 1)*(a + b*log(c*x**n))**2/(d + e*x**m), x)
```

Maxima [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m}\,dx = \int \frac{(b\log(cx^n)+a)^2(fx)^{m-1}}{ex^m+d}\,dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m),x, algorithm="maxima")
```

output
```
a^2*f^(m - 1)*log((e*x^m + d)/e)/(e*m) + integrate((b^2*f^m*x^m*log(x^n)^2
 + 2*(b^2*f^m*log(c) + a*b*f^m)*x^m*log(x^n) + (b^2*f^m*log(c)^2 + 2*a*b*f
^m*log(c))*x^m)/(e*f*x*x^m + d*f*x), x)
```

Giac [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m}\,dx=\int \frac{(b\log(cx^n)+a)^2(fx)^{m-1}}{ex^m+d}\,dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*(f*x)^(m - 1)/(e*x^m + d), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m}\,dx=\int \frac{(f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))^2}{d+e\,x^m}\,dx$$

input
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m),x)
```

output
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m), x)
```

Reduce [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m}\,dx$$
$$=\frac{f^m\left(\left(\int \frac{x^m\log(x^nc)^2}{x^m ex+dx}dx\right)b^2em+2\left(\int \frac{x^m\log(x^nc)}{x^m ex+dx}dx\right)abem+\log(x^me+d)\,a^2\right)}{efm}$$

input
```
int((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m),x)
```

output
```
(f**m*(int((x**m*log(x**n*c)**2)/(x**m*e*x + d*x),x)*b**2*e*m + 2*int((x**
m*log(x**n*c))/(x**m*e*x + d*x),x)*a*b*e*m + log(x**m*e + d)*a**2))/(e*f*m
)
```

3.362 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx$

Optimal result 2697
Mathematica [A] (warning: unable to verify) 2698
Rubi [A] (verified) 2698
Maple [F] 2700
Fricas [A] (verification not implemented) 2700
Sympy [F] 2701
Maxima [F] 2701
Giac [F] 2702
Mupad [F(-1)] 2702
Reduce [F] 2702

Optimal result

Integrand size = 29, antiderivative size = 138

$$\begin{aligned}\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx &= -\frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))^2}{em(d+ex^m)} \\ &\quad - \frac{2bnx^{1-m}(fx)^{-1+m}(a+b\log(cx^n))\log\left(1+\frac{dx^{-m}}{e}\right)}{dem^2} \\ &\quad + \frac{2b^2n^2x^{1-m}(fx)^{-1+m}\operatorname{PolyLog}\left(2,-\frac{dx^{-m}}{e}\right)}{dem^3}\end{aligned}$$

output
```
-x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))^2/e/m/(d+e*x^m)-2*b*n*x^(1-m)*(f*x)^
(-1+m)*(a+b*ln(c*x^n))*ln(1+d/e/(x^m))/d/e/m^2+2*b^2*n^2*x^(1-m)*(f*x)^(-1
+m)*polylog(2,-d/e/(x^m))/d/e/m^3
```

Mathematica [A] (warning: unable to verify)

Time = 0.94 (sec) , antiderivative size = 157, normalized size of antiderivative = 1.14

$$\int \frac{(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)^2}{(d+ex^m)^2}\,dx = \frac{x^{-m}(fx)^m\left(-\frac{m^2(a+b\log(cx^n))^2}{d+ex^m}-\frac{2abmn\log(d-dx^m)}{d}+\frac{2b^2mn(n\log(x)-\log(cx^n))\log(d-dx^m)}{d}+\frac{2b^2n^2\left(\frac{1}{2}m^2\log^2(x)+\left(-m\log\right.\right.}{}\right.}{efm^3}$$

input
```
Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m)^2,x]
```

output
```
((f*x)^m*(-((m^2*(a + b*Log[c*x^n])^2)/(d + e*x^m)) - (2*a*b*m*n*Log[d - d
*x^m])/d + (2*b^2*m*n*(n*Log[x] - Log[c*x^n])*Log[d - d*x^m])/d + (2*b^2*n
^2*((m^2*Log[x]^2)/2 + (-(m*Log[x]) + Log[-((e*x^m)/d)])*Log[d + e*x^m] +
PolyLog[2, 1 + (e*x^m)/d]))/d))/(e*f*m^3*x^m)
```

Rubi [A] (verified)

Time = 0.61 (sec) , antiderivative size = 109, normalized size of antiderivative = 0.79, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.138$, Rules used = {2777, 2776, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^{m-1}\left(a+b\log\left(cx^n\right)\right)^2}{(d+ex^m)^2}\,dx$$

$$\Big\downarrow \text{ 2777}$$

$$x^{1-m}(fx)^{m-1}\int \frac{x^{m-1}\left(a+b\log\left(cx^n\right)\right)^2}{(ex^m+d)^2}dx$$

$$\Big\downarrow \text{ 2776}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\int \frac{a+b\log(cx^n)}{x(ex^m+d)}dx}{em}-\frac{\left(a+b\log\left(cx^n\right)\right)^2}{em\left(d+ex^m\right)}\right)$$

$$\Big\downarrow \textbf{2779}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{bn\int\frac{\log\left(\frac{dx^{-m}}{e}+1\right)}{x}dx}{dm}-\frac{\log\left(\frac{dx^{-m}}{e}+1\right)(a+b\log(cx^n))}{dm}\right)}{em}-\frac{(a+b\log(cx^n))^2}{em(d+ex^m)}\right)$$

$$\Big\downarrow \textbf{2838}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{bn\operatorname{PolyLog}\left(2,-\frac{dx^{-m}}{e}\right)}{dm^2}-\frac{\log\left(\frac{dx^{-m}}{e}+1\right)(a+b\log(cx^n))}{dm}\right)}{em}-\frac{(a+b\log(cx^n))^2}{em(d+ex^m)}\right)$$

input
```
Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m)^2,x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(-((a + b*Log[c*x^n])^2/(e*m*(d + e*x^m))) + (2*b
*n*(-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^m)])/(d*m)) + (b*n*PolyLog[2, -(d
/(e*x^m))])/(d*m^2)))/(e*m))
```

Defintions of rubi rules used

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [F]

$$\int \frac{(fx)^{m-1} (a+b\ln (c\,x^{n}))^{2}}{(d+e\,x^{m})^{2}}dx$$

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))^2/(d+e*x^m)^2,x)
```

output
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))^2/(d+e*x^m)^2,x)
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 266, normalized size of antiderivative = 1.93

$$\int \frac{(fx)^{-1+m} (a+b\log (cx^n))^2}{(d+ex^m)^2}\,dx$$
$$= \frac{\left(b^2em^2n^2\log (x)^2+2\left(b^2em^2n\log (c)+abem^2n\right)\log (x)\right)f^{m-1}x^m-\left(b^2dm^2\log (c)^2+2\,abdm^2\log (c)+\right.}{}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^2,x, algorithm="fricas
")
```

output
```
((b^2*e*m^2*n^2*log(x)^2 + 2*(b^2*e*m^2*n*log(c) + a*b*e*m^2*n)*log(x))*f^
(m - 1)*x^m - (b^2*d*m^2*log(c)^2 + 2*a*b*d*m^2*log(c) + a^2*d*m^2)*f^(m -
 1) - 2*(b^2*e*f^(m - 1)*n^2*x^m + b^2*d*f^(m - 1)*n^2)*dilog(-(e*x^m + d)
/d + 1) - 2*((b^2*e*m*n*log(c) + a*b*e*m*n)*f^(m - 1)*x^m + (b^2*d*m*n*log
(c) + a*b*d*m*n)*f^(m - 1))*log(e*x^m + d) - 2*(b^2*e*f^(m - 1)*m*n^2*x^m*
log(x) + b^2*d*f^(m - 1)*m*n^2*log(x))*log((e*x^m + d)/d))/(d*e^2*m^3*x^m
+ d^2*e*m^3)
```

Sympy [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx=\int \frac{(fx)^{m-1}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))**2/(d+e*x**m)**2,x)
```

output
```
Integral((f*x)**(m - 1)*(a + b*log(c*x**n))**2/(d + e*x**m)**2, x)
```

Maxima [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx=\int \frac{(b\log(cx^n)+a)^2(fx)^{m-1}}{(ex^m+d)^2}\,dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^2,x, algorithm="maxima
")
```

output
```
2*a*b*f^m*n*(log(x)/(d*e*f*m) - log(e*x^m + d)/(d*e*f*m^2)) - (f^m*log(x^n
)^2/(e^2*f*m*x^m + d*e*f*m) - integrate((e*f^m*m*x^m*log(c)^2 + 2*(d*f^m*n
 + (e*f^m*m*log(c) + e*f^m*n)*x^m)*log(x^n))/(e^3*f*m*x*x^(2*m) + 2*d*e^2*
f*m*x*x^m + d^2*e*f*m*x), x))*b^2 - 2*a*b*f^m*log(c*x^n)/(e^2*f*m*x^m + d*
e*f*m) - a^2*f^m/(e^2*f*m*x^m + d*e*f*m)
```

Giac [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx=\int \frac{(b\log(cx^n)+a)^2(fx)^{m-1}}{(ex^m+d)^2}\,dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*(f*x)^(m - 1)/(e*x^m + d)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx=\int \frac{(f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x^m)^2}\,dx$$

input
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m)^2,x)
```

output
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m)^2, x)
```

Reduce [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx$$
$$=\frac{f^m\left(2x^m\left(\int\frac{\log(x^nc)}{x^{2m}e^2x+2x^mdex+d^2x}dx\right)b^2d^2e\,m^2n-2x^m\log(x^me+d)\,abemn-2x^m\log(x^me+d)\,b^2e\,n^2+2x^m\cdots}{\cdots}$$

input
```
int((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^2,x)
```

output
```
(f**m*(2*x**m*int(log(x**n*c)/(x**(2*m)*e**2*x + 2*x**m*d*e*x + d**2*x),x)
*b**2*d**2*e*m**2*n - 2*x**m*log(x**m*e + d)*a*b*e*m*n - 2*x**m*log(x**m*e
 + d)*b**2*e*n**2 + 2*x**m*log(x)*a*b*e*m**2*n + 2*x**m*log(x)*b**2*e*m*n*
*2 + x**m*a**2*e*m**2 + 2*int(log(x**n*c)/(x**(2*m)*e**2*x + 2*x**m*d*e*x
+ d**2*x),x)*b**2*d**3*m**2*n - 2*log(x**m*e + d)*a*b*d*m*n - 2*log(x**m*e
 + d)*b**2*d*n**2 - log(x**n*c)**2*b**2*d*m**2 - 2*log(x**n*c)*a*b*d*m**2
- 2*log(x**n*c)*b**2*d*m*n + 2*log(x)*a*b*d*m**2*n + 2*log(x)*b**2*d*m*n**
2))/(d*e*f*m**3*(x**m*e + d))
```

3.363 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx$

Optimal result 2704
Mathematica [A] (warning: unable to verify) 2705
Rubi [A] (verified) 2705
Maple [F] 2708
Fricas [B] (verification not implemented) 2709
Sympy [F(-1)] 2709
Maxima [F] 2710
Giac [F] 2710
Mupad [F(-1)] 2711
Reduce [F] 2711

Optimal result

Integrand size = 29, antiderivative size = 214

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx = -\frac{bnx(fx)^{-1+m}(a+b\log(cx^n))}{d^2m^2(d+ex^m)} - \frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))^2}{2em(d+ex^m)^2} - \frac{bnx^{1-m}(fx)^{-1+m}(a+b\log(cx^n))\log\left(1+\frac{dx^{-m}}{e}\right)}{d^2em^2} + \frac{b^2n^2x^{1-m}(fx)^{-1+m}\log(d+ex^m)}{d^2em^3} + \frac{b^2n^2x^{1-m}(fx)^{-1+m}\operatorname{PolyLog}\left(2,-\frac{dx^{-m}}{e}\right)}{d^2em^3}$$

output
```
-b*n*x*(f*x)^(-1+m)*(a+b*ln(c*x^n))/d^2/m^2/(d+e*x^m)-1/2*x^(1-m)*(f*x)^(-
1+m)*(a+b*ln(c*x^n))^2/e/m/(d+e*x^m)^2-b*n*x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*
x^n))*ln(1+d/e/(x^m))/d^2/e/m^2+b^2*n^2*x^(1-m)*(f*x)^(-1+m)*ln(d+e*x^m)/d
^2/e/m^3+b^2*n^2*x^(1-m)*(f*x)^(-1+m)*polylog(2,-d/e/(x^m))/d^2/e/m^3
```

Mathematica [A] (warning: unable to verify)

Time = 0.89 (sec) , antiderivative size = 207, normalized size of antiderivative = 0.97

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx$$

$$= \frac{x^{-m}(fx)^m\left(\frac{2bmn(a+b\log(cx^n))}{d(d+ex^m)} - \frac{m^2(a+b\log(cx^n))^2}{(d+ex^m)^2} - \frac{2abmn\log(d-dx^m)}{d^2} + \frac{2b^2n^2\log(d-dx^m)}{d^2} + \frac{2b^2mn(n\log(x)-\log(cx^n))}{d^2}\right.}{2efm^3}$$

input
```
Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m)^3,x]
```

output
```
((f*x)^m*((2*b*m*n*(a + b*Log[c*x^n]))/(d*(d + e*x^m)) - (m^2*(a + b*Log[c
*x^n])^2)/(d + e*x^m)^2 - (2*a*b*m*n*Log[d - d*x^m])/d^2 + (2*b^2*n^2*Log[
d - d*x^m])/d^2 + (2*b^2*m*n*(n*Log[x] - Log[c*x^n])*Log[d - d*x^m])/d^2 +
 (2*b^2*n^2*((m^2*Log[x]^2)/2 + (-(m*Log[x]) + Log[-((e*x^m)/d)])*Log[d +
e*x^m] + PolyLog[2, 1 + (e*x^m)/d]))/d^2))/(2*e*f*m^3*x^m)
```

Rubi [A] (verified)

Time = 0.95 (sec) , antiderivative size = 172, normalized size of antiderivative = 0.80, number of steps used = 7, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.241$, Rules used = {2777, 2776, 2791, 2773, 792, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^{m-1}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx$$

$$\Big\downarrow \text{2777}$$

$$x^{1-m}(fx)^{m-1}\int \frac{x^{m-1}(a+b\log(cx^n))^2}{(ex^m+d)^3}dx$$

$$\Big\downarrow \text{2776}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\int \frac{a+b\log(cx^n)}{x(ex^m+d)^2}dx}{em}-\frac{(a+b\log(cx^n))^2}{2em(d+ex^m)^2}\right)$$

$\Big\downarrow$ 2791

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^m+d)}dx}{d}-\frac{e\int \frac{x^{m-1}(a+b\log(cx^n))}{(ex^m+d)^2}dx}{d}\right)}{em}-\frac{(a+b\log(cx^n))^2}{2em(d+ex^m)^2}\right)$$

$\Big\downarrow$ 2773

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^m+d)}dx}{d}-\frac{e\left(\frac{x^m(a+b\log(cx^n))}{dm(d+ex^m)}-\frac{bn\int \frac{x^{m-1}}{ex^m+d}dx}{dm}\right)}{d}\right)}{em}-\frac{(a+b\log(cx^n))^2}{2em(d+ex^m)^2}\right)$$

$\Big\downarrow$ 792

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^m+d)}dx}{d}-\frac{e\left(\frac{x^m(a+b\log(cx^n))}{dm(d+ex^m)}-\frac{bn\log(d+ex^m)}{dem^2}\right)}{d}\right)}{em}-\frac{(a+b\log(cx^n))^2}{2em(d+ex^m)^2}\right)$$

$\Big\downarrow$ 2779

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\left(\frac{\frac{bn\int \frac{\log\left(\frac{dx^{-m}}{e}+1\right)}{x}dx}{dm}-\frac{\log\left(\frac{dx^{-m}}{e}+1\right)(a+b\log(cx^n))}{dm}}{d}-\frac{e\left(\frac{x^m(a+b\log(cx^n))}{dm(d+ex^m)}-\frac{bn\log(d+ex^m)}{dem^2}\right)}{d}\right)}{em}-\frac{(a+b\log(c\ldots}{2em(d+e\ldots}\right.$$

$\Big\downarrow$ 2838

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\left(\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-m}}{e}\right)}{dm^2}-\frac{\log\left(\frac{dx^{-m}}{e}+1\right)(a+b\log(cx^n))}{dm}}{d}-\frac{e\left(\frac{x^m(a+b\log(cx^n))}{dm(d+ex^m)}-\frac{bn\log(d+ex^m)}{dem^2}\right)}{d}\right)}{em}-\frac{(a+b\log(}{2em\,(d+e}\right.$$

input
```
Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m)^3,x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(-1/2*(a + b*Log[c*x^n])^2/(e*m*(d + e*x^m)^2) +
(b*n*(-((e*((x^m*(a + b*Log[c*x^n]))/(d*m*(d + e*x^m)) - (b*n*Log[d + e*x^
m])/(d*e*m^2)))/d) + (-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^m)])/(d*m)) + (
b*n*PolyLog[2, -(d/(e*x^m))])/(d*m^2))/d))/(e*m))
```

Defintions of rubi rules used

rule 792
```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2791
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x
^n])^p/x), x], x] - Simp[e/d   Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n
])^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1
]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [F]

$$\int \frac{(fx)^{m-1} (a+b\ln(c\,x^n))^2}{(d+e\,x^m)^3}dx$$

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))^2/(d+e*x^m)^3,x)
```

output
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))^2/(d+e*x^m)^3,x)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 535 vs. 2(211) = 422.

Time = 0.08 (sec) , antiderivative size = 535, normalized size of antiderivative = 2.50

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx$$
$$= \frac{\left(b^2e^2m^2n^2\log(x)^2+2\left(b^2e^2m^2n\log(c)+abe^2m^2n-b^2e^2mn^2\right)\log(x)\right)f^{m-1}x^{2m}+2\left(b^2dem^2n^2\log(x)^2\right.}{}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^3,x, algorithm="fricas
")
```

output
```
1/2*((b^2*e^2*m^2*n^2*log(x)^2 + 2*(b^2*e^2*m^2*n*log(c) + a*b*e^2*m^2*n -
 b^2*e^2*m*n^2)*log(x))*f^(m - 1)*x^(2*m) + 2*(b^2*d*e*m^2*n^2*log(x)^2 +
b^2*d*e*m*n*log(c) + a*b*d*e*m*n + (2*b^2*d*e*m^2*n*log(c) + 2*a*b*d*e*m^2
*n - b^2*d*e*m*n^2)*log(x))*f^(m - 1)*x^m - (b^2*d^2*m^2*log(c)^2 + a^2*d^
2*m^2 - 2*a*b*d^2*m*n + 2*(a*b*d^2*m^2 - b^2*d^2*m*n)*log(c))*f^(m - 1) -
2*(b^2*e^2*f^(m - 1)*n^2*x^(2*m) + 2*b^2*d*e*f^(m - 1)*n^2*x^m + b^2*d^2*f
^(m - 1)*n^2)*dilog(-(e*x^m + d)/d + 1) - 2*((b^2*e^2*m*n*log(c) + a*b*e^2
*m*n - b^2*e^2*n^2)*f^(m - 1)*x^(2*m) + 2*(b^2*d*e*m*n*log(c) + a*b*d*e*m*
n - b^2*d*e*n^2)*f^(m - 1)*x^m + (b^2*d^2*m*n*log(c) + a*b*d^2*m*n - b^2*d
^2*n^2)*f^(m - 1))*log(e*x^m + d) - 2*(b^2*e^2*f^(m - 1)*m*n^2*x^(2*m)*log
(x) + 2*b^2*d*e*f^(m - 1)*m*n^2*x^m*log(x) + b^2*d^2*f^(m - 1)*m*n^2*log(x
))*log((e*x^m + d)/d))/(d^2*e^3*m^3*x^(2*m) + 2*d^3*e^2*m^3*x^m + d^4*e*m^
3)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx = \text{Timed out}$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))**2/(d+e*x**m)**3,x)
```

output
```
Timed out
```

Maxima [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2(fx)^{m-1}}{(ex^m+d)^3}\,dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^3,x, algorithm="maxima
")
```

output
```
a*b*f^m*n*(1/((d*e^2*f*m*x^m + d^2*e*f*m)*m) + log(x)/(d^2*e*f*m) - log(e*
x^m + d)/(d^2*e*f*m^2)) - 1/2*(f^m*log(x^n)^2/(e^3*f*m*x^(2*m) + 2*d*e^2*f
*m*x^m + d^2*e*f*m) - 2*integrate((e*f^m*m*x^m*log(c)^2 + (d*f^m*n + (2*e*
f^m*m*log(c) + e*f^m*n)*x^m)*log(x^n))/(e^4*f*m*x*x^(3*m) + 3*d*e^3*f*m*x*
x^(2*m) + 3*d^2*e^2*f*m*x*x^m + d^3*e*f*m*x), x))*b^2 - a*b*f^m*log(c*x^n)
/(e^3*f*m*x^(2*m) + 2*d*e^2*f*m*x^m + d^2*e*f*m) - 1/2*a^2*f^m/(e^3*f*m*x^
(2*m) + 2*d*e^2*f*m*x^m + d^2*e*f*m)
```

Giac [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2(fx)^{m-1}}{(ex^m+d)^3}\,dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*(f*x)^(m - 1)/(e*x^m + d)^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx=\int \frac{(f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x^m)^3}\,dx$$

input
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m)^3,x)
```

output
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m)^3, x)
```

Reduce [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx$$
$$=\frac{f^m\left(4x^{2m}\left(\int \frac{\log(x^nc)}{x^{3m}e^3x+3x^{2m}d\,e^2x+3x^m d^2ex+d^3x}dx\right)b^2d^3e^2m^2n-4x^{2m}\log(x^me+d)\,ab\,e^2mn-2x^{2m}\log(x^me+\right.}{}$$

input
```
int((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^3,x)
```

output
```
(f**m*(4*x**(2*m)*int(log(x**n*c)/(x**(3*m)*e**3*x + 3*x**(2*m)*d*e**2*x +
 3*x**m*d**2*e*x + d**3*x),x)*b**2*d**3*e**2*m**2*n - 4*x**(2*m)*log(x**m*
e + d)*a*b*e**2*m*n - 2*x**(2*m)*log(x**m*e + d)*b**2*e**2*n**2 + 4*x**(2*
m)*log(x)*a*b*e**2*m**2*n + 2*x**(2*m)*log(x)*b**2*e**2*m*n**2 - 2*x**(2*m
)*a*b*e**2*m*n - x**(2*m)*b**2*e**2*n**2 + 8*x**m*int(log(x**n*c)/(x**(3*m
)*e**3*x + 3*x**(2*m)*d*e**2*x + 3*x**m*d**2*e*x + d**3*x),x)*b**2*d**4*e*
m**2*n - 8*x**m*log(x**m*e + d)*a*b*d*e*m*n - 4*x**m*log(x**m*e + d)*b**2*
d*e*n**2 + 8*x**m*log(x)*a*b*d*e*m**2*n + 4*x**m*log(x)*b**2*d*e*m*n**2 +
4*int(log(x**n*c)/(x**(3*m)*e**3*x + 3*x**(2*m)*d*e**2*x + 3*x**m*d**2*e*x
 + d**3*x),x)*b**2*d**5*m**2*n - 4*log(x**m*e + d)*a*b*d**2*m*n - 2*log(x*
*m*e + d)*b**2*d**2*n**2 - 2*log(x**n*c)**2*b**2*d**2*m**2 - 4*log(x**n*c)
*a*b*d**2*m**2 - 2*log(x**n*c)*b**2*d**2*m*n + 4*log(x)*a*b*d**2*m**2*n +
2*log(x)*b**2*d**2*m*n**2 - 2*a**2*d**2*m**2 + 2*a*b*d**2*m*n + b**2*d**2*
n**2))/(4*d**2*e*f*m**3*(x**(2*m)*e**2 + 2*x**m*d*e + d**2))
```

3.364 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx$

Optimal result 2712
Mathematica [A] (warning: unable to verify) 2713
Rubi [A] (verified) 2713
Maple [F] 2719
Fricas [B] (verification not implemented) 2719
Sympy [F(-1)] 2720
Maxima [F] 2721
Giac [F] 2721
Mupad [F(-1)] 2722
Reduce [F] 2722

Optimal result

Integrand size = 29, antiderivative size = 346

$$\begin{aligned}
&\int \frac{(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)^2}{(d+ex^m)^4}\,dx \\
&= -\frac{b^2n^2x^{1-m}(fx)^{-1+m}}{3d^2em^3\left(d+ex^m\right)} - \frac{b^2n^2x^{1-m}(fx)^{-1+m}\log(x)}{3d^3em^2} \\
&\quad + \frac{bnx^{1-m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)}{3dem^2\left(d+ex^m\right)^2} \\
&\quad - \frac{2bnx(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)}{3d^3m^2\left(d+ex^m\right)} - \frac{x^{1-m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)^2}{3em\left(d+ex^m\right)^3} \\
&\quad - \frac{2bnx^{1-m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)\log\left(1+\frac{dx^{-m}}{e}\right)}{3d^3em^2} \\
&\quad + \frac{b^2n^2x^{1-m}(fx)^{-1+m}\log\left(d+ex^m\right)}{d^3em^3} + \frac{2b^2n^2x^{1-m}(fx)^{-1+m}\operatorname{PolyLog}\left(2,-\frac{dx^{-m}}{e}\right)}{3d^3em^3}
\end{aligned}$$

output
```
-1/3*b^2*n^2*x^(1-m)*(f*x)^(-1+m)/d^2/e/m^3/(d+e*x^m)-1/3*b^2*n^2*x^(1-m)*
(f*x)^(-1+m)*ln(x)/d^3/e/m^2+1/3*b*n*x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/
d/e/m^2/(d+e*x^m)^2-2/3*b*n*x*(f*x)^(-1+m)*(a+b*ln(c*x^n))/d^3/m^2/(d+e*x^
m)-1/3*x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))^2/e/m/(d+e*x^m)^3-2/3*b*n*x^(1
-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))*ln(1+d/e/(x^m))/d^3/e/m^2+b^2*n^2*x^(1-m)
*(f*x)^(-1+m)*ln(d+e*x^m)/d^3/e/m^3+2/3*b^2*n^2*x^(1-m)*(f*x)^(-1+m)*polyl
og(2,-d/e/(x^m))/d^3/e/m^3
```

Mathematica [A] (warning: unable to verify)

Time = 1.19 (sec) , antiderivative size = 240, normalized size of antiderivative = 0.69

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx$$
$$= \frac{x^{-m}(fx)^m\left(\frac{bmn(a+b\log(cx^n))}{d(d+ex^m)^2}-\frac{m^2(a+b\log(cx^n))^2}{(d+ex^m)^3}+\frac{bn(2am-bn+2bm\log(cx^n))}{d^2(d+ex^m)}-\frac{2abmn\log(d-dx^m)}{d^3}+\frac{3b^2n^2\log(d-dx^m)}{d^3}\right.}{3efm}$$

input
```
Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m)^4,x]
```

output
```
((f*x)^m*((b*m*n*(a + b*Log[c*x^n]))/(d*(d + e*x^m)^2) - (m^2*(a + b*Log[c
*x^n])^2)/(d + e*x^m)^3 + (b*n*(2*a*m - b*n + 2*b*m*Log[c*x^n]))/(d^2*(d +
 e*x^m)) - (2*a*b*m*n*Log[d - d*x^m])/d^3 + (3*b^2*n^2*Log[d - d*x^m])/d^3
 + (2*b^2*m*n*(n*Log[x] - Log[c*x^n])*Log[d - d*x^m])/d^3 + (2*b^2*n^2*((m
^2*Log[x]^2)/2 + (-(m*Log[x]) + Log[-((e*x^m)/d)])*Log[d + e*x^m] + PolyLo
g[2, 1 + (e*x^m)/d]))/d^3))/(3*e*f*m^3*x^m)
```

Rubi [A] (verified)

Time = 1.51 (sec) , antiderivative size = 263, normalized size of antiderivative = 0.76, number of steps used = 13, number of rules used = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.414$, Rules used = {2777, 2776, 2791, 2776, 798, 54, 2009, 2791, 2773, 792, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^{m-1}\left(a+b\log\left(cx^n\right)\right)^2}{\left(d+ex^m\right)^4}dx$$

$\Big\downarrow$ 2777

$$x^{1-m}(fx)^{m-1}\int \frac{x^{m-1}\left(a+b\log\left(cx^n\right)\right)^2}{\left(ex^m+d\right)^4}dx$$

$\Big\downarrow$ 2776

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\int \frac{a+b\log(cx^n)}{x(ex^m+d)^3}dx}{3em}-\frac{\left(a+b\log\left(cx^n\right)\right)^2}{3em\left(d+ex^m\right)^3}\right)$$

$\Big\downarrow$ 2791

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^m+d)^2}dx}{d}-\frac{e\int \frac{x^{m-1}(a+b\log(cx^n))}{(ex^m+d)^3}dx}{d}\right)}{3em}-\frac{\left(a+b\log\left(cx^n\right)\right)^2}{3em\left(d+ex^m\right)^3}\right)$$

$\Big\downarrow$ 2776

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^m+d)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(ex^m+d)^2}dx}{2em}-\frac{a+b\log(cx^n)}{2em(d+ex^m)^2}\right)}{d}\right)}{3em}-\frac{\left(a+b\log\left(cx^n\right)\right)^2}{3em\left(d+ex^m\right)^3}\right)$$

$\Big\downarrow$ 798

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^m+d)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{x^{-m}}{(ex^m+d)^2}dx^m}{2em^2}-\frac{a+b\log(cx^n)}{2em(d+ex^m)^2}\right)}{d}\right)}{3em}-\frac{\left(a+b\log\left(cx^n\right)\right)^2}{3em\left(d+ex^m\right)^3}\right)$$

$\Big\downarrow$ 54

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^m+d)^2}dx}{d}-\frac{e\left(\frac{bn\int\left(\frac{x^{-m}}{d^2}-\frac{e}{d^2(ex^m+d)}-\frac{e}{d(ex^m+d)^2}\right)dx^m}{2em^2}-\frac{a+b\log(cx^n)}{2em(d+ex^m)^2}\right)}{d}\right)}{3em}-\frac{(a+b\log(cx^n))^2}{3em(d+ex^m)^3}\right.$$

$\downarrow$ 2009

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^m+d)^2}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^m)}{d^2}+\frac{\log(x^m)}{d^2}+\frac{1}{d(d+ex^m)}\right)}{2em^2}-\frac{a+b\log(cx^n)}{2em(d+ex^m)^2}\right)}{d}\right)}{3em}-\frac{(a+b\log(cx^n))^2}{3em(d+ex^m)^3}\right)$$

$\downarrow$ 2791

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\frac{\int \frac{a+b\log(cx^n)}{x(ex^m+d)}dx}{d}-\frac{e\int \frac{x^{m-1}(a+b\log(cx^n))}{(ex^m+d)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^m)}{d^2}+\frac{\log(x^m)}{d^2}+\frac{1}{d(d+ex^m)}\right)}{2em^2}-\frac{a+b\log(cx^n)}{2em(d+ex^m)^2}\right)}{d}\right)}{3em}\right.$$

$\downarrow$ 2773

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\frac{\int \frac{a+b\log(cx^n)}{x(ex^m+d)}dx}{d}-\frac{e\left(\frac{x^m(a+b\log(cx^n))}{dm(d+ex^m)}-\frac{bn\int \frac{x^{m-1}}{ex^m+d}dx}{dm}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^m)}{d^2}+\frac{\log(x^m)}{d^2}+\frac{1}{d(d+ex^m)}\right)}{2em^2}-\frac{a+b\log(\ldots}{2em(d+e\ldots}\ldots\right.}{d}\ldots\right)}{3em}\ldots\right.$$

$$\Big\downarrow \text{792}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\frac{\int \frac{a+b\log(cx^n)}{x(ex^m+d)}dx}{d}-\frac{e\left(\frac{x^m(a+b\log(cx^n))}{dm(d+ex^m)}-\frac{bn\log(d+ex^m)}{dem^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^m)}{d^2}+\frac{\log(x^m)}{d^2}+\frac{1}{d(d+ex^m)}\right)}{2em^2}-\frac{a+b\log(\ldots}{2em(d+e\ldots}\ldots\right.}{d}\ldots\right)}{3em}\ldots\right.$$

$$\Big\downarrow \text{2779}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\frac{\frac{bn\int \frac{\log\left(\frac{dx^{-m}}{e}+1\right)}{x}dx}{dm}-\frac{\log\left(\frac{dx^{-m}}{e}+1\right)(a+b\log(cx^n))}{dm}}{d}-\frac{e\left(\frac{x^m(a+b\log(cx^n))}{dm(d+ex^m)}-\frac{bn\log(d+ex^m)}{dem^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^{\ldots}}{d^2}\ldots\right.}{\ldots}\right.}{\ldots}\ldots\right)}{3em}\ldots\right.$$

$$\Big\downarrow \text{2838}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-m}}{e}\right)}{dm^2}-\frac{\log\left(\frac{dx^{-m}}{e}+1\right)(a+b\log(cx^n))}{dm}}{d}-\frac{e\left(\frac{x^m(a+b\log(cx^n))}{dm(d+ex^m)}-\frac{bn\log(d+ex^m)}{dem^2}\right)}{d}}{d}-\frac{e\left(bn\left(-\frac{\log(d+ex}{d^2}\right.\right.}{}\right.}{3em}\right.$$

input
```
Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m)^4,x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(-1/3*(a + b*Log[c*x^n])^2/(e*m*(d + e*x^m)^3) +
(2*b*n*(-((e*(-1/2*(a + b*Log[c*x^n])/(e*m*(d + e*x^m)^2) + (b*n*(1/(d*(d
+ e*x^m)) + Log[x^m]/d^2 - Log[d + e*x^m]/d^2))/(2*e*m^2)))/d) + (-((e*((x
^m*(a + b*Log[c*x^n]))/(d*m*(d + e*x^m)) - (b*n*Log[d + e*x^m])/(d*e*m^2))
)/d) + (-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^m)])/(d*m)) + (b*n*PolyLog[2,
 -(d/(e*x^m))])/(d*m^2))/d)/d))/(3*e*m))
```

Defintions of rubi rules used

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 792
```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

rule 798
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[1/n   Subst
[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a,
b, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2791
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x
^n])^p/x), x], x] - Simp[e/d   Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n
])^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1
]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [F]

$$\int \frac{(fx)^{m-1} (a+b\ln (c\,x^{n}))^{2}}{(d+e\,x^{m})^{4}}dx$$

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))^2/(d+e*x^m)^4,x)
```

output
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))^2/(d+e*x^m)^4,x)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 810 vs. 2(331) = 662.

Time = 0.09 (sec) , antiderivative size = 810, normalized size of antiderivative = 2.34

$$\int \frac{(fx)^{-1+m} (a+b\log (cx^n))^2}{(d+ex^m)^4} \, dx = \text{Too large to display}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^4,x, algorithm="fricas
")
```

output
```
1/3*((b^2*e^3*m^2*n^2*log(x)^2 + (2*b^2*e^3*m^2*n*log(c) + 2*a*b*e^3*m^2*n
 - 3*b^2*e^3*m*n^2)*log(x))*f^(m - 1)*x^(3*m) + (3*b^2*d*e^2*m^2*n^2*log(x
)^2 + 2*b^2*d*e^2*m*n*log(c) + 2*a*b*d*e^2*m*n - b^2*d*e^2*n^2 + (6*b^2*d*
e^2*m^2*n*log(c) + 6*a*b*d*e^2*m^2*n - 7*b^2*d*e^2*m*n^2)*log(x))*f^(m - 1
)*x^(2*m) + (3*b^2*d^2*e*m^2*n^2*log(x)^2 + 5*b^2*d^2*e*m*n*log(c) + 5*a*b
*d^2*e*m*n - 2*b^2*d^2*e*n^2 + 2*(3*b^2*d^2*e*m^2*n*log(c) + 3*a*b*d^2*e*m
^2*n - 2*b^2*d^2*e*m*n^2)*log(x))*f^(m - 1)*x^m - (b^2*d^3*m^2*log(c)^2 +
a^2*d^3*m^2 - 3*a*b*d^3*m*n + b^2*d^3*n^2 + (2*a*b*d^3*m^2 - 3*b^2*d^3*m*n
)*log(c))*f^(m - 1) - 2*(b^2*e^3*f^(m - 1)*n^2*x^(3*m) + 3*b^2*d*e^2*f^(m
- 1)*n^2*x^(2*m) + 3*b^2*d^2*e*f^(m - 1)*n^2*x^m + b^2*d^3*f^(m - 1)*n^2)*
dilog(-(e*x^m + d)/d + 1) - ((2*b^2*e^3*m*n*log(c) + 2*a*b*e^3*m*n - 3*b^2
*e^3*n^2)*f^(m - 1)*x^(3*m) + 3*(2*b^2*d*e^2*m*n*log(c) + 2*a*b*d*e^2*m*n
- 3*b^2*d*e^2*n^2)*f^(m - 1)*x^(2*m) + 3*(2*b^2*d^2*e*m*n*log(c) + 2*a*b*d
^2*e*m*n - 3*b^2*d^2*e*n^2)*f^(m - 1)*x^m + (2*b^2*d^3*m*n*log(c) + 2*a*b*
d^3*m*n - 3*b^2*d^3*n^2)*f^(m - 1))*log(e*x^m + d) - 2*(b^2*e^3*f^(m - 1)*
m*n^2*x^(3*m)*log(x) + 3*b^2*d*e^2*f^(m - 1)*m*n^2*x^(2*m)*log(x) + 3*b^2*
d^2*e*f^(m - 1)*m*n^2*x^m*log(x) + b^2*d^3*f^(m - 1)*m*n^2*log(x))*log((e*
x^m + d)/d))/(d^3*e^4*m^3*x^(3*m) + 3*d^4*e^3*m^3*x^(2*m) + 3*d^5*e^2*m^3*
x^m + d^6*e*m^3)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx = \text{Timed out}$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))**2/(d+e*x**m)**4,x)
```

output
```
Timed out
```

Maxima [F]

$$\int \frac{(fx)^{-1+m} (a + b \log (cx^n))^2}{(d + ex^m)^4} \, dx = \int \frac{(b \log (cx^n) + a)^2 (fx)^{m-1}}{(ex^m + d)^4} \, dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^4,x, algorithm="maxima
")
```

output
```
1/3*a*b*f^m*n*((2*e*x^m + 3*d)/((d^2*e^3*f*m*x^(2*m) + 2*d^3*e^2*f*m*x^m +
 d^4*e*f*m)*m) + 2*log(x)/(d^3*e*f*m) - 2*log(e*x^m + d)/(d^3*e*f*m^2)) -
1/3*(f^m*log(x^n)^2/(e^4*f*m*x^(3*m) + 3*d*e^3*f*m*x^(2*m) + 3*d^2*e^2*f*m
*x^m + d^3*e*f*m) - 3*integrate(1/3*(3*e*f^m*m*x^m*log(c)^2 + 2*(d*f^m*n +
 (3*e*f^m*m*log(c) + e*f^m*n)*x^m)*log(x^n))/(e^5*f*m*x*x^(4*m) + 4*d*e^4*
f*m*x*x^(3*m) + 6*d^2*e^3*f*m*x*x^(2*m) + 4*d^3*e^2*f*m*x*x^m + d^4*e*f*m*
x), x))*b^2 - 2/3*a*b*f^m*log(c*x^n)/(e^4*f*m*x^(3*m) + 3*d*e^3*f*m*x^(2*m
) + 3*d^2*e^2*f*m*x^m + d^3*e*f*m) - 1/3*a^2*f^m/(e^4*f*m*x^(3*m) + 3*d*e^
3*f*m*x^(2*m) + 3*d^2*e^2*f*m*x^m + d^3*e*f*m)
```

Giac [F]

$$\int \frac{(fx)^{-1+m} (a + b \log (cx^n))^2}{(d + ex^m)^4} \, dx = \int \frac{(b \log (cx^n) + a)^2 (fx)^{m-1}}{(ex^m + d)^4} \, dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*(f*x)^(m - 1)/(e*x^m + d)^4, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx = \int \frac{(f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x^m)^4}\,dx$$

input
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m)^4,x)
```

output
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m)^4, x)
```

Reduce [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx = \text{Too large to display}$$

input
```
int((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^4,x)
```

output

```
(f**m*(18*x**(3*m)*int(log(x**n*c)/(x**(4*m)*e**4*x + 4*x**(3*m)*d*e**3*x
+ 6*x**(2*m)*d**2*e**2*x + 4*x**m*d**3*e*x + d**4*x),x)*b**2*d**4*e**3*m**
2*n - 18*x**(3*m)*log(x**m*e + d)*a*b*e**3*m*n - 6*x**(3*m)*log(x**m*e + d
)*b**2*e**3*n**2 + 18*x**(3*m)*log(x)*a*b*e**3*m**2*n + 6*x**(3*m)*log(x)*
b**2*e**3*m*n**2 - 6*x**(3*m)*a*b*e**3*m*n - 2*x**(3*m)*b**2*e**3*n**2 + 5
4*x**(2*m)*int(log(x**n*c)/(x**(4*m)*e**4*x + 4*x**(3*m)*d*e**3*x + 6*x**(
2*m)*d**2*e**2*x + 4*x**m*d**3*e*x + d**4*x),x)*b**2*d**5*e**2*m**2*n - 54
*x**(2*m)*log(x**m*e + d)*a*b*d*e**2*m*n - 18*x**(2*m)*log(x**m*e + d)*b**
2*d*e**2*n**2 + 54*x**(2*m)*log(x)*a*b*d*e**2*m**2*n + 18*x**(2*m)*log(x)*
b**2*d*e**2*m*n**2 + 54*x**m*int(log(x**n*c)/(x**(4*m)*e**4*x + 4*x**(3*m)
*d*e**3*x + 6*x**(2*m)*d**2*e**2*x + 4*x**m*d**3*e*x + d**4*x),x)*b**2*d**
6*e*m**2*n - 54*x**m*log(x**m*e + d)*a*b*d**2*e*m*n - 18*x**m*log(x**m*e +
 d)*b**2*d**2*e*n**2 + 54*x**m*log(x)*a*b*d**2*e*m**2*n + 18*x**m*log(x)*b
**2*d**2*e*m*n**2 + 27*x**m*a*b*d**2*e*m*n + 9*x**m*b**2*d**2*e*n**2 + 18*
int(log(x**n*c)/(x**(4*m)*e**4*x + 4*x**(3*m)*d*e**3*x + 6*x**(2*m)*d**2*e
**2*x + 4*x**m*d**3*e*x + d**4*x),x)*b**2*d**7*m**2*n - 18*log(x**m*e + d)
*a*b*d**3*m*n - 6*log(x**m*e + d)*b**2*d**3*n**2 - 9*log(x**n*c)**2*b**2*d
**3*m**2 - 18*log(x**n*c)*a*b*d**3*m**2 - 6*log(x**n*c)*b**2*d**3*m*n + 18
*log(x)*a*b*d**3*m**2*n + 6*log(x)*b**2*d**3*m*n**2 - 9*a**2*d**3*m**2 + 2
1*a*b*d**3*m*n + 7*b**2*d**3*n**2))/(27*d**3*e*f*m**3*(x**(3*m)*e**3 + ...
```

3.365 $\int x^5(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal result 2724
Mathematica [A] (verified) 2724
Rubi [A] (verified) 2725
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Mupad [F(-1)] 2729
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Optimal result

Integrand size = 21, antiderivative size = 59

$$\int x^5(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{36}bdnx^6-\frac{benx^{6+r}}{(6+r)^2}+\frac{1}{6}\left(dx^6+\frac{6ex^{6+r}}{6+r}\right)\left(a+b\log\left(cx^n\right)\right)$$

output
```
-1/36*b*d*n*x^6-b*e*n*x^(6+r)/(6+r)^2+1/6*(d*x^6+6*e*x^(6+r)/(6+r))*(a+b*l
n(c*x^n))
```

Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 73, normalized size of antiderivative = 1.24

$$\int x^5(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{x^6\left(6a(6+r)\left(d(6+r)+6ex^r\right)-bn\left(d(6+r)^2+36ex^r\right)+6b(6+r)\left(d(6+r)+6ex^r\right)\log\left(cx^n\right)\right)}{36(6+r)^2}$$

input
```
Integrate[x^5*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
(x^6*(6*a*(6 + r)*(d*(6 + r) + 6*e*x^r) - b*n*(d*(6 + r)^2 + 36*e*x^r) + 6
*b*(6 + r)*(d*(6 + r) + 6*e*x^r)*Log[c*x^n]))/(36*(6 + r)^2)
```

Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 62, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2771, 27, 802, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^5(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{6}\left(dx^6+\frac{6ex^{r+6}}{r+6}\right)\left(a+b\log\left(cx^n\right)\right)-bn\int \frac{1}{6}x^5\left(\frac{6ex^r}{r+6}+d\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{6}\left(dx^6+\frac{6ex^{r+6}}{r+6}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{6}bn\int x^5\left(\frac{6ex^r}{r+6}+d\right)dx$$

$$\Big\downarrow \text{802}$$

$$\frac{1}{6}\left(dx^6+\frac{6ex^{r+6}}{r+6}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{6}bn\int \left(\frac{6ex^{r+5}}{r+6}+dx^5\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{6}\left(dx^6+\frac{6ex^{r+6}}{r+6}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{6}bn\left(\frac{dx^6}{6}+\frac{6ex^{r+6}}{(r+6)^2}\right)$$

input
```
Int[x^5*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
-1/6*(b*n*((d*x^6)/6 + (6*e*x^(6 + r))/(6 + r)^2)) + ((d*x^6 + (6*e*x^(6 +
 r))/(6 + r))*(a + b*Log[c*x^n]))/6
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 802
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 173 vs. $2(55) = 110$.

Time = 6.68 (sec) , antiderivative size = 174, normalized size of antiderivative = 2.95

method	result
parallelrisch	$-\frac{-36x^6x^r\ln(c\,x^n)ber-6x^6\ln(c\,x^n)bd\,r^2+x^6bdn\,r^2-216x^6x^r\ln(c\,x^n)be-36x^6x^raer+36x^6x^rben-72x^6\ln(c\,x^n)bdr-6x^6a}{36(r^2+12r+36)}$
risch	$\frac{b\,x^6(dr+6e\,x^r+6d)\ln(x^n)}{36+6r}-\frac{x^6\left(-36x^raer+36x^rben-6\ln(c)bd\,r^2-72\ln(c)bdr-216da+36bdn-216x^rae+bdn\,r^2+12bdnr\right.}{}$

input
```
int(x^5*(d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/36*(-36*x^6*x^r*ln(c*x^n)*b*e*r-6*x^6*ln(c*x^n)*b*d*r^2+x^6*b*d*n*r^2-2
16*x^6*x^r*ln(c*x^n)*b*e-36*x^6*x^r*a*e*r+36*x^6*x^r*b*e*n-72*x^6*ln(c*x^n
)*b*d*r-6*x^6*a*d*r^2+12*x^6*b*d*n*r-216*x^6*x^r*a*e-216*x^6*ln(c*x^n)*b*d
-72*x^6*a*d*r+36*b*d*n*x^6-216*d*a*x^6)/(r^2+12*r+36)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 159 vs. $2(55) = 110$.

Time = 0.08 (sec) , antiderivative size = 159, normalized size of antiderivative = 2.69

$$\int x^5(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$= \frac{6\left(bdr^2+12\,bdr+36\,bd\right)x^6\log\left(c\right)+6\left(bdnr^2+12\,bdnr+36\,bdn\right)x^6\log\left(x\right)-\left(36\,bdn+\left(bdn-6\,ad\right)r^2\right.}{36\,(r^2}$$

input
```
integrate(x^5*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/36*(6*(b*d*r^2 + 12*b*d*r + 36*b*d)*x^6*log(c) + 6*(b*d*n*r^2 + 12*b*d*n
*r + 36*b*d*n)*x^6*log(x) - (36*b*d*n + (b*d*n - 6*a*d)*r^2 - 216*a*d + 12
*(b*d*n - 6*a*d)*r)*x^6 + 36*((b*e*r + 6*b*e)*x^6*log(c) + (b*e*n*r + 6*b*
e*n)*x^6*log(x) - (b*e*n - a*e*r - 6*a*e)*x^6)*x^r)/(r^2 + 12*r + 36)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 398 vs. $2(51) = 102$.

Time = 8.53 (sec) , antiderivative size = 398, normalized size of antiderivative = 6.75

$$\int x^5(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$= \begin{cases} \frac{6adr^2x^6}{36r^2+432r+1296}+\frac{72adrx^6}{36r^2+432r+1296}+\frac{216adx^6}{36r^2+432r+1296}+\frac{36aerx^6x^r}{36r^2+432r+1296}+\frac{216aex^6x^r}{36r^2+432r+1296}-\frac{bdnr^2x^6}{36r^2+432r+1296}-\frac{12}{36r^2+} \\ \frac{adx^6}{6}+\frac{ae\log\left(cx^n\right)}{n}-\frac{bdnx^6}{36}+\frac{bdx^6\log\left(cx^n\right)}{6}+\frac{be\log\left(cx^n\right)^2}{2n} \end{cases}$$

input
```
integrate(x**5*(d+e*x**r)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((6*a*d*r**2*x**6/(36*r**2 + 432*r + 1296) + 72*a*d*r*x**6/(36*r*
*2 + 432*r + 1296) + 216*a*d*x**6/(36*r**2 + 432*r + 1296) + 36*a*e*r*x**6
*x**r/(36*r**2 + 432*r + 1296) + 216*a*e*x**6*x**r/(36*r**2 + 432*r + 1296
) - b*d*n*r**2*x**6/(36*r**2 + 432*r + 1296) - 12*b*d*n*r*x**6/(36*r**2 +
432*r + 1296) - 36*b*d*n*x**6/(36*r**2 + 432*r + 1296) + 6*b*d*r**2*x**6*l
og(c*x**n)/(36*r**2 + 432*r + 1296) + 72*b*d*r*x**6*log(c*x**n)/(36*r**2 +
 432*r + 1296) + 216*b*d*x**6*log(c*x**n)/(36*r**2 + 432*r + 1296) - 36*b*
e*n*x**6*x**r/(36*r**2 + 432*r + 1296) + 36*b*e*r*x**6*x**r*log(c*x**n)/(3
6*r**2 + 432*r + 1296) + 216*b*e*x**6*x**r*log(c*x**n)/(36*r**2 + 432*r +
1296), Ne(r, -6)), (a*d*x**6/6 + a*e*log(c*x**n)/n - b*d*n*x**6/36 + b*d*x
**6*log(c*x**n)/6 + b*e*log(c*x**n)**2/(2*n), True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 76, normalized size of antiderivative = 1.29

$$\int x^5(d+ex^r)\,(a+b\log{(cx^n)})\,\,dx = -\frac{1}{36}\,bdnx^6+\frac{1}{6}\,bdx^6\log{(cx^n)}+\frac{1}{6}\,adx^6 + \frac{bex^{r+6}\log{(cx^n)}}{r+6} - \frac{benx^{r+6}}{(r+6)^2} + \frac{aex^{r+6}}{r+6}$$

input
```
integrate(x^5*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/36*b*d*n*x^6 + 1/6*b*d*x^6*log(c*x^n) + 1/6*a*d*x^6 + b*e*x^(r + 6)*log
(c*x^n)/(r + 6) - b*e*n*x^(r + 6)/(r + 6)^2 + a*e*x^(r + 6)/(r + 6)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 132 vs. 2(55) = 110.

Time = 0.12 (sec) , antiderivative size = 132, normalized size of antiderivative = 2.24

$$\int x^5(d+ex^r)\,(a+b\log{(cx^n)})\,\,dx = \frac{benrx^6x^r\log{(x)}}{r^2+12\,r+36}+\frac{6\,benx^6x^r\log{(x)}}{r^2+12\,r+36} + \frac{1}{6}\,bdnx^6\log{(x)} - \frac{benx^6x^r}{r^2+12\,r+36} - \frac{1}{36}\,bdnx^6 + \frac{bex^6x^r\log{(c)}}{r+6} + \frac{1}{6}\,bdx^6\log{(c)} + \frac{aex^6x^r}{r+6} + \frac{1}{6}\,adx^6$$

input
```
integrate(x^5*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e*n*r*x^6*x^r*log(x)/(r^2 + 12*r + 36) + 6*b*e*n*x^6*x^r*log(x)/(r^2 + 1
2*r + 36) + 1/6*b*d*n*x^6*log(x) - b*e*n*x^6*x^r/(r^2 + 12*r + 36) - 1/36*
b*d*n*x^6 + b*e*x^6*x^r*log(c)/(r + 6) + 1/6*b*d*x^6*log(c) + a*e*x^6*x^r/
(r + 6) + 1/6*a*d*x^6
```

Mupad [F(-1)]

Timed out.

$$\int x^5(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx=\int x^5\left(d+e\,x^r\right)\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x^5*(d + e*x^r)*(a + b*log(c*x^n)),x)
```

output
```
int(x^5*(d + e*x^r)*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 136, normalized size of antiderivative = 2.31

$$\int x^5(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$=\frac{x^6\left(36x^r\log\left(x^nc\right)ber+216x^r\log\left(x^nc\right)be+36x^raer+216x^rae-36x^rben+6\log\left(x^nc\right)bd\,r^2+72\log\left(x^nc\right.\right.}{36r^2+432r+1296}$$

input
```
int(x^5*(d+e*x^r)*(a+b*log(c*x^n)),x)
```

output
```
(x**6*(36*x**r*log(x**n*c)*b*e*r + 216*x**r*log(x**n*c)*b*e + 36*x**r*a*e*
r + 216*x**r*a*e - 36*x**r*b*e*n + 6*log(x**n*c)*b*d*r**2 + 72*log(x**n*c)
*b*d*r + 216*log(x**n*c)*b*d + 6*a*d*r**2 + 72*a*d*r + 216*a*d - b*d*n*r**
2 - 12*b*d*n*r - 36*b*d*n))/(36*(r**2 + 12*r + 36))
```

3.366 $\int x^3(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal result . . . 2730
Mathematica [A] (verified) . . . 2730
Rubi [A] (verified) . . . 2731
Maple [B] (verified) . . . 2732
Fricas [B] (verification not implemented) . . . 2733
Sympy [B] (verification not implemented) . . . 2733
Maxima [A] (verification not implemented) . . . 2734
Giac [B] (verification not implemented) . . . 2734
Mupad [F(-1)] . . . 2735
Reduce [B] (verification not implemented) . . . 2735

Optimal result

Integrand size = 21, antiderivative size = 59

$$\int x^3(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{16}bdnx^4-\frac{benx^{4+r}}{(4+r)^2}+\frac{1}{4}\left(dx^4+\frac{4ex^{4+r}}{4+r}\right)\left(a+b\log\left(cx^n\right)\right)$$

output
```
-1/16*b*d*n*x^4-b*e*n*x^(4+r)/(4+r)^2+1/4*(d*x^4+4*e*x^(4+r)/(4+r))*(a+b*l
n(c*x^n))
```

Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 73, normalized size of antiderivative = 1.24

$$\int x^3(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{x^4\left(4a(4+r)\left(d(4+r)+4ex^r\right)-bn\left(d(4+r)^2+16ex^r\right)+4b(4+r)\left(d(4+r)+4ex^r\right)\log\left(cx^n\right)\right)}{16(4+r)^2}$$

input
```
Integrate[x^3*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
(x^4*(4*a*(4 + r)*(d*(4 + r) + 4*e*x^r) - b*n*(d*(4 + r)^2 + 16*e*x^r) + 4
*b*(4 + r)*(d*(4 + r) + 4*e*x^r)*Log[c*x^n]))/(16*(4 + r)^2)
```

Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 62, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2771, 27, 802, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3(d+ex^r)(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{4}\left(dx^4+\frac{4ex^{r+4}}{r+4}\right)(a+b\log(cx^n))-bn\int \frac{1}{4}x^3\left(\frac{4ex^r}{r+4}+d\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}\left(dx^4+\frac{4ex^{r+4}}{r+4}\right)(a+b\log(cx^n))-\frac{1}{4}bn\int x^3\left(\frac{4ex^r}{r+4}+d\right)dx$$

$$\Big\downarrow \text{802}$$

$$\frac{1}{4}\left(dx^4+\frac{4ex^{r+4}}{r+4}\right)(a+b\log(cx^n))-\frac{1}{4}bn\int \left(\frac{4ex^{r+3}}{r+4}+dx^3\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\left(dx^4+\frac{4ex^{r+4}}{r+4}\right)(a+b\log(cx^n))-\frac{1}{4}bn\left(\frac{dx^4}{4}+\frac{4ex^{r+4}}{(r+4)^2}\right)$$

input
```
Int[x^3*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
-1/4*(b*n*((d*x^4)/4 + (4*e*x^(4 + r))/(4 + r)^2)) + ((d*x^4 + (4*e*x^(4 +
 r))/(4 + r))*(a + b*Log[c*x^n]))/4
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 802
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 168 vs. $2(55) = 110$.

Time = 1.94 (sec) , antiderivative size = 169, normalized size of antiderivative = 2.86

method	result
parallelrisch	$-\frac{-16x^4x^r\ln(c\,x^n)ber-4x^4\ln(c\,x^n)bd\,r^2+x^4bdn\,r^2-64x^4x^r\ln(c\,x^n)be-16x^4x^r aer+16x^4x^r ben-32x^4\ln(c\,x^n)bdr-4x^4ad}{16(4+r)^2}$
risch	$\frac{b\,x^4(dr+4e\,x^r+4d)\ln(x^n)}{16+4r}-\frac{x^4\left(-16x^r aer+16x^r ben-4\ln(c)bd\,r^2-32\ln(c)bdr-64da+16bdn-64x^r ae+bdn\,r^2+8bdnr-6\right.}{}$

input
```
int(x^3*(d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/16*(-16*x^4*x^r*ln(c*x^n)*b*e*r-4*x^4*ln(c*x^n)*b*d*r^2+x^4*b*d*n*r^2-6
4*x^4*x^r*ln(c*x^n)*b*e-16*x^4*x^r*a*e*r+16*x^4*x^r*b*e*n-32*x^4*ln(c*x^n)
*b*d*r-4*x^4*a*d*r^2+8*x^4*b*d*n*r-64*x^4*x^r*a*e-64*x^4*ln(c*x^n)*b*d-32*
x^4*a*d*r+16*b*d*n*x^4-64*d*a*x^4)/(4+r)^2
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 159 vs. 2(55) = 110.

Time = 0.08 (sec) , antiderivative size = 159, normalized size of antiderivative = 2.69

$$\int x^3(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$=\frac{4\left(bdr^2+8\,bdr+16\,bd\right)x^4\log\left(c\right)+4\left(bdnr^2+8\,bdnr+16\,bdn\right)x^4\log\left(x\right)-\left(16\,bdn+\left(bdn-4\,ad\right)r^2-6\right.}{16\left(r^2\right.}$$

input
```
integrate(x^3*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/16*(4*(b*d*r^2 + 8*b*d*r + 16*b*d)*x^4*log(c) + 4*(b*d*n*r^2 + 8*b*d*n*r
 + 16*b*d*n)*x^4*log(x) - (16*b*d*n + (b*d*n - 4*a*d)*r^2 - 64*a*d + 8*(b*
d*n - 4*a*d)*r)*x^4 + 16*((b*e*r + 4*b*e)*x^4*log(c) + (b*e*n*r + 4*b*e*n)
*x^4*log(x) - (b*e*n - a*e*r - 4*a*e)*x^4)*x^r)/(r^2 + 8*r + 16)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 398 vs. 2(51) = 102.

Time = 2.79 (sec) , antiderivative size = 398, normalized size of antiderivative = 6.75

$$\int x^3(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$=\begin{cases}\frac{4adr^2x^4}{16r^2+128r+256}+\frac{32adrx^4}{16r^2+128r+256}+\frac{64adx^4}{16r^2+128r+256}+\frac{16aerx^4x^r}{16r^2+128r+256}+\frac{64aex^4x^r}{16r^2+128r+256}-\frac{bdnr^2x^4}{16r^2+128r+256}-\frac{8bdnrx^4}{16r^2+128r+}\\ \frac{adx^4}{4}+\frac{ae\log\left(cx^n\right)}{n}-\frac{bdnx^4}{16}+\frac{bdx^4\log\left(cx^n\right)}{4}+\frac{be\log\left(cx^n\right)^2}{2n}\end{cases}$$

input
```
integrate(x**3*(d+e*x**r)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((4*a*d*r**2*x**4/(16*r**2 + 128*r + 256) + 32*a*d*r*x**4/(16*r**
2 + 128*r + 256) + 64*a*d*x**4/(16*r**2 + 128*r + 256) + 16*a*e*r*x**4*x**
r/(16*r**2 + 128*r + 256) + 64*a*e*x**4*x**r/(16*r**2 + 128*r + 256) - b*d
*n*r**2*x**4/(16*r**2 + 128*r + 256) - 8*b*d*n*r*x**4/(16*r**2 + 128*r + 2
56) - 16*b*d*n*x**4/(16*r**2 + 128*r + 256) + 4*b*d*r**2*x**4*log(c*x**n)/
(16*r**2 + 128*r + 256) + 32*b*d*r*x**4*log(c*x**n)/(16*r**2 + 128*r + 256
) + 64*b*d*x**4*log(c*x**n)/(16*r**2 + 128*r + 256) - 16*b*e*n*x**4*x**r/(
16*r**2 + 128*r + 256) + 16*b*e*r*x**4*x**r*log(c*x**n)/(16*r**2 + 128*r +
 256) + 64*b*e*x**4*x**r*log(c*x**n)/(16*r**2 + 128*r + 256), Ne(r, -4)),
(a*d*x**4/4 + a*e*log(c*x**n)/n - b*d*n*x**4/16 + b*d*x**4*log(c*x**n)/4 +
 b*e*log(c*x**n)**2/(2*n), True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 76, normalized size of antiderivative = 1.29

$$\int x^3(d+ex^r)\,(a+b\log{(cx^n)})\;dx = -\frac{1}{16}\,bdnx^4+\frac{1}{4}\,bdx^4\log{(cx^n)}+\frac{1}{4}\,adx^4+\frac{bex^{r+4}\log{(cx^n)}}{r+4}-\frac{benx^{r+4}}{(r+4)^2}+\frac{aex^{r+4}}{r+4}$$

input
```
integrate(x^3*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/16*b*d*n*x^4 + 1/4*b*d*x^4*log(c*x^n) + 1/4*a*d*x^4 + b*e*x^(r + 4)*log
(c*x^n)/(r + 4) - b*e*n*x^(r + 4)/(r + 4)^2 + a*e*x^(r + 4)/(r + 4)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 132 vs. $2(55) = 110$.

Time = 0.12 (sec) , antiderivative size = 132, normalized size of antiderivative = 2.24

$$\int x^3(d+ex^r)\,(a+b\log{(cx^n)})\;dx = \frac{benrx^4x^r\log{(x)}}{r^2+8\,r+16}+\frac{4\,benx^4x^r\log{(x)}}{r^2+8\,r+16}+\frac{1}{4}\,bdnx^4\log{(x)}-\frac{benx^4x^r}{r^2+8\,r+16}-\frac{1}{16}\,bdnx^4+\frac{bex^4x^r\log{(c)}}{r+4}+\frac{1}{4}\,bdx^4\log{(c)}+\frac{aex^4x^r}{r+4}+\frac{1}{4}\,adx^4$$

input
```
integrate(x^3*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e*n*r*x^4*x^r*log(x)/(r^2 + 8*r + 16) + 4*b*e*n*x^4*x^r*log(x)/(r^2 + 8*
r + 16) + 1/4*b*d*n*x^4*log(x) - b*e*n*x^4*x^r/(r^2 + 8*r + 16) - 1/16*b*d
*n*x^4 + b*e*x^4*x^r*log(c)/(r + 4) + 1/4*b*d*x^4*log(c) + a*e*x^4*x^r/(r
+ 4) + 1/4*a*d*x^4
```

Mupad [F(-1)]

Timed out.

$$\int x^3(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx=\int x^3\left(d+e\,x^r\right)\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x^3*(d + e*x^r)*(a + b*log(c*x^n)),x)
```

output
```
int(x^3*(d + e*x^r)*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 136, normalized size of antiderivative = 2.31

$$\int x^3(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$=\frac{x^4(16x^r\log(x^nc)\,ber+64x^r\log(x^nc)\,be+16x^raer+64x^rae-16x^rben+4\log(x^nc)\,bd\,r^2+32\log(x^nc)\,b}{16r^2+128r+256}$$

input
```
int(x^3*(d+e*x^r)*(a+b*log(c*x^n)),x)
```

output
```
(x**4*(16*x**r*log(x**n*c)*b*e*r + 64*x**r*log(x**n*c)*b*e + 16*x**r*a*e*r
 + 64*x**r*a*e - 16*x**r*b*e*n + 4*log(x**n*c)*b*d*r**2 + 32*log(x**n*c)*b
*d*r + 64*log(x**n*c)*b*d + 4*a*d*r**2 + 32*a*d*r + 64*a*d - b*d*n*r**2 -
8*b*d*n*r - 16*b*d*n))/(16*(r**2 + 8*r + 16))
```

3.367 $\int x(d+ex^r)(a+b\log(cx^n))\,dx$

Optimal result 2736
Mathematica [A] (verified) 2736
Rubi [A] (verified) 2737
Maple [B] (verified) 2738
Fricas [B] (verification not implemented) 2739
Sympy [B] (verification not implemented) 2739
Maxima [A] (verification not implemented) 2740
Giac [B] (verification not implemented) 2740
Mupad [F(-1)] 2741
Reduce [B] (verification not implemented) 2741

Optimal result

Integrand size = 19, antiderivative size = 59

$$\int x(d+ex^r)(a+b\log(cx^n))\,dx=-\frac{1}{4}bdnx^2-\frac{benx^{2+r}}{(2+r)^2}+\frac{1}{2}\left(dx^2+\frac{2ex^{2+r}}{2+r}\right)(a+b\log(cx^n))$$

output
```
-1/4*b*d*n*x^2-b*e*n*x^(2+r)/(2+r)^2+1/2*(d*x^2+2*e*x^(2+r)/(2+r))*(a+b*ln
(c*x^n))
```

Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 73, normalized size of antiderivative = 1.24

$$\int x(d+ex^r)(a+b\log(cx^n))\,dx=\frac{x^2(2a(2+r)(d(2+r)+2ex^r)-bn(d(2+r)^2+4ex^r)+2b(2+r)(d(2+r)+2ex^r)\log(cx^n))}{4(2+r)^2}$$

input
```
Integrate[x*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
(x^2*(2*a*(2 + r)*(d*(2 + r) + 2*e*x^r) - b*n*(d*(2 + r)^2 + 4*e*x^r) + 2*
b*(2 + r)*(d*(2 + r) + 2*e*x^r)*Log[c*x^n]))/(4*(2 + r)^2)
```

Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 62, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.211$, Rules used = {2771, 27, 802, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex^r)(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{2}\left(dx^2+\frac{2ex^{r+2}}{r+2}\right)(a+b\log(cx^n))-bn\int \frac{1}{2}x\left(\frac{2ex^r}{r+2}+d\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}\left(dx^2+\frac{2ex^{r+2}}{r+2}\right)(a+b\log(cx^n))-\frac{1}{2}bn\int x\left(\frac{2ex^r}{r+2}+d\right)dx$$

$$\Big\downarrow \text{802}$$

$$\frac{1}{2}\left(dx^2+\frac{2ex^{r+2}}{r+2}\right)(a+b\log(cx^n))-\frac{1}{2}bn\int \left(\frac{2ex^{r+1}}{r+2}+dx\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}\left(dx^2+\frac{2ex^{r+2}}{r+2}\right)(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{dx^2}{2}+\frac{2ex^{r+2}}{(r+2)^2}\right)$$

input
```
Int[x*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
-1/2*(b*n*((d*x^2)/2 + (2*e*x^(2 + r))/(2 + r)^2)) + ((d*x^2 + (2*e*x^(2 +
 r))/(2 + r))*(a + b*Log[c*x^n]))/2
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 802
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 168 vs. $2(55) = 110$.

Time = 0.54 (sec) , antiderivative size = 169, normalized size of antiderivative = 2.86

method	result
parallelrisch	$-\frac{-4x^2x^r\ln(c\,x^n)ber-2x^2\ln(c\,x^n)bd\,r^2+x^2bdn\,r^2-8x^2x^r\ln(c\,x^n)be-4x^2x^r aer+4x^2x^r ben-8x^2\ln(c\,x^n)bdr-2x^2ad\,r^2+4}{4(2+r)^2}$
risch	$\frac{b\,x^2(dr+2e\,x^r+2d)\ln(x^n)}{4+2r}-\frac{x^2\left(-4x^r aer+4x^r ben-2\ln(c)bd\,r^2-8\ln(c)bdr-8da+4bdn-8x^r ae+bdn\,r^2+4bdnr-8\ln(c)be\right.}{}$

input
```
int(x*(d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/4*(-4*x^2*x^r*ln(c*x^n)*b*e*r-2*x^2*ln(c*x^n)*b*d*r^2+x^2*b*d*n*r^2-8*x
^2*x^r*ln(c*x^n)*b*e-4*x^2*x^r*a*e*r+4*x^2*x^r*b*e*n-8*x^2*ln(c*x^n)*b*d*r
-2*x^2*a*d*r^2+4*x^2*b*d*n*r-8*x^2*x^r*a*e-8*x^2*ln(c*x^n)*b*d-8*x^2*a*d*r
+4*b*d*n*x^2-8*d*a*x^2)/(2+r)^2
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 159 vs. $2(55) = 110$.

Time = 0.08 (sec) , antiderivative size = 159, normalized size of antiderivative = 2.69

$$\int x(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$= \frac{2\left(bdr^2+4\,bdr+4\,bd\right)x^2\log\left(c\right)+2\left(bdnr^2+4\,bdnr+4\,bdn\right)x^2\log\left(x\right)-\left(4\,bdn+\left(bdn-2\,ad\right)r^2-8\,ad\right.}{4\left(r^2+4\right.}$$

input
```
integrate(x*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/4*(2*(b*d*r^2 + 4*b*d*r + 4*b*d)*x^2*log(c) + 2*(b*d*n*r^2 + 4*b*d*n*r +
 4*b*d*n)*x^2*log(x) - (4*b*d*n + (b*d*n - 2*a*d)*r^2 - 8*a*d + 4*(b*d*n -
 2*a*d)*r)*x^2 + 4*((b*e*r + 2*b*e)*x^2*log(c) + (b*e*n*r + 2*b*e*n)*x^2*l
og(x) - (b*e*n - a*e*r - 2*a*e)*x^2)*x^r)/(r^2 + 4*r + 4)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 398 vs. $2(51) = 102$.

Time = 0.89 (sec) , antiderivative size = 398, normalized size of antiderivative = 6.75

$$\int x(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$= \begin{cases} \frac{2adr^2x^2}{4r^2+16r+16}+\frac{8adrx^2}{4r^2+16r+16}+\frac{8adx^2}{4r^2+16r+16}+\frac{4aerx^2x^r}{4r^2+16r+16}+\frac{8aex^2x^r}{4r^2+16r+16}-\frac{bdnr^2x^2}{4r^2+16r+16}-\frac{4bdnrx^2}{4r^2+16r+16}-\frac{4bdnx^2}{4r^2+16r+16}+ \\ \frac{adx^2}{2}+\frac{ae\log\left(cx^n\right)}{n}-\frac{bdnx^2}{4}+\frac{bdx^2\log\left(cx^n\right)}{2}+\frac{be\log\left(cx^n\right)^2}{2n} \end{cases}$$

input
```
integrate(x*(d+e*x**r)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((2*a*d*r**2*x**2/(4*r**2 + 16*r + 16) + 8*a*d*r*x**2/(4*r**2 + 1
6*r + 16) + 8*a*d*x**2/(4*r**2 + 16*r + 16) + 4*a*e*r*x**2*x**r/(4*r**2 +
16*r + 16) + 8*a*e*x**2*x**r/(4*r**2 + 16*r + 16) - b*d*n*r**2*x**2/(4*r**
2 + 16*r + 16) - 4*b*d*n*r*x**2/(4*r**2 + 16*r + 16) - 4*b*d*n*x**2/(4*r**
2 + 16*r + 16) + 2*b*d*r**2*x**2*log(c*x**n)/(4*r**2 + 16*r + 16) + 8*b*d*
r*x**2*log(c*x**n)/(4*r**2 + 16*r + 16) + 8*b*d*x**2*log(c*x**n)/(4*r**2 +
 16*r + 16) - 4*b*e*n*x**2*x**r/(4*r**2 + 16*r + 16) + 4*b*e*r*x**2*x**r*l
og(c*x**n)/(4*r**2 + 16*r + 16) + 8*b*e*x**2*x**r*log(c*x**n)/(4*r**2 + 16
*r + 16), Ne(r, -2)), (a*d*x**2/2 + a*e*log(c*x**n)/n - b*d*n*x**2/4 + b*d
*x**2*log(c*x**n)/2 + b*e*log(c*x**n)**2/(2*n), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 76, normalized size of antiderivative = 1.29

$$\int x(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{4}\,bdnx^2+\frac{1}{2}\,bdx^2\log\left(cx^n\right)+\frac{1}{2}\,adx^2+\frac{bex^{r+2}\log\left(cx^n\right)}{r+2}-\frac{benx^{r+2}}{(r+2)^2}+\frac{aex^{r+2}}{r+2}$$

input
```
integrate(x*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/4*b*d*n*x^2 + 1/2*b*d*x^2*log(c*x^n) + 1/2*a*d*x^2 + b*e*x^(r + 2)*log(
c*x^n)/(r + 2) - b*e*n*x^(r + 2)/(r + 2)^2 + a*e*x^(r + 2)/(r + 2)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 132 vs. 2(55) = 110.

Time = 0.13 (sec) , antiderivative size = 132, normalized size of antiderivative = 2.24

$$\int x(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{benrx^2x^r\log\left(x\right)}{r^2+4\,r+4}+\frac{2\,benx^2x^r\log\left(x\right)}{r^2+4\,r+4}+\frac{1}{2}\,bdnx^2\log\left(x\right)-\frac{benx^2x^r}{r^2+4\,r+4}-\frac{1}{4}\,bdnx^2+\frac{bex^2x^r\log\left(c\right)}{r+2}+\frac{1}{2}\,bdx^2\log\left(c\right)+\frac{aex^2x^r}{r+2}+\frac{1}{2}\,adx^2$$

input
```
integrate(x*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e*n*r*x^2*x^r*log(x)/(r^2 + 4*r + 4) + 2*b*e*n*x^2*x^r*log(x)/(r^2 + 4*r
 + 4) + 1/2*b*d*n*x^2*log(x) - b*e*n*x^2*x^r/(r^2 + 4*r + 4) - 1/4*b*d*n*x
^2 + b*e*x^2*x^r*log(c)/(r + 2) + 1/2*b*d*x^2*log(c) + a*e*x^2*x^r/(r + 2)
 + 1/2*a*d*x^2
```

Mupad [F(-1)]

Timed out.

$$\int x(d+ex^r)\,(a+b\log\left(cx^n\right))\;dx=\int x\,\left(d+e\,x^r\right)\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x*(d + e*x^r)*(a + b*log(c*x^n)),x)
```

output
```
int(x*(d + e*x^r)*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 136, normalized size of antiderivative = 2.31

$$\int x(d+ex^r)\,(a+b\log\left(cx^n\right))\;dx = \frac{x^2(4x^r\log(x^nc)\,ber+8x^r\log(x^nc)\,be+4x^raer+8x^rae-4x^rben+2\log(x^nc)\,bd\,r^2+8\log(x^nc)\,bdr+8\ldots}{4r^2+16r+16}$$

input
```
int(x*(d+e*x^r)*(a+b*log(c*x^n)),x)
```

output
```
(x**2*(4*x**r*log(x**n*c)*b*e*r + 8*x**r*log(x**n*c)*b*e + 4*x**r*a*e*r +
8*x**r*a*e - 4*x**r*b*e*n + 2*log(x**n*c)*b*d*r**2 + 8*log(x**n*c)*b*d*r +
 8*log(x**n*c)*b*d + 2*a*d*r**2 + 8*a*d*r + 8*a*d - b*d*n*r**2 - 4*b*d*n*r
 - 4*b*d*n))/(4*(r**2 + 4*r + 4))
```

3.368 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx$

Optimal result 2742
Mathematica [A] (verified) 2742
Rubi [A] (verified) 2743
Maple [A] (verified) 2744
Fricas [A] (verification not implemented) 2744
Sympy [B] (verification not implemented) 2745
Maxima [A] (verification not implemented) 2745
Giac [F] 2746
Mupad [F(-1)] 2746
Reduce [B] (verification not implemented) 2746

Optimal result

Integrand size = 21, antiderivative size = 53

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx=-\frac{benx^r}{r^2}+\frac{ex^r(a+b\log(cx^n))}{r}+\frac{d(a+b\log(cx^n))^2}{2bn}$$

output
```
-b*e*n*x^r/r^2+e*x^r*(a+b*ln(c*x^n))/r+1/2*d*(a+b*ln(c*x^n))^2/b/n
```

Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.02

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx=\frac{e(-bn+ar)x^r}{r^2}+ad\log(x)+\frac{bex^r\log(cx^n)}{r}+\frac{bd\log^2(cx^n)}{2n}$$

input
```
Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x,x]
```

output
```
(e*(-(b*n) + a*r)*x^r)/r^2 + a*d*Log[x] + (b*e*x^r*Log[c*x^n])/r + (b*d*Lo
g[c*x^n]^2)/(2*n)
```

Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{d(a+b\log(cx^n))}{x}+ex^{r-1}(a+b\log(cx^n))\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{d(a+b\log(cx^n))^2}{2bn}+\frac{ex^r(a+b\log(cx^n))}{r}-\frac{benx^r}{r^2}$$

input
```
Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x,x]
```

output
```
-((b*e*n*x^r)/r^2) + (e*x^r*(a + b*Log[c*x^n]))/r + (d*(a + b*Log[c*x^n])^
2)/(2*b*n)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [A] (verified)

Time = 0.39 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.28

method	result
parallelrisch	$\frac{2\ln(x)adn\,r^{2}+2x^{r}\ln(c\,x^{n})bern+bd\ln(c\,x^{n})^{2}r^{2}+2x^{r}aenr-2x^{r}be\,n^{2}}{2r^{2}n}$
risch	$\frac{b(dr\ln(x)+e\,x^{r})\ln(x^{n})}{r}+\frac{i\pi\ln(x)bd\,\mathrm{csgn}(ix^{n})\,\mathrm{csgn}(ic\,x^{n})^{2}}{2}-\frac{i\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^{n})\,\mathrm{csgn}(ix^{n})db\ln(x)\pi}{2}-\frac{i\,\mathrm{csgn}(ic\,x^{n})}{2}$

input
```
int((d+e*x^r)*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/2*(2*ln(x)*a*d*n*r^2+2*x^r*ln(c*x^n)*b*e*r*n+b*d*ln(c*x^n)^2*r^2+2*x^r*a
*e*n*r-2*x^r*b*e*n^2)/r^2/n
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 64, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx = \frac{bdnr^2\log(x)^2+2(benr\log(x)+ber\log(c)-ben+aer)x^r+2(bdr^2\log(c)+adr^2)\log(x)}{2r^2}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/2*(b*d*n*r^2*log(x)^2 + 2*(b*e*n*r*log(x) + b*e*r*log(c) - b*e*n + a*e*r
)*x^r + 2*(b*d*r^2*log(c) + a*d*r^2)*log(x))/r^2
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 131 vs. $2(46) = 92$.

Time = 2.17 (sec) , antiderivative size = 131, normalized size of antiderivative = 2.47

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx = \begin{cases} (a+b\log(c))(d+e)\log(x) & \text{for } n=0 \wedge r=0 \\ (a+b\log(c))\left(d\log(x)+\frac{ex^r}{r}\right) & \text{for } n=0 \\ (d+e)\left(\begin{cases} a\log(x) & \text{for } b=0 \\ -(-a-b\log(c))\log(x) & \text{for } n=0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}\right) & \text{for } r=0 \\ \frac{ad\log(cx^n)}{n}+\frac{aex^r}{r}+\frac{bd\log(cx^n)^2}{2n}-\frac{benx^r}{r^2}+\frac{bex^r\log(cx^n)}{r} & \text{otherwise} \end{cases}$$

input
```
integrate((d+e*x**r)*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise(((a + b*log(c))*(d + e)*log(x), Eq(n, 0) & Eq(r, 0)), ((a + b*lo
g(c))*(d*log(x) + e*x**r/r), Eq(n, 0)), ((d + e)*Piecewise((a*log(x), Eq(b
, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*
n), True)), Eq(r, 0)), (a*d*log(c*x**n)/n + a*e*x**r/r + b*d*log(c*x**n)**
2/(2*n) - b*e*n*x**r/r**2 + b*e*x**r*log(c*x**n)/r, True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.06

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx = \frac{bex^r\log(cx^n)}{r}+\frac{bd\log(cx^n)^2}{2n}+ad\log(x)-\frac{benx^r}{r^2}+\frac{aex^r}{r}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
b*e*x^r*log(c*x^n)/r + 1/2*b*d*log(c*x^n)^2/n + a*d*log(x) - b*e*n*x^r/r^2
 + a*e*x^r/r
```

Giac [F]

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx = \int \frac{(ex^r+d)(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)*(b*log(c*x^n) + a)/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx = \int \frac{(d+e\,x^r)\,(a+b\,\ln(c\,x^n))}{x}\,dx$$

input
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 67, normalized size of antiderivative = 1.26

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx = \frac{2x^r\log(x^nc)\,benr+2x^r aenr-2x^r be\,n^2+\log(x^nc)^2\,bd\,r^2+2\log(x)\,adn\,r^2}{2n\,r^2}$$

input
```
int((d+e*x^r)*(a+b*log(c*x^n))/x,x)
```

output
```
(2*x**r*log(x**n*c)*b*e*n*r + 2*x**r*a*e*n*r - 2*x**r*b*e*n**2 + log(x**n*
c)**2*b*d*r**2 + 2*log(x)*a*d*n*r**2)/(2*n*r**2)
```

3.369 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^3}\,dx$

Optimal result 2748
Mathematica [A] (verified) 2748
Rubi [A] (verified) 2749
Maple [A] (verified) 2750
Fricas [B] (verification not implemented) 2750
Sympy [B] (verification not implemented) 2751
Maxima [F(-2)] 2752
Giac [B] (verification not implemented) 2752
Mupad [F(-1)] 2753
Reduce [B] (verification not implemented) 2753

Optimal result

Integrand size = 21, antiderivative size = 71

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^3}\,dx = -\frac{bdn}{4x^2}-\frac{benx^{-2+r}}{(2-r)^2}-\frac{d(a+b\log(cx^n))}{2x^2} - \frac{ex^{-2+r}(a+b\log(cx^n))}{2-r}$$

output
```
-1/4*b*d*n/x^2-b*e*n*x^(-2+r)/(2-r)^2-1/2*d*(a+b*ln(c*x^n))/x^2-e*x^(-2+r)
*(a+b*ln(c*x^n))/(2-r)
```

Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 72, normalized size of antiderivative = 1.01

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^3}\,dx = -\frac{2a(-2+r)\,(d(-2+r)-2ex^r)+bn(d(-2+r)^2+4ex^r)+2b(-2+r)\,(d(-2+r)-2ex^r)\log(cx^n)}{4(-2+r)^2x^2}$$

input
```
Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-1/4*(2*a*(-2 + r)*(d*(-2 + r) - 2*e*x^r) + b*n*(d*(-2 + r)^2 + 4*e*x^r) +
 2*b*(-2 + r)*(d*(-2 + r) - 2*e*x^r)*Log[c*x^n])/((-2 + r)^2*x^2)
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^3}\,dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(-\frac{ex^{r-3}}{2-r}-\frac{d}{2x^3}\right)dx-\frac{d(a+b\log(cx^n))}{2x^2}-\frac{ex^{r-2}(a+b\log(cx^n))}{2-r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d(a+b\log(cx^n))}{2x^2}-\frac{ex^{r-2}(a+b\log(cx^n))}{2-r}-bn\left(\frac{d}{4x^2}+\frac{ex^{r-2}}{(2-r)^2}\right)$$

input
```
Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-(b*n*(d/(4*x^2) + (e*x^(-2 + r))/(2 - r)^2)) - (d*(a + b*Log[c*x^n]))/(2*
x^2) - (e*x^(-2 + r)*(a + b*Log[c*x^n]))/(2 - r)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.39 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.90

method	result
parallelrisch	$-\frac{-4\ln(c\,x^n)x^r ber+2\ln(c\,x^n)bd\,r^2+bdn\,r^2+8x^r\ln(c\,x^n)be-4x^r aer+4x^r ben-8\ln(c\,x^n)bdr+2ad\,r^2-4bdnr+8x^r ae+8\ln(c}{4x^2(r^2-4r+4)}$
risch	$-\frac{b(dr-2e\,x^r-2d)\ln(x^n)}{2(-2+r)x^2}-\frac{-4x^r aer+4x^r ben+2\ln(c)bd\,r^2-8\ln(c)bdr+8da+4bdn+8x^r ae+bdn\,r^2-4bdnr+8\ln(c)be\,x^r-}{}$

input
```
int((d+e*x^r)*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

output
```
-1/4*(-4*ln(c*x^n)*x^r*b*e*r+2*ln(c*x^n)*b*d*r^2+b*d*n*r^2+8*x^r*ln(c*x^n)
*b*e-4*x^r*a*e*r+4*x^r*b*e*n-8*ln(c*x^n)*b*d*r+2*a*d*r^2-4*b*d*n*r+8*x^r*a
*e+8*ln(c*x^n)*b*d-8*d*a*r+4*b*d*n+8*d*a)/x^2/(r^2-4*r+4)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 140 vs. $2(62) = 124$.

Time = 0.08 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.97

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})}{x^3}\,dx = -\frac{4\,bdn+(bdn+2\,ad)r^2+8\,ad-4\,(bdn+2\,ad)r+4\,(ben-aer+2\,ae-(ber-2\,be)\log{(c)}-(benr-}{4\,(r^2-4\,r+4)x}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
-1/4*(4*b*d*n + (b*d*n + 2*a*d)*r^2 + 8*a*d - 4*(b*d*n + 2*a*d)*r + 4*(b*e
*n - a*e*r + 2*a*e - (b*e*r - 2*b*e)*log(c) - (b*e*n*r - 2*b*e*n)*log(x))*
x^r + 2*(b*d*r^2 - 4*b*d*r + 4*b*d)*log(c) + 2*(b*d*n*r^2 - 4*b*d*n*r + 4*
b*d*n)*log(x))/((r^2 - 4*r + 4)*x^2)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 495 vs. $2(63) = 126$.

Time = 1.97 (sec) , antiderivative size = 495, normalized size of antiderivative = 6.97

$$\int \frac{(d + ex^r)(a + b\log(cx^n))}{x^3}\,dx$$
$$= \begin{cases} -\frac{2adr^2}{4r^2x^2-16rx^2+16x^2} + \frac{8adr}{4r^2x^2-16rx^2+16x^2} - \frac{8ad}{4r^2x^2-16rx^2+16x^2} + \frac{4aerx^r}{4r^2x^2-16rx^2+16x^2} - \frac{8aex^r}{4r^2x^2-16rx^2+16x^2} - \frac{bdnr}{4r^2x^2-16r\cdots} \\ -\frac{ad}{2x^2} + ae\log(x) + bd\left(-\frac{n}{4x^2} - \frac{\log(cx^n)}{2x^2}\right) - be\left(\begin{cases} -\log(c)\log(x) & \text{for } n = 0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right) \end{cases}$$

input
```
integrate((d+e*x**r)*(a+b*ln(c*x**n))/x**3,x)
```

output
```
Piecewise((-2*a*d*r**2/(4*r**2*x**2 - 16*r*x**2 + 16*x**2) + 8*a*d*r/(4*r*
*2*x**2 - 16*r*x**2 + 16*x**2) - 8*a*d/(4*r**2*x**2 - 16*r*x**2 + 16*x**2)
 + 4*a*e*r*x**r/(4*r**2*x**2 - 16*r*x**2 + 16*x**2) - 8*a*e*x**r/(4*r**2*x
**2 - 16*r*x**2 + 16*x**2) - b*d*n*r**2/(4*r**2*x**2 - 16*r*x**2 + 16*x**2
) + 4*b*d*n*r/(4*r**2*x**2 - 16*r*x**2 + 16*x**2) - 4*b*d*n/(4*r**2*x**2 -
 16*r*x**2 + 16*x**2) - 2*b*d*r**2*log(c*x**n)/(4*r**2*x**2 - 16*r*x**2 +
16*x**2) + 8*b*d*r*log(c*x**n)/(4*r**2*x**2 - 16*r*x**2 + 16*x**2) - 8*b*d
*log(c*x**n)/(4*r**2*x**2 - 16*r*x**2 + 16*x**2) - 4*b*e*n*x**r/(4*r**2*x*
*2 - 16*r*x**2 + 16*x**2) + 4*b*e*r*x**r*log(c*x**n)/(4*r**2*x**2 - 16*r*x
**2 + 16*x**2) - 8*b*e*x**r*log(c*x**n)/(4*r**2*x**2 - 16*r*x**2 + 16*x**2
), Ne(r, 2)), (-a*d/(2*x**2) + a*e*log(x) + b*d*(-n/(4*x**2) - log(c*x**n)
/(2*x**2)) - b*e*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2
*n), True)), True))
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^3}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-3>0)', see `assume?` for more
details)Is
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 541 vs. $2(62) = 124$.

Time = 0.14 (sec) , antiderivative size = 541, normalized size of antiderivative = 7.62

$$\begin{aligned}\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^3}\,dx = & -\frac{bdnr^2\log(x)}{2(r^2x^2-4rx^2+4x^2)} + \frac{benrx^r\log(x)}{r^2x^2-4rx^2+4x^2} \\ & -\frac{bdnr^2}{4(r^2x^2-4rx^2+4x^2)} \\ & -\frac{bdr^2\log(c)}{2(r^2x^2-4rx^2+4x^2)} + \frac{berx^r\log(c)}{r^2x^2-4rx^2+4x^2} \\ & +\frac{2bdnr\log(x)}{r^2x^2-4rx^2+4x^2} - \frac{2benx^r\log(x)}{r^2x^2-4rx^2+4x^2} \\ & +\frac{bdnr}{r^2x^2-4rx^2+4x^2} - \frac{adr^2}{2(r^2x^2-4rx^2+4x^2)} \\ & -\frac{benx^r}{r^2x^2-4rx^2+4x^2} + \frac{aerx^r}{r^2x^2-4rx^2+4x^2} \\ & +\frac{2bdr\log(c)}{r^2x^2-4rx^2+4x^2} - \frac{2bex^r\log(c)}{r^2x^2-4rx^2+4x^2} \\ & -\frac{2bdn\log(x)}{r^2x^2-4rx^2+4x^2} - \frac{bdn}{r^2x^2-4rx^2+4x^2} \\ & +\frac{2adr}{r^2x^2-4rx^2+4x^2} - \frac{2aex^r}{r^2x^2-4rx^2+4x^2} \\ & -\frac{2bd\log(c)}{r^2x^2-4rx^2+4x^2} - \frac{2ad}{r^2x^2-4rx^2+4x^2}\end{aligned}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
-1/2*b*d*n*r^2*log(x)/(r^2*x^2 - 4*r*x^2 + 4*x^2) + b*e*n*r*x^r*log(x)/(r^
2*x^2 - 4*r*x^2 + 4*x^2) - 1/4*b*d*n*r^2/(r^2*x^2 - 4*r*x^2 + 4*x^2) - 1/2
*b*d*r^2*log(c)/(r^2*x^2 - 4*r*x^2 + 4*x^2) + b*e*r*x^r*log(c)/(r^2*x^2 -
4*r*x^2 + 4*x^2) + 2*b*d*n*r*log(x)/(r^2*x^2 - 4*r*x^2 + 4*x^2) - 2*b*e*n*
x^r*log(x)/(r^2*x^2 - 4*r*x^2 + 4*x^2) + b*d*n*r/(r^2*x^2 - 4*r*x^2 + 4*x^
2) - 1/2*a*d*r^2/(r^2*x^2 - 4*r*x^2 + 4*x^2) - b*e*n*x^r/(r^2*x^2 - 4*r*x^
2 + 4*x^2) + a*e*r*x^r/(r^2*x^2 - 4*r*x^2 + 4*x^2) + 2*b*d*r*log(c)/(r^2*x
^2 - 4*r*x^2 + 4*x^2) - 2*b*e*x^r*log(c)/(r^2*x^2 - 4*r*x^2 + 4*x^2) - 2*b
*d*n*log(x)/(r^2*x^2 - 4*r*x^2 + 4*x^2) - b*d*n/(r^2*x^2 - 4*r*x^2 + 4*x^2
) + 2*a*d*r/(r^2*x^2 - 4*r*x^2 + 4*x^2) - 2*a*e*x^r/(r^2*x^2 - 4*r*x^2 + 4
*x^2) - 2*b*d*log(c)/(r^2*x^2 - 4*r*x^2 + 4*x^2) - 2*a*d/(r^2*x^2 - 4*r*x^
2 + 4*x^2)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^3}\,dx=\int \frac{(d+e\,x^r)\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^3}\,dx$$

input
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^3,x)
```

output
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^3, x)
```

Reduce [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.90

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^3}\,dx = \frac{4x^r\log(x^nc)\,ber-8x^r\log(x^nc)\,be+4x^r aer-8x^r ae-4x^r ben-2\log(x^nc)\,bd\,r^2+8\log(x^nc)\,bdr-8\log}{4x^2\left(r^2-4r+4\right)}$$

input
```
int((d+e*x^r)*(a+b*log(c*x^n))/x^3,x)
```

output
```
(4*x**r*log(x**n*c)*b*e*r - 8*x**r*log(x**n*c)*b*e + 4*x**r*a*e*r - 8*x**r
*a*e - 4*x**r*b*e*n - 2*log(x**n*c)*b*d*r**2 + 8*log(x**n*c)*b*d*r - 8*log
(x**n*c)*b*d - 2*a*d*r**2 + 8*a*d*r - 8*a*d - b*d*n*r**2 + 4*b*d*n*r - 4*b
*d*n)/(4*x**2*(r**2 - 4*r + 4))
```

3.370 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx$

Optimal result 2755
Mathematica [A] (verified) 2755
Rubi [A] (verified) 2756
Maple [A] (verified) 2757
Fricas [B] (verification not implemented) 2757
Sympy [B] (verification not implemented) 2758
Maxima [F(-2)] 2759
Giac [B] (verification not implemented) 2759
Mupad [F(-1)] 2760
Reduce [B] (verification not implemented) 2760

Optimal result

Integrand size = 21, antiderivative size = 71

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx = -\frac{bdn}{16x^4} - \frac{benx^{-4+r}}{(4-r)^2} - \frac{d(a+b\log(cx^n))}{4x^4} - \frac{ex^{-4+r}(a+b\log(cx^n))}{4-r}$$

output
```
-1/16*b*d*n/x^4-b*e*n*x^(-4+r)/(4-r)^2-1/4*d*(a+b*ln(c*x^n))/x^4-e*x^(-4+r
)*(a+b*ln(c*x^n))/(4-r)
```

Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 72, normalized size of antiderivative = 1.01

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx = -\frac{4a(-4+r)(d(-4+r)-4ex^r)+bn(d(-4+r)^2+16ex^r)+4b(-4+r)(d(-4+r)-4ex^r)\log(cx^n)}{16(-4+r)^2x^4}$$

input
```
Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
-1/16*(4*a*(-4 + r)*(d*(-4 + r) - 4*e*x^r) + b*n*(d*(-4 + r)^2 + 16*e*x^r)
 + 4*b*(-4 + r)*(d*(-4 + r) - 4*e*x^r)*Log[c*x^n])/((-4 + r)^2*x^4)
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx$$

$$\Big\downarrow \; 2772$$

$$-bn\int \left(-\frac{ex^{r-5}}{4-r}-\frac{d}{4x^5}\right)dx-\frac{d(a+b\log(cx^n))}{4x^4}-\frac{ex^{r-4}(a+b\log(cx^n))}{4-r}$$

$$\Big\downarrow \; 2009$$

$$-\frac{d(a+b\log(cx^n))}{4x^4}-\frac{ex^{r-4}(a+b\log(cx^n))}{4-r}-bn\left(\frac{d}{16x^4}+\frac{ex^{r-4}}{(4-r)^2}\right)$$

input
```
Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
-(b*n*(d/(16*x^4) + (e*x^(-4 + r))/(4 - r)^2)) - (d*(a + b*Log[c*x^n]))/(4
*x^4) - (e*x^(-4 + r)*(a + b*Log[c*x^n]))/(4 - r)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.57 (sec) , antiderivative size = 130, normalized size of antiderivative = 1.83

method	result
parallelrisch	$-\frac{-16\ln(c\,x^n)x^r ber+4\ln(c\,x^n)bd\,r^2+bdn\,r^2+64x^r\ln(c\,x^n)be-16x^r aer+16x^r ben-32\ln(c\,x^n)bdr+4ad\,r^2-8bdnr+64x^r ae}{16x^4(-4+r)^2}$
risch	$-\frac{b(dr-4e\,x^r-4d)\ln(x^n)}{4(-4+r)x^4}-\frac{-16x^r aer+16x^r ben+4\ln(c)bd\,r^2-32\ln(c)bdr+64da+16bdn+64x^r ae+bdn\,r^2-8bdnr+64\ln(}{}$

input
```
int((d+e*x^r)*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

output
```
-1/16*(-16*ln(c*x^n)*x^r*b*e*r+4*ln(c*x^n)*b*d*r^2+b*d*n*r^2+64*x^r*ln(c*x
^n)*b*e-16*x^r*a*e*r+16*x^r*b*e*n-32*ln(c*x^n)*b*d*r+4*a*d*r^2-8*b*d*n*r+6
4*x^r*a*e+64*ln(c*x^n)*b*d-32*d*a*r+16*b*d*n+64*d*a)/x^4/(-4+r)^2
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 140 vs. $2(62) = 124$.

Time = 0.08 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.97

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^5}\,dx =$$
$$-\frac{16\,bdn+(bdn+4\,ad)r^2+64\,ad-8\,(bdn+4\,ad)r+16\,(ben-aer+4\,ae-(ber-4\,be)\log(c)-(be}{16\,(r^2-8\,r+}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

output
```
-1/16*(16*b*d*n + (b*d*n + 4*a*d)*r^2 + 64*a*d - 8*(b*d*n + 4*a*d)*r + 16*
(b*e*n - a*e*r + 4*a*e - (b*e*r - 4*b*e)*log(c) - (b*e*n*r - 4*b*e*n)*log(
x))*x^r + 4*(b*d*r^2 - 8*b*d*r + 16*b*d)*log(c) + 4*(b*d*n*r^2 - 8*b*d*n*r
 + 16*b*d*n)*log(x))/((r^2 - 8*r + 16)*x^4)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 495 vs. $2(63) = 126$.

Time = 3.41 (sec) , antiderivative size = 495, normalized size of antiderivative = 6.97

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx$$
$$= \begin{cases} -\frac{4adr^2}{16r^2x^4-128rx^4+256x^4} + \frac{32adr}{16r^2x^4-128rx^4+256x^4} - \frac{64ad}{16r^2x^4-128rx^4+256x^4} + \frac{16aerx^r}{16r^2x^4-128rx^4+256x^4} - \frac{64aex^r}{16r^2x^4-128rx^4+256x} \\ -\frac{ad}{4x^4} + ae\log(x) + bd\left(-\frac{n}{16x^4} - \frac{\log(cx^n)}{4x^4}\right) - be\left(\begin{cases} -\log(c)\log(x) & \text{for } n=0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right) \end{cases}$$

input
```
integrate((d+e*x**r)*(a+b*ln(c*x**n))/x**5,x)
```

output
```
Piecewise((-4*a*d*r**2/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) + 32*a*d*r/(
16*r**2*x**4 - 128*r*x**4 + 256*x**4) - 64*a*d/(16*r**2*x**4 - 128*r*x**4
+ 256*x**4) + 16*a*e*r*x**r/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) - 64*a*
e*x**r/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) - b*d*n*r**2/(16*r**2*x**4 -
 128*r*x**4 + 256*x**4) + 8*b*d*n*r/(16*r**2*x**4 - 128*r*x**4 + 256*x**4)
 - 16*b*d*n/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) - 4*b*d*r**2*log(c*x**n
)/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) + 32*b*d*r*log(c*x**n)/(16*r**2*x
**4 - 128*r*x**4 + 256*x**4) - 64*b*d*log(c*x**n)/(16*r**2*x**4 - 128*r*x*
*4 + 256*x**4) - 16*b*e*n*x**r/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) + 16
*b*e*r*x**r*log(c*x**n)/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) - 64*b*e*x*
*r*log(c*x**n)/(16*r**2*x**4 - 128*r*x**4 + 256*x**4), Ne(r, 4)), (-a*d/(4
*x**4) + a*e*log(x) + b*d*(-n/(16*x**4) - log(c*x**n)/(4*x**4)) - b*e*Piec
ewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)), True))
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-5>0)', see `assume?` for more
details)Is
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 542 vs. $2(62) = 124$.

Time = 0.12 (sec) , antiderivative size = 542, normalized size of antiderivative = 7.63

$$\begin{aligned}\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx = &-\frac{bdnr^2\log(x)}{4\,(r^2x^4-8\,rx^4+16\,x^4)}+\frac{benrx^r\log(x)}{r^2x^4-8\,rx^4+16\,x^4}\\ &-\frac{bdnr^2}{16\,(r^2x^4-8\,rx^4+16\,x^4)}\\ &-\frac{bdr^2\log(c)}{4\,(r^2x^4-8\,rx^4+16\,x^4)}+\frac{berx^r\log(c)}{r^2x^4-8\,rx^4+16\,x^4}\\ &+\frac{2\,bdnr\log(x)}{r^2x^4-8\,rx^4+16\,x^4}-\frac{4\,benx^r\log(x)}{r^2x^4-8\,rx^4+16\,x^4}\\ &+\frac{bdnr}{2\,(r^2x^4-8\,rx^4+16\,x^4)}-\frac{adr^2}{4\,(r^2x^4-8\,rx^4+16\,x^4)}\\ &-\frac{benx^r}{r^2x^4-8\,rx^4+16\,x^4}+\frac{aerx^r}{r^2x^4-8\,rx^4+16\,x^4}\\ &+\frac{2\,bdr\log(c)}{r^2x^4-8\,rx^4+16\,x^4}-\frac{4\,bex^r\log(c)}{r^2x^4-8\,rx^4+16\,x^4}\\ &-\frac{4\,bdn\log(x)}{r^2x^4-8\,rx^4+16\,x^4}-\frac{bdn}{r^2x^4-8\,rx^4+16\,x^4}\\ &+\frac{2\,adr}{r^2x^4-8\,rx^4+16\,x^4}-\frac{4\,aex^r}{r^2x^4-8\,rx^4+16\,x^4}\\ &-\frac{4\,bd\log(c)}{r^2x^4-8\,rx^4+16\,x^4}-\frac{4\,ad}{r^2x^4-8\,rx^4+16\,x^4}\end{aligned}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

output
```
-1/4*b*d*n*r^2*log(x)/(r^2*x^4 - 8*r*x^4 + 16*x^4) + b*e*n*r*x^r*log(x)/(r
^2*x^4 - 8*r*x^4 + 16*x^4) - 1/16*b*d*n*r^2/(r^2*x^4 - 8*r*x^4 + 16*x^4) -
 1/4*b*d*r^2*log(c)/(r^2*x^4 - 8*r*x^4 + 16*x^4) + b*e*r*x^r*log(c)/(r^2*x
^4 - 8*r*x^4 + 16*x^4) + 2*b*d*n*r*log(x)/(r^2*x^4 - 8*r*x^4 + 16*x^4) - 4
*b*e*n*x^r*log(x)/(r^2*x^4 - 8*r*x^4 + 16*x^4) + 1/2*b*d*n*r/(r^2*x^4 - 8*
r*x^4 + 16*x^4) - 1/4*a*d*r^2/(r^2*x^4 - 8*r*x^4 + 16*x^4) - b*e*n*x^r/(r^
2*x^4 - 8*r*x^4 + 16*x^4) + a*e*r*x^r/(r^2*x^4 - 8*r*x^4 + 16*x^4) + 2*b*d
*r*log(c)/(r^2*x^4 - 8*r*x^4 + 16*x^4) - 4*b*e*x^r*log(c)/(r^2*x^4 - 8*r*x
^4 + 16*x^4) - 4*b*d*n*log(x)/(r^2*x^4 - 8*r*x^4 + 16*x^4) - b*d*n/(r^2*x^
4 - 8*r*x^4 + 16*x^4) + 2*a*d*r/(r^2*x^4 - 8*r*x^4 + 16*x^4) - 4*a*e*x^r/(
r^2*x^4 - 8*r*x^4 + 16*x^4) - 4*b*d*log(c)/(r^2*x^4 - 8*r*x^4 + 16*x^4) -
4*a*d/(r^2*x^4 - 8*r*x^4 + 16*x^4)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx = \int \frac{(d+e\,x^r)\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^5}\,dx$$

input
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^5,x)
```

output
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^5, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.90

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx = \frac{16x^r\log(x^nc)\,ber-64x^r\log(x^nc)\,be+16x^raer-64x^rae-16x^rben-4\log(x^nc)\,bd\,r^2+32\log(x^nc)\,bdr}{16x^4\left(r^2-8r+16\right)}$$

input
```
int((d+e*x^r)*(a+b*log(c*x^n))/x^5,x)
```

output
```
(16*x**r*log(x**n*c)*b*e*r - 64*x**r*log(x**n*c)*b*e + 16*x**r*a*e*r - 64*
x**r*a*e - 16*x**r*b*e*n - 4*log(x**n*c)*b*d*r**2 + 32*log(x**n*c)*b*d*r -
 64*log(x**n*c)*b*d - 4*a*d*r**2 + 32*a*d*r - 64*a*d - b*d*n*r**2 + 8*b*d*
n*r - 16*b*d*n)/(16*x**4*(r**2 - 8*r + 16))
```

3.371 $\int x^4(d+ex^r)(a+b\log(cx^n))\,dx$

Optimal result 2762
Mathematica [A] (verified) 2762
Rubi [A] (verified) 2763
Maple [B] (verified) 2764
Fricas [B] (verification not implemented) 2765
Sympy [B] (verification not implemented) 2765
Maxima [A] (verification not implemented) 2766
Giac [B] (verification not implemented) 2766
Mupad [F(-1)] 2767
Reduce [B] (verification not implemented) 2767

Optimal result

Integrand size = 21, antiderivative size = 59

$$\int x^4(d+ex^r)(a+b\log(cx^n))\,dx=-\frac{1}{25}bdnx^5-\frac{benx^{5+r}}{(5+r)^2}+\frac{1}{5}\left(dx^5+\frac{5ex^{5+r}}{5+r}\right)(a+b\log(cx^n))$$

output
```
-1/25*b*d*n*x^5-b*e*n*x^(5+r)/(5+r)^2+1/5*(d*x^5+5*e*x^(5+r)/(5+r))*(a+b*l
n(c*x^n))
```

Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 73, normalized size of antiderivative = 1.24

$$\int x^4(d+ex^r)(a+b\log(cx^n))\,dx =\frac{x^5(5a(5+r)(d(5+r)+5ex^r)-bn(d(5+r)^2+25ex^r)+5b(5+r)(d(5+r)+5ex^r)\log(cx^n))}{25(5+r)^2}$$

input
```
Integrate[x^4*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
(x^5*(5*a*(5 + r)*(d*(5 + r) + 5*e*x^r) - b*n*(d*(5 + r)^2 + 25*e*x^r) + 5
*b*(5 + r)*(d*(5 + r) + 5*e*x^r)*Log[c*x^n]))/(25*(5 + r)^2)
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 62, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2771, 27, 802, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^4(d+ex^r)\left(a+b\log\left(cx^n\right)\right)dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{5}\left(dx^5+\frac{5ex^{r+5}}{r+5}\right)\left(a+b\log\left(cx^n\right)\right)-bn\int \frac{1}{5}x^4\left(\frac{5ex^r}{r+5}+d\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\left(dx^5+\frac{5ex^{r+5}}{r+5}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{5}bn\int x^4\left(\frac{5ex^r}{r+5}+d\right)dx$$

$$\Big\downarrow \text{802}$$

$$\frac{1}{5}\left(dx^5+\frac{5ex^{r+5}}{r+5}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{5}bn\int \left(\frac{5ex^{r+4}}{r+5}+dx^4\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left(dx^5+\frac{5ex^{r+5}}{r+5}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{5}bn\left(\frac{dx^5}{5}+\frac{5ex^{r+5}}{(r+5)^2}\right)$$

input
```
Int[x^4*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
-1/5*(b*n*((d*x^5)/5 + (5*e*x^(5 + r))/(5 + r)^2)) + ((d*x^5 + (5*e*x^(5 +
 r))/(5 + r))*(a + b*Log[c*x^n]))/5
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 802
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 168 vs. $2(55) = 110$.

Time = 3.24 (sec) , antiderivative size = 169, normalized size of antiderivative = 2.86

method	result
parallelrisch	$-\frac{-25x^5x^r\ln(c\,x^n)ber-5x^5\ln(c\,x^n)bd\,r^2+x^5bdn\,r^2-125x^5x^r\ln(c\,x^n)be-25x^5x^raer+25x^5x^rben-50x^5\ln(c\,x^n)bdr-5x^5a}{25(5+r)^2}$
risch	$\frac{b\,x^5(dr+5e\,x^r+5d)\ln(x^n)}{25+5r}-\frac{x^5\left(-50x^raer+50x^rben-10\ln(c)bd\,r^2-100\ln(c)bdr-250da+50bdn-250x^rae+2bdn\,r^2+20b\right.}{}$

input
```
int(x^4*(d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/25*(-25*x^5*x^r*ln(c*x^n)*b*e*r-5*x^5*ln(c*x^n)*b*d*r^2+x^5*b*d*n*r^2-1
25*x^5*x^r*ln(c*x^n)*b*e-25*x^5*x^r*a*e*r+25*x^5*x^r*b*e*n-50*x^5*ln(c*x^n
)*b*d*r-5*x^5*a*d*r^2+10*x^5*b*d*n*r-125*x^5*x^r*a*e-125*x^5*ln(c*x^n)*b*d
-50*x^5*a*d*r+25*b*d*n*x^5-125*x^5*d*a)/(5+r)^2
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 159 vs. $2(55) = 110$.

Time = 0.08 (sec) , antiderivative size = 159, normalized size of antiderivative = 2.69

$$\int x^4(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$= \frac{5\left(bdr^2+10\,bdr+25\,bd\right)x^5\log\left(c\right)+5\left(bdnr^2+10\,bdnr+25\,bdn\right)x^5\log\left(x\right)-\left(25\,bdn+\left(bdn-5\,ad\right)r^2\right.}{25\left(r^2\right.}$$

input
```
integrate(x^4*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/25*(5*(b*d*r^2 + 10*b*d*r + 25*b*d)*x^5*log(c) + 5*(b*d*n*r^2 + 10*b*d*n
*r + 25*b*d*n)*x^5*log(x) - (25*b*d*n + (b*d*n - 5*a*d)*r^2 - 125*a*d + 10
*(b*d*n - 5*a*d)*r)*x^5 + 25*((b*e*r + 5*b*e)*x^5*log(c) + (b*e*n*r + 5*b*
e*n)*x^5*log(x) - (b*e*n - a*e*r - 5*a*e)*x^5)*x^r)/(r^2 + 10*r + 25)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 398 vs. $2(51) = 102$.

Time = 5.01 (sec) , antiderivative size = 398, normalized size of antiderivative = 6.75

$$\int x^4(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$= \begin{cases} \frac{5adr^2x^5}{25r^2+250r+625}+\frac{50adrx^5}{25r^2+250r+625}+\frac{125adx^5}{25r^2+250r+625}+\frac{25aerx^5x^r}{25r^2+250r+625}+\frac{125aex^5x^r}{25r^2+250r+625}-\frac{bdnr^2x^5}{25r^2+250r+625}-\frac{10bdnrx^5}{25r^2+250r+} \\ \frac{adx^5}{5}+\frac{ae\log\left(cx^n\right)}{n}-\frac{bdnx^5}{25}+\frac{bdx^5\log\left(cx^n\right)}{5}+\frac{be\log\left(cx^n\right)^2}{2n} \end{cases}$$

input
```
integrate(x**4*(d+e*x**r)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((5*a*d*r**2*x**5/(25*r**2 + 250*r + 625) + 50*a*d*r*x**5/(25*r**
2 + 250*r + 625) + 125*a*d*x**5/(25*r**2 + 250*r + 625) + 25*a*e*r*x**5*x*
*r/(25*r**2 + 250*r + 625) + 125*a*e*x**5*x**r/(25*r**2 + 250*r + 625) - b
*d*n*r**2*x**5/(25*r**2 + 250*r + 625) - 10*b*d*n*r*x**5/(25*r**2 + 250*r
+ 625) - 25*b*d*n*x**5/(25*r**2 + 250*r + 625) + 5*b*d*r**2*x**5*log(c*x**
n)/(25*r**2 + 250*r + 625) + 50*b*d*r*x**5*log(c*x**n)/(25*r**2 + 250*r +
625) + 125*b*d*x**5*log(c*x**n)/(25*r**2 + 250*r + 625) - 25*b*e*n*x**5*x*
*r/(25*r**2 + 250*r + 625) + 25*b*e*r*x**5*x**r*log(c*x**n)/(25*r**2 + 250
*r + 625) + 125*b*e*x**5*x**r*log(c*x**n)/(25*r**2 + 250*r + 625), Ne(r, -
5)), (a*d*x**5/5 + a*e*log(c*x**n)/n - b*d*n*x**5/25 + b*d*x**5*log(c*x**n
)/5 + b*e*log(c*x**n)**2/(2*n), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 76, normalized size of antiderivative = 1.29

$$\int x^4(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{25}\,bdnx^5+\frac{1}{5}\,bdx^5\log\left(cx^n\right)+\frac{1}{5}\,adx^5+\frac{bex^{r+5}\log\left(cx^n\right)}{r+5}-\frac{benx^{r+5}}{(r+5)^2}+\frac{aex^{r+5}}{r+5}$$

input
```
integrate(x^4*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/25*b*d*n*x^5 + 1/5*b*d*x^5*log(c*x^n) + 1/5*a*d*x^5 + b*e*x^(r + 5)*log
(c*x^n)/(r + 5) - b*e*n*x^(r + 5)/(r + 5)^2 + a*e*x^(r + 5)/(r + 5)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 132 vs. $2(55) = 110$.

Time = 0.12 (sec) , antiderivative size = 132, normalized size of antiderivative = 2.24

$$\int x^4(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{benrx^5x^r\log\left(x\right)}{r^2+10\,r+25}+\frac{5\,benx^5x^r\log\left(x\right)}{r^2+10\,r+25}+\frac{1}{5}\,bdnx^5\log\left(x\right)-\frac{benx^5x^r}{r^2+10\,r+25}-\frac{1}{25}\,bdnx^5+\frac{bex^5x^r\log\left(c\right)}{r+5}+\frac{1}{5}\,bdx^5\log\left(c\right)+\frac{aex^5x^r}{r+5}+\frac{1}{5}\,adx^5$$

input
```
integrate(x^4*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e*n*r*x^5*x^r*log(x)/(r^2 + 10*r + 25) + 5*b*e*n*x^5*x^r*log(x)/(r^2 + 1
0*r + 25) + 1/5*b*d*n*x^5*log(x) - b*e*n*x^5*x^r/(r^2 + 10*r + 25) - 1/25*
b*d*n*x^5 + b*e*x^5*x^r*log(c)/(r + 5) + 1/5*b*d*x^5*log(c) + a*e*x^5*x^r/
(r + 5) + 1/5*a*d*x^5
```

Mupad [F(-1)]

Timed out.

$$\int x^4(d+ex^r)\,(a+b\log(cx^n))\,dx=\int x^4\,(d+e\,x^r)\,\left(a+b\,\ln(c\,x^n)\right)\,dx$$

input
```
int(x^4*(d + e*x^r)*(a + b*log(c*x^n)),x)
```

output
```
int(x^4*(d + e*x^r)*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 136, normalized size of antiderivative = 2.31

$$\int x^4(d+ex^r)\,(a+b\log(cx^n))\,dx$$
$$=\frac{x^5(25x^r\log(x^nc)\,ber+125x^r\log(x^nc)\,be+25x^raer+125x^rae-25x^rben+5\log(x^nc)\,bd\,r^2+50\log(x^nc}{25r^2+250r+625}$$

input
```
int(x^4*(d+e*x^r)*(a+b*log(c*x^n)),x)
```

output
```
(x**5*(25*x**r*log(x**n*c)*b*e*r + 125*x**r*log(x**n*c)*b*e + 25*x**r*a*e*
r + 125*x**r*a*e - 25*x**r*b*e*n + 5*log(x**n*c)*b*d*r**2 + 50*log(x**n*c)
*b*d*r + 125*log(x**n*c)*b*d + 5*a*d*r**2 + 50*a*d*r + 125*a*d - b*d*n*r**
2 - 10*b*d*n*r - 25*b*d*n))/(25*(r**2 + 10*r + 25))
```

3.372 $\int x^2(d+ex^r)(a+b\log(cx^n))\,dx$

Optimal result 2768
Mathematica [A] (verified) 2768
Rubi [A] (verified) 2769
Maple [B] (verified) 2770
Fricas [B] (verification not implemented) 2771
Sympy [B] (verification not implemented) 2771
Maxima [A] (verification not implemented) 2772
Giac [B] (verification not implemented) 2772
Mupad [F(-1)] 2773
Reduce [B] (verification not implemented) 2773

Optimal result

Integrand size = 21, antiderivative size = 59

$$\int x^2(d+ex^r)(a+b\log(cx^n))\,dx=-\frac{1}{9}bdnx^3-\frac{benx^{3+r}}{(3+r)^2}+\frac{1}{3}\left(dx^3+\frac{3ex^{3+r}}{3+r}\right)(a+b\log(cx^n))$$

output
```
-1/9*b*d*n*x^3-b*e*n*x^(3+r)/(3+r)^2+1/3*(d*x^3+3*e*x^(3+r)/(3+r))*(a+b*ln
(c*x^n))
```

Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 73, normalized size of antiderivative = 1.24

$$\int x^2(d+ex^r)(a+b\log(cx^n))\,dx=\frac{x^3(3a(3+r)(d(3+r)+3ex^r)-bn(d(3+r)^2+9ex^r)+3b(3+r)(d(3+r)+3ex^r)\log(cx^n))}{9(3+r)^2}$$

input
```
Integrate[x^2*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
(x^3*(3*a*(3 + r)*(d*(3 + r) + 3*e*x^r) - b*n*(d*(3 + r)^2 + 9*e*x^r) + 3*
b*(3 + r)*(d*(3 + r) + 3*e*x^r)*Log[c*x^n]))/(9*(3 + r)^2)
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 62, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2771, 27, 802, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2(d+ex^r)(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{3}\left(dx^3+\frac{3ex^{r+3}}{r+3}\right)(a+b\log(cx^n))-bn\int\frac{1}{3}x^2\left(\frac{3ex^r}{r+3}+d\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{3}\left(dx^3+\frac{3ex^{r+3}}{r+3}\right)(a+b\log(cx^n))-\frac{1}{3}bn\int x^2\left(\frac{3ex^r}{r+3}+d\right)dx$$

$$\Big\downarrow \text{802}$$

$$\frac{1}{3}\left(dx^3+\frac{3ex^{r+3}}{r+3}\right)(a+b\log(cx^n))-\frac{1}{3}bn\int\left(\frac{3ex^{r+2}}{r+3}+dx^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{3}\left(dx^3+\frac{3ex^{r+3}}{r+3}\right)(a+b\log(cx^n))-\frac{1}{3}bn\left(\frac{dx^3}{3}+\frac{3ex^{r+3}}{(r+3)^2}\right)$$

input
```
Int[x^2*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
-1/3*(b*n*((d*x^3)/3 + (3*e*x^(3 + r))/(3 + r)^2)) + ((d*x^3 + (3*e*x^(3 +
 r))/(3 + r))*(a + b*Log[c*x^n]))/3
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 802
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 173 vs. 2(55) = 110.

Time = 1.01 (sec) , antiderivative size = 174, normalized size of antiderivative = 2.95

method	result
parallelrisch	$-\frac{-9x^3x^r\ln(cx^n)ber-3x^3\ln(cx^n)bdr^2+x^3bdnr^2-27x^3x^r\ln(cx^n)be-9x^3x^raer+9x^3x^rben-18x^3\ln(cx^n)bdr-3x^3adr^2}{9(r^2+6r+9)}$
risch	$\frac{bx^3(dr+3ex^r+3d)\ln(x^n)}{9+3r}-\frac{x^3\left(-18x^raer+18x^rben-6\ln(c)bdr^2-36\ln(c)bdr-54da+18bdn-54x^rae+2bdnr^2+12bdnr-\right.}{}$

input
```
int(x^2*(d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/9*(-9*x^3*x^r*ln(c*x^n)*b*e*r-3*x^3*ln(c*x^n)*b*d*r^2+x^3*b*d*n*r^2-27*
x^3*x^r*ln(c*x^n)*b*e-9*x^3*x^r*a*e*r+9*x^3*x^r*b*e*n-18*x^3*ln(c*x^n)*b*d
*r-3*x^3*a*d*r^2+6*x^3*b*d*n*r-27*x^3*x^r*a*e-27*x^3*ln(c*x^n)*b*d-18*x^3*
a*d*r+9*b*d*n*x^3-27*x^3*d*a)/(r^2+6*r+9)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 159 vs. $2(55) = 110$.

Time = 0.09 (sec) , antiderivative size = 159, normalized size of antiderivative = 2.69

$$\int x^2(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{3\left(bdr^2+6\,bdr+9\,bd\right)x^3\log\left(c\right)+3\left(bdnr^2+6\,bdnr+9\,bdn\right)x^3\log\left(x\right)-\left(9\,bdn+\left(bdn-3\,ad\right)r^2-27\,a}{9\left(r^2+6\right.}$$

input
```
integrate(x^2*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/9*(3*(b*d*r^2 + 6*b*d*r + 9*b*d)*x^3*log(c) + 3*(b*d*n*r^2 + 6*b*d*n*r +
 9*b*d*n)*x^3*log(x) - (9*b*d*n + (b*d*n - 3*a*d)*r^2 - 27*a*d + 6*(b*d*n
- 3*a*d)*r)*x^3 + 9*((b*e*r + 3*b*e)*x^3*log(c) + (b*e*n*r + 3*b*e*n)*x^3*
log(x) - (b*e*n - a*e*r - 3*a*e)*x^3)*x^r)/(r^2 + 6*r + 9)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 398 vs. $2(51) = 102$.

Time = 1.52 (sec) , antiderivative size = 398, normalized size of antiderivative = 6.75

$$\int x^2(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx = \begin{cases} \frac{3adr^2x^3}{9r^2+54r+81}+\frac{18adrx^3}{9r^2+54r+81}+\frac{27adx^3}{9r^2+54r+81}+\frac{9aerx^3x^r}{9r^2+54r+81}+\frac{27aex^3x^r}{9r^2+54r+81}-\frac{bdnr^2x^3}{9r^2+54r+81}-\frac{6bdnrx^3}{9r^2+54r+81}-\frac{9bdnx^3}{9r^2+54r+81}+ \\ \frac{adx^3}{3}+\frac{ae\log\left(cx^n\right)}{n}-\frac{bdnx^3}{9}+\frac{bdx^3\log\left(cx^n\right)}{3}+\frac{be\log\left(cx^n\right)^2}{2n} \end{cases}$$

input
```
integrate(x**2*(d+e*x**r)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((3*a*d*r**2*x**3/(9*r**2 + 54*r + 81) + 18*a*d*r*x**3/(9*r**2 +
54*r + 81) + 27*a*d*x**3/(9*r**2 + 54*r + 81) + 9*a*e*r*x**3*x**r/(9*r**2
+ 54*r + 81) + 27*a*e*x**3*x**r/(9*r**2 + 54*r + 81) - b*d*n*r**2*x**3/(9*
r**2 + 54*r + 81) - 6*b*d*n*r*x**3/(9*r**2 + 54*r + 81) - 9*b*d*n*x**3/(9*
r**2 + 54*r + 81) + 3*b*d*r**2*x**3*log(c*x**n)/(9*r**2 + 54*r + 81) + 18*
b*d*r*x**3*log(c*x**n)/(9*r**2 + 54*r + 81) + 27*b*d*x**3*log(c*x**n)/(9*r
**2 + 54*r + 81) - 9*b*e*n*x**3*x**r/(9*r**2 + 54*r + 81) + 9*b*e*r*x**3*x
**r*log(c*x**n)/(9*r**2 + 54*r + 81) + 27*b*e*x**3*x**r*log(c*x**n)/(9*r**
2 + 54*r + 81), Ne(r, -3)), (a*d*x**3/3 + a*e*log(c*x**n)/n - b*d*n*x**3/9
 + b*d*x**3*log(c*x**n)/3 + b*e*log(c*x**n)**2/(2*n), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 76, normalized size of antiderivative = 1.29

$$\int x^2(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{9}\,bdnx^3+\frac{1}{3}\,bdx^3\log\left(cx^n\right)+\frac{1}{3}\,adx^3+\frac{bex^{r+3}\log\left(cx^n\right)}{r+3}-\frac{benx^{r+3}}{\left(r+3\right)^2}+\frac{aex^{r+3}}{r+3}$$

input
```
integrate(x^2*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/9*b*d*n*x^3 + 1/3*b*d*x^3*log(c*x^n) + 1/3*a*d*x^3 + b*e*x^(r + 3)*log(
c*x^n)/(r + 3) - b*e*n*x^(r + 3)/(r + 3)^2 + a*e*x^(r + 3)/(r + 3)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 132 vs. 2(55) = 110.

Time = 0.12 (sec) , antiderivative size = 132, normalized size of antiderivative = 2.24

$$\int x^2(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{benrx^3x^r\log\left(x\right)}{r^2+6\,r+9}+\frac{3\,benx^3x^r\log\left(x\right)}{r^2+6\,r+9}+\frac{1}{3}\,bdnx^3\log\left(x\right)-\frac{benx^3x^r}{r^2+6\,r+9}-\frac{1}{9}\,bdnx^3+\frac{bex^3x^r\log\left(c\right)}{r+3}+\frac{1}{3}\,bdx^3\log\left(c\right)+\frac{aex^3x^r}{r+3}+\frac{1}{3}\,adx^3$$

input
```
integrate(x^2*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e*n*r*x^3*x^r*log(x)/(r^2 + 6*r + 9) + 3*b*e*n*x^3*x^r*log(x)/(r^2 + 6*r
 + 9) + 1/3*b*d*n*x^3*log(x) - b*e*n*x^3*x^r/(r^2 + 6*r + 9) - 1/9*b*d*n*x
^3 + b*e*x^3*x^r*log(c)/(r + 3) + 1/3*b*d*x^3*log(c) + a*e*x^3*x^r/(r + 3)
 + 1/3*a*d*x^3
```

Mupad [F(-1)]

Timed out.

$$\int x^2(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx=\int x^2\left(d+e\,x^r\right)\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x^2*(d + e*x^r)*(a + b*log(c*x^n)),x)
```

output
```
int(x^2*(d + e*x^r)*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 136, normalized size of antiderivative = 2.31

$$\int x^2(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$=\frac{x^3(9x^r\log(x^nc)\,ber+27x^r\log(x^nc)\,be+9x^raer+27x^rae-9x^rben+3\log(x^nc)\,bd\,r^2+18\log(x^nc)\,bdr}{9r^2+54r+81}$$

input
```
int(x^2*(d+e*x^r)*(a+b*log(c*x^n)),x)
```

output
```
(x**3*(9*x**r*log(x**n*c)*b*e*r + 27*x**r*log(x**n*c)*b*e + 9*x**r*a*e*r +
 27*x**r*a*e - 9*x**r*b*e*n + 3*log(x**n*c)*b*d*r**2 + 18*log(x**n*c)*b*d*
r + 27*log(x**n*c)*b*d + 3*a*d*r**2 + 18*a*d*r + 27*a*d - b*d*n*r**2 - 6*b
*d*n*r - 9*b*d*n))/(9*(r**2 + 6*r + 9))
```

3.373 $\int (d+ex^r)(a+b\log(cx^n))\,dx$

Optimal result . . . 2774
Mathematica [A] (verified) . . . 2774
Rubi [A] (verified) . . . 2775
Maple [B] (verified) . . . 2776
Fricas [B] (verification not implemented) . . . 2777
Sympy [B] (verification not implemented) . . . 2777
Maxima [A] (verification not implemented) . . . 2778
Giac [A] (verification not implemented) . . . 2778
Mupad [F(-1)] . . . 2779
Reduce [B] (verification not implemented) . . . 2779

Optimal result

Integrand size = 18, antiderivative size = 57

$$\int (d+ex^r)(a+b\log(cx^n))\,dx=-bdnx-\frac{benx^{1+r}}{(1+r)^2}+dx(a+b\log(cx^n))+\frac{ex^{1+r}(a+b\log(cx^n))}{1+r}$$

output
```
-b*d*n*x-b*e*n*x^(1+r)/(1+r)^2+d*x*(a+b*ln(c*x^n))+e*x^(1+r)*(a+b*ln(c*x^n
))/(1+r)
```

Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 53, normalized size of antiderivative = 0.93

$$\int (d+ex^r)(a+b\log(cx^n))\,dx=x\left(ad-bdn-\frac{benx^r}{(1+r)^2}+bd\log(cx^n)+\frac{ex^r(a+b\log(cx^n))}{1+r}\right)$$

input
```
Integrate[(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
x*(a*d - b*d*n - (b*e*n*x^r)/(1 + r)^2 + b*d*Log[c*x^n] + (e*x^r*(a + b*Lo
g[c*x^n]))/(1 + r))
```

Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 64, normalized size of antiderivative = 1.12, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {2750, 27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$$

$$\Big\downarrow \text{2750}$$

$$-bn\int \frac{ex^r+d(r+1)}{r+1}dx+dx(a+b\log\left(cx^n\right))+\frac{ex^{r+1}(a+b\log\left(cx^n\right))}{r+1}$$

$$\Big\downarrow \text{27}$$

$$-\frac{bn\int (ex^r+d(r+1))\,dx}{r+1}+dx(a+b\log\left(cx^n\right))+\frac{ex^{r+1}(a+b\log\left(cx^n\right))}{r+1}$$

$$\Big\downarrow \text{2009}$$

$$dx(a+b\log\left(cx^n\right))+\frac{ex^{r+1}(a+b\log\left(cx^n\right))}{r+1}-\frac{bn\left(d(r+1)x+\frac{ex^{r+1}}{r+1}\right)}{r+1}$$

input
```
Int[(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
-((b*n*(d*(1 + r)*x + (e*x^(1 + r))/(1 + r)))/(1 + r)) + d*x*(a + b*Log[c*
x^n]) + (e*x^(1 + r)*(a + b*Log[c*x^n]))/(1 + r)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2750
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Simp[(a + b*Log[c*x^n])
  u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b,
 c, d, e, n, r}, x] && IGtQ[q, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 143 vs. $2(57) = 114$.

Time = 0.35 (sec) , antiderivative size = 144, normalized size of antiderivative = 2.53

method	result
parallelrisch	$-\frac{-x\,x^{r}\ln\left(c\,x^{n}\right)ber-x\ln\left(c\,x^{n}\right)bd\,r^{2}+xbdn\,r^{2}-x\,x^{r}\ln\left(c\,x^{n}\right)be-x\,x^{r}aer+x\,x^{r}ben-2x\ln\left(c\,x^{n}\right)bdr-xad\,r^{2}+2xbdnr-x\,x^{r}ae}{r^{2}+2r+1}$
risch	$\frac{bx\left(dr+e\,x^{r}+d\right)\ln\left(x^{n}\right)}{1+r}-\frac{x\left(-2x^{r}aer+2x^{r}ben-2\ln\left(c\right)bd\,r^{2}-4\ln\left(c\right)bdr-2da+2bdn-2x^{r}ae+2bdn\,r^{2}+4bdnr-2\ln\left(c\right)be\,x^{r}-\right.}{}$

input
```
int((d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-x*x^r*ln(c*x^n)*b*e*r-x*ln(c*x^n)*b*d*r^2+x*b*d*n*r^2-x*x^r*ln(c*x^n)*b
*e-x*x^r*a*e*r+x*x^r*b*e*n-2*x*ln(c*x^n)*b*d*r-x*a*d*r^2+2*x*b*d*n*r-x*x^r
*a*e-x*ln(c*x^n)*b*d-2*x*a*d*r+b*d*n*x-x*d*a)/(r^2+2*r+1)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 138 vs. $2(57) = 114$.

Time = 0.09 (sec) , antiderivative size = 138, normalized size of antiderivative = 2.42

$$\int (d + ex^r)(a + b\log(cx^n))\,dx$$
$$= \frac{(bdr^2 + 2\,bdr + bd)x\log(c) + (bdnr^2 + 2\,bdnr + bdn)x\log(x) - (bdn + (bdn - ad)r^2 - ad + 2\,(bdn - a}{r^2 + 2\,r + 1}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((b*d*r^2 + 2*b*d*r + b*d)*x*log(c) + (b*d*n*r^2 + 2*b*d*n*r + b*d*n)*x*lo
g(x) - (b*d*n + (b*d*n - a*d)*r^2 - a*d + 2*(b*d*n - a*d)*r)*x + ((b*e*r +
 b*e)*x*log(c) + (b*e*n*r + b*e*n)*x*log(x) - (b*e*n - a*e*r - a*e)*x)*x^r
)/(r^2 + 2*r + 1)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 323 vs. $2(54) = 108$.

Time = 0.47 (sec) , antiderivative size = 323, normalized size of antiderivative = 5.67

$$\int (d + ex^r)(a + b\log(cx^n))\,dx$$
$$= \begin{cases} \frac{adr^2x}{r^2+2r+1} + \frac{2adrx}{r^2+2r+1} + \frac{adx}{r^2+2r+1} + \frac{aerxx^r}{r^2+2r+1} + \frac{aexx^r}{r^2+2r+1} - \frac{bdnr^2x}{r^2+2r+1} - \frac{2bdnrx}{r^2+2r+1} - \frac{bdnx}{r^2+2r+1} + \frac{bdr^2x\log(cx^n)}{r^2+2r+1} + \frac{2bdrx\,\mathrm{l}}{r^2+} \\ adx + \frac{ae\log(cx^n)}{n} - bdnx + bdx\log(cx^n) + \frac{be\log(cx^n)^2}{2n} \end{cases}$$

input
```
integrate((d+e*x**r)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*d*r**2*x/(r**2 + 2*r + 1) + 2*a*d*r*x/(r**2 + 2*r + 1) + a*d*
x/(r**2 + 2*r + 1) + a*e*r*x*x**r/(r**2 + 2*r + 1) + a*e*x*x**r/(r**2 + 2*
r + 1) - b*d*n*r**2*x/(r**2 + 2*r + 1) - 2*b*d*n*r*x/(r**2 + 2*r + 1) - b*
d*n*x/(r**2 + 2*r + 1) + b*d*r**2*x*log(c*x**n)/(r**2 + 2*r + 1) + 2*b*d*r
*x*log(c*x**n)/(r**2 + 2*r + 1) + b*d*x*log(c*x**n)/(r**2 + 2*r + 1) - b*e
*n*x*x**r/(r**2 + 2*r + 1) + b*e*r*x*x**r*log(c*x**n)/(r**2 + 2*r + 1) + b
*e*x*x**r*log(c*x**n)/(r**2 + 2*r + 1), Ne(r, -1)), (a*d*x + a*e*log(c*x**
n)/n - b*d*n*x + b*d*x*log(c*x**n) + b*e*log(c*x**n)**2/(2*n), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.19

$$\int (d+ex^r)(a+b\log(cx^n))\,dx = -bdnx + bdx\log(cx^n) + adx + \frac{bex^{r+1}\log(cx^n)}{r+1} - \frac{benx^{r+1}}{(r+1)^2} + \frac{aex^{r+1}}{r+1}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-b*d*n*x + b*d*x*log(c*x^n) + a*d*x + b*e*x^(r + 1)*log(c*x^n)/(r + 1) - b
*e*n*x^(r + 1)/(r + 1)^2 + a*e*x^(r + 1)/(r + 1)
```

Giac [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 110, normalized size of antiderivative = 1.93

$$\int (d+ex^r)(a+b\log(cx^n))\,dx = \frac{benrxx^r\log(x)}{r^2+2r+1} + bdnx\log(x) + \frac{benxx^r\log(x)}{r^2+2r+1} - bdnx - \frac{benxx^r}{r^2+2r+1} + bdx\log(c) + \frac{bexx^r\log(c)}{r+1} + adx + \frac{aexx^r}{r+1}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e*n*r*x*x^r*log(x)/(r^2 + 2*r + 1) + b*d*n*x*log(x) + b*e*n*x*x^r*log(x)
/(r^2 + 2*r + 1) - b*d*n*x - b*e*n*x*x^r/(r^2 + 2*r + 1) + b*d*x*log(c) +
b*e*x*x^r*log(c)/(r + 1) + a*d*x + a*e*x*x^r/(r + 1)
```

Mupad [F(-1)]

Timed out.

$$\int (d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx=\int \left(d+e\,x^r\right)\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int((d + e*x^r)*(a + b*log(c*x^n)),x)
```

output
```
int((d + e*x^r)*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 124, normalized size of antiderivative = 2.18

$$\int (d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$=\frac{x(x^r\log(x^nc)\,ber+x^r\log(x^nc)\,be+x^raer+x^rae-x^rben+\log(x^nc)\,bd\,r^2+2\log(x^nc)\,bdr+\log(x^nc)\,b}{r^2+2r+1}$$

input
```
int((d+e*x^r)*(a+b*log(c*x^n)),x)
```

output
```
(x*(x**r*log(x**n*c)*b*e*r + x**r*log(x**n*c)*b*e + x**r*a*e*r + x**r*a*e
- x**r*b*e*n + log(x**n*c)*b*d*r**2 + 2*log(x**n*c)*b*d*r + log(x**n*c)*b*
d + a*d*r**2 + 2*a*d*r + a*d - b*d*n*r**2 - 2*b*d*n*r - b*d*n))/(r**2 + 2*
r + 1)
```

3.374 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^2}\,dx$

Optimal result 2780
Mathematica [A] (verified) 2780
Rubi [A] (verified) 2781
Maple [A] (verified) 2782
Fricas [B] (verification not implemented) 2783
Sympy [B] (verification not implemented) 2783
Maxima [F(-2)] 2784
Giac [B] (verification not implemented) 2784
Mupad [F(-1)] 2785
Reduce [B] (verification not implemented) 2785

Optimal result

Integrand size = 21, antiderivative size = 67

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^2}\,dx = -\frac{bdn}{x}-\frac{benx^{-1+r}}{(1-r)^2}-\frac{d(a+b\log(cx^n))}{x} - \frac{ex^{-1+r}(a+b\log(cx^n))}{1-r}$$

output
```
-b*d*n/x-b*e*n*x^(-1+r)/(1-r)^2-d*(a+b*ln(c*x^n))/x-e*x^(-1+r)*(a+b*ln(c*x
^n))/(1-r)
```

Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 67, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^2}\,dx = -\frac{a(-1+r)\,(d(-1+r)-ex^r)+bn(d(-1+r)^2+ex^r)+b(-1+r)\,(d(-1+r)-ex^r)\log(cx^n)}{(-1+r)^2x}$$

input
```
Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-((a*(-1 + r)*(d*(-1 + r) - e*x^r) + b*n*(d*(-1 + r)^2 + e*x^r) + b*(-1 +
r)*(d*(-1 + r) - e*x^r)*Log[c*x^n])/((-1 + r)^2*x))
```

Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 79, normalized size of antiderivative = 1.18, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.238$, Rules used = {2772, 25, 27, 802, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^2}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{ex^r+d(1-r)}{(1-r)x^2}dx-\frac{d(a+b\log(cx^n))}{x}-\frac{ex^{r-1}(a+b\log(cx^n))}{1-r}$$

$$\Big\downarrow \text{25}$$

$$bn\int \frac{ex^r+d(1-r)}{(1-r)x^2}dx-\frac{d(a+b\log(cx^n))}{x}-\frac{ex^{r-1}(a+b\log(cx^n))}{1-r}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{ex^r+d(1-r)}{x^2}dx}{1-r}-\frac{d(a+b\log(cx^n))}{x}-\frac{ex^{r-1}(a+b\log(cx^n))}{1-r}$$

$$\Big\downarrow \text{802}$$

$$\frac{bn\int \left(ex^{r-2}+\frac{d-dr}{x^2}\right)dx}{1-r}-\frac{d(a+b\log(cx^n))}{x}-\frac{ex^{r-1}(a+b\log(cx^n))}{1-r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d(a+b\log(cx^n))}{x}-\frac{ex^{r-1}(a+b\log(cx^n))}{1-r}+\frac{bn\left(-\frac{d(1-r)}{x}-\frac{ex^{r-1}}{1-r}\right)}{1-r}$$

input
```
Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
(b*n*(-((d*(1 - r))/x) - (e*x^(-1 + r))/(1 - r)))/(1 - r) - (d*(a + b*Log[
c*x^n]))/x - (e*x^(-1 + r)*(a + b*Log[c*x^n]))/(1 - r)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 802
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.36 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.90

method	result
parallelrisch	$-\frac{-\ln(c\,x^n)x^r ber+\ln(c\,x^n)bd\,r^2+bdn\,r^2+x^r\ln(c\,x^n)be-x^r aer+x^r ben-2\ln(c\,x^n)bdr+ad\,r^2-2bdnr+x^r ae+\ln(c\,x^n)bd}{x(r^2-2r+1)}$
risch	$-\frac{b(dr-e\,x^r-d)\ln(x^n)}{(-1+r)x}-\frac{-2x^r aer+2x^r ben+2\ln(c)bd\,r^2-4\ln(c)bdr+2da+2bdn+2x^r ae+2bdn\,r^2-4bdnr+2\ln(c)be\,x^r}{}$

input
```
int((d+e*x^r)*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

output
```
-(-ln(c*x^n)*x^r*b*e*r+ln(c*x^n)*b*d*r^2+b*d*n*r^2+x^r*ln(c*x^n)*b*e-x^r*a
*e*r+x^r*b*e*n-2*ln(c*x^n)*b*d*r+a*d*r^2-2*b*d*n*r+x^r*a*e+ln(c*x^n)*b*d-2
*d*a*r+b*d*n+d*a)/x/(r^2-2*r+1)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 130 vs. $2(62) = 124$.

Time = 0.08 (sec) , antiderivative size = 130, normalized size of antiderivative = 1.94

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^2}\,dx = -\frac{bdn+(bdn+ad)r^2+ad-2(bdn+ad)r+(ben-aer+ae-(ber-be)\log(c)-(benr-ben)\log(\cdots}{(r^2-2r+1)x}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
-(b*d*n + (b*d*n + a*d)*r^2 + a*d - 2*(b*d*n + a*d)*r + (b*e*n - a*e*r + a
*e - (b*e*r - b*e)*log(c) - (b*e*n*r - b*e*n)*log(x))*x^r + (b*d*r^2 - 2*b
*d*r + b*d)*log(c) + (b*d*n*r^2 - 2*b*d*n*r + b*d*n)*log(x))/((r^2 - 2*r +
 1)*x)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 348 vs. $2(56) = 112$.

Time = 2.15 (sec) , antiderivative size = 348, normalized size of antiderivative = 5.19

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^2}\,dx = \begin{cases} -\frac{adr^2}{r^2x-2rx+x}+\frac{2adr}{r^2x-2rx+x}-\frac{ad}{r^2x-2rx+x}+\frac{aerx^r}{r^2x-2rx+x}-\frac{aex^r}{r^2x-2rx+x}-\frac{bdnr^2}{r^2x-2rx+x}+\frac{2bdnr}{r^2x-2rx+x}-\frac{bdn}{r^2x-2rx+x}-\cdots \\ -\frac{ad}{x}+ae\log(x)+bd\left(-\frac{n}{x}-\frac{\log(cx^n)}{x}\right)-be\left(\begin{cases}-\log(c)\log(x) & \text{for } n=0\\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise}\end{cases}\right) \end{cases}$$

input
```
integrate((d+e*x**r)*(a+b*ln(c*x**n))/x**2,x)
```

output
```
Piecewise((-a*d*r**2/(r**2*x - 2*r*x + x) + 2*a*d*r/(r**2*x - 2*r*x + x) -
 a*d/(r**2*x - 2*r*x + x) + a*e*r*x**r/(r**2*x - 2*r*x + x) - a*e*x**r/(r*
*2*x - 2*r*x + x) - b*d*n*r**2/(r**2*x - 2*r*x + x) + 2*b*d*n*r/(r**2*x -
2*r*x + x) - b*d*n/(r**2*x - 2*r*x + x) - b*d*r**2*log(c*x**n)/(r**2*x - 2
*r*x + x) + 2*b*d*r*log(c*x**n)/(r**2*x - 2*r*x + x) - b*d*log(c*x**n)/(r*
*2*x - 2*r*x + x) - b*e*n*x**r/(r**2*x - 2*r*x + x) + b*e*r*x**r*log(c*x**
n)/(r**2*x - 2*r*x + x) - b*e*x**r*log(c*x**n)/(r**2*x - 2*r*x + x), Ne(r,
 1)), (-a*d/x + a*e*log(x) + b*d*(-n/x - log(c*x**n)/x) - b*e*Piecewise((-
log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)), True))
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-2>0)', see `assume?` for more
details)Is
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 186 vs. 2(62) = 124.

Time = 0.12 (sec) , antiderivative size = 186, normalized size of antiderivative = 2.78

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^2}\,dx = \frac{benrx^r\log(x)}{(r^2-2r+1)x} + \frac{berx^r\log(c)}{(r^2-2r+1)x} - \frac{bdn\log(x)}{x} - \frac{benx^r\log(x)}{(r^2-2r+1)x} - \frac{bdn}{x} - \frac{benx^r}{(r^2-2r+1)x} + \frac{aerx^r}{(r^2-2r+1)x} - \frac{bd\log(c)}{x} - \frac{bex^r\log(c)}{(r^2-2r+1)x} - \frac{ad}{x} - \frac{aex^r}{(r^2-2r+1)x}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
b*e*n*r*x^r*log(x)/((r^2 - 2*r + 1)*x) + b*e*r*x^r*log(c)/((r^2 - 2*r + 1)
*x) - b*d*n*log(x)/x - b*e*n*x^r*log(x)/((r^2 - 2*r + 1)*x) - b*d*n/x - b*
e*n*x^r/((r^2 - 2*r + 1)*x) + a*e*r*x^r/((r^2 - 2*r + 1)*x) - b*d*log(c)/x
 - b*e*x^r*log(c)/((r^2 - 2*r + 1)*x) - a*d/x - a*e*x^r/((r^2 - 2*r + 1)*x
)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^2}\,dx=\int \frac{(d+e\,x^r)\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^2}\,dx$$

input
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^2,x)
```

output
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^2, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 132, normalized size of antiderivative = 1.97

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^2}\,dx = \frac{x^r\log(x^nc)\,ber-x^r\log(x^nc)\,be+x^raer-x^rae-x^rben-\log(x^nc)\,bd\,r^2+2\log(x^nc)\,bdr-\log(x^nc)\,bd\,-}{x\,(r^2-2r+1)}$$

input
```
int((d+e*x^r)*(a+b*log(c*x^n))/x^2,x)
```

output
```
(x**r*log(x**n*c)*b*e*r - x**r*log(x**n*c)*b*e + x**r*a*e*r - x**r*a*e - x
**r*b*e*n - log(x**n*c)*b*d*r**2 + 2*log(x**n*c)*b*d*r - log(x**n*c)*b*d -
 a*d*r**2 + 2*a*d*r - a*d - b*d*n*r**2 + 2*b*d*n*r - b*d*n)/(x*(r**2 - 2*r
 + 1))
```

3.375 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^4}\,dx$

Optimal result . . . 2786
Mathematica [A] (verified) . . . 2786
Rubi [A] (verified) . . . 2787
Maple [A] (verified) . . . 2788
Fricas [B] (verification not implemented) . . . 2788
Sympy [B] (verification not implemented) . . . 2789
Maxima [F(-2)] . . . 2790
Giac [B] (verification not implemented) . . . 2790
Mupad [F(-1)] . . . 2791
Reduce [B] (verification not implemented) . . . 2791

Optimal result

Integrand size = 21, antiderivative size = 71

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^4}\,dx=-\frac{bdn}{9x^3}-\frac{benx^{-3+r}}{(3-r)^2}-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{ex^{-3+r}(a+b\log(cx^n))}{3-r}$$

output
```
-1/9*b*d*n/x^3-b*e*n*x^(-3+r)/(3-r)^2-1/3*d*(a+b*ln(c*x^n))/x^3-e*x^(-3+r)
*(a+b*ln(c*x^n))/(3-r)
```

Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 72, normalized size of antiderivative = 1.01

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^4}\,dx=-\frac{3a(-3+r)(d(-3+r)-3ex^r)+bn(d(-3+r)^2+9ex^r)+3b(-3+r)(d(-3+r)-3ex^r)\log(cx^n)}{9(-3+r)^2x^3}$$

input
```
Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-1/9*(3*a*(-3 + r)*(d*(-3 + r) - 3*e*x^r) + b*n*(d*(-3 + r)^2 + 9*e*x^r) +
 3*b*(-3 + r)*(d*(-3 + r) - 3*e*x^r)*Log[c*x^n])/((-3 + r)^2*x^3)
```

Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^4}\,dx$$

$$\Big\downarrow \; 2772$$

$$-bn\int \left(-\frac{ex^{r-4}}{3-r}-\frac{d}{3x^4}\right)dx-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{ex^{r-3}(a+b\log(cx^n))}{3-r}$$

$$\Big\downarrow \; 2009$$

$$-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{ex^{r-3}(a+b\log(cx^n))}{3-r}-bn\left(\frac{d}{9x^3}+\frac{ex^{r-3}}{(3-r)^2}\right)$$

input
```
Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-(b*n*(d/(9*x^3) + (e*x^(-3 + r))/(3 - r)^2)) - (d*(a + b*Log[c*x^n]))/(3*
x^3) - (e*x^(-3 + r)*(a + b*Log[c*x^n]))/(3 - r)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.37 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.90

method	result
parallelrisch	$-\frac{-9\ln(c\,x^n)x^r ber+3\ln(c\,x^n)bd\,r^2+bdn\,r^2+27x^r\ln(c\,x^n)be-9x^r aer+9x^r ben-18\ln(c\,x^n)bdr+3ad\,r^2-6bdnr+27x^r ae+27}{9x^3(r^2-6r+9)}$
risch	$-\frac{b(dr-3e\,x^r-3d)\ln(x^n)}{3(-3+r)x^3}-\frac{-18x^r aer+18x^r ben+6\ln(c)bd\,r^2-36\ln(c)bdr+54da+18bdn+54x^r ae+2bdn\,r^2-12bdnr+54}{}$

input
```
int((d+e*x^r)*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/9*(-9*ln(c*x^n)*x^r*b*e*r+3*ln(c*x^n)*b*d*r^2+b*d*n*r^2+27*x^r*ln(c*x^n
)*b*e-9*x^r*a*e*r+9*x^r*b*e*n-18*ln(c*x^n)*b*d*r+3*a*d*r^2-6*b*d*n*r+27*x^
r*a*e+27*ln(c*x^n)*b*d-18*d*a*r+9*b*d*n+27*d*a)/x^3/(r^2-6*r+9)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 140 vs. $2(62) = 124$.

Time = 0.10 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.97

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^4}\,dx = -\frac{9\,bdn+(bdn+3\,ad)r^2+27\,ad-6\,(bdn+3\,ad)r+9\,(ben-aer+3\,ae-(ber-3\,be)\log(c)-(benr}{9\,(r^2-6\,r+9)}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
-1/9*(9*b*d*n + (b*d*n + 3*a*d)*r^2 + 27*a*d - 6*(b*d*n + 3*a*d)*r + 9*(b*
e*n - a*e*r + 3*a*e - (b*e*r - 3*b*e)*log(c) - (b*e*n*r - 3*b*e*n)*log(x))
*x^r + 3*(b*d*r^2 - 6*b*d*r + 9*b*d)*log(c) + 3*(b*d*n*r^2 - 6*b*d*n*r + 9
*b*d*n)*log(x))/((r^2 - 6*r + 9)*x^3)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 495 vs. $2(63) = 126$.

Time = 2.60 (sec) , antiderivative size = 495, normalized size of antiderivative = 6.97

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^4}\,dx = \begin{cases} -\frac{3adr^2}{9r^2x^3-54rx^3+81x^3} + \frac{18adr}{9r^2x^3-54rx^3+81x^3} - \frac{27ad}{9r^2x^3-54rx^3+81x^3} + \frac{9aerx^r}{9r^2x^3-54rx^3+81x^3} - \frac{27aex^r}{9r^2x^3-54rx^3+81x^3} - \frac{bdnr}{9r^2x^3-54r\ldots} \\ -\frac{ad}{3x^3} + ae\log(x) + bd\left(-\frac{n}{9x^3} - \frac{\log(cx^n)}{3x^3}\right) - be\left(\begin{cases} -\log(c)\log(x) & \text{for } n=0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right) \end{cases}$$

input
```
integrate((d+e*x**r)*(a+b*ln(c*x**n))/x**4,x)
```

output
```
Piecewise((-3*a*d*r**2/(9*r**2*x**3 - 54*r*x**3 + 81*x**3) + 18*a*d*r/(9*r
**2*x**3 - 54*r*x**3 + 81*x**3) - 27*a*d/(9*r**2*x**3 - 54*r*x**3 + 81*x**
3) + 9*a*e*r*x**r/(9*r**2*x**3 - 54*r*x**3 + 81*x**3) - 27*a*e*x**r/(9*r**
2*x**3 - 54*r*x**3 + 81*x**3) - b*d*n*r**2/(9*r**2*x**3 - 54*r*x**3 + 81*x
**3) + 6*b*d*n*r/(9*r**2*x**3 - 54*r*x**3 + 81*x**3) - 9*b*d*n/(9*r**2*x**
3 - 54*r*x**3 + 81*x**3) - 3*b*d*r**2*log(c*x**n)/(9*r**2*x**3 - 54*r*x**3
 + 81*x**3) + 18*b*d*r*log(c*x**n)/(9*r**2*x**3 - 54*r*x**3 + 81*x**3) - 2
7*b*d*log(c*x**n)/(9*r**2*x**3 - 54*r*x**3 + 81*x**3) - 9*b*e*n*x**r/(9*r*
*2*x**3 - 54*r*x**3 + 81*x**3) + 9*b*e*r*x**r*log(c*x**n)/(9*r**2*x**3 - 5
4*r*x**3 + 81*x**3) - 27*b*e*x**r*log(c*x**n)/(9*r**2*x**3 - 54*r*x**3 + 8
1*x**3), Ne(r, 3)), (-a*d/(3*x**3) + a*e*log(x) + b*d*(-n/(9*x**3) - log(c
*x**n)/(3*x**3)) - b*e*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)
**2/(2*n), True)), True))
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^4}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-4>0)', see `assume?` for more
details)Is
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 542 vs. $2(62) = 124$.

Time = 0.12 (sec) , antiderivative size = 542, normalized size of antiderivative = 7.63

$$\begin{aligned}\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^4}\,dx &= -\frac{bdnr^2\log(x)}{3(r^2x^3-6rx^3+9x^3)}+\frac{benrx^r\log(x)}{r^2x^3-6rx^3+9x^3} \\ &\quad -\frac{bdnr^2}{9(r^2x^3-6rx^3+9x^3)} \\ &\quad -\frac{bdr^2\log(c)}{3(r^2x^3-6rx^3+9x^3)}+\frac{berx^r\log(c)}{r^2x^3-6rx^3+9x^3} \\ &\quad +\frac{2bdnr\log(x)}{r^2x^3-6rx^3+9x^3}-\frac{3benx^r\log(x)}{r^2x^3-6rx^3+9x^3} \\ &\quad +\frac{2bdnr}{3(r^2x^3-6rx^3+9x^3)}-\frac{adr^2}{3(r^2x^3-6rx^3+9x^3)} \\ &\quad -\frac{benx^r}{r^2x^3-6rx^3+9x^3}+\frac{aerx^r}{r^2x^3-6rx^3+9x^3} \\ &\quad +\frac{2bdr\log(c)}{r^2x^3-6rx^3+9x^3}-\frac{3bex^r\log(c)}{r^2x^3-6rx^3+9x^3} \\ &\quad -\frac{3bdn\log(x)}{r^2x^3-6rx^3+9x^3}-\frac{bdn}{r^2x^3-6rx^3+9x^3} \\ &\quad +\frac{2adr}{r^2x^3-6rx^3+9x^3}-\frac{3aex^r}{r^2x^3-6rx^3+9x^3} \\ &\quad -\frac{3bd\log(c)}{r^2x^3-6rx^3+9x^3}-\frac{3ad}{r^2x^3-6rx^3+9x^3}\end{aligned}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
-1/3*b*d*n*r^2*log(x)/(r^2*x^3 - 6*r*x^3 + 9*x^3) + b*e*n*r*x^r*log(x)/(r^
2*x^3 - 6*r*x^3 + 9*x^3) - 1/9*b*d*n*r^2/(r^2*x^3 - 6*r*x^3 + 9*x^3) - 1/3
*b*d*r^2*log(c)/(r^2*x^3 - 6*r*x^3 + 9*x^3) + b*e*r*x^r*log(c)/(r^2*x^3 -
6*r*x^3 + 9*x^3) + 2*b*d*n*r*log(x)/(r^2*x^3 - 6*r*x^3 + 9*x^3) - 3*b*e*n*
x^r*log(x)/(r^2*x^3 - 6*r*x^3 + 9*x^3) + 2/3*b*d*n*r/(r^2*x^3 - 6*r*x^3 +
9*x^3) - 1/3*a*d*r^2/(r^2*x^3 - 6*r*x^3 + 9*x^3) - b*e*n*x^r/(r^2*x^3 - 6*
r*x^3 + 9*x^3) + a*e*r*x^r/(r^2*x^3 - 6*r*x^3 + 9*x^3) + 2*b*d*r*log(c)/(r
^2*x^3 - 6*r*x^3 + 9*x^3) - 3*b*e*x^r*log(c)/(r^2*x^3 - 6*r*x^3 + 9*x^3) -
 3*b*d*n*log(x)/(r^2*x^3 - 6*r*x^3 + 9*x^3) - b*d*n/(r^2*x^3 - 6*r*x^3 + 9
*x^3) + 2*a*d*r/(r^2*x^3 - 6*r*x^3 + 9*x^3) - 3*a*e*x^r/(r^2*x^3 - 6*r*x^3
 + 9*x^3) - 3*b*d*log(c)/(r^2*x^3 - 6*r*x^3 + 9*x^3) - 3*a*d/(r^2*x^3 - 6*
r*x^3 + 9*x^3)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^4}\,dx = \int \frac{(d+e\,x^r)\,\left(a+b\,\ln(c\,x^n)\right)}{x^4}\,dx$$

input
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^4,x)
```

output
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^4, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.90

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^4}\,dx = \frac{9x^r\log(x^nc)\,ber-27x^r\log(x^nc)\,be+9x^raer-27x^rae-9x^rben-3\log(x^nc)\,bd\,r^2+18\log(x^nc)\,bdr-2}{9x^3\,(r^2-6r+9)}$$

input
```
int((d+e*x^r)*(a+b*log(c*x^n))/x^4,x)
```

output
```
(9*x**r*log(x**n*c)*b*e*r - 27*x**r*log(x**n*c)*b*e + 9*x**r*a*e*r - 27*x*
*r*a*e - 9*x**r*b*e*n - 3*log(x**n*c)*b*d*r**2 + 18*log(x**n*c)*b*d*r - 27
*log(x**n*c)*b*d - 3*a*d*r**2 + 18*a*d*r - 27*a*d - b*d*n*r**2 + 6*b*d*n*r
 - 9*b*d*n)/(9*x**3*(r**2 - 6*r + 9))
```

3.376 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^6}\,dx$

Optimal result 2793
Mathematica [A] (verified) 2793
Rubi [A] (verified) 2794
Maple [A] (verified) 2795
Fricas [B] (verification not implemented) 2795
Sympy [B] (verification not implemented) 2796
Maxima [F(-2)] 2797
Giac [B] (verification not implemented) 2797
Mupad [F(-1)] 2799
Reduce [B] (verification not implemented) 2799

Optimal result

Integrand size = 21, antiderivative size = 71

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^6}\,dx = -\frac{bdn}{25x^5} - \frac{benx^{-5+r}}{(5-r)^2} - \frac{d(a+b\log(cx^n))}{5x^5} - \frac{ex^{-5+r}(a+b\log(cx^n))}{5-r}$$

output
```
-1/25*b*d*n/x^5-b*e*n*x^(-5+r)/(5-r)^2-1/5*d*(a+b*ln(c*x^n))/x^5-e*x^(-5+r
)*(a+b*ln(c*x^n))/(5-r)
```

Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 72, normalized size of antiderivative = 1.01

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^6}\,dx = -\frac{5a(-5+r)\,(d(-5+r)-5ex^r)+bn(d(-5+r)^2+25ex^r)+5b(-5+r)\,(d(-5+r)-5ex^r)\log(cx^n)}{25(-5+r)^2x^5}$$

input
```
Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-1/25*(5*a*(-5 + r)*(d*(-5 + r) - 5*e*x^r) + b*n*(d*(-5 + r)^2 + 25*e*x^r)
 + 5*b*(-5 + r)*(d*(-5 + r) - 5*e*x^r)*Log[c*x^n])/((-5 + r)^2*x^5)
```

Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^6}\,dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int\left(-\frac{ex^{r-6}}{5-r}-\frac{d}{5x^6}\right)dx-\frac{d(a+b\log(cx^n))}{5x^5}-\frac{ex^{r-5}(a+b\log(cx^n))}{5-r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d(a+b\log(cx^n))}{5x^5}-\frac{ex^{r-5}(a+b\log(cx^n))}{5-r}-bn\left(\frac{d}{25x^5}+\frac{ex^{r-5}}{(5-r)^2}\right)$$

input
```
Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-(b*n*(d/(25*x^5) + (e*x^(-5 + r))/(5 - r)^2)) - (d*(a + b*Log[c*x^n]))/(5
*x^5) - (e*x^(-5 + r)*(a + b*Log[c*x^n]))/(5 - r)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (verified)

Time = 0.93 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.90

method	result
parallelrisch	$-\frac{-25\ln(c\,x^{n})x^{r}ber+5\ln(c\,x^{n})bd\,r^{2}+bdn\,r^{2}+125x^{r}\ln(c\,x^{n})be-25x^{r}aer+25x^{r}ben-50\ln(c\,x^{n})bdr+5ad\,r^{2}-10bdnr+125x}{25x^{5}(r^{2}-10r+25)}$
risch	$-\frac{b(dr-5e\,x^{r}-5d)\ln(x^{n})}{5(-5+r)x^{5}}-\frac{-50x^{r}aer+50x^{r}ben+10\ln(c)bd\,r^{2}-100\ln(c)bdr+250da+50bdn+250x^{r}ae+2bdn\,r^{2}-20bdnr}{}$

input
```
int((d+e*x^r)*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

output
```
-1/25*(-25*ln(c*x^n)*x^r*b*e*r+5*ln(c*x^n)*b*d*r^2+b*d*n*r^2+125*x^r*ln(c*
x^n)*b*e-25*x^r*a*e*r+25*x^r*b*e*n-50*ln(c*x^n)*b*d*r+5*a*d*r^2-10*b*d*n*r
+125*x^r*a*e+125*ln(c*x^n)*b*d-50*d*a*r+25*b*d*n+125*d*a)/x^5/(r^2-10*r+25
)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 140 vs. $2(62) = 124$.

Time = 0.08 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.97

$$\int \frac{(d+ex^r)\left(a+b\log\left(cx^n\right)\right)}{x^6}\,dx =$$
$$-\frac{25\,bdn+(bdn+5\,ad)r^2+125\,ad-10\,(bdn+5\,ad)r+25\,(ben-aer+5\,ae-(ber-5\,be)\log\left(c\right)-(}{25\,(r^2-10\,r}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
-1/25*(25*b*d*n + (b*d*n + 5*a*d)*r^2 + 125*a*d - 10*(b*d*n + 5*a*d)*r + 2
5*(b*e*n - a*e*r + 5*a*e - (b*e*r - 5*b*e)*log(c) - (b*e*n*r - 5*b*e*n)*lo
g(x))*x^r + 5*(b*d*r^2 - 10*b*d*r + 25*b*d)*log(c) + 5*(b*d*n*r^2 - 10*b*d
*n*r + 25*b*d*n)*log(x))/((r^2 - 10*r + 25)*x^5)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 495 vs. $2(63) = 126$.

Time = 5.08 (sec) , antiderivative size = 495, normalized size of antiderivative = 6.97

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^6}\,dx$$
$$= \begin{cases} -\frac{5adr^2}{25r^2x^5-250rx^5+625x^5} + \frac{50adr}{25r^2x^5-250rx^5+625x^5} - \frac{125ad}{25r^2x^5-250rx^5+625x^5} + \frac{25aerx^r}{25r^2x^5-250rx^5+625x^5} - \frac{125aex^r}{25r^2x^5-250rx^5+625x} \\ -\frac{ad}{5x^5} + ae\log(x) + bd\left(-\frac{n}{25x^5} - \frac{\log(cx^n)}{5x^5}\right) - be\left(\begin{cases} -\log(c)\log(x) & \text{for } n=0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right) \end{cases}$$

input
```
integrate((d+e*x**r)*(a+b*ln(c*x**n))/x**6,x)
```

output
```
Piecewise((-5*a*d*r**2/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) + 50*a*d*r/(
25*r**2*x**5 - 250*r*x**5 + 625*x**5) - 125*a*d/(25*r**2*x**5 - 250*r*x**5
 + 625*x**5) + 25*a*e*r*x**r/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) - 125*
a*e*x**r/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) - b*d*n*r**2/(25*r**2*x**5
 - 250*r*x**5 + 625*x**5) + 10*b*d*n*r/(25*r**2*x**5 - 250*r*x**5 + 625*x*
*5) - 25*b*d*n/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) - 5*b*d*r**2*log(c*x
**n)/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) + 50*b*d*r*log(c*x**n)/(25*r**
2*x**5 - 250*r*x**5 + 625*x**5) - 125*b*d*log(c*x**n)/(25*r**2*x**5 - 250*
r*x**5 + 625*x**5) - 25*b*e*n*x**r/(25*r**2*x**5 - 250*r*x**5 + 625*x**5)
+ 25*b*e*r*x**r*log(c*x**n)/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) - 125*b
*e*x**r*log(c*x**n)/(25*r**2*x**5 - 250*r*x**5 + 625*x**5), Ne(r, 5)), (-a
*d/(5*x**5) + a*e*log(x) + b*d*(-n/(25*x**5) - log(c*x**n)/(5*x**5)) - b*e
*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)), Tru
e))
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^6}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-6>0)', see `assume?` for more
details)Is
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 542 vs. $2(62) = 124$.

Time = 0.13 (sec) , antiderivative size = 542, normalized size of antiderivative = 7.63

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^6}\,dx = -\frac{bdnr^2\log(x)}{5(r^2x^5-10rx^5+25x^5)}+\frac{benrx^r\log(x)}{r^2x^5-10rx^5+25x^5} - \frac{bdnr^2}{25(r^2x^5-10rx^5+25x^5)} - \frac{bdr^2\log(c)}{5(r^2x^5-10rx^5+25x^5)} + \frac{berx^r\log(c)}{r^2x^5-10rx^5+25x^5}+\frac{2bdnr\log(x)}{r^2x^5-10rx^5+25x^5} - \frac{5benx^r\log(x)}{r^2x^5-10rx^5+25x^5}+\frac{2bdnr}{5(r^2x^5-10rx^5+25x^5)} - \frac{adr^2}{5(r^2x^5-10rx^5+25x^5)} - \frac{benx^r}{r^2x^5-10rx^5+25x^5}+\frac{aerx^r}{r^2x^5-10rx^5+25x^5} + \frac{2bdr\log(c)}{r^2x^5-10rx^5+25x^5}-\frac{5bex^r\log(c)}{r^2x^5-10rx^5+25x^5} - \frac{5bdn\log(x)}{r^2x^5-10rx^5+25x^5}-\frac{bdn}{r^2x^5-10rx^5+25x^5} + \frac{2adr}{r^2x^5-10rx^5+25x^5}-\frac{5aex^r}{r^2x^5-10rx^5+25x^5} - \frac{5bd\log(c)}{r^2x^5-10rx^5+25x^5}-\frac{5ad}{r^2x^5-10rx^5+25x^5}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
-1/5*b*d*n*r^2*log(x)/(r^2*x^5 - 10*r*x^5 + 25*x^5) + b*e*n*r*x^r*log(x)/(
r^2*x^5 - 10*r*x^5 + 25*x^5) - 1/25*b*d*n*r^2/(r^2*x^5 - 10*r*x^5 + 25*x^5
) - 1/5*b*d*r^2*log(c)/(r^2*x^5 - 10*r*x^5 + 25*x^5) + b*e*r*x^r*log(c)/(r
^2*x^5 - 10*r*x^5 + 25*x^5) + 2*b*d*n*r*log(x)/(r^2*x^5 - 10*r*x^5 + 25*x^
5) - 5*b*e*n*x^r*log(x)/(r^2*x^5 - 10*r*x^5 + 25*x^5) + 2/5*b*d*n*r/(r^2*x
^5 - 10*r*x^5 + 25*x^5) - 1/5*a*d*r^2/(r^2*x^5 - 10*r*x^5 + 25*x^5) - b*e*
n*x^r/(r^2*x^5 - 10*r*x^5 + 25*x^5) + a*e*r*x^r/(r^2*x^5 - 10*r*x^5 + 25*x
^5) + 2*b*d*r*log(c)/(r^2*x^5 - 10*r*x^5 + 25*x^5) - 5*b*e*x^r*log(c)/(r^2
*x^5 - 10*r*x^5 + 25*x^5) - 5*b*d*n*log(x)/(r^2*x^5 - 10*r*x^5 + 25*x^5) -
 b*d*n/(r^2*x^5 - 10*r*x^5 + 25*x^5) + 2*a*d*r/(r^2*x^5 - 10*r*x^5 + 25*x^
5) - 5*a*e*x^r/(r^2*x^5 - 10*r*x^5 + 25*x^5) - 5*b*d*log(c)/(r^2*x^5 - 10*
r*x^5 + 25*x^5) - 5*a*d/(r^2*x^5 - 10*r*x^5 + 25*x^5)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})}{x^6}\,dx = \int \frac{(d+e\,x^r)\,\left(a+b\,\ln{(c\,x^n)}\right)}{x^6}\,dx$$

input
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^6,x)
```

output
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^6, x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.90

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})}{x^6}\,dx = \frac{25x^r\log(x^nc)\,ber-125x^r\log(x^nc)\,be+25x^raer-125x^rae-25x^rben-5\log(x^nc)\,bd\,r^2+50\log(x^nc)\,bc}{25x^5\,(r^2-10r+25)}$$

input
```
int((d+e*x^r)*(a+b*log(c*x^n))/x^6,x)
```

output
```
(25*x**r*log(x**n*c)*b*e*r - 125*x**r*log(x**n*c)*b*e + 25*x**r*a*e*r - 12
5*x**r*a*e - 25*x**r*b*e*n - 5*log(x**n*c)*b*d*r**2 + 50*log(x**n*c)*b*d*r
 - 125*log(x**n*c)*b*d - 5*a*d*r**2 + 50*a*d*r - 125*a*d - b*d*n*r**2 + 10
*b*d*n*r - 25*b*d*n)/(25*x**5*(r**2 - 10*r + 25))
```

3.377 $\int x^5(d+ex^r)^2 (a+b\log(cx^n))\,dx$

Optimal result . . . 2800
Mathematica [A] (verified) . . . 2800
Rubi [A] (verified) . . . 2801
Maple [B] (verified) . . . 2802
Fricas [B] (verification not implemented) . . . 2803
Sympy [B] (verification not implemented) . . . 2804
Maxima [A] (verification not implemented) . . . 2805
Giac [B] (verification not implemented) . . . 2806
Mupad [F(-1)] . . . 2806
Reduce [B] (verification not implemented) . . . 2807

Optimal result

Integrand size = 23, antiderivative size = 103

$$\int x^5(d+ex^r)^2 (a+b\log(cx^n))\,dx = -\frac{1}{36}bd^2nx^6 - \frac{be^2nx^{2(3+r)}}{4(3+r)^2} - \frac{2bdenx^{6+r}}{(6+r)^2} + \frac{1}{6}\left(d^2x^6 + \frac{3e^2x^{2(3+r)}}{3+r} + \frac{12dex^{6+r}}{6+r}\right)(a+b\log(cx^n))$$

output
```
-1/36*b*d^2*n*x^6-1/4*b*e^2*n*x^(6+2*r)/(3+r)^2-2*b*d*e*n*x^(6+r)/(6+r)^2+
1/6*(d^2*x^6+3*e^2*x^(6+2*r)/(3+r)+12*d*e*x^(6+r)/(6+r))*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.31 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.15

$$\int x^5(d+ex^r)^2 (a+b\log(cx^n))\,dx = \frac{1}{36}x^6\left(bn\left(-d^2 - \frac{72dex^r}{(6+r)^2} - \frac{9e^2x^{2r}}{(3+r)^2}\right) + 6a\left(d^2 + \frac{12dex^r}{6+r} + \frac{3e^2x^{2r}}{3+r}\right) + 6b\left(d^2 + \frac{12dex^r}{6+r} + \frac{3e^2x^{2r}}{3+r}\right)\log(cx^n)\right)$$

input
```
Integrate[x^5*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^6*(b*n*(-d^2 - (72*d*e*x^r)/(6 + r)^2 - (9*e^2*x^(2*r))/(3 + r)^2) + 6*
a*(d^2 + (12*d*e*x^r)/(6 + r) + (3*e^2*x^(2*r))/(3 + r)) + 6*b*(d^2 + (12*
d*e*x^r)/(6 + r) + (3*e^2*x^(2*r))/(3 + r))*Log[c*x^n]))/36
```

Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 104, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2771, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^5(d+ex^r)^2(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{6}\left(d^2x^6+\frac{12dex^{r+6}}{r+6}+\frac{3e^2x^{2(r+3)}}{r+3}\right)(a+b\log(cx^n))-bn\int\frac{1}{6}x^5\left(\frac{12dex^r}{r+6}+\frac{3e^2x^{2r}}{r+3}+d^2\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{6}\left(d^2x^6+\frac{12dex^{r+6}}{r+6}+\frac{3e^2x^{2(r+3)}}{r+3}\right)(a+b\log(cx^n))-\frac{1}{6}bn\int x^5\left(\frac{12dex^r}{r+6}+\frac{3e^2x^{2r}}{r+3}+d^2\right)dx$$

$$\Big\downarrow \text{1691}$$

$$\frac{1}{6}\left(d^2x^6+\frac{12dex^{r+6}}{r+6}+\frac{3e^2x^{2(r+3)}}{r+3}\right)(a+b\log(cx^n))-\frac{1}{6}bn\int\left(\frac{12dex^{r+5}}{r+6}+\frac{3e^2x^{2r+5}}{r+3}+d^2x^5\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{6}\left(d^2x^6+\frac{12dex^{r+6}}{r+6}+\frac{3e^2x^{2(r+3)}}{r+3}\right)(a+b\log(cx^n))-\frac{1}{6}bn\left(\frac{d^2x^6}{6}+\frac{12dex^{r+6}}{(r+6)^2}+\frac{3e^2x^{2(r+3)}}{2(r+3)^2}\right)$$

input
```
Int[x^5*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/6*(b*n*((d^2*x^6)/6 + (3*e^2*x^(2*(3 + r)))/(2*(3 + r)^2) + (12*d*e*x^(
6 + r))/(6 + r)^2)) + ((d^2*x^6 + (3*e^2*x^(2*(3 + r)))/(3 + r) + (12*d*e*
x^(6 + r))/(6 + r))*(a + b*Log[c*x^n]))/6
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 582 vs. $2(97) = 194$.

Time = 18.80 (sec) , antiderivative size = 583, normalized size of antiderivative = 5.66

method	result
parallelrisch	$-\frac{-6x^6\ln(c\,x^n)b\,d^2r^4-108x^6\ln(c\,x^n)b\,d^2r^3-702x^6\ln(c\,x^n)b\,d^2r^2-1944x^6\ln(c\,x^n)b\,d^2r+x^6b\,d^2n\,r^4+18x^6b\,d^2n\,r^3+117x^6}{}$
risch	Expression too large to display

input
```
int(x^5*(d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output

```
-1/36*(-1944*e^2*b*ln(c*x^n)*(x^r)^2*x^6-6*x^6*ln(c*x^n)*b*d^2*r^4-108*x^6
*ln(c*x^n)*b*d^2*r^3-702*x^6*ln(c*x^n)*b*d^2*r^2-1944*x^6*ln(c*x^n)*b*d^2*
r+x^6*b*d^2*n*r^4+18*x^6*b*d^2*n*r^3+117*x^6*b*d^2*n*r^2+324*x^6*b*d^2*n*r
-3888*x^6*x^r*a*d*e-18*x^6*(x^r)^2*a*e^2*r^3-270*x^6*(x^r)^2*a*e^2*r^2-129
6*x^6*(x^r)^2*a*e^2*r+324*x^6*(x^r)^2*b*e^2*n-1944*x^6*ln(c*x^n)*b*d^2-194
4*a*d^2*x^6+324*b*d^2*n*x^6-6*x^6*a*d^2*r^4-108*x^6*a*d^2*r^3-702*x^6*a*d^
2*r^2-1944*x^6*a*d^2*r-1944*x^6*(x^r)^2*a*e^2+72*x^6*x^r*b*d*e*n*r^2+432*x
^6*x^r*b*d*e*n*r-72*x^6*x^r*ln(c*x^n)*b*d*e*r^3-864*x^6*x^r*ln(c*x^n)*b*d*
e*r^2-3240*x^6*x^r*ln(c*x^n)*b*d*e*r-270*x^6*(x^r)^2*ln(c*x^n)*b*e^2*r^2-1
296*x^6*(x^r)^2*ln(c*x^n)*b*e^2*r-72*x^6*x^r*a*d*e*r^3-864*x^6*x^r*a*d*e*r
^2-3240*x^6*x^r*a*d*e*r+648*x^6*x^r*b*d*e*n+9*x^6*(x^r)^2*b*e^2*n*r^2+108*
x^6*(x^r)^2*b*e^2*n*r-3888*b*d*e*ln(c*x^n)*x^r*x^6-18*x^6*(x^r)^2*ln(c*x^n
)*b*e^2*r^3)/(6+r)^2/(r^2+6*r+9)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 489 vs. $2(97) = 194$.

Time = 0.09 (sec) , antiderivative size = 489, normalized size of antiderivative = 4.75

$$\int x^5(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$= \frac{6\,(bd^2r^4+18\,bd^2r^3+117\,bd^2r^2+324\,bd^2r+324\,bd^2)x^6\log\left(c\right)+6\,(bd^2nr^4+18\,bd^2nr^3+117\,bd^2nr^2+3}{}$$

input

```
integrate(x^5*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/36*(6*(b*d^2*r^4 + 18*b*d^2*r^3 + 117*b*d^2*r^2 + 324*b*d^2*r + 324*b*d^
2)*x^6*log(c) + 6*(b*d^2*n*r^4 + 18*b*d^2*n*r^3 + 117*b*d^2*n*r^2 + 324*b*
d^2*n*r + 324*b*d^2*n)*x^6*log(x) - ((b*d^2*n - 6*a*d^2)*r^4 + 324*b*d^2*n
 + 18*(b*d^2*n - 6*a*d^2)*r^3 - 1944*a*d^2 + 117*(b*d^2*n - 6*a*d^2)*r^2 +
 324*(b*d^2*n - 6*a*d^2)*r)*x^6 + 9*(2*(b*e^2*r^3 + 15*b*e^2*r^2 + 72*b*e^
2*r + 108*b*e^2)*x^6*log(c) + 2*(b*e^2*n*r^3 + 15*b*e^2*n*r^2 + 72*b*e^2*n
*r + 108*b*e^2*n)*x^6*log(x) + (2*a*e^2*r^3 - 36*b*e^2*n + 216*a*e^2 - (b*
e^2*n - 30*a*e^2)*r^2 - 12*(b*e^2*n - 12*a*e^2)*r)*x^6)*x^(2*r) + 72*((b*d
*e*r^3 + 12*b*d*e*r^2 + 45*b*d*e*r + 54*b*d*e)*x^6*log(c) + (b*d*e*n*r^3 +
 12*b*d*e*n*r^2 + 45*b*d*e*n*r + 54*b*d*e*n)*x^6*log(x) + (a*d*e*r^3 - 9*b
*d*e*n + 54*a*d*e - (b*d*e*n - 12*a*d*e)*r^2 - 3*(2*b*d*e*n - 15*a*d*e)*r)
*x^6)*x^r)/(r^4 + 18*r^3 + 117*r^2 + 324*r + 324)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1634 vs. $2(97) = 194$.

Time = 26.52 (sec) , antiderivative size = 1634, normalized size of antiderivative = 15.86

$$\int x^5(d + ex^r)^2 \left(a + b\log\left(cx^n\right)\right)\,dx = \text{Too large to display}$$

input
```
integrate(x**5*(d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*d**2*x**6/6 + 2*a*d*e*log(c*x**n)/n - a*e**2/(6*x**6) - b*d**
2*n*x**6/36 + b*d**2*x**6*log(c*x**n)/6 + b*d*e*log(c*x**n)**2/n - b*e**2*
n/(36*x**6) - b*e**2*log(c*x**n)/(6*x**6), Eq(r, -6)), (a*d**2*x**6/6 + 2*
a*d*e*x**3/3 + a*e**2*log(c*x**n)/n - b*d**2*n*x**6/36 + b*d**2*x**6*log(c
*x**n)/6 - 2*b*d*e*n*x**3/9 + 2*b*d*e*x**3*log(c*x**n)/3 + b*e**2*log(c*x*
*n)**2/(2*n), Eq(r, -3)), (6*a*d**2*r**4*x**6/(36*r**4 + 648*r**3 + 4212*r
**2 + 11664*r + 11664) + 108*a*d**2*r**3*x**6/(36*r**4 + 648*r**3 + 4212*r
**2 + 11664*r + 11664) + 702*a*d**2*r**2*x**6/(36*r**4 + 648*r**3 + 4212*r
**2 + 11664*r + 11664) + 1944*a*d**2*r*x**6/(36*r**4 + 648*r**3 + 4212*r**
2 + 11664*r + 11664) + 1944*a*d**2*x**6/(36*r**4 + 648*r**3 + 4212*r**2 +
11664*r + 11664) + 72*a*d*e*r**3*x**6*x**r/(36*r**4 + 648*r**3 + 4212*r**2
 + 11664*r + 11664) + 864*a*d*e*r**2*x**6*x**r/(36*r**4 + 648*r**3 + 4212*
r**2 + 11664*r + 11664) + 3240*a*d*e*r*x**6*x**r/(36*r**4 + 648*r**3 + 421
2*r**2 + 11664*r + 11664) + 3888*a*d*e*x**6*x**r/(36*r**4 + 648*r**3 + 421
2*r**2 + 11664*r + 11664) + 18*a*e**2*r**3*x**6*x**(2*r)/(36*r**4 + 648*r*
*3 + 4212*r**2 + 11664*r + 11664) + 270*a*e**2*r**2*x**6*x**(2*r)/(36*r**4
 + 648*r**3 + 4212*r**2 + 11664*r + 11664) + 1296*a*e**2*r*x**6*x**(2*r)/(
36*r**4 + 648*r**3 + 4212*r**2 + 11664*r + 11664) + 1944*a*e**2*x**6*x**(2
*r)/(36*r**4 + 648*r**3 + 4212*r**2 + 11664*r + 11664) - b*d**2*n*r**4*x**
6/(36*r**4 + 648*r**3 + 4212*r**2 + 11664*r + 11664) - 18*b*d**2*n*r**3...
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 148, normalized size of antiderivative = 1.44

$$\int x^5 (d+ex^r)^2 (a+b\log(cx^n))\,dx = -\frac{1}{36}\,bd^2nx^6 + \frac{1}{6}\,bd^2x^6\log(cx^n) + \frac{1}{6}\,ad^2x^6 + \frac{be^2x^{2\,r+6}\log(cx^n)}{2\,(r+3)} + \frac{2\,bdex^{r+6}\log(cx^n)}{r+6} - \frac{be^2nx^{2\,r+6}}{4\,(r+3)^2} + \frac{ae^2x^{2\,r+6}}{2\,(r+3)} - \frac{2\,bdenx^{r+6}}{(r+6)^2} + \frac{2\,adex^{r+6}}{r+6}$$

input
```
integrate(x^5*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/36*b*d^2*n*x^6 + 1/6*b*d^2*x^6*log(c*x^n) + 1/6*a*d^2*x^6 + 1/2*b*e^2*x
^(2*r + 6)*log(c*x^n)/(r + 3) + 2*b*d*e*x^(r + 6)*log(c*x^n)/(r + 6) - 1/4
*b*e^2*n*x^(2*r + 6)/(r + 3)^2 + 1/2*a*e^2*x^(2*r + 6)/(r + 3) - 2*b*d*e*n
*x^(r + 6)/(r + 6)^2 + 2*a*d*e*x^(r + 6)/(r + 6)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 744 vs. $2(97) = 194$.

Time = 0.14 (sec) , antiderivative size = 744, normalized size of antiderivative = 7.22

$$\int x^5(d+ex^r)^2(a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x^5*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/36*(18*b*e^2*n*r^3*x^6*x^(2*r)*log(x) + 72*b*d*e*n*r^3*x^6*x^r*log(x) +
6*b*d^2*n*r^4*x^6*log(x) - b*d^2*n*r^4*x^6 + 18*b*e^2*r^3*x^6*x^(2*r)*log(
c) + 72*b*d*e*r^3*x^6*x^r*log(c) + 6*b*d^2*r^4*x^6*log(c) + 270*b*e^2*n*r^
2*x^6*x^(2*r)*log(x) + 864*b*d*e*n*r^2*x^6*x^r*log(x) + 108*b*d^2*n*r^3*x^
6*log(x) - 9*b*e^2*n*r^2*x^6*x^(2*r) + 18*a*e^2*r^3*x^6*x^(2*r) - 72*b*d*e
*n*r^2*x^6*x^r + 72*a*d*e*r^3*x^6*x^r - 18*b*d^2*n*r^3*x^6 + 6*a*d^2*r^4*x
^6 + 270*b*e^2*r^2*x^6*x^(2*r)*log(c) + 864*b*d*e*r^2*x^6*x^r*log(c) + 108
*b*d^2*r^3*x^6*log(c) + 1296*b*e^2*n*r*x^6*x^(2*r)*log(x) + 3240*b*d*e*n*r
*x^6*x^r*log(x) + 702*b*d^2*n*r^2*x^6*log(x) - 108*b*e^2*n*r*x^6*x^(2*r) +
 270*a*e^2*r^2*x^6*x^(2*r) - 432*b*d*e*n*r*x^6*x^r + 864*a*d*e*r^2*x^6*x^r
 - 117*b*d^2*n*r^2*x^6 + 108*a*d^2*r^3*x^6 + 1296*b*e^2*r*x^6*x^(2*r)*log(
c) + 3240*b*d*e*r*x^6*x^r*log(c) + 702*b*d^2*r^2*x^6*log(c) + 1944*b*e^2*n
*x^6*x^(2*r)*log(x) + 3888*b*d*e*n*x^6*x^r*log(x) + 1944*b*d^2*n*r*x^6*log
(x) - 324*b*e^2*n*x^6*x^(2*r) + 1296*a*e^2*r*x^6*x^(2*r) - 648*b*d*e*n*x^6
*x^r + 3240*a*d*e*r*x^6*x^r - 324*b*d^2*n*r*x^6 + 702*a*d^2*r^2*x^6 + 1944
*b*e^2*x^6*x^(2*r)*log(c) + 3888*b*d*e*x^6*x^r*log(c) + 1944*b*d^2*r*x^6*l
og(c) + 1944*b*d^2*n*x^6*log(x) + 1944*a*e^2*x^6*x^(2*r) + 3888*a*d*e*x^6*
x^r - 324*b*d^2*n*x^6 + 1944*a*d^2*r*x^6 + 1944*b*d^2*x^6*log(c) + 1944*a*
d^2*x^6)/(r^4 + 18*r^3 + 117*r^2 + 324*r + 324)
```

Mupad [F(-1)]

Timed out.

$$\int x^5(d+ex^r)^2(a+b\log(cx^n))\,dx = \int x^5\,(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int(x^5*(d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

output
```
int(x^5*(d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 481, normalized size of antiderivative = 4.67

$$\int x^5(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$=\frac{x^6(1944x^{2r}a\,e^2+6a\,d^2r^4+108a\,d^2r^3+702a\,d^2r^2+1944a\,d^2r+1944\log(x^nc)\,b\,d^2-324b\,d^2n-b\,d^2n\,r}{}$$

input
```
int(x^5*(d+e*x^r)^2*(a+b*log(c*x^n)),x)
```

output
```
(x**6*(18*x**(2*r)*log(x**n*c)*b*e**2*r**3 + 270*x**(2*r)*log(x**n*c)*b*e*
*2*r**2 + 1296*x**(2*r)*log(x**n*c)*b*e**2*r + 1944*x**(2*r)*log(x**n*c)*b
*e**2 + 18*x**(2*r)*a*e**2*r**3 + 270*x**(2*r)*a*e**2*r**2 + 1296*x**(2*r)
*a*e**2*r + 1944*x**(2*r)*a*e**2 - 9*x**(2*r)*b*e**2*n*r**2 - 108*x**(2*r)
*b*e**2*n*r - 324*x**(2*r)*b*e**2*n + 72*x**r*log(x**n*c)*b*d*e*r**3 + 864
*x**r*log(x**n*c)*b*d*e*r**2 + 3240*x**r*log(x**n*c)*b*d*e*r + 3888*x**r*l
og(x**n*c)*b*d*e + 72*x**r*a*d*e*r**3 + 864*x**r*a*d*e*r**2 + 3240*x**r*a*
d*e*r + 3888*x**r*a*d*e - 72*x**r*b*d*e*n*r**2 - 432*x**r*b*d*e*n*r - 648*
x**r*b*d*e*n + 6*log(x**n*c)*b*d**2*r**4 + 108*log(x**n*c)*b*d**2*r**3 + 7
02*log(x**n*c)*b*d**2*r**2 + 1944*log(x**n*c)*b*d**2*r + 1944*log(x**n*c)*
b*d**2 + 6*a*d**2*r**4 + 108*a*d**2*r**3 + 702*a*d**2*r**2 + 1944*a*d**2*r
 + 1944*a*d**2 - b*d**2*n*r**4 - 18*b*d**2*n*r**3 - 117*b*d**2*n*r**2 - 32
4*b*d**2*n*r - 324*b*d**2*n))/(36*(r**4 + 18*r**3 + 117*r**2 + 324*r + 324
))
```

3.378 $\int x^3(d+ex^r)^2 (a+b\log(cx^n))\,dx$

Optimal result 2808
Mathematica [A] (verified) 2808
Rubi [A] (verified) 2809
Maple [B] (verified) 2810
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Mupad [F(-1)] 2814
Reduce [B] (verification not implemented) 2815

Optimal result

Integrand size = 23, antiderivative size = 103

$$\int x^3(d+ex^r)^2 (a+b\log(cx^n))\,dx = -\frac{1}{16}bd^2nx^4 - \frac{be^2nx^{2(2+r)}}{4(2+r)^2} - \frac{2bdenx^{4+r}}{(4+r)^2} + \frac{1}{4}\left(d^2x^4 + \frac{2e^2x^{2(2+r)}}{2+r} + \frac{8dex^{4+r}}{4+r}\right)(a+b\log(cx^n))$$

output
```
-1/16*b*d^2*n*x^4-1/4*b*e^2*n*x^(4+2*r)/(2+r)^2-2*b*d*e*n*x^(4+r)/(4+r)^2+
1/4*(d^2*x^4+2*e^2*x^(4+2*r)/(2+r)+8*d*e*x^(4+r)/(4+r))*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.31 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.15

$$\int x^3(d+ex^r)^2 (a+b\log(cx^n))\,dx = \frac{1}{16}x^4\left(bn\left(-d^2 - \frac{32dex^r}{(4+r)^2} - \frac{4e^2x^{2r}}{(2+r)^2}\right) + 4a\left(d^2 + \frac{8dex^r}{4+r} + \frac{2e^2x^{2r}}{2+r}\right) + 4b\left(d^2 + \frac{8dex^r}{4+r} + \frac{2e^2x^{2r}}{2+r}\right)\log(cx^n)\right)$$

input
```
Integrate[x^3*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^4*(b*n*(-d^2 - (32*d*e*x^r)/(4 + r)^2 - (4*e^2*x^(2*r))/(2 + r)^2) + 4*
a*(d^2 + (8*d*e*x^r)/(4 + r) + (2*e^2*x^(2*r))/(2 + r)) + 4*b*(d^2 + (8*d*
e*x^r)/(4 + r) + (2*e^2*x^(2*r))/(2 + r))*Log[c*x^n]))/16
```

Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 101, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2771, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3(d+ex^r)^2(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{4}\left(d^2x^4+\frac{8dex^{r+4}}{r+4}+\frac{2e^2x^{2(r+2)}}{r+2}\right)(a+b\log(cx^n))-bn\int \frac{1}{4}x^3\left(\frac{8dex^r}{r+4}+\frac{2e^2x^{2r}}{r+2}+d^2\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}\left(d^2x^4+\frac{8dex^{r+4}}{r+4}+\frac{2e^2x^{2(r+2)}}{r+2}\right)(a+b\log(cx^n))-\frac{1}{4}bn\int x^3\left(\frac{8dex^r}{r+4}+\frac{2e^2x^{2r}}{r+2}+d^2\right)dx$$

$$\Big\downarrow \text{1691}$$

$$\frac{1}{4}\left(d^2x^4+\frac{8dex^{r+4}}{r+4}+\frac{2e^2x^{2(r+2)}}{r+2}\right)(a+b\log(cx^n))-\frac{1}{4}bn\int \left(\frac{8dex^{r+3}}{r+4}+\frac{2e^2x^{2r+3}}{r+2}+d^2x^3\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\left(d^2x^4+\frac{8dex^{r+4}}{r+4}+\frac{2e^2x^{2(r+2)}}{r+2}\right)(a+b\log(cx^n))-\frac{1}{4}bn\left(\frac{d^2x^4}{4}+\frac{8dex^{r+4}}{(r+4)^2}+\frac{e^2x^{2(r+2)}}{(r+2)^2}\right)$$

input
```
Int[x^3*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/4*(b*n*((d^2*x^4)/4 + (e^2*x^(2*(2 + r)))/(2 + r)^2 + (8*d*e*x^(4 + r))
/(4 + r)^2)) + ((d^2*x^4 + (2*e^2*x^(2*(2 + r)))/(2 + r) + (8*d*e*x^(4 + r
))/(4 + r))*(a + b*Log[c*x^n]))/4
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 587 vs. $2(97) = 194$.

Time = 5.95 (sec) , antiderivative size = 588, normalized size of antiderivative = 5.71

method	result
parallelrisch	$-\frac{-256x^4\ln(c\,x^n)b\,d^2-256a\,d^2x^4-256x^4x^{2r}a\,e^2-32x^4x^r ade\,r^3-256x^4x^r ade\,r^2-640x^4x^r ader+128x^4x^r bden-512x^4x^r \ln}{}$
risch	Expression too large to display

input
```
int(x^3*(d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/16*(-256*x^4*ln(c*x^n)*b*d^2-256*a*d^2*x^4-8*x^4*(x^r)^2*ln(c*x^n)*b*e^
2*r^3-80*x^4*(x^r)^2*ln(c*x^n)*b*e^2*r^2-256*x^4*(x^r)^2*ln(c*x^n)*b*e^2*r
-32*x^4*x^r*a*d*e*r^3-256*x^4*x^r*a*d*e*r^2-640*x^4*x^r*a*d*e*r+128*x^4*x^
r*b*d*e*n+4*x^4*(x^r)^2*b*e^2*n*r^2+32*x^4*(x^r)^2*b*e^2*n*r-512*x^4*x^r*l
n(c*x^n)*b*d*e-4*x^4*a*d^2*r^4-48*x^4*a*d^2*r^3-208*x^4*a*d^2*r^2-384*x^4*
a*d^2*r-256*x^4*(x^r)^2*a*e^2-256*x^4*(x^r)^2*ln(c*x^n)*b*e^2+x^4*b*d^2*n*
r^4+12*x^4*b*d^2*n*r^3+52*x^4*b*d^2*n*r^2+96*x^4*b*d^2*n*r-512*x^4*x^r*a*d
*e-8*x^4*(x^r)^2*a*e^2*r^3-80*x^4*(x^r)^2*a*e^2*r^2-256*x^4*(x^r)^2*a*e^2*
r+64*x^4*(x^r)^2*b*e^2*n-4*x^4*ln(c*x^n)*b*d^2*r^4-48*x^4*ln(c*x^n)*b*d^2*
r^3-208*x^4*ln(c*x^n)*b*d^2*r^2-384*x^4*ln(c*x^n)*b*d^2*r-32*x^4*x^r*ln(c*
x^n)*b*d*e*r^3-256*x^4*x^r*ln(c*x^n)*b*d*e*r^2-640*x^4*x^r*ln(c*x^n)*b*d*e
*r+32*x^4*x^r*b*d*e*n*r^2+128*x^4*x^r*b*d*e*n*r+64*b*d^2*n*x^4)/(r^2+4*r+4
)/(r^2+8*r+16)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 488 vs. $2(97) = 194$.

Time = 0.09 (sec) , antiderivative size = 488, normalized size of antiderivative = 4.74

$$\int x^3(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{4\left(bd^2r^4+12\,bd^2r^3+52\,bd^2r^2+96\,bd^2r+64\,bd^2\right)x^4\log\left(c\right)+4\left(bd^2nr^4+12\,bd^2nr^3+52\,bd^2nr^2+96\,bd^2\right.}{}$$

input
```
integrate(x^3*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/16*(4*(b*d^2*r^4 + 12*b*d^2*r^3 + 52*b*d^2*r^2 + 96*b*d^2*r + 64*b*d^2)*
x^4*log(c) + 4*(b*d^2*n*r^4 + 12*b*d^2*n*r^3 + 52*b*d^2*n*r^2 + 96*b*d^2*n
*r + 64*b*d^2*n)*x^4*log(x) - ((b*d^2*n - 4*a*d^2)*r^4 + 64*b*d^2*n + 12*(
b*d^2*n - 4*a*d^2)*r^3 - 256*a*d^2 + 52*(b*d^2*n - 4*a*d^2)*r^2 + 96*(b*d^
2*n - 4*a*d^2)*r)*x^4 + 4*(2*(b*e^2*r^3 + 10*b*e^2*r^2 + 32*b*e^2*r + 32*b
*e^2)*x^4*log(c) + 2*(b*e^2*n*r^3 + 10*b*e^2*n*r^2 + 32*b*e^2*n*r + 32*b*e
^2*n)*x^4*log(x) + (2*a*e^2*r^3 - 16*b*e^2*n + 64*a*e^2 - (b*e^2*n - 20*a*
e^2)*r^2 - 8*(b*e^2*n - 8*a*e^2)*r)*x^4)*x^(2*r) + 32*((b*d*e*r^3 + 8*b*d*
e*r^2 + 20*b*d*e*r + 16*b*d*e)*x^4*log(c) + (b*d*e*n*r^3 + 8*b*d*e*n*r^2 +
 20*b*d*e*n*r + 16*b*d*e*n)*x^4*log(x) + (a*d*e*r^3 - 4*b*d*e*n + 16*a*d*e
 - (b*d*e*n - 8*a*d*e)*r^2 - 4*(b*d*e*n - 5*a*d*e)*r)*x^4)*x^r)/(r^4 + 12*
r^3 + 52*r^2 + 96*r + 64)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1625 vs. $2(97) = 194$.

Time = 7.11 (sec) , antiderivative size = 1625, normalized size of antiderivative = 15.78

$$\int x^3(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx = \text{Too large to display}$$

input
```
integrate(x**3*(d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*d**2*x**4/4 + 2*a*d*e*log(c*x**n)/n - a*e**2/(4*x**4) - b*d**
2*n*x**4/16 + b*d**2*x**4*log(c*x**n)/4 + b*d*e*log(c*x**n)**2/n - b*e**2*
n/(16*x**4) - b*e**2*log(c*x**n)/(4*x**4), Eq(r, -4)), (a*d**2*x**4/4 + a*
d*e*x**2 + a*e**2*log(c*x**n)/n - b*d**2*n*x**4/16 + b*d**2*x**4*log(c*x**
n)/4 - b*d*e*n*x**2/2 + b*d*e*x**2*log(c*x**n) + b*e**2*log(c*x**n)**2/(2*
n), Eq(r, -2)), (4*a*d**2*r**4*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*
r + 1024) + 48*a*d**2*r**3*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r +
1024) + 208*a*d**2*r**2*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 102
4) + 384*a*d**2*r*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 2
56*a*d**2*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 32*a*d*e*
r**3*x**4*x**r/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 256*a*d*e
*r**2*x**4*x**r/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 640*a*d*
e*r*x**4*x**r/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 512*a*d*e*
x**4*x**r/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 8*a*e**2*r**3*
x**4*x**(2*r)/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 80*a*e**2*
r**2*x**4*x**(2*r)/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 256*a
*e**2*r*x**4*x**(2*r)/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 25
6*a*e**2*x**4*x**(2*r)/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) - b
*d**2*n*r**4*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) - 12*b*d
**2*n*r**3*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) - 52*b*...
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 148, normalized size of antiderivative = 1.44

$$\int x^3(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{16}\,bd^2nx^4+\frac{1}{4}\,bd^2x^4\log\left(cx^n\right)+\frac{1}{4}\,ad^2x^4+\frac{be^2x^{2\,r+4}\log\left(cx^n\right)}{2\,(r+2)}+\frac{2\,bdex^{r+4}\log\left(cx^n\right)}{r+4}-\frac{be^2nx^{2\,r+4}}{4\,(r+2)^2}+\frac{ae^2x^{2\,r+4}}{2\,(r+2)}-\frac{2\,bdenx^{r+4}}{(r+4)^2}+\frac{2\,adex^{r+4}}{r+4}$$

input
```
integrate(x^3*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/16*b*d^2*n*x^4 + 1/4*b*d^2*x^4*log(c*x^n) + 1/4*a*d^2*x^4 + 1/2*b*e^2*x
^(2*r + 4)*log(c*x^n)/(r + 2) + 2*b*d*e*x^(r + 4)*log(c*x^n)/(r + 4) - 1/4
*b*e^2*n*x^(2*r + 4)/(r + 2)^2 + 1/2*a*e^2*x^(2*r + 4)/(r + 2) - 2*b*d*e*n
*x^(r + 4)/(r + 4)^2 + 2*a*d*e*x^(r + 4)/(r + 4)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 744 vs. $2(97) = 194$.

Time = 0.13 (sec) , antiderivative size = 744, normalized size of antiderivative = 7.22

$$\int x^3(d+ex^r)^2(a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x^3*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/16*(8*b*e^2*n*r^3*x^4*x^(2*r)*log(x) + 32*b*d*e*n*r^3*x^4*x^r*log(x) + 4
*b*d^2*n*r^4*x^4*log(x) - b*d^2*n*r^4*x^4 + 8*b*e^2*r^3*x^4*x^(2*r)*log(c)
 + 32*b*d*e*r^3*x^4*x^r*log(c) + 4*b*d^2*r^4*x^4*log(c) + 80*b*e^2*n*r^2*x
^4*x^(2*r)*log(x) + 256*b*d*e*n*r^2*x^4*x^r*log(x) + 48*b*d^2*n*r^3*x^4*lo
g(x) - 4*b*e^2*n*r^2*x^4*x^(2*r) + 8*a*e^2*r^3*x^4*x^(2*r) - 32*b*d*e*n*r^
2*x^4*x^r + 32*a*d*e*r^3*x^4*x^r - 12*b*d^2*n*r^3*x^4 + 4*a*d^2*r^4*x^4 +
80*b*e^2*r^2*x^4*x^(2*r)*log(c) + 256*b*d*e*r^2*x^4*x^r*log(c) + 48*b*d^2*
r^3*x^4*log(c) + 256*b*e^2*n*r*x^4*x^(2*r)*log(x) + 640*b*d*e*n*r*x^4*x^r*
log(x) + 208*b*d^2*n*r^2*x^4*log(x) - 32*b*e^2*n*r*x^4*x^(2*r) + 80*a*e^2*
r^2*x^4*x^(2*r) - 128*b*d*e*n*r*x^4*x^r + 256*a*d*e*r^2*x^4*x^r - 52*b*d^2
*n*r^2*x^4 + 48*a*d^2*r^3*x^4 + 256*b*e^2*r*x^4*x^(2*r)*log(c) + 640*b*d*e
*r*x^4*x^r*log(c) + 208*b*d^2*r^2*x^4*log(c) + 256*b*e^2*n*x^4*x^(2*r)*log
(x) + 512*b*d*e*n*x^4*x^r*log(x) + 384*b*d^2*n*r*x^4*log(x) - 64*b*e^2*n*x
^4*x^(2*r) + 256*a*e^2*r*x^4*x^(2*r) - 128*b*d*e*n*x^4*x^r + 640*a*d*e*r*x
^4*x^r - 96*b*d^2*n*r*x^4 + 208*a*d^2*r^2*x^4 + 256*b*e^2*x^4*x^(2*r)*log(
c) + 512*b*d*e*x^4*x^r*log(c) + 384*b*d^2*r*x^4*log(c) + 256*b*d^2*n*x^4*l
og(x) + 256*a*e^2*x^4*x^(2*r) + 512*a*d*e*x^4*x^r - 64*b*d^2*n*x^4 + 384*a
*d^2*r*x^4 + 256*b*d^2*x^4*log(c) + 256*a*d^2*x^4)/(r^4 + 12*r^3 + 52*r^2
+ 96*r + 64)
```

Mupad [F(-1)]

Timed out.

$$\int x^3(d+ex^r)^2(a+b\log(cx^n))\,dx = \int x^3\,(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int(x^3*(d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

output
```
int(x^3*(d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 481, normalized size of antiderivative = 4.67

$$\int x^3(d+ex^r)^2\,(a+b\log(cx^n))\;dx$$
$$=\frac{x^4(256x^{2r}a\,e^2+4a\,d^2r^4+48a\,d^2r^3+208a\,d^2r^2+384a\,d^2r+256\log(x^nc)\,b\,d^2-64b\,d^2n-b\,d^2n\,r^4+25}{}$$

input
```
int(x^3*(d+e*x^r)^2*(a+b*log(c*x^n)),x)
```

output
```
(x**4*(8*x**(2*r)*log(x**n*c)*b*e**2*r**3 + 80*x**(2*r)*log(x**n*c)*b*e**2
*r**2 + 256*x**(2*r)*log(x**n*c)*b*e**2*r + 256*x**(2*r)*log(x**n*c)*b*e**
2 + 8*x**(2*r)*a*e**2*r**3 + 80*x**(2*r)*a*e**2*r**2 + 256*x**(2*r)*a*e**2
*r + 256*x**(2*r)*a*e**2 - 4*x**(2*r)*b*e**2*n*r**2 - 32*x**(2*r)*b*e**2*n
*r - 64*x**(2*r)*b*e**2*n + 32*x**r*log(x**n*c)*b*d*e*r**3 + 256*x**r*log(
x**n*c)*b*d*e*r**2 + 640*x**r*log(x**n*c)*b*d*e*r + 512*x**r*log(x**n*c)*b
*d*e + 32*x**r*a*d*e*r**3 + 256*x**r*a*d*e*r**2 + 640*x**r*a*d*e*r + 512*x
**r*a*d*e - 32*x**r*b*d*e*n*r**2 - 128*x**r*b*d*e*n*r - 128*x**r*b*d*e*n +
 4*log(x**n*c)*b*d**2*r**4 + 48*log(x**n*c)*b*d**2*r**3 + 208*log(x**n*c)*
b*d**2*r**2 + 384*log(x**n*c)*b*d**2*r + 256*log(x**n*c)*b*d**2 + 4*a*d**2
*r**4 + 48*a*d**2*r**3 + 208*a*d**2*r**2 + 384*a*d**2*r + 256*a*d**2 - b*d
**2*n*r**4 - 12*b*d**2*n*r**3 - 52*b*d**2*n*r**2 - 96*b*d**2*n*r - 64*b*d*
*2*n))/(16*(r**4 + 12*r**3 + 52*r**2 + 96*r + 64))
```

3.379 $\int x(d+ex^r)^2 (a+b\log(cx^n))\,dx$

Optimal result . . . 2816
Mathematica [A] (verified) . . . 2816
Rubi [A] (verified) . . . 2817
Maple [B] (verified) . . . 2818
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Maxima [A] (verification not implemented) . . . 2821
Giac [B] (verification not implemented) . . . 2821
Mupad [F(-1)] . . . 2822
Reduce [B] (verification not implemented) . . . 2823

Optimal result

Integrand size = 21, antiderivative size = 102

$$\int x(d+ex^r)^2 (a+b\log(cx^n))\,dx = -\frac{1}{4}bd^2nx^2 - \frac{be^2nx^{2(1+r)}}{4(1+r)^2} - \frac{2bdenx^{2+r}}{(2+r)^2} + \frac{1}{2}\left(d^2x^2 + \frac{e^2x^{2(1+r)}}{1+r} + \frac{4dex^{2+r}}{2+r}\right)(a+b\log(cx^n))$$

output
```
-1/4*b*d^2*n*x^2-1/4*b*e^2*n*x^(2+2*r)/(1+r)^2-2*b*d*e*n*x^(2+r)/(2+r)^2+1
/2*(d^2*x^2+e^2*x^(2+2*r)/(1+r)+4*d*e*x^(2+r)/(2+r))*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.14

$$\int x(d+ex^r)^2 (a+b\log(cx^n))\,dx = \frac{1}{4}x^2\left(bn\left(-d^2 - \frac{8dex^r}{(2+r)^2} - \frac{e^2x^{2r}}{(1+r)^2}\right) + 2a\left(d^2 + \frac{4dex^r}{2+r} + \frac{e^2x^{2r}}{1+r}\right) + 2b\left(d^2 + \frac{4dex^r}{2+r} + \frac{e^2x^{2r}}{1+r}\right)\log(cx^n)\right)$$

input
```
Integrate[x*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^2*(b*n*(-d^2 - (8*d*e*x^r)/(2 + r)^2 - (e^2*x^(2*r))/(1 + r)^2) + 2*a*(
d^2 + (4*d*e*x^r)/(2 + r) + (e^2*x^(2*r))/(1 + r)) + 2*b*(d^2 + (4*d*e*x^r
)/(2 + r) + (e^2*x^(2*r))/(1 + r))*Log[c*x^n]))/4
```

Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 103, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2771, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex^r)^2(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{2}\left(d^2x^2+\frac{4dex^{r+2}}{r+2}+\frac{e^2x^{2(r+1)}}{r+1}\right)(a+b\log(cx^n))-bn\int\frac{1}{2}x\left(\frac{4dex^r}{r+2}+\frac{e^2x^{2r}}{r+1}+d^2\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}\left(d^2x^2+\frac{4dex^{r+2}}{r+2}+\frac{e^2x^{2(r+1)}}{r+1}\right)(a+b\log(cx^n))-\frac{1}{2}bn\int x\left(\frac{4dex^r}{r+2}+\frac{e^2x^{2r}}{r+1}+d^2\right)dx$$

$$\Big\downarrow \text{1691}$$

$$\frac{1}{2}\left(d^2x^2+\frac{4dex^{r+2}}{r+2}+\frac{e^2x^{2(r+1)}}{r+1}\right)(a+b\log(cx^n))-\frac{1}{2}bn\int\left(\frac{4dex^{r+1}}{r+2}+\frac{e^2x^{2r+1}}{r+1}+d^2x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}\left(d^2x^2+\frac{4dex^{r+2}}{r+2}+\frac{e^2x^{2(r+1)}}{r+1}\right)(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d^2x^2}{2}+\frac{4dex^{r+2}}{(r+2)^2}+\frac{e^2x^{2(r+1)}}{2(r+1)^2}\right)$$

input
```
Int[x*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/2*(b*n*((d^2*x^2)/2 + (e^2*x^(2*(1 + r)))/(2*(1 + r)^2) + (4*d*e*x^(2 +
 r))/(2 + r)^2)) + ((d^2*x^2 + (e^2*x^(2*(1 + r)))/(1 + r) + (4*d*e*x^(2 +
 r))/(2 + r))*(a + b*Log[c*x^n]))/2
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 576 vs. $2(96) = 192$.

Time = 1.88 (sec) , antiderivative size = 577, normalized size of antiderivative = 5.66

method	result
parallelrisch	$-\frac{-8x^2x^r ade\,r^3-32x^2x^r ade\,r^2-40x^2x^r ader+8x^2x^r bden-8x^2a\,d^2-8x^2b\ln(c\,x^n)d^2-32x^2x^r\ln(c\,x^n)bde\,r^2-40x^2x^r\ln(c\,x}{}$
risch	Expression too large to display

input
```
int(x*(d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/4*(-8*x^2*x^r*a*d*e*r^3-32*x^2*x^r*a*d*e*r^2-40*x^2*x^r*a*d*e*r+8*x^2*x
^r*b*d*e*n+x^2*(x^r)^2*b*e^2*n*r^2+4*x^2*(x^r)^2*b*e^2*n*r-2*x^2*(x^r)^2*l
n(c*x^n)*b*e^2*r^3-10*x^2*(x^r)^2*ln(c*x^n)*b*e^2*r^2-16*x^2*(x^r)^2*ln(c*
x^n)*b*e^2*r-8*x^2*a*d^2-8*x^2*b*ln(c*x^n)*d^2-32*x^2*x^r*ln(c*x^n)*b*d*e*
r^2-40*x^2*x^r*ln(c*x^n)*b*d*e*r+8*x^2*x^r*b*d*e*n*r^2+16*x^2*x^r*b*d*e*n*
r-16*x^2*x^r*a*d*e-2*x^2*(x^r)^2*a*e^2*r^3-10*x^2*(x^r)^2*a*e^2*r^2-16*x^2
*(x^r)^2*a*e^2*r+4*x^2*(x^r)^2*b*e^2*n+x^2*b*d^2*n*r^4+6*x^2*b*d^2*n*r^3+1
3*x^2*b*d^2*n*r^2+12*x^2*b*d^2*n*r-2*x^2*ln(c*x^n)*b*d^2*r^4-8*x^2*(x^r)^2
*a*e^2-2*x^2*a*d^2*r^4-12*x^2*a*d^2*r^3-26*x^2*a*d^2*r^2-24*x^2*a*d^2*r-12
*x^2*ln(c*x^n)*b*d^2*r^3-26*x^2*ln(c*x^n)*b*d^2*r^2-24*x^2*ln(c*x^n)*b*d^2
*r-8*x^2*(x^r)^2*ln(c*x^n)*b*e^2-16*x^2*x^r*ln(c*x^n)*b*d*e-8*x^2*x^r*ln(c
*x^n)*b*d*e*r^3+4*b*d^2*n*x^2)/(1+r)^2/(2+r)^2
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 488 vs. $2(96) = 192$.

Time = 0.08 (sec) , antiderivative size = 488, normalized size of antiderivative = 4.78

$$\int x(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$= \frac{2\left(bd^2r^4+6\,bd^2r^3+13\,bd^2r^2+12\,bd^2r+4\,bd^2\right)x^2\log\left(c\right)+2\left(bd^2nr^4+6\,bd^2nr^3+13\,bd^2nr^2+12\,bd^2nr\right.}{}$$

input
```
integrate(x*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/4*(2*(b*d^2*r^4 + 6*b*d^2*r^3 + 13*b*d^2*r^2 + 12*b*d^2*r + 4*b*d^2)*x^2
*log(c) + 2*(b*d^2*n*r^4 + 6*b*d^2*n*r^3 + 13*b*d^2*n*r^2 + 12*b*d^2*n*r +
 4*b*d^2*n)*x^2*log(x) - ((b*d^2*n - 2*a*d^2)*r^4 + 4*b*d^2*n + 6*(b*d^2*n
 - 2*a*d^2)*r^3 - 8*a*d^2 + 13*(b*d^2*n - 2*a*d^2)*r^2 + 12*(b*d^2*n - 2*a
*d^2)*r)*x^2 + (2*(b*e^2*r^3 + 5*b*e^2*r^2 + 8*b*e^2*r + 4*b*e^2)*x^2*log(
c) + 2*(b*e^2*n*r^3 + 5*b*e^2*n*r^2 + 8*b*e^2*n*r + 4*b*e^2*n)*x^2*log(x)
+ (2*a*e^2*r^3 - 4*b*e^2*n + 8*a*e^2 - (b*e^2*n - 10*a*e^2)*r^2 - 4*(b*e^2
*n - 4*a*e^2)*r)*x^2)*x^(2*r) + 8*((b*d*e*r^3 + 4*b*d*e*r^2 + 5*b*d*e*r +
2*b*d*e)*x^2*log(c) + (b*d*e*n*r^3 + 4*b*d*e*n*r^2 + 5*b*d*e*n*r + 2*b*d*e
*n)*x^2*log(x) + (a*d*e*r^3 - b*d*e*n + 2*a*d*e - (b*d*e*n - 4*a*d*e)*r^2
- (2*b*d*e*n - 5*a*d*e)*r)*x^2)*x^r)/(r^4 + 6*r^3 + 13*r^2 + 12*r + 4)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1622 vs. $2(97) = 194$.

Time = 1.69 (sec) , antiderivative size = 1622, normalized size of antiderivative = 15.90

$$\int x(d+ex^r)^2 (a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x*(d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*d**2*x**2/2 + 2*a*d*e*log(c*x**n)/n - a*e**2/(2*x**2) - b*d**
2*n*x**2/4 + b*d**2*x**2*log(c*x**n)/2 + b*d*e*log(c*x**n)**2/n - b*e**2*n
/(4*x**2) - b*e**2*log(c*x**n)/(2*x**2), Eq(r, -2)), (a*d**2*x**2/2 + 2*a*
d*e*x + a*e**2*log(c*x**n)/n - b*d**2*n*x**2/4 + b*d**2*x**2*log(c*x**n)/2
 - 2*b*d*e*n*x + 2*b*d*e*x*log(c*x**n) + b*e**2*log(c*x**n)**2/(2*n), Eq(r
, -1)), (2*a*d**2*r**4*x**2/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 12*
a*d**2*r**3*x**2/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 26*a*d**2*r**2
*x**2/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 24*a*d**2*r*x**2/(4*r**4
+ 24*r**3 + 52*r**2 + 48*r + 16) + 8*a*d**2*x**2/(4*r**4 + 24*r**3 + 52*r*
*2 + 48*r + 16) + 8*a*d*e*r**3*x**2*x**r/(4*r**4 + 24*r**3 + 52*r**2 + 48*
r + 16) + 32*a*d*e*r**2*x**2*x**r/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16)
 + 40*a*d*e*r*x**2*x**r/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 16*a*d*
e*x**2*x**r/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 2*a*e**2*r**3*x**2*
x**(2*r)/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 10*a*e**2*r**2*x**2*x*
*(2*r)/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 16*a*e**2*r*x**2*x**(2*r
)/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 8*a*e**2*x**2*x**(2*r)/(4*r**
4 + 24*r**3 + 52*r**2 + 48*r + 16) - b*d**2*n*r**4*x**2/(4*r**4 + 24*r**3
+ 52*r**2 + 48*r + 16) - 6*b*d**2*n*r**3*x**2/(4*r**4 + 24*r**3 + 52*r**2
+ 48*r + 16) - 13*b*d**2*n*r**2*x**2/(4*r**4 + 24*r**3 + 52*r**2 + 48*r +
16) - 12*b*d**2*n*r*x**2/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) - 4*b...
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 148, normalized size of antiderivative = 1.45

$$\int x(d+ex^r)^2 (a+b\log(cx^n))\,dx = -\frac{1}{4}bd^2nx^2 + \frac{1}{2}bd^2x^2\log(cx^n) + \frac{1}{2}ad^2x^2 + \frac{be^2x^{2r+2}\log(cx^n)}{2(r+1)} + \frac{2\,bdex^{r+2}\log(cx^n)}{r+2} - \frac{be^2nx^{2r+2}}{4(r+1)^2} + \frac{ae^2x^{2r+2}}{2(r+1)} - \frac{2\,bdenx^{r+2}}{(r+2)^2} + \frac{2\,adex^{r+2}}{r+2}$$

input
```
integrate(x*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/4*b*d^2*n*x^2 + 1/2*b*d^2*x^2*log(c*x^n) + 1/2*a*d^2*x^2 + 1/2*b*e^2*x^
(2*r + 2)*log(c*x^n)/(r + 1) + 2*b*d*e*x^(r + 2)*log(c*x^n)/(r + 2) - 1/4*
b*e^2*n*x^(2*r + 2)/(r + 1)^2 + 1/2*a*e^2*x^(2*r + 2)/(r + 1) - 2*b*d*e*n*
x^(r + 2)/(r + 2)^2 + 2*a*d*e*x^(r + 2)/(r + 2)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 744 vs. 2(96) = 192.

Time = 0.13 (sec) , antiderivative size = 744, normalized size of antiderivative = 7.29

$$\int x(d+ex^r)^2 (a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/4*(2*b*e^2*n*r^3*x^2*x^(2*r)*log(x) + 8*b*d*e*n*r^3*x^2*x^r*log(x) + 2*b
*d^2*n*r^4*x^2*log(x) - b*d^2*n*r^4*x^2 + 2*b*e^2*r^3*x^2*x^(2*r)*log(c) +
 8*b*d*e*r^3*x^2*x^r*log(c) + 2*b*d^2*r^4*x^2*log(c) + 10*b*e^2*n*r^2*x^2*
x^(2*r)*log(x) + 32*b*d*e*n*r^2*x^2*x^r*log(x) + 12*b*d^2*n*r^3*x^2*log(x)
 - b*e^2*n*r^2*x^2*x^(2*r) + 2*a*e^2*r^3*x^2*x^(2*r) - 8*b*d*e*n*r^2*x^2*x
^r + 8*a*d*e*r^3*x^2*x^r - 6*b*d^2*n*r^3*x^2 + 2*a*d^2*r^4*x^2 + 10*b*e^2*
r^2*x^2*x^(2*r)*log(c) + 32*b*d*e*r^2*x^2*x^r*log(c) + 12*b*d^2*r^3*x^2*lo
g(c) + 16*b*e^2*n*r*x^2*x^(2*r)*log(x) + 40*b*d*e*n*r*x^2*x^r*log(x) + 26*
b*d^2*n*r^2*x^2*log(x) - 4*b*e^2*n*r*x^2*x^(2*r) + 10*a*e^2*r^2*x^2*x^(2*r
) - 16*b*d*e*n*r*x^2*x^r + 32*a*d*e*r^2*x^2*x^r - 13*b*d^2*n*r^2*x^2 + 12*
a*d^2*r^3*x^2 + 16*b*e^2*r*x^2*x^(2*r)*log(c) + 40*b*d*e*r*x^2*x^r*log(c)
+ 26*b*d^2*r^2*x^2*log(c) + 8*b*e^2*n*x^2*x^(2*r)*log(x) + 16*b*d*e*n*x^2*
x^r*log(x) + 24*b*d^2*n*r*x^2*log(x) - 4*b*e^2*n*x^2*x^(2*r) + 16*a*e^2*r*
x^2*x^(2*r) - 8*b*d*e*n*x^2*x^r + 40*a*d*e*r*x^2*x^r - 12*b*d^2*n*r*x^2 +
26*a*d^2*r^2*x^2 + 8*b*e^2*x^2*x^(2*r)*log(c) + 16*b*d*e*x^2*x^r*log(c) +
24*b*d^2*r*x^2*log(c) + 8*b*d^2*n*x^2*log(x) + 8*a*e^2*x^2*x^(2*r) + 16*a*
d*e*x^2*x^r - 4*b*d^2*n*x^2 + 24*a*d^2*r*x^2 + 8*b*d^2*x^2*log(c) + 8*a*d^
2*x^2)/(r^4 + 6*r^3 + 13*r^2 + 12*r + 4)
```

Mupad [F(-1)]

Timed out.

$$\int x(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\int x\left(d+e\,x^r\right)^2\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x*(d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

output
```
int(x*(d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 481, normalized size of antiderivative = 4.72

$$\int x(d+ex^r)^2\,(a+b\log\left(cx^n\right))\;dx$$
$$=\frac{x^2(8x^{2r}a\,e^2+2a\,d^2r^4+12a\,d^2r^3+26a\,d^2r^2+24a\,d^2r+8\log(x^nc)\,b\,d^2-4b\,d^2n-b\,d^2n\,r^4+8x^{2r}\log(x^n}{}$$

input
```
int(x*(d+e*x^r)^2*(a+b*log(c*x^n)),x)
```

output
```
(x**2*(2*x**(2*r)*log(x**n*c)*b*e**2*r**3 + 10*x**(2*r)*log(x**n*c)*b*e**2
*r**2 + 16*x**(2*r)*log(x**n*c)*b*e**2*r + 8*x**(2*r)*log(x**n*c)*b*e**2 +
 2*x**(2*r)*a*e**2*r**3 + 10*x**(2*r)*a*e**2*r**2 + 16*x**(2*r)*a*e**2*r +
 8*x**(2*r)*a*e**2 - x**(2*r)*b*e**2*n*r**2 - 4*x**(2*r)*b*e**2*n*r - 4*x*
*(2*r)*b*e**2*n + 8*x**r*log(x**n*c)*b*d*e*r**3 + 32*x**r*log(x**n*c)*b*d*
e*r**2 + 40*x**r*log(x**n*c)*b*d*e*r + 16*x**r*log(x**n*c)*b*d*e + 8*x**r*
a*d*e*r**3 + 32*x**r*a*d*e*r**2 + 40*x**r*a*d*e*r + 16*x**r*a*d*e - 8*x**r
*b*d*e*n*r**2 - 16*x**r*b*d*e*n*r - 8*x**r*b*d*e*n + 2*log(x**n*c)*b*d**2*
r**4 + 12*log(x**n*c)*b*d**2*r**3 + 26*log(x**n*c)*b*d**2*r**2 + 24*log(x*
*n*c)*b*d**2*r + 8*log(x**n*c)*b*d**2 + 2*a*d**2*r**4 + 12*a*d**2*r**3 + 2
6*a*d**2*r**2 + 24*a*d**2*r + 8*a*d**2 - b*d**2*n*r**4 - 6*b*d**2*n*r**3 -
 13*b*d**2*n*r**2 - 12*b*d**2*n*r - 4*b*d**2*n))/(4*(r**4 + 6*r**3 + 13*r*
*2 + 12*r + 4))
```

3.380 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x}\,dx$

Optimal result 2824
Mathematica [A] (verified) 2824
Rubi [A] (verified) 2825
Maple [A] (warning: unable to verify) 2826
Fricas [A] (verification not implemented) 2827
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Giac [F] 2828
Mupad [F(-1)] 2829
Reduce [B] (verification not implemented) 2829

Optimal result

Integrand size = 23, antiderivative size = 104

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x}\,dx = -\frac{2bdenx^r}{r^2}-\frac{be^2nx^{2r}}{4r^2}-\frac{1}{2}bd^2n\log^2(x)+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}+d^2\log(x)\,(a+b\log(cx^n))$$

output
```
-2*b*d*e*n*x^r/r^2-1/4*b*e^2*n*x^(2*r)/r^2-1/2*b*d^2*n*ln(x)^2+2*d*e*x^r*(
a+b*ln(c*x^n))/r+1/2*e^2*x^(2*r)*(a+b*ln(c*x^n))/r+d^2*ln(x)*(a+b*ln(c*x^n
))
```

Mathematica [A] (verified)

Time = 0.24 (sec) , antiderivative size = 90, normalized size of antiderivative = 0.87

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x}\,dx = \frac{1}{4}\left(\frac{ex^r(2ar(4d+ex^r)-bn(8d+ex^r))}{r^2}+4ad^2\log(x)+\frac{2bex^r(4d+ex^r)\log(cx^n)}{r}+\frac{2bd^2\log^2(cx^n)}{n}\right)$$

input
```
Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x,x]
```

output
```
((e*x^r*(2*a*r*(4*d + e*x^r) - b*n*(8*d + e*x^r)))/r^2 + 4*a*d^2*Log[x] +
(2*b*e*x^r*(4*d + e*x^r)*Log[c*x^n])/r + (2*b*d^2*Log[c*x^n]^2)/n)/4
```

Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 106, normalized size of antiderivative = 1.02, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x} dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \frac{e(ex^r+4d)x^r+2d^2r\log(x)}{2rx}dx+d^2\log(x)(a+b\log(cx^n))+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}$$

$$\Big\downarrow \text{27}$$

$$-\frac{bn\int \frac{e(ex^r+4d)x^r+2d^2r\log(x)}{x}dx}{2r}+d^2\log(x)(a+b\log(cx^n))+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}$$

$$\Big\downarrow \text{2010}$$

$$-\frac{bn\int \left(4dex^{r-1}+e^2x^{2r-1}+\frac{2d^2r\log(x)}{x}\right)dx}{2r}+d^2\log(x)(a+b\log(cx^n))+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}$$

$$\Big\downarrow \text{2009}$$

$$d^2\log(x)(a+b\log(cx^n))+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}-\frac{bn\left(d^2r\log^2(x)+\frac{4dex^r}{r}+\frac{e^2x^{2r}}{2r}\right)}{2r}$$

input
```
Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x,x]
```

output
```
-1/2*(b*n*((4*d*e*x^r)/r + (e^2*x^(2*r))/(2*r) + d^2*r*Log[x]^2))/r + (2*d
*e*x^r*(a + b*Log[c*x^n]))/r + (e^2*x^(2*r)*(a + b*Log[c*x^n]))/(2*r) + d^
2*Log[x]*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (warning: unable to verify)

Time = 1.10 (sec) , antiderivative size = 122, normalized size of antiderivative = 1.17

method	result
parallelrisch	$\frac{2x^{2r} \ln(c\,x^{n}) b\,e^{2} r n+4 \ln(x) a\,d^{2} n\,r^{2}+2x^{2r} a\,e^{2} n r-x^{2r} b\,e^{2} n^{2}+8x^{r} \ln(c\,x^{n}) b d e r n+2b\,d^{2} \ln(c\,x^{n})^{2} r^{2}+8x^{r} a d e n r-8x^{r} b d e\,n^{2}}{4r^{2} n}$
risch	$\frac{b(2d^{2} \ln(x) r+e^{2} x^{2r}+4de\,x^{r}) \ln(x^{n})}{2r}+\frac{i\pi \ln(x) b\,d^{2} \operatorname{csgn}(ix^{n}) \operatorname{csgn}(ic\,x^{n})^{2}}{2}-\frac{i\pi b d e \operatorname{csgn}(ic\,x^{n})^{3} x^{r}}{r}+\frac{i\pi b\,e^{2} \operatorname{csgn}(ix^{n}) \operatorname{cs}}{4r}$

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/4*(2*(x^r)^2*ln(c*x^n)*b*e^2*r*n+4*ln(x)*a*d^2*n*r^2+2*(x^r)^2*a*e^2*n*r
-(x^r)^2*b*e^2*n^2+8*x^r*ln(c*x^n)*b*d*e*r*n+2*b*d^2*ln(c*x^n)^2*r^2+8*x^r
*a*d*e*n*r-8*x^r*b*d*e*n^2)/r^2/n
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 115, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x}\,dx$$
$$= \frac{2\,bd^2nr^2\log(x)^2 + (2\,be^2nr\log(x) + 2\,be^2r\log(c) - be^2n + 2\,ae^2r)x^{2\,r} + 8\,(bdenr\log(x) + bder\log(c)}{4\,r^2}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/4*(2*b*d^2*n*r^2*log(x)^2 + (2*b*e^2*n*r*log(x) + 2*b*e^2*r*log(c) - b*e
^2*n + 2*a*e^2*r)*x^(2*r) + 8*(b*d*e*n*r*log(x) + b*d*e*r*log(c) - b*d*e*n
 + a*d*e*r)*x^r + 4*(b*d^2*r^2*log(c) + a*d^2*r^2)*log(x))/r^2
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 216 vs. 2(104) = 208.

Time = 2.28 (sec) , antiderivative size = 216, normalized size of antiderivative = 2.08

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x}\,dx$$
$$= \begin{cases} (a+b\log(c))\,(d+e)^2\log(x) & \text{for } n=0 \\ (a+b\log(c))\left(d^2\log(x) + \frac{2dex^r}{r} + \frac{e^2x^{2r}}{2r}\right) & \text{for } n=0 \\ (d+e)^2\left(\begin{cases} a\log(x) & \text{for } b=0 \\ -(-a-b\log(c))\log(x) & \text{for } n=0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}\right) & \text{for } r=0 \\ \frac{ad^2\log(cx^n)}{n} + \frac{2adex^r}{r} + \frac{ae^2x^{2r}}{2r} + \frac{bd^2\log(cx^n)^2}{2n} - \frac{2bdenx^r}{r^2} + \frac{2bdex^r\log(cx^n)}{r} - \frac{be^2nx^{2r}}{4r^2} + \frac{be^2x^{2r}\log(cx^n)}{2r} & \text{otherwise} \end{cases}$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise(((a + b*log(c))*(d + e)**2*log(x), Eq(n, 0) & Eq(r, 0)), ((a + b
*log(c))*(d**2*log(x) + 2*d*e*x**r/r + e**2*x**(2*r)/(2*r)), Eq(n, 0)), ((
d + e)**2*Piecewise((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n,
0)), ((-a - b*log(c*x**n))**2/(2*b*n), True)), Eq(r, 0)), (a*d**2*log(c*x*
*n)/n + 2*a*d*e*x**r/r + a*e**2*x**(2*r)/(2*r) + b*d**2*log(c*x**n)**2/(2*
n) - 2*b*d*e*n*x**r/r**2 + 2*b*d*e*x**r*log(c*x**n)/r - b*e**2*n*x**(2*r)/
(4*r**2) + b*e**2*x**(2*r)*log(c*x**n)/(2*r), True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.10

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x}\,dx = \frac{be^2x^{2\,r}\log(cx^n)}{2\,r} + \frac{2\,bdex^r\log(cx^n)}{r} + \frac{bd^2\log(cx^n)^2}{2\,n} + ad^2\log(x) - \frac{be^2nx^{2\,r}}{4\,r^2} + \frac{ae^2x^{2\,r}}{2\,r} - \frac{2\,bdenx^r}{r^2} + \frac{2\,adex^r}{r}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
1/2*b*e^2*x^(2*r)*log(c*x^n)/r + 2*b*d*e*x^r*log(c*x^n)/r + 1/2*b*d^2*log(
c*x^n)^2/n + a*d^2*log(x) - 1/4*b*e^2*n*x^(2*r)/r^2 + 1/2*a*e^2*x^(2*r)/r
- 2*b*d*e*n*x^r/r^2 + 2*a*d*e*x^r/r
```

Giac [F]

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x}\,dx = \int \frac{(ex^r+d)^2(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(b*log(c*x^n) + a)/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x} \, dx = \int \frac{(d+e\,x^r)^2 (a+b\,\ln(c\,x^n))}{x} \, dx$$

input
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 121, normalized size of antiderivative = 1.16

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x} \, dx$$
$$= \frac{2x^{2r}\log(x^nc)\,b\,e^2nr + 2x^{2r}a\,e^2nr - x^{2r}b\,e^2n^2 + 8x^r\log(x^nc)\,bdenr + 8x^r adenr - 8x^r bde\,n^2 + 2\log(x^nc)^2}{4n\,r^2}$$

input
```
int((d+e*x^r)^2*(a+b*log(c*x^n))/x,x)
```

output
```
(2*x**(2*r)*log(x**n*c)*b*e**2*n*r + 2*x**(2*r)*a*e**2*n*r - x**(2*r)*b*e*
*2*n**2 + 8*x**r*log(x**n*c)*b*d*e*n*r + 8*x**r*a*d*e*n*r - 8*x**r*b*d*e*n
**2 + 2*log(x**n*c)**2*b*d**2*r**2 + 4*log(x)*a*d**2*n*r**2)/(4*n*r**2)
```

3.381 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^3}\,dx$

Optimal result 2830
Mathematica [A] (verified) 2830
Rubi [A] (verified) 2831
Maple [B] (verified) 2833
Fricas [B] (verification not implemented) 2833
Sympy [B] (verification not implemented) 2834
Maxima [F(-2)] 2835
Giac [F] 2836
Mupad [F(-1)] 2836
Reduce [B] (verification not implemented) 2836

Optimal result

Integrand size = 23, antiderivative size = 135

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^3}\,dx = -\frac{bd^2n}{4x^2}-\frac{be^2nx^{-2(1-r)}}{4(1-r)^2}-\frac{2bdenx^{-2+r}}{(2-r)^2}-\frac{d^2(a+b\log(cx^n))}{2x^2}-\frac{e^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}-\frac{2dex^{-2+r}(a+b\log(cx^n))}{2-r}$$

output

```
-1/4*b*d^2*n/x^2-1/4*b*e^2*n/(1-r)^2/(x^(2-2*r))-2*b*d*e*n*x^(-2+r)/(2-r)^
2-1/2*d^2*(a+b*ln(c*x^n))/x^2-1/2*e^2*(a+b*ln(c*x^n))/(1-r)/(x^(2-2*r))-2*
d*e*x^(-2+r)*(a+b*ln(c*x^n))/(2-r)
```

Mathematica [A] (verified)

Time = 0.37 (sec) , antiderivative size = 120, normalized size of antiderivative = 0.89

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^3}\,dx = \frac{bn\left(-d^2-\frac{8dex^r}{(-2+r)^2}-\frac{e^2x^{2r}}{(-1+r)^2}\right)+a\left(-2d^2+\frac{8dex^r}{-2+r}+\frac{2e^2x^{2r}}{-1+r}\right)+2b\left(-d^2+\frac{4dex^r}{-2+r}+\frac{e^2x^{2r}}{-1+r}\right)\log(cx^n)}{4x^2}$$

input
```
Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(b*n*(-d^2 - (8*d*e*x^r)/(-2 + r)^2 - (e^2*x^(2*r))/(-1 + r)^2) + a*(-2*d^
2 + (8*d*e*x^r)/(-2 + r) + (2*e^2*x^(2*r))/(-1 + r)) + 2*b*(-d^2 + (4*d*e*
x^r)/(-2 + r) + (e^2*x^(2*r))/(-1 + r))*Log[c*x^n])/(4*x^2)
```

Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 166, normalized size of antiderivative = 1.23, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^3} \, dx$$

$$\Big\downarrow \text{ 2772}$$

$$-bn\int -\frac{4de(1-r)x^r+e^2(2-r)x^{2r}+d^2(1-r)(2-r)}{2(r^2-3r+2)x^3}dx-\frac{d^2(a+b\log(cx^n))}{2x^2}-\frac{2dex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{e^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{bn\int \frac{4de(1-r)x^r+e^2(2-r)x^{2r}+d^2(1-r)(2-r)}{x^3}dx}{2(r^2-3r+2)}-\frac{d^2(a+b\log(cx^n))}{2x^2}-\frac{2dex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{e^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}$$

$$\Big\downarrow \text{ 1691}$$

$$\frac{bn\int \left(-4de(r-1)x^{r-3}-e^2(r-2)x^{2r-3}+\frac{d^2(r-2)(r-1)}{x^3}\right)dx}{2(r^2-3r+2)}-\frac{d^2(a+b\log(cx^n))}{2x^2}-\frac{2dex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{e^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{2x^2}-\frac{2dex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{e^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}+\frac{bn\left(-\frac{d^2(1-r)(2-r)}{2x^2}-\frac{4de(1-r)x^{r-2}}{2-r}-\frac{e^2(2-r)x^{-2(1-r)}}{2(1-r)}\right)}{2\left(r^2-3r+2\right)}$$

input
```
Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(b*n*(-1/2*(d^2*(1 - r)*(2 - r))/x^2 - (e^2*(2 - r))/(2*(1 - r)*x^(2*(1 -
r))) - (4*d*e*(1 - r)*x^(-2 + r))/(2 - r)))/(2*(2 - 3*r + r^2)) - (d^2*(a
+ b*Log[c*x^n]))/(2*x^2) - (e^2*(a + b*Log[c*x^n]))/(2*(1 - r)*x^(2*(1 - r
))) - (2*d*e*x^(-2 + r)*(a + b*Log[c*x^n]))/(2 - r)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 473 vs. $2(127) = 254$.

Time = 1.16 (sec) , antiderivative size = 474, normalized size of antiderivative = 3.51

method	result
parallelrisch	$-\frac{26a\,d^2r^2-24a\,d^2r+b\,e^2n\,r^2x^{2r}-4b\,e^2nr\,x^{2r}-2x^{2r}\ln(c\,x^n)b\,e^2r^3+10x^{2r}\ln(c\,x^n)b\,e^2r^2-16x^{2r}\ln(c\,x^n)b\,e^2r+8b\ln(c\,x^n)a}{}$
risch	Expression too large to display

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

output
```
-1/4/x^2*(26*a*d^2*r^2-24*a*d^2*r+8*b*ln(c*x^n)*d^2+8*e^2*(x^r)^2*a+8*e^2*
(x^r)^2*b*ln(c*x^n)+16*d*e*x^r*a+4*b*d^2*n+8*a*d^2+16*d*e*x^r*b*ln(c*x^n)+
2*ln(c*x^n)*b*d^2*r^4-12*ln(c*x^n)*b*d^2*r^3+26*ln(c*x^n)*b*d^2*r^2-24*ln(
c*x^n)*b*d^2*r+b*e^2*n*r^2*(x^r)^2-8*a*d*e*r^3*x^r+32*a*d*e*r^2*x^r+b*d^2*
n*r^4-6*b*d^2*n*r^3-2*a*e^2*r^3*(x^r)^2+10*a*e^2*r^2*(x^r)^2-16*a*e^2*r*(x
^r)^2+4*b*e^2*n*(x^r)^2-40*a*d*e*r*x^r-4*b*e^2*n*r*(x^r)^2+8*b*d*e*n*x^r+1
3*b*d^2*n*r^2-12*b*d^2*n*r-2*(x^r)^2*ln(c*x^n)*b*e^2*r^3+10*(x^r)^2*ln(c*x
^n)*b*e^2*r^2-16*(x^r)^2*ln(c*x^n)*b*e^2*r-8*x^r*ln(c*x^n)*b*d*e*r^3+32*x^
r*ln(c*x^n)*b*d*e*r^2-40*x^r*ln(c*x^n)*b*d*e*r+8*b*d*e*n*r^2*x^r+2*a*d^2*r
^4-16*b*d*e*n*r*x^r-12*a*d^2*r^3)/(-1+r)^2/(r^2-4*r+4)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 457 vs. $2(119) = 238$.

Time = 0.09 (sec) , antiderivative size = 457, normalized size of antiderivative = 3.39

$$\int \frac{(d+ex^r)^2\,(a+b\log{(cx^n)})}{x^3}\,dx = -\frac{(bd^2n+2\,ad^2)r^4+4\,bd^2n-6\,(bd^2n+2\,ad^2)r^3+8\,ad^2+13\,(bd^2n+2\,ad^2)r^2-12\,(bd^2n+2\,ad^2)r-(}{}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
-1/4*((b*d^2*n + 2*a*d^2)*r^4 + 4*b*d^2*n - 6*(b*d^2*n + 2*a*d^2)*r^3 + 8*
a*d^2 + 13*(b*d^2*n + 2*a*d^2)*r^2 - 12*(b*d^2*n + 2*a*d^2)*r - (2*a*e^2*r
^3 - 4*b*e^2*n - 8*a*e^2 - (b*e^2*n + 10*a*e^2)*r^2 + 4*(b*e^2*n + 4*a*e^2
)*r + 2*(b*e^2*r^3 - 5*b*e^2*r^2 + 8*b*e^2*r - 4*b*e^2)*log(c) + 2*(b*e^2*
n*r^3 - 5*b*e^2*n*r^2 + 8*b*e^2*n*r - 4*b*e^2*n)*log(x))*x^(2*r) - 8*(a*d*
e*r^3 - b*d*e*n - 2*a*d*e - (b*d*e*n + 4*a*d*e)*r^2 + (2*b*d*e*n + 5*a*d*e
)*r + (b*d*e*r^3 - 4*b*d*e*r^2 + 5*b*d*e*r - 2*b*d*e)*log(c) + (b*d*e*n*r^
3 - 4*b*d*e*n*r^2 + 5*b*d*e*n*r - 2*b*d*e*n)*log(x))*x^r + 2*(b*d^2*r^4 -
6*b*d^2*r^3 + 13*b*d^2*r^2 - 12*b*d^2*r + 4*b*d^2)*log(c) + 2*(b*d^2*n*r^4
 - 6*b*d^2*n*r^3 + 13*b*d^2*n*r^2 - 12*b*d^2*n*r + 4*b*d^2*n)*log(x))/((r^
4 - 6*r^3 + 13*r^2 - 12*r + 4)*x^2)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 2118 vs. $2(119) = 238$.

Time = 3.21 (sec) , antiderivative size = 2118, normalized size of antiderivative = 15.69

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^3} dx = \text{Too large to display}$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x**3,x)
```

output
```
Piecewise((-a*d**2/(2*x**2) - 2*a*d*e/x + a*e**2*log(x) + b*d**2*(-n/(4*x*
*2) - log(c*x**n)/(2*x**2)) + 2*b*d*e*(-n/x - log(c*x**n)/x) - b*e**2*Piec
ewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)), Eq(r, 1)
), (-a*d**2/(2*x**2) + 2*a*d*e*log(c*x**n)/n + a*e**2*x**2/2 - b*d**2*n/(4
*x**2) - b*d**2*log(c*x**n)/(2*x**2) + b*d*e*log(c*x**n)**2/n - b*e**2*n*x
**2/4 + b*e**2*x**2*log(c*x**n)/2, Eq(r, 2)), (-2*a*d**2*r**4/(4*r**4*x**2
 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) + 12*a*d**2*r**3/(4*
r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) - 26*a*d**2
*r**2/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) +
24*a*d**2*r/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x*
*2) - 8*a*d**2/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16
*x**2) + 8*a*d*e*r**3*x**r/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48
*r*x**2 + 16*x**2) - 32*a*d*e*r**2*x**r/(4*r**4*x**2 - 24*r**3*x**2 + 52*r
**2*x**2 - 48*r*x**2 + 16*x**2) + 40*a*d*e*r*x**r/(4*r**4*x**2 - 24*r**3*x
**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) - 16*a*d*e*x**r/(4*r**4*x**2 - 2
4*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) + 2*a*e**2*r**3*x**(2*r)
/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) - 10*a*
e**2*r**2*x**(2*r)/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2
+ 16*x**2) + 16*a*e**2*r*x**(2*r)/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x*
*2 - 48*r*x**2 + 16*x**2) - 8*a*e**2*x**(2*r)/(4*r**4*x**2 - 24*r**3*x*...
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^3} dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-3>0)', see `assume?` for more
details)Is
```

Giac [F]

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^3}\,dx=\int \frac{(ex^r+d)^2(b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(b*log(c*x^n) + a)/x^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^3}\,dx=\int \frac{(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))}{x^3}\,dx$$

input
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^3,x)
```

output
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^3, x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 480, normalized size of antiderivative = 3.56

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^3}\,dx$$
$$=\frac{-8x^{2r}a\,e^2-2a\,d^2r^4+12a\,d^2r^3-26a\,d^2r^2+24a\,d^2r-8\log(x^nc)\,b\,d^2-4b\,d^2n-b\,d^2n\,r^4-8x^{2r}\log(x^nc}{}$$

input
```
int((d+e*x^r)^2*(a+b*log(c*x^n))/x^3,x)
```

output
```
(2*x**(2*r)*log(x**n*c)*b*e**2*r**3 - 10*x**(2*r)*log(x**n*c)*b*e**2*r**2
+ 16*x**(2*r)*log(x**n*c)*b*e**2*r - 8*x**(2*r)*log(x**n*c)*b*e**2 + 2*x**
(2*r)*a*e**2*r**3 - 10*x**(2*r)*a*e**2*r**2 + 16*x**(2*r)*a*e**2*r - 8*x**
(2*r)*a*e**2 - x**(2*r)*b*e**2*n*r**2 + 4*x**(2*r)*b*e**2*n*r - 4*x**(2*r)
*b*e**2*n + 8*x**r*log(x**n*c)*b*d*e*r**3 - 32*x**r*log(x**n*c)*b*d*e*r**2
 + 40*x**r*log(x**n*c)*b*d*e*r - 16*x**r*log(x**n*c)*b*d*e + 8*x**r*a*d*e*
r**3 - 32*x**r*a*d*e*r**2 + 40*x**r*a*d*e*r - 16*x**r*a*d*e - 8*x**r*b*d*e
*n*r**2 + 16*x**r*b*d*e*n*r - 8*x**r*b*d*e*n - 2*log(x**n*c)*b*d**2*r**4 +
 12*log(x**n*c)*b*d**2*r**3 - 26*log(x**n*c)*b*d**2*r**2 + 24*log(x**n*c)*
b*d**2*r - 8*log(x**n*c)*b*d**2 - 2*a*d**2*r**4 + 12*a*d**2*r**3 - 26*a*d*
*2*r**2 + 24*a*d**2*r - 8*a*d**2 - b*d**2*n*r**4 + 6*b*d**2*n*r**3 - 13*b*
d**2*n*r**2 + 12*b*d**2*n*r - 4*b*d**2*n)/(4*x**2*(r**4 - 6*r**3 + 13*r**2
 - 12*r + 4))
```

3.382 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^5}\,dx$

Optimal result 2838
Mathematica [A] (verified) 2838
Rubi [A] (verified) 2839
Maple [B] (verified) 2841
Fricas [B] (verification not implemented) 2841
Sympy [B] (verification not implemented) 2842
Maxima [F(-2)] 2843
Giac [F] 2844
Mupad [F(-1)] 2844
Reduce [B] (verification not implemented) 2844

Optimal result

Integrand size = 23, antiderivative size = 135

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^5}\,dx = -\frac{bd^2n}{16x^4} - \frac{be^2nx^{-2(2-r)}}{4(2-r)^2} - \frac{2bdenx^{-4+r}}{(4-r)^2} - \frac{d^2(a+b\log(cx^n))}{4x^4} - \frac{e^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)} - \frac{2dex^{-4+r}(a+b\log(cx^n))}{4-r}$$

output
```
-1/16*b*d^2*n/x^4-1/4*b*e^2*n/(2-r)^2/(x^(4-2*r))-2*b*d*e*n*x^(-4+r)/(4-r)
^2-1/4*d^2*(a+b*ln(c*x^n))/x^4-1/2*e^2*(a+b*ln(c*x^n))/(2-r)/(x^(4-2*r))-2
*d*e*x^(-4+r)*(a+b*ln(c*x^n))/(4-r)
```

Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 121, normalized size of antiderivative = 0.90

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^5}\,dx = \frac{bn\left(-d^2 - \frac{32dex^r}{(-4+r)^2} - \frac{4e^2x^{2r}}{(-2+r)^2}\right) + a\left(-4d^2 + \frac{32dex^r}{-4+r} + \frac{8e^2x^{2r}}{-2+r}\right) + 4b\left(-d^2 + \frac{8dex^r}{-4+r} + \frac{2e^2x^{2r}}{-2+r}\right)\log(cx^n)}{16x^4}$$

input
```
Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(b*n*(-d^2 - (32*d*e*x^r)/(-4 + r)^2 - (4*e^2*x^(2*r))/(-2 + r)^2) + a*(-4
*d^2 + (32*d*e*x^r)/(-4 + r) + (8*e^2*x^(2*r))/(-2 + r)) + 4*b*(-d^2 + (8*
d*e*x^r)/(-4 + r) + (2*e^2*x^(2*r))/(-2 + r))*Log[c*x^n])/(16*x^4)
```

Rubi [A] (verified)

Time = 0.45 (sec) , antiderivative size = 164, normalized size of antiderivative = 1.21, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2772, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^5} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{8de(2-r)x^r+2e^2(4-r)x^{2r}+d^2(2-r)(4-r)}{4(r^2-6r+8)x^5}dx-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2dex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{e^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{8de(2-r)x^r+2e^2(4-r)x^{2r}+d^2(2-r)(4-r)}{x^5}dx}{4(r^2-6r+8)}-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2dex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{e^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}$$

$$\Big\downarrow \text{1691}$$

$$\frac{bn\int \left(-8de(r-2)x^{r-5}-2e^2(r-4)x^{2r-5}+\frac{d^2(r-4)(r-2)}{x^5}\right)dx}{4(r^2-6r+8)}-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2dex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{e^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2dex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{e^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}+\frac{bn\left(-\frac{d^2(2-r)(4-r)}{4x^4}-\frac{8de(2-r)x^{r-4}}{4-r}-\frac{e^2(4-r)x^{-2(2-r)}}{2-r}\right)}{4(r^2-6r+8)}$$

input
```
Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(b*n*(-1/4*(d^2*(2 - r)*(4 - r))/x^4 - (e^2*(4 - r))/((2 - r)*x^(2*(2 - r)
)) - (8*d*e*(2 - r)*x^(-4 + r))/(4 - r)))/(4*(8 - 6*r + r^2)) - (d^2*(a +
b*Log[c*x^n]))/(4*x^4) - (e^2*(a + b*Log[c*x^n]))/(2*(2 - r)*x^(2*(2 - r))
) - (2*d*e*x^(-4 + r)*(a + b*Log[c*x^n]))/(4 - r)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 474 vs. 2(127) = 254.

Time = 1.16 (sec) , antiderivative size = 475, normalized size of antiderivative = 3.52

method	result
parallelrisch	$-\frac{208a\,d^2r^2-384a\,d^2r+4b\,e^2n\,r^2x^{2r}-32b\,e^2nr\,x^{2r}-8x^{2r}\ln(c\,x^n)b\,e^2r^3+80x^{2r}\ln(c\,x^n)b\,e^2r^2-256x^{2r}\ln(c\,x^n)b\,e^2r+256b\,\mathrm{l}}{}$
risch	Expression too large to display

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

output
```
-1/16/x^4*(208*a*d^2*r^2-384*a*d^2*r+256*b*ln(c*x^n)*d^2+256*e^2*(x^r)^2*a
+256*e^2*(x^r)^2*b*ln(c*x^n)+512*d*e*x^r*a+64*b*d^2*n+256*a*d^2+512*d*e*x^
r*b*ln(c*x^n)+4*ln(c*x^n)*b*d^2*r^4-48*ln(c*x^n)*b*d^2*r^3+208*ln(c*x^n)*b
*d^2*r^2-384*ln(c*x^n)*b*d^2*r+4*b*e^2*n*r^2*(x^r)^2-32*a*d*e*r^3*x^r+256*
a*d*e*r^2*x^r+b*d^2*n*r^4-12*b*d^2*n*r^3-8*a*e^2*r^3*(x^r)^2+80*a*e^2*r^2*
(x^r)^2-256*a*e^2*r*(x^r)^2+64*b*e^2*n*(x^r)^2-640*a*d*e*r*x^r-32*b*e^2*n*
r*(x^r)^2+128*b*d*e*n*x^r+52*b*d^2*n*r^2-96*b*d^2*n*r-8*(x^r)^2*ln(c*x^n)*
b*e^2*r^3+80*(x^r)^2*ln(c*x^n)*b*e^2*r^2-256*(x^r)^2*ln(c*x^n)*b*e^2*r-32*
x^r*ln(c*x^n)*b*d*e*r^3+256*x^r*ln(c*x^n)*b*d*e*r^2-640*x^r*ln(c*x^n)*b*d*
e*r+32*b*d*e*n*r^2*x^r+4*a*d^2*r^4-128*b*d*e*n*r*x^r-48*a*d^2*r^3)/(-2+r)^
2/(r^2-8*r+16)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 457 vs. 2(119) = 238.

Time = 0.08 (sec) , antiderivative size = 457, normalized size of antiderivative = 3.39

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^5}\,dx = -\frac{(bd^2n+4\,ad^2)r^4+64\,bd^2n-12\,(bd^2n+4\,ad^2)r^3+256\,ad^2+52\,(bd^2n+4\,ad^2)r^2-96\,(bd^2n+4\,ad^2)}{}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

output
```
-1/16*((b*d^2*n + 4*a*d^2)*r^4 + 64*b*d^2*n - 12*(b*d^2*n + 4*a*d^2)*r^3 +
 256*a*d^2 + 52*(b*d^2*n + 4*a*d^2)*r^2 - 96*(b*d^2*n + 4*a*d^2)*r - 4*(2*
a*e^2*r^3 - 16*b*e^2*n - 64*a*e^2 - (b*e^2*n + 20*a*e^2)*r^2 + 8*(b*e^2*n
+ 8*a*e^2)*r + 2*(b*e^2*r^3 - 10*b*e^2*r^2 + 32*b*e^2*r - 32*b*e^2)*log(c)
 + 2*(b*e^2*n*r^3 - 10*b*e^2*n*r^2 + 32*b*e^2*n*r - 32*b*e^2*n)*log(x))*x^
(2*r) - 32*(a*d*e*r^3 - 4*b*d*e*n - 16*a*d*e - (b*d*e*n + 8*a*d*e)*r^2 + 4
*(b*d*e*n + 5*a*d*e)*r + (b*d*e*r^3 - 8*b*d*e*r^2 + 20*b*d*e*r - 16*b*d*e)
*log(c) + (b*d*e*n*r^3 - 8*b*d*e*n*r^2 + 20*b*d*e*n*r - 16*b*d*e*n)*log(x)
)*x^r + 4*(b*d^2*r^4 - 12*b*d^2*r^3 + 52*b*d^2*r^2 - 96*b*d^2*r + 64*b*d^2
)*log(c) + 4*(b*d^2*n*r^4 - 12*b*d^2*n*r^3 + 52*b*d^2*n*r^2 - 96*b*d^2*n*r
 + 64*b*d^2*n)*log(x))/((r^4 - 12*r^3 + 52*r^2 - 96*r + 64)*x^4)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 2127 vs. $2(119) = 238$.

Time = 4.72 (sec) , antiderivative size = 2127, normalized size of antiderivative = 15.76

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^5} dx = \text{Too large to display}$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x**5,x)
```

output
```
Piecewise((-a*d**2/(4*x**4) - a*d*e/x**2 + a*e**2*log(x) + b*d**2*(-n/(16*
x**4) - log(c*x**n)/(4*x**4)) + 2*b*d*e*(-n/(4*x**2) - log(c*x**n)/(2*x**2
)) - b*e**2*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n),
True)), Eq(r, 2)), (-a*d**2/(4*x**4) + 2*a*d*e*log(c*x**n)/n + a*e**2*x**4
/4 - b*d**2*n/(16*x**4) - b*d**2*log(c*x**n)/(4*x**4) + b*d*e*log(c*x**n)*
*2/n - b*e**2*n*x**4/16 + b*e**2*x**4*log(c*x**n)/4, Eq(r, 4)), (-4*a*d**2
*r**4/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x
**4) + 48*a*d**2*r**3/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536
*r*x**4 + 1024*x**4) - 208*a*d**2*r**2/(16*r**4*x**4 - 192*r**3*x**4 + 832
*r**2*x**4 - 1536*r*x**4 + 1024*x**4) + 384*a*d**2*r/(16*r**4*x**4 - 192*r
**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) - 256*a*d**2/(16*r**4*
x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) + 32*a*d*e
*r**3*x**r/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1
024*x**4) - 256*a*d*e*r**2*x**r/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x
**4 - 1536*r*x**4 + 1024*x**4) + 640*a*d*e*r*x**r/(16*r**4*x**4 - 192*r**3
*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) - 512*a*d*e*x**r/(16*r**4
*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) + 8*a*e**
2*r**3*x**(2*r)/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**
4 + 1024*x**4) - 80*a*e**2*r**2*x**(2*r)/(16*r**4*x**4 - 192*r**3*x**4 + 8
32*r**2*x**4 - 1536*r*x**4 + 1024*x**4) + 256*a*e**2*r*x**(2*r)/(16*r**...
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^5} \, dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-5>0)', see `assume?` for more
details)Is
```

Giac [F]

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^5}\,dx = \int \frac{(ex^r+d)^2(b\log(cx^n)+a)}{x^5}\,dx$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(b*log(c*x^n) + a)/x^5, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^5}\,dx = \int \frac{(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))}{x^5}\,dx$$

input
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^5,x)
```

output
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^5, x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 480, normalized size of antiderivative = 3.56

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^5}\,dx$$
$$= \frac{-256x^{2r}a\,e^2 - 4a\,d^2r^4 + 48a\,d^2r^3 - 208a\,d^2r^2 + 384a\,d^2r - 256\log(x^nc)\,b\,d^2 - 64b\,d^2n - b\,d^2n\,r^4 - 256}{}$$

input
```
int((d+e*x^r)^2*(a+b*log(c*x^n))/x^5,x)
```

output

```
(8*x**(2*r)*log(x**n*c)*b*e**2*r**3 - 80*x**(2*r)*log(x**n*c)*b*e**2*r**2
+ 256*x**(2*r)*log(x**n*c)*b*e**2*r - 256*x**(2*r)*log(x**n*c)*b*e**2 + 8*
x**(2*r)*a*e**2*r**3 - 80*x**(2*r)*a*e**2*r**2 + 256*x**(2*r)*a*e**2*r - 2
56*x**(2*r)*a*e**2 - 4*x**(2*r)*b*e**2*n*r**2 + 32*x**(2*r)*b*e**2*n*r - 6
4*x**(2*r)*b*e**2*n + 32*x**r*log(x**n*c)*b*d*e*r**3 - 256*x**r*log(x**n*c
)*b*d*e*r**2 + 640*x**r*log(x**n*c)*b*d*e*r - 512*x**r*log(x**n*c)*b*d*e +
 32*x**r*a*d*e*r**3 - 256*x**r*a*d*e*r**2 + 640*x**r*a*d*e*r - 512*x**r*a*
d*e - 32*x**r*b*d*e*n*r**2 + 128*x**r*b*d*e*n*r - 128*x**r*b*d*e*n - 4*log
(x**n*c)*b*d**2*r**4 + 48*log(x**n*c)*b*d**2*r**3 - 208*log(x**n*c)*b*d**2
*r**2 + 384*log(x**n*c)*b*d**2*r - 256*log(x**n*c)*b*d**2 - 4*a*d**2*r**4
+ 48*a*d**2*r**3 - 208*a*d**2*r**2 + 384*a*d**2*r - 256*a*d**2 - b*d**2*n*
r**4 + 12*b*d**2*n*r**3 - 52*b*d**2*n*r**2 + 96*b*d**2*n*r - 64*b*d**2*n)/
(16*x**4*(r**4 - 12*r**3 + 52*r**2 - 96*r + 64))
```

3.383 $\int x^4(d+ex^r)^2(a+b\log(cx^n))\,dx$

Optimal result 2846
Mathematica [A] (verified) 2846
Rubi [A] (verified) 2847
Maple [B] (verified) 2848
Fricas [B] (verification not implemented) 2849
Sympy [F(-1)] 2850
Maxima [A] (verification not implemented) 2850
Giac [B] (verification not implemented) 2851
Mupad [F(-1)] 2852
Reduce [B] (verification not implemented) 2852

Optimal result

Integrand size = 23, antiderivative size = 105

$$\int x^4(d+ex^r)^2(a+b\log(cx^n))\,dx=-\frac{1}{25}bd^2nx^5-\frac{2bdenx^{5+r}}{(5+r)^2}-\frac{be^2nx^{5+2r}}{(5+2r)^2}+\frac{1}{5}\left(d^2x^5+\frac{10dex^{5+r}}{5+r}+\frac{5e^2x^{5+2r}}{5+2r}\right)(a+b\log(cx^n))$$

output
```
-1/25*b*d^2*n*x^5-2*b*d*e*n*x^(5+r)/(5+r)^2-b*e^2*n*x^(5+2*r)/(5+2*r)^2+1/
5*(d^2*x^5+10*d*e*x^(5+r)/(5+r)+5*e^2*x^(5+2*r)/(5+2*r))*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.30 (sec) , antiderivative size = 124, normalized size of antiderivative = 1.18

$$\int x^4(d+ex^r)^2(a+b\log(cx^n))\,dx=\frac{1}{25}x^5\left(bn\left(-d^2-\frac{50dex^r}{(5+r)^2}-\frac{25e^2x^{2r}}{(5+2r)^2}\right)+5a\left(d^2+\frac{10dex^r}{5+r}+\frac{5e^2x^{2r}}{5+2r}\right)+5b\left(d^2+\frac{10dex^r}{5+r}+\frac{5e^2x^{2r}}{5+2r}\right)\log(cx^n)\right)$$

input
```
Integrate[x^4*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^5*(b*n*(-d^2 - (50*d*e*x^r)/(5 + r)^2 - (25*e^2*x^(2*r))/(5 + 2*r)^2) +
 5*a*(d^2 + (10*d*e*x^r)/(5 + r) + (5*e^2*x^(2*r))/(5 + 2*r)) + 5*b*(d^2 +
 (10*d*e*x^r)/(5 + r) + (5*e^2*x^(2*r))/(5 + 2*r))*Log[c*x^n]))/25
```

Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 106, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2771, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^4(d+ex^r)^2 (a+b\log (cx^n)) \, dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{5}\left(d^2x^5+\frac{10dex^{r+5}}{r+5}+\frac{5e^2x^{2r+5}}{2r+5}\right)(a+b\log (cx^n))-bn\int \frac{1}{5}x^4\left(\frac{10dex^r}{r+5}+\frac{5e^2x^{2r}}{2r+5}+d^2\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\left(d^2x^5+\frac{10dex^{r+5}}{r+5}+\frac{5e^2x^{2r+5}}{2r+5}\right)(a+b\log (cx^n))-\frac{1}{5}bn\int x^4\left(\frac{10dex^r}{r+5}+\frac{5e^2x^{2r}}{2r+5}+d^2\right)dx$$

$$\Big\downarrow \text{1691}$$

$$\frac{1}{5}\left(d^2x^5+\frac{10dex^{r+5}}{r+5}+\frac{5e^2x^{2r+5}}{2r+5}\right)(a+b\log (cx^n))-\frac{1}{5}bn\int \left(\frac{5e^2x^{2(r+2)}}{2r+5}+\frac{10dex^{r+4}}{r+5}+d^2x^4\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left(d^2x^5+\frac{10dex^{r+5}}{r+5}+\frac{5e^2x^{2r+5}}{2r+5}\right)(a+b\log (cx^n))-\frac{1}{5}bn\left(\frac{d^2x^5}{5}+\frac{10dex^{r+5}}{(r+5)^2}+\frac{5e^2x^{2r+5}}{(2r+5)^2}\right)$$

input
```
Int[x^4*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/5*(b*n*((d^2*x^5)/5 + (10*d*e*x^(5 + r))/(5 + r)^2 + (5*e^2*x^(5 + 2*r)
)/(5 + 2*r)^2)) + ((d^2*x^5 + (10*d*e*x^(5 + r))/(5 + r) + (5*e^2*x^(5 + 2
*r))/(5 + 2*r))*(a + b*Log[c*x^n]))/5
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 590 vs. $2(101) = 202$.

Time = 10.58 (sec) , antiderivative size = 591, normalized size of antiderivative = 5.63

method	result
parallelrisch	$-\frac{-50x^5x^{2r}a\,e^2r^3-625x^5x^{2r}a\,e^2r^2-2500x^5x^{2r}a\,e^2r+625x^5x^{2r}b\,e^2n-3125e^2b\ln(c\,x^n)x^{2r}x^5-3125x^5a\,d^2-6250x^5de\,x^ra}{}$
risch	Expression too large to display

input
```
int(x^4*(d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/25*(-3125*x^5*a*d^2-3125*x^5*e^2*(x^r)^2*a-6250*x^5*d*e*x^r*a+625*b*d^2
*n*x^5-2000*x^5*x^r*ln(c*x^n)*b*d*e*r^2-200*x^5*x^r*ln(c*x^n)*b*d*e*r^3-62
50*x^5*x^r*ln(c*x^n)*b*d*e*r+200*x^5*x^r*b*d*e*n*r^2+1000*x^5*x^r*b*d*e*n*
r-20*x^5*a*d^2*r^4-300*x^5*a*d^2*r^3-1625*x^5*a*d^2*r^2-3750*x^5*a*d^2*r-3
125*b*d^2*ln(c*x^n)*x^5-50*x^5*(x^r)^2*ln(c*x^n)*b*e^2*r^3-625*x^5*(x^r)^2
*ln(c*x^n)*b*e^2*r^2-2500*x^5*(x^r)^2*ln(c*x^n)*b*e^2*r-200*x^5*x^r*a*d*e*
r^3-2000*x^5*x^r*a*d*e*r^2-6250*x^5*x^r*a*d*e*r+1250*x^5*x^r*b*d*e*n+25*x^
5*(x^r)^2*b*e^2*n*r^2+250*x^5*(x^r)^2*b*e^2*n*r-6250*b*d*e*ln(c*x^n)*x^r*x
^5+4*x^5*b*d^2*n*r^4+60*x^5*b*d^2*n*r^3+325*x^5*b*d^2*n*r^2+750*x^5*b*d^2*
n*r-50*x^5*(x^r)^2*a*e^2*r^3-625*x^5*(x^r)^2*a*e^2*r^2-2500*x^5*(x^r)^2*a*
e^2*r+625*x^5*(x^r)^2*b*e^2*n-20*x^5*ln(c*x^n)*b*d^2*r^4-300*x^5*ln(c*x^n)
*b*d^2*r^3-1625*x^5*ln(c*x^n)*b*d^2*r^2-3750*x^5*ln(c*x^n)*b*d^2*r-3125*e^
2*b*ln(c*x^n)*(x^r)^2*x^5)/(4*r^2+20*r+25)/(r^2+10*r+25)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 497 vs. $2(101) = 202$.

Time = 0.08 (sec) , antiderivative size = 497, normalized size of antiderivative = 4.73

$$\int x^4(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$= \frac{5\left(4\,bd^2r^4+60\,bd^2r^3+325\,bd^2r^2+750\,bd^2r+625\,bd^2\right)x^5\log\left(c\right)+5\left(4\,bd^2nr^4+60\,bd^2nr^3+325\,bd^2nr^2\right.}{}$$

input
```
integrate(x^4*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/25*(5*(4*b*d^2*r^4 + 60*b*d^2*r^3 + 325*b*d^2*r^2 + 750*b*d^2*r + 625*b*
d^2)*x^5*log(c) + 5*(4*b*d^2*n*r^4 + 60*b*d^2*n*r^3 + 325*b*d^2*n*r^2 + 75
0*b*d^2*n*r + 625*b*d^2*n)*x^5*log(x) - (4*(b*d^2*n - 5*a*d^2)*r^4 + 625*b
*d^2*n + 60*(b*d^2*n - 5*a*d^2)*r^3 - 3125*a*d^2 + 325*(b*d^2*n - 5*a*d^2)
*r^2 + 750*(b*d^2*n - 5*a*d^2)*r)*x^5 + 25*((2*b*e^2*r^3 + 25*b*e^2*r^2 +
100*b*e^2*r + 125*b*e^2)*x^5*log(c) + (2*b*e^2*n*r^3 + 25*b*e^2*n*r^2 + 10
0*b*e^2*n*r + 125*b*e^2*n)*x^5*log(x) + (2*a*e^2*r^3 - 25*b*e^2*n + 125*a*
e^2 - (b*e^2*n - 25*a*e^2)*r^2 - 10*(b*e^2*n - 10*a*e^2)*r)*x^5)*x^(2*r) +
 50*((4*b*d*e*r^3 + 40*b*d*e*r^2 + 125*b*d*e*r + 125*b*d*e)*x^5*log(c) + (
4*b*d*e*n*r^3 + 40*b*d*e*n*r^2 + 125*b*d*e*n*r + 125*b*d*e*n)*x^5*log(x) +
 (4*a*d*e*r^3 - 25*b*d*e*n + 125*a*d*e - 4*(b*d*e*n - 10*a*d*e)*r^2 - 5*(4
*b*d*e*n - 25*a*d*e)*r)*x^5)*x^r)/(4*r^4 + 60*r^3 + 325*r^2 + 750*r + 625)
```

Sympy [F(-1)]

Timed out.

$$\int x^4(d+ex^r)^2(a+b\log(cx^n))\,dx = \text{Timed out}$$

input
```
integrate(x**4*(d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 152, normalized size of antiderivative = 1.45

$$\int x^4(d+ex^r)^2(a+b\log(cx^n))\,dx = -\frac{1}{25}bd^2nx^5 + \frac{1}{5}bd^2x^5\log(cx^n) + \frac{1}{5}ad^2x^5 + \frac{be^2x^{2r+5}\log(cx^n)}{2r+5} + \frac{2bdex^{r+5}\log(cx^n)}{r+5} - \frac{be^2nx^{2r+5}}{(2r+5)^2} + \frac{ae^2x^{2r+5}}{2r+5} - \frac{2bdenx^{r+5}}{(r+5)^2} + \frac{2adex^{r+5}}{r+5}$$

input
```
integrate(x^4*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/25*b*d^2*n*x^5 + 1/5*b*d^2*x^5*log(c*x^n) + 1/5*a*d^2*x^5 + b*e^2*x^(2*
r + 5)*log(c*x^n)/(2*r + 5) + 2*b*d*e*x^(r + 5)*log(c*x^n)/(r + 5) - b*e^2
*n*x^(2*r + 5)/(2*r + 5)^2 + a*e^2*x^(2*r + 5)/(2*r + 5) - 2*b*d*e*n*x^(r
+ 5)/(r + 5)^2 + 2*a*d*e*x^(r + 5)/(r + 5)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 746 vs. $2(101) = 202$.

Time = 0.16 (sec) , antiderivative size = 746, normalized size of antiderivative = 7.10

$$\int x^4(d+ex^r)^2\,(a+b\log{(cx^n)})\,\,dx = \text{Too large to display}$$

input
```
integrate(x^4*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/25*(50*b*e^2*n*r^3*x^5*x^(2*r)*log(x) + 200*b*d*e*n*r^3*x^5*x^r*log(x) +
 20*b*d^2*n*r^4*x^5*log(x) - 4*b*d^2*n*r^4*x^5 + 50*b*e^2*r^3*x^5*x^(2*r)*
log(c) + 200*b*d*e*r^3*x^5*x^r*log(c) + 20*b*d^2*r^4*x^5*log(c) + 625*b*e^
2*n*r^2*x^5*x^(2*r)*log(x) + 2000*b*d*e*n*r^2*x^5*x^r*log(x) + 300*b*d^2*n
*r^3*x^5*log(x) - 25*b*e^2*n*r^2*x^5*x^(2*r) + 50*a*e^2*r^3*x^5*x^(2*r) -
200*b*d*e*n*r^2*x^5*x^r + 200*a*d*e*r^3*x^5*x^r - 60*b*d^2*n*r^3*x^5 + 20*
a*d^2*r^4*x^5 + 625*b*e^2*r^2*x^5*x^(2*r)*log(c) + 2000*b*d*e*r^2*x^5*x^r*
log(c) + 300*b*d^2*r^3*x^5*log(c) + 2500*b*e^2*n*r*x^5*x^(2*r)*log(x) + 62
50*b*d*e*n*r*x^5*x^r*log(x) + 1625*b*d^2*n*r^2*x^5*log(x) - 250*b*e^2*n*r*
x^5*x^(2*r) + 625*a*e^2*r^2*x^5*x^(2*r) - 1000*b*d*e*n*r*x^5*x^r + 2000*a*
d*e*r^2*x^5*x^r - 325*b*d^2*n*r^2*x^5 + 300*a*d^2*r^3*x^5 + 2500*b*e^2*r*x
^5*x^(2*r)*log(c) + 6250*b*d*e*r*x^5*x^r*log(c) + 1625*b*d^2*r^2*x^5*log(c
) + 3125*b*e^2*n*x^5*x^(2*r)*log(x) + 6250*b*d*e*n*x^5*x^r*log(x) + 3750*b
*d^2*n*r*x^5*log(x) - 625*b*e^2*n*x^5*x^(2*r) + 2500*a*e^2*r*x^5*x^(2*r) -
 1250*b*d*e*n*x^5*x^r + 6250*a*d*e*r*x^5*x^r - 750*b*d^2*n*r*x^5 + 1625*a*
d^2*r^2*x^5 + 3125*b*e^2*x^5*x^(2*r)*log(c) + 6250*b*d*e*x^5*x^r*log(c) +
3750*b*d^2*r*x^5*log(c) + 3125*b*d^2*n*x^5*log(x) + 3125*a*e^2*x^5*x^(2*r)
 + 6250*a*d*e*x^5*x^r - 625*b*d^2*n*x^5 + 3750*a*d^2*r*x^5 + 3125*b*d^2*x^
5*log(c) + 3125*a*d^2*x^5)/(4*r^4 + 60*r^3 + 325*r^2 + 750*r + 625)
```

Mupad [F(-1)]

Timed out.

$$\int x^4(d+ex^r)^2\,(a+b\log{(cx^n)})\,\,dx = \int x^4\,(d+e\,x^r)^2\,(a+b\,\ln{(c\,x^n)})\,\,dx$$

input
```
int(x^4*(d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

output
```
int(x^4*(d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 481, normalized size of antiderivative = 4.58

$$\int x^4(d+ex^r)^2\,(a+b\log{(cx^n)})\,\,dx$$
$$= \frac{x^5(3125x^{2r}a\,e^2+20a\,d^2r^4+300a\,d^2r^3+1625a\,d^2r^2+3750a\,d^2r+3125\log(x^nc)\,b\,d^2-625b\,d^2n-4b\,d^2}{}$$

input
```
int(x^4*(d+e*x^r)^2*(a+b*log(c*x^n)),x)
```

output
```
(x**5*(50*x**(2*r)*log(x**n*c)*b*e**2*r**3 + 625*x**(2*r)*log(x**n*c)*b*e*
*2*r**2 + 2500*x**(2*r)*log(x**n*c)*b*e**2*r + 3125*x**(2*r)*log(x**n*c)*b
*e**2 + 50*x**(2*r)*a*e**2*r**3 + 625*x**(2*r)*a*e**2*r**2 + 2500*x**(2*r)
*a*e**2*r + 3125*x**(2*r)*a*e**2 - 25*x**(2*r)*b*e**2*n*r**2 - 250*x**(2*r
)*b*e**2*n*r - 625*x**(2*r)*b*e**2*n + 200*x**r*log(x**n*c)*b*d*e*r**3 + 2
000*x**r*log(x**n*c)*b*d*e*r**2 + 6250*x**r*log(x**n*c)*b*d*e*r + 6250*x**
r*log(x**n*c)*b*d*e + 200*x**r*a*d*e*r**3 + 2000*x**r*a*d*e*r**2 + 6250*x*
*r*a*d*e*r + 6250*x**r*a*d*e - 200*x**r*b*d*e*n*r**2 - 1000*x**r*b*d*e*n*r
 - 1250*x**r*b*d*e*n + 20*log(x**n*c)*b*d**2*r**4 + 300*log(x**n*c)*b*d**2
*r**3 + 1625*log(x**n*c)*b*d**2*r**2 + 3750*log(x**n*c)*b*d**2*r + 3125*lo
g(x**n*c)*b*d**2 + 20*a*d**2*r**4 + 300*a*d**2*r**3 + 1625*a*d**2*r**2 + 3
750*a*d**2*r + 3125*a*d**2 - 4*b*d**2*n*r**4 - 60*b*d**2*n*r**3 - 325*b*d*
*2*n*r**2 - 750*b*d**2*n*r - 625*b*d**2*n))/(25*(4*r**4 + 60*r**3 + 325*r*
*2 + 750*r + 625))
```

3.384 $\int x^2(d+ex^r)^2 (a+b\log(cx^n)) \, dx$

Optimal result . . . 2853
Mathematica [A] (verified) . . . 2853
Rubi [A] (verified) . . . 2854
Maple [B] (verified) . . . 2855
Fricas [B] (verification not implemented) . . . 2856
Sympy [A] (verification not implemented) . . . 2858
Maxima [A] (verification not implemented) . . . 2859
Giac [B] (verification not implemented) . . . 2860
Mupad [F(-1)] . . . 2860
Reduce [B] (verification not implemented) . . . 2861

Optimal result

Integrand size = 23, antiderivative size = 105

$$\int x^2(d+ex^r)^2 (a+b\log(cx^n)) \, dx = -\frac{1}{9}bd^2nx^3 - \frac{2bdenx^{3+r}}{(3+r)^2} - \frac{be^2nx^{3+2r}}{(3+2r)^2} + \frac{1}{3}\left(d^2x^3 + \frac{6dex^{3+r}}{3+r} + \frac{3e^2x^{3+2r}}{3+2r}\right)(a+b\log(cx^n))$$

output
```
-1/9*b*d^2*n*x^3-2*b*d*e*n*x^(3+r)/(3+r)^2-b*e^2*n*x^(3+2*r)/(3+2*r)^2+1/3
*(d^2*x^3+6*d*e*x^(3+r)/(3+r)+3*e^2*x^(3+2*r)/(3+2*r))*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.30 (sec) , antiderivative size = 124, normalized size of antiderivative = 1.18

$$\int x^2(d+ex^r)^2 (a+b\log(cx^n)) \, dx = \frac{1}{9}x^3\left(bn\left(-d^2 - \frac{18dex^r}{(3+r)^2} - \frac{9e^2x^{2r}}{(3+2r)^2}\right) + 3a\left(d^2 + \frac{6dex^r}{3+r} + \frac{3e^2x^{2r}}{3+2r}\right) + 3b\left(d^2 + \frac{6dex^r}{3+r} + \frac{3e^2x^{2r}}{3+2r}\right)\log(cx^n)\right)$$

input
```
Integrate[x^2*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^3*(b*n*(-d^2 - (18*d*e*x^r)/(3 + r)^2 - (9*e^2*x^(2*r))/(3 + 2*r)^2) +
3*a*(d^2 + (6*d*e*x^r)/(3 + r) + (3*e^2*x^(2*r))/(3 + 2*r)) + 3*b*(d^2 + (
6*d*e*x^r)/(3 + r) + (3*e^2*x^(2*r))/(3 + 2*r))*Log[c*x^n]))/9
```

Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 106, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2771, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2(d+ex^r)^2(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \; 2771$$

$$\frac{1}{3}\left(d^2x^3+\frac{6dex^{r+3}}{r+3}+\frac{3e^2x^{2r+3}}{2r+3}\right)(a+b\log(cx^n))-bn\int \frac{1}{3}x^2\left(\frac{6dex^r}{r+3}+\frac{3e^2x^{2r}}{2r+3}+d^2\right)dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{3}\left(d^2x^3+\frac{6dex^{r+3}}{r+3}+\frac{3e^2x^{2r+3}}{2r+3}\right)(a+b\log(cx^n))-\frac{1}{3}bn\int x^2\left(\frac{6dex^r}{r+3}+\frac{3e^2x^{2r}}{2r+3}+d^2\right)dx$$

$$\Big\downarrow \; 1691$$

$$\frac{1}{3}\left(d^2x^3+\frac{6dex^{r+3}}{r+3}+\frac{3e^2x^{2r+3}}{2r+3}\right)(a+b\log(cx^n))-\frac{1}{3}bn\int \left(\frac{3e^2x^{2(r+1)}}{2r+3}+\frac{6dex^{r+2}}{r+3}+d^2x^2\right)dx$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{3}\left(d^2x^3+\frac{6dex^{r+3}}{r+3}+\frac{3e^2x^{2r+3}}{2r+3}\right)(a+b\log(cx^n))-\frac{1}{3}bn\left(\frac{d^2x^3}{3}+\frac{6dex^{r+3}}{(r+3)^2}+\frac{3e^2x^{2r+3}}{(2r+3)^2}\right)$$

input
```
Int[x^2*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/3*(b*n*((d^2*x^3)/3 + (6*d*e*x^(3 + r))/(3 + r)^2 + (3*e^2*x^(3 + 2*r))
/(3 + 2*r)^2)) + ((d^2*x^3 + (6*d*e*x^(3 + r))/(3 + r) + (3*e^2*x^(3 + 2*r
))/(3 + 2*r))*(a + b*Log[c*x^n]))/3
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 580 vs. $2(101) = 202$.

Time = 3.29 (sec) , antiderivative size = 581, normalized size of antiderivative = 5.53

method	result
parallelrisch	$-\frac{-243x^3 b\ln(c\,x^n)d^2-243d^2 a\,x^3-486x^3 de\,x^r a-12x^3 a\,d^2 r^4-108x^3 a\,d^2 r^3-351x^3 a\,d^2 r^2-486x^3 a\,d^2 r-243x^3 e^2 x^{2r} a+4x^3 b}{}$
risch	Expression too large to display

input
```
int(x^2*(d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/9*(-243*x^3*b*ln(c*x^n)*d^2-243*x^3*e^2*(x^r)^2*a-243*d^2*a*x^3-486*x^3
*d*e*x^r*a-12*x^3*a*d^2*r^4-108*x^3*a*d^2*r^3-351*x^3*a*d^2*r^2-486*x^3*a*
d^2*r-243*x^3*(x^r)^2*ln(c*x^n)*b*e^2+4*x^3*b*d^2*n*r^4+72*x^3*x^r*b*d*e*n
*r^2+216*x^3*x^r*b*d*e*n*r+9*x^3*(x^r)^2*b*e^2*n*r^2+54*x^3*(x^r)^2*b*e^2*
n*r-72*x^3*x^r*a*d*e*r^3-432*x^3*x^r*a*d*e*r^2-810*x^3*x^r*a*d*e*r+162*x^3
*x^r*b*d*e*n-18*x^3*(x^r)^2*ln(c*x^n)*b*e^2*r^3-135*x^3*(x^r)^2*ln(c*x^n)*
b*e^2*r^2-324*x^3*(x^r)^2*ln(c*x^n)*b*e^2*r-486*x^3*x^r*ln(c*x^n)*b*d*e-72
*x^3*x^r*ln(c*x^n)*b*d*e*r^3-432*x^3*x^r*ln(c*x^n)*b*d*e*r^2-810*x^3*x^r*l
n(c*x^n)*b*d*e*r+36*x^3*b*d^2*n*r^3+117*x^3*b*d^2*n*r^2+162*x^3*b*d^2*n*r-
12*x^3*ln(c*x^n)*b*d^2*r^4-108*x^3*ln(c*x^n)*b*d^2*r^3-351*x^3*ln(c*x^n)*b
*d^2*r^2-486*x^3*ln(c*x^n)*b*d^2*r-18*x^3*(x^r)^2*a*e^2*r^3-135*x^3*(x^r)^
2*a*e^2*r^2-324*x^3*(x^r)^2*a*e^2*r+81*x^3*(x^r)^2*b*e^2*n+81*b*d^2*n*x^3)
/(3+2*r)^2/(3+r)^2
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 497 vs. $2(101) = 202$.

Time = 0.08 (sec) , antiderivative size = 497, normalized size of antiderivative = 4.73

$$\int x^2(d+ex^r)^2\,(a+b\log{(cx^n)})\;dx$$
$$= \frac{3\,(4\,bd^2r^4+36\,bd^2r^3+117\,bd^2r^2+162\,bd^2r+81\,bd^2)x^3\log{(c)}+3\,(4\,bd^2nr^4+36\,bd^2nr^3+117\,bd^2nr^2+}{}$$

input
```
integrate(x^2*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/9*(3*(4*b*d^2*r^4 + 36*b*d^2*r^3 + 117*b*d^2*r^2 + 162*b*d^2*r + 81*b*d^
2)*x^3*log(c) + 3*(4*b*d^2*n*r^4 + 36*b*d^2*n*r^3 + 117*b*d^2*n*r^2 + 162*
b*d^2*n*r + 81*b*d^2*n)*x^3*log(x) - (4*(b*d^2*n - 3*a*d^2)*r^4 + 81*b*d^2
*n + 36*(b*d^2*n - 3*a*d^2)*r^3 - 243*a*d^2 + 117*(b*d^2*n - 3*a*d^2)*r^2
+ 162*(b*d^2*n - 3*a*d^2)*r)*x^3 + 9*((2*b*e^2*r^3 + 15*b*e^2*r^2 + 36*b*e
^2*r + 27*b*e^2)*x^3*log(c) + (2*b*e^2*n*r^3 + 15*b*e^2*n*r^2 + 36*b*e^2*n
*r + 27*b*e^2*n)*x^3*log(x) + (2*a*e^2*r^3 - 9*b*e^2*n + 27*a*e^2 - (b*e^2
*n - 15*a*e^2)*r^2 - 6*(b*e^2*n - 6*a*e^2)*r)*x^3)*x^(2*r) + 18*((4*b*d*e*
r^3 + 24*b*d*e*r^2 + 45*b*d*e*r + 27*b*d*e)*x^3*log(c) + (4*b*d*e*n*r^3 +
24*b*d*e*n*r^2 + 45*b*d*e*n*r + 27*b*d*e*n)*x^3*log(x) + (4*a*d*e*r^3 - 9*
b*d*e*n + 27*a*d*e - 4*(b*d*e*n - 6*a*d*e)*r^2 - 3*(4*b*d*e*n - 15*a*d*e)*
r)*x^3)*x^r)/(4*r^4 + 36*r^3 + 117*r^2 + 162*r + 81)
```

Sympy [A] (verification not implemented)

Time = 81.51 (sec) , antiderivative size = 240, normalized size of antiderivative = 2.29

$$\int x^2(d+ex^r)^2\,(a+b\log{(cx^n)})\;dx$$

$$= \frac{ad^2x^3}{3} + 2ade\left(\begin{cases} \frac{x^3x^r}{r+3} & \text{for}\: r \neq -3 \\ x^3x^r\log{(x)} & \text{otherwise} \end{cases}\right) + ae^2\left(\begin{cases} \frac{x^3x^{2r}}{2r+3} & \text{for}\: r \neq -\frac{3}{2} \\ x^3x^{2r}\log{(x)} & \text{otherwise} \end{cases}\right) - \frac{bd^2nx^3}{9} + \frac{bd^2x^3\log{(cx^n)}}{3} - 2bden\left(\begin{cases} \frac{\begin{cases} \frac{x^{r+3}}{r+3} & \text{for}\: r \neq -3 \\ \log{(x)} & \text{otherwise} \end{cases}}{r+3} & \text{for}\: r > -\infty \wedge r < \infty \wedge r \neq -3 \\ \frac{\log{(x)}^2}{2} & \text{otherwise} \end{cases}\right) + 2bde\left(\begin{cases} \frac{x^{r+3}}{r+3} & \text{for}\: r \neq -3 \\ \log{(x)} & \text{otherwise} \end{cases}\right)\log{(cx^n)} - be^2n\left(\begin{cases} \frac{\begin{cases} \frac{x^{2r+3}}{2r+3} & \text{for}\: r \neq -\frac{3}{2} \\ \log{(x)} & \text{otherwise} \end{cases}}{2r+3} & \text{for}\: r > -\infty \wedge r < \infty \wedge r \neq -\frac{3}{2} \\ \frac{\log{(x)}^2}{2} & \text{otherwise} \end{cases}\right) + be^2\left(\begin{cases} \frac{x^{2r+3}}{2r+3} & \text{for}\: r \neq -\frac{3}{2} \\ \log{(x)} & \text{otherwise} \end{cases}\right)\log{(cx^n)}$$

input
```
integrate(x**2*(d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x**3/3 + 2*a*d*e*Piecewise((x**3*x**r/(r + 3), Ne(r, -3)), (x**3*x*
*r*log(x), True)) + a*e**2*Piecewise((x**3*x**(2*r)/(2*r + 3), Ne(r, -3/2)
), (x**3*x**(2*r)*log(x), True)) - b*d**2*n*x**3/9 + b*d**2*x**3*log(c*x**
n)/3 - 2*b*d*e*n*Piecewise((Piecewise((x**(r + 3)/(r + 3), Ne(r, -3)), (lo
g(x), True))/(r + 3), (r > -oo) & (r < oo) & Ne(r, -3)), (log(x)**2/2, Tru
e)) + 2*b*d*e*Piecewise((x**(r + 3)/(r + 3), Ne(r, -3)), (log(x), True))*l
og(c*x**n) - b*e**2*n*Piecewise((Piecewise((x**(2*r + 3)/(2*r + 3), Ne(r,
-3/2)), (log(x), True))/(2*r + 3), (r > -oo) & (r < oo) & Ne(r, -3/2)), (l
og(x)**2/2, True)) + b*e**2*Piecewise((x**(2*r + 3)/(2*r + 3), Ne(r, -3/2)
), (log(x), True))*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 152, normalized size of antiderivative = 1.45

$$\int x^2(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{9}\,bd^2nx^3+\frac{1}{3}\,bd^2x^3\log\left(cx^n\right)+\frac{1}{3}\,ad^2x^3+\frac{be^2x^{2\,r+3}\log\left(cx^n\right)}{2\,r+3}+\frac{2\,bdex^{r+3}\log\left(cx^n\right)}{r+3}-\frac{be^2nx^{2\,r+3}}{\left(2\,r+3\right)^2}+\frac{ae^2x^{2\,r+3}}{2\,r+3}-\frac{2\,bdenx^{r+3}}{\left(r+3\right)^2}+\frac{2\,adex^{r+3}}{r+3}$$

input
```
integrate(x^2*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/9*b*d^2*n*x^3 + 1/3*b*d^2*x^3*log(c*x^n) + 1/3*a*d^2*x^3 + b*e^2*x^(2*r
 + 3)*log(c*x^n)/(2*r + 3) + 2*b*d*e*x^(r + 3)*log(c*x^n)/(r + 3) - b*e^2*
n*x^(2*r + 3)/(2*r + 3)^2 + a*e^2*x^(2*r + 3)/(2*r + 3) - 2*b*d*e*n*x^(r +
 3)/(r + 3)^2 + 2*a*d*e*x^(r + 3)/(r + 3)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 746 vs. $2(101) = 202$.

Time = 0.14 (sec) , antiderivative size = 746, normalized size of antiderivative = 7.10

$$\int x^2(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\text{Too large to display}$$

input
```
integrate(x^2*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/9*(18*b*e^2*n*r^3*x^3*x^(2*r)*log(x) + 72*b*d*e*n*r^3*x^3*x^r*log(x) + 1
2*b*d^2*n*r^4*x^3*log(x) - 4*b*d^2*n*r^4*x^3 + 18*b*e^2*r^3*x^3*x^(2*r)*lo
g(c) + 72*b*d*e*r^3*x^3*x^r*log(c) + 12*b*d^2*r^4*x^3*log(c) + 135*b*e^2*n
*r^2*x^3*x^(2*r)*log(x) + 432*b*d*e*n*r^2*x^3*x^r*log(x) + 108*b*d^2*n*r^3
*x^3*log(x) - 9*b*e^2*n*r^2*x^3*x^(2*r) + 18*a*e^2*r^3*x^3*x^(2*r) - 72*b*
d*e*n*r^2*x^3*x^r + 72*a*d*e*r^3*x^3*x^r - 36*b*d^2*n*r^3*x^3 + 12*a*d^2*r
^4*x^3 + 135*b*e^2*r^2*x^3*x^(2*r)*log(c) + 432*b*d*e*r^2*x^3*x^r*log(c) +
 108*b*d^2*r^3*x^3*log(c) + 324*b*e^2*n*r*x^3*x^(2*r)*log(x) + 810*b*d*e*n
*r*x^3*x^r*log(x) + 351*b*d^2*n*r^2*x^3*log(x) - 54*b*e^2*n*r*x^3*x^(2*r)
+ 135*a*e^2*r^2*x^3*x^(2*r) - 216*b*d*e*n*r*x^3*x^r + 432*a*d*e*r^2*x^3*x^
r - 117*b*d^2*n*r^2*x^3 + 108*a*d^2*r^3*x^3 + 324*b*e^2*r*x^3*x^(2*r)*log(
c) + 810*b*d*e*r*x^3*x^r*log(c) + 351*b*d^2*r^2*x^3*log(c) + 243*b*e^2*n*x
^3*x^(2*r)*log(x) + 486*b*d*e*n*x^3*x^r*log(x) + 486*b*d^2*n*r*x^3*log(x)
- 81*b*e^2*n*x^3*x^(2*r) + 324*a*e^2*r*x^3*x^(2*r) - 162*b*d*e*n*x^3*x^r +
 810*a*d*e*r*x^3*x^r - 162*b*d^2*n*r*x^3 + 351*a*d^2*r^2*x^3 + 243*b*e^2*x
^3*x^(2*r)*log(c) + 486*b*d*e*x^3*x^r*log(c) + 486*b*d^2*r*x^3*log(c) + 24
3*b*d^2*n*x^3*log(x) + 243*a*e^2*x^3*x^(2*r) + 486*a*d*e*x^3*x^r - 81*b*d^
2*n*x^3 + 486*a*d^2*r*x^3 + 243*b*d^2*x^3*log(c) + 243*a*d^2*x^3)/(4*r^4 +
 36*r^3 + 117*r^2 + 162*r + 81)
```

Mupad [F(-1)]

Timed out.

$$\int x^2(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\int x^2\,{\left(d+e\,x^r\right)}^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x^2*(d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

output
```
int(x^2*(d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 481, normalized size of antiderivative = 4.58

$$\int x^2(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$= \frac{x^3(243x^{2r}a\,e^2+12a\,d^2r^4+108a\,d^2r^3+351a\,d^2r^2+486a\,d^2r+243\log(x^nc)\,b\,d^2-81b\,d^2n-4b\,d^2n\,r^4+}{}$$

input
```
int(x^2*(d+e*x^r)^2*(a+b*log(c*x^n)),x)
```

output
```
(x**3*(18*x**(2*r)*log(x**n*c)*b*e**2*r**3 + 135*x**(2*r)*log(x**n*c)*b*e*
*2*r**2 + 324*x**(2*r)*log(x**n*c)*b*e**2*r + 243*x**(2*r)*log(x**n*c)*b*e
**2 + 18*x**(2*r)*a*e**2*r**3 + 135*x**(2*r)*a*e**2*r**2 + 324*x**(2*r)*a*
e**2*r + 243*x**(2*r)*a*e**2 - 9*x**(2*r)*b*e**2*n*r**2 - 54*x**(2*r)*b*e*
*2*n*r - 81*x**(2*r)*b*e**2*n + 72*x**r*log(x**n*c)*b*d*e*r**3 + 432*x**r*
log(x**n*c)*b*d*e*r**2 + 810*x**r*log(x**n*c)*b*d*e*r + 486*x**r*log(x**n*
c)*b*d*e + 72*x**r*a*d*e*r**3 + 432*x**r*a*d*e*r**2 + 810*x**r*a*d*e*r + 4
86*x**r*a*d*e - 72*x**r*b*d*e*n*r**2 - 216*x**r*b*d*e*n*r - 162*x**r*b*d*e
*n + 12*log(x**n*c)*b*d**2*r**4 + 108*log(x**n*c)*b*d**2*r**3 + 351*log(x*
*n*c)*b*d**2*r**2 + 486*log(x**n*c)*b*d**2*r + 243*log(x**n*c)*b*d**2 + 12
*a*d**2*r**4 + 108*a*d**2*r**3 + 351*a*d**2*r**2 + 486*a*d**2*r + 243*a*d*
*2 - 4*b*d**2*n*r**4 - 36*b*d**2*n*r**3 - 117*b*d**2*n*r**2 - 162*b*d**2*n
*r - 81*b*d**2*n))/(9*(4*r**4 + 36*r**3 + 117*r**2 + 162*r + 81))
```

3.385 $\int (d+ex^r)^2 (a+b\log(cx^n))\,dx$

Optimal result . . . 2862
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Optimal result

Integrand size = 20, antiderivative size = 113

$$\int (d+ex^r)^2 (a+b\log(cx^n))\,dx = -bd^2nx - \frac{2bdenx^{1+r}}{(1+r)^2} - \frac{be^2nx^{1+2r}}{(1+2r)^2} + d^2x(a+b\log(cx^n)) + \frac{2dex^{1+r}(a+b\log(cx^n))}{1+r} + \frac{e^2x^{1+2r}(a+b\log(cx^n))}{1+2r}$$

output
```
-b*d^2*n*x-2*b*d*e*n*x^(1+r)/(1+r)^2-b*e^2*n*x^(1+2*r)/(1+2*r)^2+d^2*x*(a+
b*ln(c*x^n))+2*d*e*x^(1+r)*(a+b*ln(c*x^n))/(1+r)+e^2*x^(1+2*r)*(a+b*ln(c*x
^n))/(1+2*r)
```

Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 107, normalized size of antiderivative = 0.95

$$\int (d+ex^r)^2 (a+b\log(cx^n))\,dx = x\left(ad^2 - bd^2n - \frac{2bdenx^r}{(1+r)^2} - \frac{be^2nx^{2r}}{(1+2r)^2} + bd^2\log(cx^n) + \frac{2dex^r(a+b\log(cx^n))}{1+r} + \frac{e^2x^{2r}(a+b\log(cx^n))}{1+2r}\right)$$

input
```
Integrate[(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
x*(a*d^2 - b*d^2*n - (2*b*d*e*n*x^r)/(1 + r)^2 - (b*e^2*n*x^(2*r))/(1 + 2*
r)^2 + b*d^2*Log[c*x^n] + (2*d*e*x^r*(a + b*Log[c*x^n]))/(1 + r) + (e^2*x^
(2*r)*(a + b*Log[c*x^n]))/(1 + 2*r))
```

Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 110, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {2750, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex^r)^2 (a+b\log(cx^n)) \, dx$$

$$\Big\downarrow \text{2750}$$

$$-bn\int \left(\frac{2dex^r}{r+1}+\frac{e^2x^{2r}}{2r+1}+d^2\right)dx+d^2x(a+b\log(cx^n))+\frac{2dex^{r+1}(a+b\log(cx^n))}{r+1}+\frac{e^2x^{2r+1}(a+b\log(cx^n))}{2r+1}$$

$$\Big\downarrow \text{2009}$$

$$d^2x(a+b\log(cx^n))+\frac{2dex^{r+1}(a+b\log(cx^n))}{r+1}+\frac{e^2x^{2r+1}(a+b\log(cx^n))}{2r+1}-bn\left(d^2x+\frac{2dex^{r+1}}{(r+1)^2}+\frac{e^2x^{2r+1}}{(2r+1)^2}\right)$$

input
```
Int[(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*(d^2*x + (2*d*e*x^(1 + r))/(1 + r)^2 + (e^2*x^(1 + 2*r))/(1 + 2*r)^2
)) + d^2*x*(a + b*Log[c*x^n]) + (2*d*e*x^(1 + r)*(a + b*Log[c*x^n]))/(1 +
r) + (e^2*x^(1 + 2*r)*(a + b*Log[c*x^n]))/(1 + 2*r)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2750
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Simp[(a + b*Log[c*x^n])
  u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b,
 c, d, e, n, r}, x] && IGtQ[q, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 508 vs. $2(113) = 226$.

Time = 1.14 (sec) , antiderivative size = 509, normalized size of antiderivative = 4.50

method	result
parallelrisch	$-\frac{-4xa\,d^2r^4-12xa\,d^2r^3-13xa\,d^2r^2-6xa\,d^2r-x\ln(c\,x^n)b\,d^2-a\,d^2x-2xde\,x^r a-x\,e^2x^{2r}a-5x\,x^{2r}\ln(c\,x^n)b\,e^2r^2+x\,x^{2r}b\,e^2}{}$
risch	Expression too large to display

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-4*x*a*d^2*r^4-12*x*a*d^2*r^3-13*x*a*d^2*r^2-6*x*a*d^2*r-x*ln(c*x^n)*b*d
^2-a*d^2*x-x*e^2*(x^r)^2*a-2*x*d*e*x^r*a-8*x*x^r*ln(c*x^n)*b*d*e*r^3-16*x*
x^r*ln(c*x^n)*b*d*e*r^2+8*x*x^r*b*d*e*n*r^2-10*x*x^r*ln(c*x^n)*b*d*e*r+8*x
*x^r*b*d*e*n*r-x*(x^r)^2*ln(c*x^n)*b*e^2-2*x*(x^r)^2*a*e^2*r^3-4*x*ln(c*x^
n)*b*d^2*r^4+4*x*b*d^2*n*r^4-5*x*(x^r)^2*a*e^2*r^2-12*x*ln(c*x^n)*b*d^2*r^
3+12*x*b*d^2*n*r^3-4*x*(x^r)^2*a*e^2*r+x*(x^r)^2*b*e^2*n-13*x*ln(c*x^n)*b*
d^2*r^2+13*x*b*d^2*n*r^2-6*x*ln(c*x^n)*b*d^2*r+6*x*b*d^2*n*r-2*x*x^r*ln(c*
x^n)*b*d*e-5*x*(x^r)^2*ln(c*x^n)*b*e^2*r^2+x*(x^r)^2*b*e^2*n*r^2-4*x*(x^r)
^2*ln(c*x^n)*b*e^2*r+2*x*(x^r)^2*b*e^2*n*r-8*x*x^r*a*d*e*r^3-16*x*x^r*a*d*
e*r^2-10*x*x^r*a*d*e*r+2*x*x^r*b*d*e*n-2*x*(x^r)^2*ln(c*x^n)*b*e^2*r^3+b*d
^2*n*x)/(1+2*r)^2/(r^2+2*r+1)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 466 vs. $2(113) = 226$.

Time = 0.09 (sec) , antiderivative size = 466, normalized size of antiderivative = 4.12

$$\int (d + ex^r)^2 (a + b\log(cx^n))\, dx$$
$$= \frac{(4\,bd^2r^4 + 12\,bd^2r^3 + 13\,bd^2r^2 + 6\,bd^2r + bd^2)x\log(c) + (4\,bd^2nr^4 + 12\,bd^2nr^3 + 13\,bd^2nr^2 + 6\,bd^2nr + \dots}{}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((4*b*d^2*r^4 + 12*b*d^2*r^3 + 13*b*d^2*r^2 + 6*b*d^2*r + b*d^2)*x*log(c)
+ (4*b*d^2*n*r^4 + 12*b*d^2*n*r^3 + 13*b*d^2*n*r^2 + 6*b*d^2*n*r + b*d^2*n
)*x*log(x) - (4*(b*d^2*n - a*d^2)*r^4 + b*d^2*n + 12*(b*d^2*n - a*d^2)*r^3
 - a*d^2 + 13*(b*d^2*n - a*d^2)*r^2 + 6*(b*d^2*n - a*d^2)*r)*x + ((2*b*e^2
*r^3 + 5*b*e^2*r^2 + 4*b*e^2*r + b*e^2)*x*log(c) + (2*b*e^2*n*r^3 + 5*b*e^
2*n*r^2 + 4*b*e^2*n*r + b*e^2*n)*x*log(x) + (2*a*e^2*r^3 - b*e^2*n + a*e^2
 - (b*e^2*n - 5*a*e^2)*r^2 - 2*(b*e^2*n - 2*a*e^2)*r)*x)*x^(2*r) + 2*((4*b
*d*e*r^3 + 8*b*d*e*r^2 + 5*b*d*e*r + b*d*e)*x*log(c) + (4*b*d*e*n*r^3 + 8*
b*d*e*n*r^2 + 5*b*d*e*n*r + b*d*e*n)*x*log(x) + (4*a*d*e*r^3 - b*d*e*n + a
*d*e - 4*(b*d*e*n - 2*a*d*e)*r^2 - (4*b*d*e*n - 5*a*d*e)*r)*x)*x^r)/(4*r^4
 + 12*r^3 + 13*r^2 + 6*r + 1)
```

Sympy [A] (verification not implemented)

Time = 2.18 (sec) , antiderivative size = 211, normalized size of antiderivative = 1.87

$$\int (d+ex^r)^2 (a+b\log(cx^n))\,dx$$
$$= ad^2x + 2ade\left(\begin{cases}\frac{x^{r+1}}{r+1} & \text{for } r\neq -1\\ \log(x) & \text{otherwise}\end{cases}\right)$$
$$+ ae^2\left(\begin{cases}\frac{x^{2r+1}}{2r+1} & \text{for } r\neq -\frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}\right) - bd^2nx + bd^2x\log(cx^n)$$
$$- 2bden\left(\begin{cases}\frac{\begin{cases}\frac{x^{r+1}}{r+1} & \text{for } r\neq -1\\ \log(x) & \text{otherwise}\end{cases}}{r+1} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq -1\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ 2bde\left(\begin{cases}\frac{x^{r+1}}{r+1} & \text{for } r\neq -1\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$
$$- be^2n\left(\begin{cases}\frac{\begin{cases}\frac{x^{2r+1}}{2r+1} & \text{for } r\neq -\frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}}{2r+1} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq -\frac{1}{2}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ be^2\left(\begin{cases}\frac{x^{2r+1}}{2r+1} & \text{for } r\neq -\frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x + 2*a*d*e*Piecewise((x**(r + 1)/(r + 1), Ne(r, -1)), (log(x), Tru
e)) + a*e**2*Piecewise((x**(2*r + 1)/(2*r + 1), Ne(r, -1/2)), (log(x), Tru
e)) - b*d**2*n*x + b*d**2*x*log(c*x**n) - 2*b*d*e*n*Piecewise((Piecewise((
x**(r + 1)/(r + 1), Ne(r, -1)), (log(x), True))/(r + 1), (r > -oo) & (r <
oo) & Ne(r, -1)), (log(x)**2/2, True)) + 2*b*d*e*Piecewise((x**(r + 1)/(r
+ 1), Ne(r, -1)), (log(x), True))*log(c*x**n) - b*e**2*n*Piecewise((Piecew
ise((x**(2*r + 1)/(2*r + 1), Ne(r, -1/2)), (log(x), True))/(2*r + 1), (r >
 -oo) & (r < oo) & Ne(r, -1/2)), (log(x)**2/2, True)) + b*e**2*Piecewise((
x**(2*r + 1)/(2*r + 1), Ne(r, -1/2)), (log(x), True))*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.27

$$\int (d+ex^r)^2 (a+b\log(cx^n)) \, dx = -bd^2nx + bd^2x\log(cx^n) + ad^2x + \frac{be^2x^{2r+1}\log(cx^n)}{2r+1} + \frac{2bdex^{r+1}\log(cx^n)}{r+1} - \frac{be^2nx^{2r+1}}{(2r+1)^2} + \frac{ae^2x^{2r+1}}{2r+1} - \frac{2bdenx^{r+1}}{(r+1)^2} + \frac{2adex^{r+1}}{r+1}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-b*d^2*n*x + b*d^2*x*log(c*x^n) + a*d^2*x + b*e^2*x^(2*r + 1)*log(c*x^n)/(
2*r + 1) + 2*b*d*e*x^(r + 1)*log(c*x^n)/(r + 1) - b*e^2*n*x^(2*r + 1)/(2*r
 + 1)^2 + a*e^2*x^(2*r + 1)/(2*r + 1) - 2*b*d*e*n*x^(r + 1)/(r + 1)^2 + 2*
a*d*e*x^(r + 1)/(r + 1)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 244 vs. $2(113) = 226$.

Time = 0.12 (sec) , antiderivative size = 244, normalized size of antiderivative = 2.16

$$\int (d+ex^r)^2 (a+b\log(cx^n))\, dx = \frac{2\, be^2nrxx^{2\,r}\log(x)}{4\,r^2+4\,r+1} + \frac{2\, bdenrxx^r\log(x)}{r^2+2\,r+1} + bd^2nx\log(x) + \frac{be^2nxx^{2\,r}\log(x)}{4\,r^2+4\,r+1} + \frac{2\, bdenxx^r\log(x)}{r^2+2\,r+1} - bd^2nx - \frac{be^2nxx^{2\,r}}{4\,r^2+4\,r+1} - \frac{2\, bdenxx^r}{r^2+2\,r+1} + bd^2x\log(c) + \frac{be^2xx^{2\,r}\log(c)}{2\,r+1} + \frac{2\, bdexx^r\log(c)}{r+1} + ad^2x + \frac{ae^2xx^{2\,r}}{2\,r+1} + \frac{2\, adexx^r}{r+1}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
2*b*e^2*n*r*x*x^(2*r)*log(x)/(4*r^2 + 4*r + 1) + 2*b*d*e*n*r*x*x^r*log(x)/
(r^2 + 2*r + 1) + b*d^2*n*x*log(x) + b*e^2*n*x*x^(2*r)*log(x)/(4*r^2 + 4*r
 + 1) + 2*b*d*e*n*x*x^r*log(x)/(r^2 + 2*r + 1) - b*d^2*n*x - b*e^2*n*x*x^(
2*r)/(4*r^2 + 4*r + 1) - 2*b*d*e*n*x*x^r/(r^2 + 2*r + 1) + b*d^2*x*log(c)
+ b*e^2*x*x^(2*r)*log(c)/(2*r + 1) + 2*b*d*e*x*x^r*log(c)/(r + 1) + a*d^2*
x + a*e^2*x*x^(2*r)/(2*r + 1) + 2*a*d*e*x*x^r/(r + 1)
```

Mupad [F(-1)]

Timed out.

$$\int (d+ex^r)^2 (a+b\log(cx^n))\, dx = \int (d+e\,x^r)^2\, (a+b\,\ln(c\,x^n))\, dx$$

input
```
int((d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

output
```
int((d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 475, normalized size of antiderivative = 4.20

$$\int (d+ex^r)^2 (a+b\log(cx^n))\,dx$$
$$= \frac{x(x^{2r}a\,e^2 + 4a\,d^2r^4 + 12a\,d^2r^3 + 13a\,d^2r^2 + 6a\,d^2r + \log(x^n c)\,b\,d^2 - b\,d^2n - 4b\,d^2n\,r^4 + x^{2r}\log(x^n c)\,b\,e^2}{}$$

input
```
int((d+e*x^r)^2*(a+b*log(c*x^n)),x)
```

output
```
(x*(2*x**(2*r)*log(x**n*c)*b*e**2*r**3 + 5*x**(2*r)*log(x**n*c)*b*e**2*r**
2 + 4*x**(2*r)*log(x**n*c)*b*e**2*r + x**(2*r)*log(x**n*c)*b*e**2 + 2*x**(
2*r)*a*e**2*r**3 + 5*x**(2*r)*a*e**2*r**2 + 4*x**(2*r)*a*e**2*r + x**(2*r)
*a*e**2 - x**(2*r)*b*e**2*n*r**2 - 2*x**(2*r)*b*e**2*n*r - x**(2*r)*b*e**2
*n + 8*x**r*log(x**n*c)*b*d*e*r**3 + 16*x**r*log(x**n*c)*b*d*e*r**2 + 10*x
**r*log(x**n*c)*b*d*e*r + 2*x**r*log(x**n*c)*b*d*e + 8*x**r*a*d*e*r**3 + 1
6*x**r*a*d*e*r**2 + 10*x**r*a*d*e*r + 2*x**r*a*d*e - 8*x**r*b*d*e*n*r**2 -
 8*x**r*b*d*e*n*r - 2*x**r*b*d*e*n + 4*log(x**n*c)*b*d**2*r**4 + 12*log(x*
*n*c)*b*d**2*r**3 + 13*log(x**n*c)*b*d**2*r**2 + 6*log(x**n*c)*b*d**2*r +
log(x**n*c)*b*d**2 + 4*a*d**2*r**4 + 12*a*d**2*r**3 + 13*a*d**2*r**2 + 6*a
*d**2*r + a*d**2 - 4*b*d**2*n*r**4 - 12*b*d**2*n*r**3 - 13*b*d**2*n*r**2 -
 6*b*d**2*n*r - b*d**2*n))/(4*r**4 + 12*r**3 + 13*r**2 + 6*r + 1)
```

3.386 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^2}\,dx$

Optimal result 2870
Mathematica [A] (verified) 2870
Rubi [A] (verified) 2871
Maple [B] (verified) 2873
Fricas [B] (verification not implemented) 2873
Sympy [A] (verification not implemented) 2874
Maxima [F(-2)] 2875
Giac [F] 2875
Mupad [F(-1)] 2876
Reduce [B] (verification not implemented) 2876

Optimal result

Integrand size = 23, antiderivative size = 123

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^2}\,dx = -\frac{bd^2n}{x} - \frac{2bdenx^{-1+r}}{(1-r)^2} - \frac{be^2nx^{-1+2r}}{(1-2r)^2} - \frac{d^2(a+b\log(cx^n))}{x} - \frac{2dex^{-1+r}(a+b\log(cx^n))}{1-r} - \frac{e^2x^{-1+2r}(a+b\log(cx^n))}{1-2r}$$

output
```
-b*d^2*n/x-2*b*d*e*n*x^(-1+r)/(1-r)^2-b*e^2*n*x^(-1+2*r)/(1-2*r)^2-d^2*(a+
b*ln(c*x^n))/x-2*d*e*x^(-1+r)*(a+b*ln(c*x^n))/(1-r)-e^2*x^(-1+2*r)*(a+b*ln
(c*x^n))/(1-2*r)
```

Mathematica [A] (verified)

Time = 0.35 (sec) , antiderivative size = 121, normalized size of antiderivative = 0.98

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^2}\,dx = \frac{bn\left(-d^2-\frac{2dex^r}{(-1+r)^2}-\frac{e^2x^{2r}}{(1-2r)^2}\right)+a\left(-d^2+\frac{2dex^r}{-1+r}+\frac{e^2x^{2r}}{-1+2r}\right)+b\left(-d^2+\frac{2dex^r}{-1+r}+\frac{e^2x^{2r}}{-1+2r}\right)\log(cx^n)}{x}$$

input
```
Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
(b*n*(-d^2 - (2*d*e*x^r)/(-1 + r)^2 - (e^2*x^(2*r))/(1 - 2*r)^2) + a*(-d^2
 + (2*d*e*x^r)/(-1 + r) + (e^2*x^(2*r))/(-1 + 2*r)) + b*(-d^2 + (2*d*e*x^r
)/(-1 + r) + (e^2*x^(2*r))/(-1 + 2*r))*Log[c*x^n])/x
```

Rubi [A] (verified)

Time = 0.46 (sec) , antiderivative size = 121, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 25, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^2}\,dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{\frac{2dex^r}{1-r}+\frac{e^2x^{2r}}{1-2r}+d^2}{x^2}dx-\frac{d^2(a+b\log(cx^n))}{x}-\frac{2dex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{e^2x^{2r-1}(a+b\log(cx^n))}{1-2r}$$

$$\Big\downarrow \text{25}$$

$$bn\int \frac{\frac{2dex^r}{1-r}+\frac{e^2x^{2r}}{1-2r}+d^2}{x^2}dx-\frac{d^2(a+b\log(cx^n))}{x}-\frac{2dex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{e^2x^{2r-1}(a+b\log(cx^n))}{1-2r}$$

$$\Big\downarrow \text{1691}$$

$$bn\int \left(-\frac{2dex^{r-2}}{r-1}+\frac{e^2x^{2(r-1)}}{1-2r}+\frac{d^2}{x^2}\right)dx-\frac{d^2(a+b\log(cx^n))}{x}-\frac{2dex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{e^2x^{2r-1}(a+b\log(cx^n))}{1-2r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{x}-\frac{2dex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{e^2x^{2r-1}(a+b\log(cx^n))}{1-2r}+bn\left(-\frac{d^2}{x}-\frac{2dex^{r-1}}{(1-r)^2}-\frac{e^2x^{2r-1}}{(1-2r)^2}\right)$$

input
```
Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
b*n*(-(d^2/x) - (2*d*e*x^(-1 + r))/(1 - r)^2 - (e^2*x^(-1 + 2*r))/(1 - 2*r
)^2) - (d^2*(a + b*Log[c*x^n]))/x - (2*d*e*x^(-1 + r)*(a + b*Log[c*x^n]))/
(1 - r) - (e^2*x^(-1 + 2*r)*(a + b*Log[c*x^n]))/(1 - 2*r)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 470 vs. 2(123) = 246.

Time = 1.15 (sec) , antiderivative size = 471, normalized size of antiderivative = 3.83

method	result
parallelrisch	$-\frac{13a\,d^2r^2-6a\,d^2r+b\,e^2n\,r^2x^{2r}-2b\,e^2nr\,x^{2r}-2x^{2r}\ln(c\,x^n)b\,e^2r^3+5x^{2r}\ln(c\,x^n)b\,e^2r^2-4x^{2r}\ln(c\,x^n)b\,e^2r+b\ln(c\,x^n)d^2+2}{}$
risch	Expression too large to display

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

output
```
-1/x*(13*a*d^2*r^2-6*a*d^2*r+b*ln(c*x^n)*d^2+e^2*(x^r)^2*a+e^2*(x^r)^2*b*l
n(c*x^n)+2*d*e*x^r*a+b*d^2*n+a*d^2+2*d*e*x^r*b*ln(c*x^n)+4*ln(c*x^n)*b*d^2
*r^4-12*ln(c*x^n)*b*d^2*r^3+13*ln(c*x^n)*b*d^2*r^2-6*ln(c*x^n)*b*d^2*r+b*e
^2*n*r^2*(x^r)^2-8*a*d*e*r^3*x^r+16*a*d*e*r^2*x^r+4*b*d^2*n*r^4-12*b*d^2*n
*r^3-2*a*e^2*r^3*(x^r)^2+5*a*e^2*r^2*(x^r)^2-4*a*e^2*r*(x^r)^2+b*e^2*n*(x^
r)^2-10*a*d*e*r*x^r-2*b*e^2*n*r*(x^r)^2+2*b*d*e*n*x^r+13*b*d^2*n*r^2-6*b*d
^2*n*r-2*(x^r)^2*ln(c*x^n)*b*e^2*r^3+5*(x^r)^2*ln(c*x^n)*b*e^2*r^2-4*(x^r)
^2*ln(c*x^n)*b*e^2*r-8*x^r*ln(c*x^n)*b*d*e*r^3+16*x^r*ln(c*x^n)*b*d*e*r^2-
10*x^r*ln(c*x^n)*b*d*e*r+8*b*d*e*n*r^2*x^r+4*a*d^2*r^4-8*b*d*e*n*r*x^r-12*
a*d^2*r^3)/(-1+2*r)^2/(r^2-2*r+1)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 455 vs. 2(118) = 236.

Time = 0.09 (sec) , antiderivative size = 455, normalized size of antiderivative = 3.70

$$\int \frac{(d+ex^r)^2\,(a+b\log{(cx^n)})}{x^2}\,dx =$$
$$-\frac{4\,(bd^2n+ad^2)r^4+bd^2n-12\,(bd^2n+ad^2)r^3+ad^2+13\,(bd^2n+ad^2)r^2-6\,(bd^2n+ad^2)r-(2\,ae^2r^3}{}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
-(4*(b*d^2*n + a*d^2)*r^4 + b*d^2*n - 12*(b*d^2*n + a*d^2)*r^3 + a*d^2 + 1
3*(b*d^2*n + a*d^2)*r^2 - 6*(b*d^2*n + a*d^2)*r - (2*a*e^2*r^3 - b*e^2*n -
 a*e^2 - (b*e^2*n + 5*a*e^2)*r^2 + 2*(b*e^2*n + 2*a*e^2)*r + (2*b*e^2*r^3
- 5*b*e^2*r^2 + 4*b*e^2*r - b*e^2)*log(c) + (2*b*e^2*n*r^3 - 5*b*e^2*n*r^2
 + 4*b*e^2*n*r - b*e^2*n)*log(x))*x^(2*r) - 2*(4*a*d*e*r^3 - b*d*e*n - a*d
*e - 4*(b*d*e*n + 2*a*d*e)*r^2 + (4*b*d*e*n + 5*a*d*e)*r + (4*b*d*e*r^3 -
8*b*d*e*r^2 + 5*b*d*e*r - b*d*e)*log(c) + (4*b*d*e*n*r^3 - 8*b*d*e*n*r^2 +
 5*b*d*e*n*r - b*d*e*n)*log(x))*x^r + (4*b*d^2*r^4 - 12*b*d^2*r^3 + 13*b*d
^2*r^2 - 6*b*d^2*r + b*d^2)*log(c) + (4*b*d^2*n*r^4 - 12*b*d^2*n*r^3 + 13*
b*d^2*n*r^2 - 6*b*d^2*n*r + b*d^2*n)*log(x))/((4*r^4 - 12*r^3 + 13*r^2 - 6
*r + 1)*x)
```

Sympy [A] (verification not implemented)

Time = 3.43 (sec) , antiderivative size = 209, normalized size of antiderivative = 1.70

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^2}\,dx$$
$$= -\frac{ad^2}{x} + 2ade\left(\begin{cases}\frac{x^r}{rx-x} & \text{for } r\neq 1\\ \frac{x^r\log(x)}{x} & \text{otherwise}\end{cases}\right) + ae^2\left(\begin{cases}\frac{x^{2r}}{2rx-x} & \text{for } r\neq \frac{1}{2}\\ \frac{x^{2r}\log(x)}{x} & \text{otherwise}\end{cases}\right) - \frac{bd^2n}{x}$$
$$- \frac{bd^2\log(cx^n)}{x} - 2bden\left(\begin{cases}\frac{\begin{cases}\frac{x^{r-1}}{r-1} & \text{for } r\neq 1\\ \log(x) & \text{otherwise}\end{cases}}{r-1} & \text{for } r>-\infty \wedge r<\infty \wedge r\neq 1\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ 2bde\left(\begin{cases}\frac{x^{r-1}}{r-1} & \text{for } r\neq 1\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$
$$- be^2n\left(\begin{cases}\frac{\begin{cases}\frac{x^{2r-1}}{2r-1} & \text{for } r\neq \frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}}{2r-1} & \text{for } r>-\infty \wedge r<\infty \wedge r\neq \frac{1}{2}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ be^2\left(\begin{cases}\frac{x^{2r-1}}{2r-1} & \text{for } r\neq \frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x**2,x)
```

output
```
-a*d**2/x + 2*a*d*e*Piecewise((x**r/(r*x - x), Ne(r, 1)), (x**r*log(x)/x,
True)) + a*e**2*Piecewise((x**(2*r)/(2*r*x - x), Ne(r, 1/2)), (x**(2*r)*lo
g(x)/x, True)) - b*d**2*n/x - b*d**2*log(c*x**n)/x - 2*b*d*e*n*Piecewise((
Piecewise((x**(r - 1)/(r - 1), Ne(r, 1)), (log(x), True))/(r - 1), (r > -o
o) & (r < oo) & Ne(r, 1)), (log(x)**2/2, True)) + 2*b*d*e*Piecewise((x**(r
 - 1)/(r - 1), Ne(r, 1)), (log(x), True))*log(c*x**n) - b*e**2*n*Piecewise
((Piecewise((x**(2*r - 1)/(2*r - 1), Ne(r, 1/2)), (log(x), True))/(2*r - 1
), (r > -oo) & (r < oo) & Ne(r, 1/2)), (log(x)**2/2, True)) + b*e**2*Piece
wise((x**(2*r - 1)/(2*r - 1), Ne(r, 1/2)), (log(x), True))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-2>0)', see `assume?` for more
details)Is
```

Giac [F]

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^2}\,dx = \int \frac{(ex^r+d)^2(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(b*log(c*x^n) + a)/x^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^2}\,dx = \int \frac{(d+e\,x^r)^2 \left(a+b\,\ln\left(c\,x^n\right)\right)}{x^2}\,dx$$

input
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^2,x)
```

output
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^2, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 481, normalized size of antiderivative = 3.91

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^2}\,dx = \frac{-x^{2r} a\,e^2 - 4a\,d^2r^4 + 12a\,d^2r^3 - 13a\,d^2r^2 + 6a\,d^2r - \log(x^n c)\,b\,d^2 - b\,d^2n - 4b\,d^2n\,r^4 - x^{2r}\log(x^n c)\,b\,e^2}{}$$

input
```
int((d+e*x^r)^2*(a+b*log(c*x^n))/x^2,x)
```

output
```
(2*x**(2*r)*log(x**n*c)*b*e**2*r**3 - 5*x**(2*r)*log(x**n*c)*b*e**2*r**2 +
 4*x**(2*r)*log(x**n*c)*b*e**2*r - x**(2*r)*log(x**n*c)*b*e**2 + 2*x**(2*r
)*a*e**2*r**3 - 5*x**(2*r)*a*e**2*r**2 + 4*x**(2*r)*a*e**2*r - x**(2*r)*a*
e**2 - x**(2*r)*b*e**2*n*r**2 + 2*x**(2*r)*b*e**2*n*r - x**(2*r)*b*e**2*n
+ 8*x**r*log(x**n*c)*b*d*e*r**3 - 16*x**r*log(x**n*c)*b*d*e*r**2 + 10*x**r
*log(x**n*c)*b*d*e*r - 2*x**r*log(x**n*c)*b*d*e + 8*x**r*a*d*e*r**3 - 16*x
**r*a*d*e*r**2 + 10*x**r*a*d*e*r - 2*x**r*a*d*e - 8*x**r*b*d*e*n*r**2 + 8*
x**r*b*d*e*n*r - 2*x**r*b*d*e*n - 4*log(x**n*c)*b*d**2*r**4 + 12*log(x**n*
c)*b*d**2*r**3 - 13*log(x**n*c)*b*d**2*r**2 + 6*log(x**n*c)*b*d**2*r - log
(x**n*c)*b*d**2 - 4*a*d**2*r**4 + 12*a*d**2*r**3 - 13*a*d**2*r**2 + 6*a*d*
*2*r - a*d**2 - 4*b*d**2*n*r**4 + 12*b*d**2*n*r**3 - 13*b*d**2*n*r**2 + 6*
b*d**2*n*r - b*d**2*n)/(x*(4*r**4 - 12*r**3 + 13*r**2 - 6*r + 1))
```

3.387 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^4}\,dx$

Optimal result 2877
Mathematica [A] (verified) 2877
Rubi [A] (verified) 2878
Maple [B] (verified) 2880
Fricas [B] (verification not implemented) 2880
Sympy [A] (verification not implemented) 2881
Maxima [F(-2)] 2882
Giac [F] 2882
Mupad [F(-1)] 2883
Reduce [B] (verification not implemented) 2883

Optimal result

Integrand size = 23, antiderivative size = 127

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^4}\,dx = -\frac{bd^2n}{9x^3}-\frac{2bdenx^{-3+r}}{(3-r)^2}-\frac{be^2nx^{-3+2r}}{(3-2r)^2} -\frac{d^2(a+b\log(cx^n))}{3x^3}-\frac{2dex^{-3+r}(a+b\log(cx^n))}{3-r} -\frac{e^2x^{-3+2r}(a+b\log(cx^n))}{3-2r}$$

output
```
-1/9*b*d^2*n/x^3-2*b*d*e*n*x^(-3+r)/(3-r)^2-b*e^2*n*x^(-3+2*r)/(3-2*r)^2-1
/3*d^2*(a+b*ln(c*x^n))/x^3-2*d*e*x^(-3+r)*(a+b*ln(c*x^n))/(3-r)-e^2*x^(-3+
2*r)*(a+b*ln(c*x^n))/(3-2*r)
```

Mathematica [A] (verified)

Time = 0.35 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^4}\,dx = \frac{bn\left(-d^2-\frac{18dex^r}{(-3+r)^2}-\frac{9e^2x^{2r}}{(3-2r)^2}\right)+a\left(-3d^2+\frac{18dex^r}{-3+r}+\frac{9e^2x^{2r}}{-3+2r}\right)+3b\left(-d^2+\frac{6dex^r}{-3+r}+\frac{3e^2x^{2r}}{-3+2r}\right)\log(cx^n)}{9x^3}$$

input
```
Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(b*n*(-d^2 - (18*d*e*x^r)/(-3 + r)^2 - (9*e^2*x^(2*r))/(3 - 2*r)^2) + a*(-
3*d^2 + (18*d*e*x^r)/(-3 + r) + (9*e^2*x^(2*r))/(-3 + 2*r)) + 3*b*(-d^2 +
(6*d*e*x^r)/(-3 + r) + (3*e^2*x^(2*r))/(-3 + 2*r))*Log[c*x^n])/(9*x^3)
```

Rubi [A] (verified)

Time = 0.47 (sec) , antiderivative size = 128, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^4}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{\frac{6dex^r}{3-r}+\frac{3e^2x^{2r}}{3-2r}+d^2}{3x^4}dx-\frac{d^2(a+b\log(cx^n))}{3x^3}-\frac{2dex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{e^2x^{2r-3}(a+b\log(cx^n))}{3-2r}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{3}bn\int \frac{\frac{6dex^r}{3-r}+\frac{3e^2x^{2r}}{3-2r}+d^2}{x^4}dx-\frac{d^2(a+b\log(cx^n))}{3x^3}-\frac{2dex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{e^2x^{2r-3}(a+b\log(cx^n))}{3-2r}$$

$$\Big\downarrow \text{1691}$$

$$\frac{1}{3}bn\int \left(-\frac{6dex^{r-4}}{r-3}+\frac{3e^2x^{2(r-2)}}{3-2r}+\frac{d^2}{x^4}\right)dx-\frac{d^2(a+b\log(cx^n))}{3x^3}-\frac{2dex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{e^2x^{2r-3}(a+b\log(cx^n))}{3-2r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{3x^3}-\frac{2dex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{e^2x^{2r-3}(a+b\log(cx^n))}{3-2r}+\frac{1}{3}bn\left(-\frac{d^2}{3x^3}-\frac{6dex^{r-3}}{(3-r)^2}-\frac{3e^2x^{2r-3}}{(3-2r)^2}\right)$$

input
```
Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(b*n*(-1/3*d^2/x^3 - (6*d*e*x^(-3 + r))/(3 - r)^2 - (3*e^2*x^(-3 + 2*r))/(
3 - 2*r)^2))/3 - (d^2*(a + b*Log[c*x^n]))/(3*x^3) - (2*d*e*x^(-3 + r)*(a +
 b*Log[c*x^n]))/(3 - r) - (e^2*x^(-3 + 2*r)*(a + b*Log[c*x^n]))/(3 - 2*r)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 477 vs. $2(123) = 246$.

Time = 1.17 (sec) , antiderivative size = 478, normalized size of antiderivative = 3.76

method	result
parallelrisch	$-\frac{351a\,d^2r^2-486a\,d^2r+9b\,e^2n\,r^2x^{2r}-54b\,e^2nr\,x^{2r}-18x^{2r}\ln(c\,x^n)b\,e^2r^3+135x^{2r}\ln(c\,x^n)b\,e^2r^2-324x^{2r}\ln(c\,x^n)b\,e^2r+243}{}$
risch	Expression too large to display

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/9/x^3*(351*a*d^2*r^2-486*a*d^2*r+243*b*ln(c*x^n)*d^2+243*e^2*(x^r)^2*a+
243*e^2*(x^r)^2*b*ln(c*x^n)+486*d*e*x^r*a+81*b*d^2*n+243*a*d^2+486*d*e*x^r
*b*ln(c*x^n)+12*ln(c*x^n)*b*d^2*r^4-108*ln(c*x^n)*b*d^2*r^3+351*ln(c*x^n)*
b*d^2*r^2-486*ln(c*x^n)*b*d^2*r+9*b*e^2*n*r^2*(x^r)^2-72*a*d*e*r^3*x^r+432
*a*d*e*r^2*x^r+4*b*d^2*n*r^4-36*b*d^2*n*r^3-18*a*e^2*r^3*(x^r)^2+135*a*e^2
*r^2*(x^r)^2-324*a*e^2*r*(x^r)^2+81*b*e^2*n*(x^r)^2-810*a*d*e*r*x^r-54*b*e
^2*n*r*(x^r)^2+162*b*d*e*n*x^r+117*b*d^2*n*r^2-162*b*d^2*n*r-18*(x^r)^2*ln
(c*x^n)*b*e^2*r^3+135*(x^r)^2*ln(c*x^n)*b*e^2*r^2-324*(x^r)^2*ln(c*x^n)*b*
e^2*r-72*x^r*ln(c*x^n)*b*d*e*r^3+432*x^r*ln(c*x^n)*b*d*e*r^2-810*x^r*ln(c*
x^n)*b*d*e*r+72*b*d*e*n*r^2*x^r+12*a*d^2*r^4-216*b*d*e*n*r*x^r-108*a*d^2*r
^3)/(-3+2*r)^2/(r^2-6*r+9)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 466 vs. $2(118) = 236$.

Time = 0.08 (sec) , antiderivative size = 466, normalized size of antiderivative = 3.67

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^4}\,dx =$$
$$-\frac{4\,(bd^2n+3\,ad^2)r^4+81\,bd^2n-36\,(bd^2n+3\,ad^2)r^3+243\,ad^2+117\,(bd^2n+3\,ad^2)r^2-162\,(bd^2n+3}{}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
-1/9*(4*(b*d^2*n + 3*a*d^2)*r^4 + 81*b*d^2*n - 36*(b*d^2*n + 3*a*d^2)*r^3
+ 243*a*d^2 + 117*(b*d^2*n + 3*a*d^2)*r^2 - 162*(b*d^2*n + 3*a*d^2)*r - 9*
(2*a*e^2*r^3 - 9*b*e^2*n - 27*a*e^2 - (b*e^2*n + 15*a*e^2)*r^2 + 6*(b*e^2*
n + 6*a*e^2)*r + (2*b*e^2*r^3 - 15*b*e^2*r^2 + 36*b*e^2*r - 27*b*e^2)*log(
c) + (2*b*e^2*n*r^3 - 15*b*e^2*n*r^2 + 36*b*e^2*n*r - 27*b*e^2*n)*log(x))*
x^(2*r) - 18*(4*a*d*e*r^3 - 9*b*d*e*n - 27*a*d*e - 4*(b*d*e*n + 6*a*d*e)*r
^2 + 3*(4*b*d*e*n + 15*a*d*e)*r + (4*b*d*e*r^3 - 24*b*d*e*r^2 + 45*b*d*e*r
 - 27*b*d*e)*log(c) + (4*b*d*e*n*r^3 - 24*b*d*e*n*r^2 + 45*b*d*e*n*r - 27*
b*d*e*n)*log(x))*x^r + 3*(4*b*d^2*r^4 - 36*b*d^2*r^3 + 117*b*d^2*r^2 - 162
*b*d^2*r + 81*b*d^2)*log(c) + 3*(4*b*d^2*n*r^4 - 36*b*d^2*n*r^3 + 117*b*d^
2*n*r^2 - 162*b*d^2*n*r + 81*b*d^2*n)*log(x))/((4*r^4 - 36*r^3 + 117*r^2 -
 162*r + 81)*x^3)
```

Sympy [A] (verification not implemented)

Time = 18.95 (sec) , antiderivative size = 233, normalized size of antiderivative = 1.83

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^4}\,dx$$

$$= -\frac{ad^2}{3x^3} + 2ade\left(\begin{cases}\frac{x^r}{rx^3-3x^3} & \text{for } r\neq 3\\ \frac{x^r\log(x)}{x^3} & \text{otherwise}\end{cases}\right) + ae^2\left(\begin{cases}\frac{x^{2r}}{2rx^3-3x^3} & \text{for } r\neq \frac{3}{2}\\ \frac{x^{2r}\log(x)}{x^3} & \text{otherwise}\end{cases}\right) - \frac{bd^2n}{9x^3}$$

$$- \frac{bd^2\log(cx^n)}{3x^3} - 2bden\left(\begin{cases}\frac{\begin{cases}\frac{x^{r-3}}{r-3} & \text{for } r\neq 3\\ \log(x) & \text{otherwise}\end{cases}}{r-3} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq 3\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$

$$+ 2bde\left(\begin{cases}\frac{x^{r-3}}{r-3} & \text{for } r\neq 3\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$

$$- be^2n\left(\begin{cases}\frac{\begin{cases}\frac{x^{2r-3}}{2r-3} & \text{for } r\neq \frac{3}{2}\\ \log(x) & \text{otherwise}\end{cases}}{2r-3} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq \frac{3}{2}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$

$$+ be^2\left(\begin{cases}\frac{x^{2r-3}}{2r-3} & \text{for } r\neq \frac{3}{2}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x**4,x)
```

output
```
-a*d**2/(3*x**3) + 2*a*d*e*Piecewise((x**r/(r*x**3 - 3*x**3), Ne(r, 3)), (
x**r*log(x)/x**3, True)) + a*e**2*Piecewise((x**(2*r)/(2*r*x**3 - 3*x**3),
 Ne(r, 3/2)), (x**(2*r)*log(x)/x**3, True)) - b*d**2*n/(9*x**3) - b*d**2*l
og(c*x**n)/(3*x**3) - 2*b*d*e*n*Piecewise((Piecewise((x**(r - 3)/(r - 3),
Ne(r, 3)), (log(x), True))/(r - 3), (r > -oo) & (r < oo) & Ne(r, 3)), (log
(x)**2/2, True)) + 2*b*d*e*Piecewise((x**(r - 3)/(r - 3), Ne(r, 3)), (log(
x), True))*log(c*x**n) - b*e**2*n*Piecewise((Piecewise((x**(2*r - 3)/(2*r
- 3), Ne(r, 3/2)), (log(x), True))/(2*r - 3), (r > -oo) & (r < oo) & Ne(r,
 3/2)), (log(x)**2/2, True)) + b*e**2*Piecewise((x**(2*r - 3)/(2*r - 3), N
e(r, 3/2)), (log(x), True))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^4}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-4>0)', see `assume?` for more
details)Is
```

Giac [F]

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^4}\,dx = \int \frac{(ex^r+d)^2(b\log(cx^n)+a)}{x^4}\,dx$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(b*log(c*x^n) + a)/x^4, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^4}\,dx = \int \frac{(d+e\,x^r)^2 \left(a+b\,\ln\left(c\,x^n\right)\right)}{x^4}\,dx$$

input
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^4,x)
```

output
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^4, x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 482, normalized size of antiderivative = 3.80

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^4}\,dx = \frac{-243x^{2r}a\,e^2 - 12a\,d^2r^4 + 108a\,d^2r^3 - 351a\,d^2r^2 + 486a\,d^2r - 243\log(x^nc)\,b\,d^2 - 81b\,d^2n - 4b\,d^2n\,r^4 - \cdots}{}$$

input
```
int((d+e*x^r)^2*(a+b*log(c*x^n))/x^4,x)
```

output
```
(18*x**(2*r)*log(x**n*c)*b*e**2*r**3 - 135*x**(2*r)*log(x**n*c)*b*e**2*r**
2 + 324*x**(2*r)*log(x**n*c)*b*e**2*r - 243*x**(2*r)*log(x**n*c)*b*e**2 +
18*x**(2*r)*a*e**2*r**3 - 135*x**(2*r)*a*e**2*r**2 + 324*x**(2*r)*a*e**2*r
 - 243*x**(2*r)*a*e**2 - 9*x**(2*r)*b*e**2*n*r**2 + 54*x**(2*r)*b*e**2*n*r
 - 81*x**(2*r)*b*e**2*n + 72*x**r*log(x**n*c)*b*d*e*r**3 - 432*x**r*log(x*
*n*c)*b*d*e*r**2 + 810*x**r*log(x**n*c)*b*d*e*r - 486*x**r*log(x**n*c)*b*d
*e + 72*x**r*a*d*e*r**3 - 432*x**r*a*d*e*r**2 + 810*x**r*a*d*e*r - 486*x**
r*a*d*e - 72*x**r*b*d*e*n*r**2 + 216*x**r*b*d*e*n*r - 162*x**r*b*d*e*n - 1
2*log(x**n*c)*b*d**2*r**4 + 108*log(x**n*c)*b*d**2*r**3 - 351*log(x**n*c)*
b*d**2*r**2 + 486*log(x**n*c)*b*d**2*r - 243*log(x**n*c)*b*d**2 - 12*a*d**
2*r**4 + 108*a*d**2*r**3 - 351*a*d**2*r**2 + 486*a*d**2*r - 243*a*d**2 - 4
*b*d**2*n*r**4 + 36*b*d**2*n*r**3 - 117*b*d**2*n*r**2 + 162*b*d**2*n*r - 8
1*b*d**2*n)/(9*x**3*(4*r**4 - 36*r**3 + 117*r**2 - 162*r + 81))
```

3.388 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^6}\,dx$

Optimal result 2885
Mathematica [A] (verified) 2885
Rubi [A] (verified) 2886
Maple [B] (verified) 2888
Fricas [B] (verification not implemented) 2888
Sympy [A] (verification not implemented) 2889
Maxima [F(-2)] 2890
Giac [F] 2890
Mupad [F(-1)] 2891
Reduce [B] (verification not implemented) 2891

Optimal result

Integrand size = 23, antiderivative size = 127

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^6}\,dx = -\frac{bd^2n}{25x^5} - \frac{2bdenx^{-5+r}}{(5-r)^2} - \frac{be^2nx^{-5+2r}}{(5-2r)^2} - \frac{d^2(a+b\log(cx^n))}{5x^5} - \frac{2dex^{-5+r}(a+b\log(cx^n))}{5-r} - \frac{e^2x^{-5+2r}(a+b\log(cx^n))}{5-2r}$$

output
```
-1/25*b*d^2*n/x^5-2*b*d*e*n*x^(-5+r)/(5-r)^2-b*e^2*n*x^(-5+2*r)/(5-2*r)^2-
1/5*d^2*(a+b*ln(c*x^n))/x^5-2*d*e*x^(-5+r)*(a+b*ln(c*x^n))/(5-r)-e^2*x^(-5
+2*r)*(a+b*ln(c*x^n))/(5-2*r)
```

Mathematica [A] (verified)

Time = 0.35 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^6}\,dx = \frac{bn\left(-d^2-\frac{50dex^r}{(-5+r)^2}-\frac{25e^2x^{2r}}{(5-2r)^2}\right)+a\left(-5d^2+\frac{50dex^r}{-5+r}+\frac{25e^2x^{2r}}{-5+2r}\right)+5b\left(-d^2+\frac{10dex^r}{-5+r}+\frac{5e^2x^{2r}}{-5+2r}\right)\log(cx^n)}{25x^5}$$

input
```
Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*(-d^2 - (50*d*e*x^r)/(-5 + r)^2 - (25*e^2*x^(2*r))/(5 - 2*r)^2) + a*(
-5*d^2 + (50*d*e*x^r)/(-5 + r) + (25*e^2*x^(2*r))/(-5 + 2*r)) + 5*b*(-d^2
+ (10*d*e*x^r)/(-5 + r) + (5*e^2*x^(2*r))/(-5 + 2*r))*Log[c*x^n])/(25*x^5)
```

Rubi [A] (verified)

Time = 0.45 (sec) , antiderivative size = 128, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^6} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{\frac{10dex^r}{5-r}+\frac{5e^2x^{2r}}{5-2r}+d^2}{5x^6}dx-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2dex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{e^2x^{2r-5}(a+b\log(cx^n))}{5-2r}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}bn\int \frac{\frac{10dex^r}{5-r}+\frac{5e^2x^{2r}}{5-2r}+d^2}{x^6}dx-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2dex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{e^2x^{2r-5}(a+b\log(cx^n))}{5-2r}$$

$$\Big\downarrow \text{1691}$$

$$\frac{1}{5}bn\int \left(-\frac{10dex^{r-6}}{r-5}+\frac{5e^2x^{2(r-3)}}{5-2r}+\frac{d^2}{x^6}\right)dx-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2dex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{e^2x^{2r-5}(a+b\log(cx^n))}{5-2r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2dex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{e^2x^{2r-5}(a+b\log(cx^n))}{5-2r}+\frac{1}{5}bn\left(-\frac{d^2}{5x^5}-\frac{10dex^{r-5}}{(5-r)^2}-\frac{5e^2x^{2r-5}}{(5-2r)^2}\right)$$

input
```
Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*(-1/5*d^2/x^5 - (10*d*e*x^(-5 + r))/(5 - r)^2 - (5*e^2*x^(-5 + 2*r))/
(5 - 2*r)^2))/5 - (d^2*(a + b*Log[c*x^n]))/(5*x^5) - (2*d*e*x^(-5 + r)*(a
+ b*Log[c*x^n]))/(5 - r) - (e^2*x^(-5 + 2*r)*(a + b*Log[c*x^n]))/(5 - 2*r)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 477 vs. $2(123) = 246$.

Time = 1.15 (sec) , antiderivative size = 478, normalized size of antiderivative = 3.76

method	result
parallelrisch	$-\frac{1625a\,d^{2}r^{2}-3750a\,d^{2}r+25b\,e^{2}n\,r^{2}x^{2r}-250b\,e^{2}nr\,x^{2r}-50x^{2r}\ln(c\,x^{n})b\,e^{2}r^{3}+625x^{2r}\ln(c\,x^{n})b\,e^{2}r^{2}-2500x^{2r}\ln(c\,x^{n})b\,e^{2}}{}$
risch	Expression too large to display

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

output
```
-1/25/x^5*(1625*a*d^2*r^2-3750*a*d^2*r+3125*b*ln(c*x^n)*d^2+3125*e^2*(x^r)
^2*a+3125*e^2*(x^r)^2*b*ln(c*x^n)+6250*d*e*x^r*a+625*b*d^2*n+3125*a*d^2+62
50*d*e*x^r*b*ln(c*x^n)+20*ln(c*x^n)*b*d^2*r^4-300*ln(c*x^n)*b*d^2*r^3+1625
*ln(c*x^n)*b*d^2*r^2-3750*ln(c*x^n)*b*d^2*r+25*b*e^2*n*r^2*(x^r)^2-200*a*d
*e*r^3*x^r+2000*a*d*e*r^2*x^r+4*b*d^2*n*r^4-60*b*d^2*n*r^3-50*a*e^2*r^3*(x
^r)^2+625*a*e^2*r^2*(x^r)^2-2500*a*e^2*r*(x^r)^2+625*b*e^2*n*(x^r)^2-6250*
a*d*e*r*x^r-250*b*e^2*n*r*(x^r)^2+1250*b*d*e*n*x^r+325*b*d^2*n*r^2-750*b*d
^2*n*r-50*(x^r)^2*ln(c*x^n)*b*e^2*r^3+625*(x^r)^2*ln(c*x^n)*b*e^2*r^2-2500
*(x^r)^2*ln(c*x^n)*b*e^2*r-200*x^r*ln(c*x^n)*b*d*e*r^3+2000*x^r*ln(c*x^n)*
b*d*e*r^2-6250*x^r*ln(c*x^n)*b*d*e*r+200*b*d*e*n*r^2*x^r+20*a*d^2*r^4-1000
*b*d*e*n*r*x^r-300*a*d^2*r^3)/(-5+2*r)^2/(r^2-10*r+25)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 466 vs. $2(118) = 236$.

Time = 0.09 (sec) , antiderivative size = 466, normalized size of antiderivative = 3.67

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^6}\,dx =$$
$$-\frac{4\,(bd^2n+5\,ad^2)r^4+625\,bd^2n-60\,(bd^2n+5\,ad^2)r^3+3125\,ad^2+325\,(bd^2n+5\,ad^2)r^2-750\,(bd^2n+}{}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
-1/25*(4*(b*d^2*n + 5*a*d^2)*r^4 + 625*b*d^2*n - 60*(b*d^2*n + 5*a*d^2)*r^
3 + 3125*a*d^2 + 325*(b*d^2*n + 5*a*d^2)*r^2 - 750*(b*d^2*n + 5*a*d^2)*r -
 25*(2*a*e^2*r^3 - 25*b*e^2*n - 125*a*e^2 - (b*e^2*n + 25*a*e^2)*r^2 + 10*
(b*e^2*n + 10*a*e^2)*r + (2*b*e^2*r^3 - 25*b*e^2*r^2 + 100*b*e^2*r - 125*b
*e^2)*log(c) + (2*b*e^2*n*r^3 - 25*b*e^2*n*r^2 + 100*b*e^2*n*r - 125*b*e^2
*n)*log(x))*x^(2*r) - 50*(4*a*d*e*r^3 - 25*b*d*e*n - 125*a*d*e - 4*(b*d*e*
n + 10*a*d*e)*r^2 + 5*(4*b*d*e*n + 25*a*d*e)*r + (4*b*d*e*r^3 - 40*b*d*e*r
^2 + 125*b*d*e*r - 125*b*d*e)*log(c) + (4*b*d*e*n*r^3 - 40*b*d*e*n*r^2 + 1
25*b*d*e*n*r - 125*b*d*e*n)*log(x))*x^r + 5*(4*b*d^2*r^4 - 60*b*d^2*r^3 +
325*b*d^2*r^2 - 750*b*d^2*r + 625*b*d^2)*log(c) + 5*(4*b*d^2*n*r^4 - 60*b*
d^2*n*r^3 + 325*b*d^2*n*r^2 - 750*b*d^2*n*r + 625*b*d^2*n)*log(x))/((4*r^4
 - 60*r^3 + 325*r^2 - 750*r + 625)*x^5)
```

Sympy [A] (verification not implemented)

Time = 136.59 (sec) , antiderivative size = 233, normalized size of antiderivative = 1.83

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^6}\,dx = -\frac{ad^2}{5x^5} + 2ade\left(\begin{cases}\frac{x^r}{rx^5-5x^5} & \text{for } r\neq 5\\ \frac{x^r\log(x)}{x^5} & \text{otherwise}\end{cases}\right) + ae^2\left(\begin{cases}\frac{x^{2r}}{2rx^5-5x^5} & \text{for } r\neq \frac{5}{2}\\ \frac{x^{2r}\log(x)}{x^5} & \text{otherwise}\end{cases}\right) - \frac{bd^2n}{25x^5} - \frac{bd^2\log(cx^n)}{5x^5} - 2bden\left(\begin{cases}\frac{\begin{cases}\frac{x^{r-5}}{r-5} & \text{for } r\neq 5\\ \log(x) & \text{otherwise}\end{cases}}{r-5} & \text{for } r>-\infty \wedge r<\infty \wedge r\neq 5\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right) + 2bde\left(\begin{cases}\frac{x^{r-5}}{r-5} & \text{for } r\neq 5\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n) - be^2n\left(\begin{cases}\frac{\begin{cases}\frac{x^{2r-5}}{2r-5} & \text{for } r\neq \frac{5}{2}\\ \log(x) & \text{otherwise}\end{cases}}{2r-5} & \text{for } r>-\infty \wedge r<\infty \wedge r\neq \frac{5}{2}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right) + be^2\left(\begin{cases}\frac{x^{2r-5}}{2r-5} & \text{for } r\neq \frac{5}{2}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x**6,x)
```

output
```
-a*d**2/(5*x**5) + 2*a*d*e*Piecewise((x**r/(r*x**5 - 5*x**5), Ne(r, 5)), (
x**r*log(x)/x**5, True)) + a*e**2*Piecewise((x**(2*r)/(2*r*x**5 - 5*x**5),
 Ne(r, 5/2)), (x**(2*r)*log(x)/x**5, True)) - b*d**2*n/(25*x**5) - b*d**2*
log(c*x**n)/(5*x**5) - 2*b*d*e*n*Piecewise((Piecewise((x**(r - 5)/(r - 5),
 Ne(r, 5)), (log(x), True))/(r - 5), (r > -oo) & (r < oo) & Ne(r, 5)), (lo
g(x)**2/2, True)) + 2*b*d*e*Piecewise((x**(r - 5)/(r - 5), Ne(r, 5)), (log
(x), True))*log(c*x**n) - b*e**2*n*Piecewise((Piecewise((x**(2*r - 5)/(2*r
 - 5), Ne(r, 5/2)), (log(x), True))/(2*r - 5), (r > -oo) & (r < oo) & Ne(r
, 5/2)), (log(x)**2/2, True)) + b*e**2*Piecewise((x**(2*r - 5)/(2*r - 5),
Ne(r, 5/2)), (log(x), True))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^6}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-6>0)', see `assume?` for more
details)Is
```

Giac [F]

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^6}\,dx = \int \frac{(ex^r+d)^2(b\log(cx^n)+a)}{x^6}\,dx$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(b*log(c*x^n) + a)/x^6, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^6}\,dx = \int \frac{(d+e\,x^r)^2 (a+b\,\ln(c\,x^n))}{x^6}\,dx$$

input
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^6,x)
```

output
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^6, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 482, normalized size of antiderivative = 3.80

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^6}\,dx = \frac{-3125x^{2r}a\,e^2 - 20a\,d^2r^4 + 300a\,d^2r^3 - 1625a\,d^2r^2 + 3750a\,d^2r - 3125\log(x^nc)\,b\,d^2 - 625b\,d^2n - 4b\,d^2r}{}$$

input
```
int((d+e*x^r)^2*(a+b*log(c*x^n))/x^6,x)
```

output
```
(50*x**(2*r)*log(x**n*c)*b*e**2*r**3 - 625*x**(2*r)*log(x**n*c)*b*e**2*r**
2 + 2500*x**(2*r)*log(x**n*c)*b*e**2*r - 3125*x**(2*r)*log(x**n*c)*b*e**2
+ 50*x**(2*r)*a*e**2*r**3 - 625*x**(2*r)*a*e**2*r**2 + 2500*x**(2*r)*a*e**
2*r - 3125*x**(2*r)*a*e**2 - 25*x**(2*r)*b*e**2*n*r**2 + 250*x**(2*r)*b*e*
*2*n*r - 625*x**(2*r)*b*e**2*n + 200*x**r*log(x**n*c)*b*d*e*r**3 - 2000*x*
*r*log(x**n*c)*b*d*e*r**2 + 6250*x**r*log(x**n*c)*b*d*e*r - 6250*x**r*log(
x**n*c)*b*d*e + 200*x**r*a*d*e*r**3 - 2000*x**r*a*d*e*r**2 + 6250*x**r*a*d
*e*r - 6250*x**r*a*d*e - 200*x**r*b*d*e*n*r**2 + 1000*x**r*b*d*e*n*r - 125
0*x**r*b*d*e*n - 20*log(x**n*c)*b*d**2*r**4 + 300*log(x**n*c)*b*d**2*r**3
- 1625*log(x**n*c)*b*d**2*r**2 + 3750*log(x**n*c)*b*d**2*r - 3125*log(x**n
*c)*b*d**2 - 20*a*d**2*r**4 + 300*a*d**2*r**3 - 1625*a*d**2*r**2 + 3750*a*
d**2*r - 3125*a*d**2 - 4*b*d**2*n*r**4 + 60*b*d**2*n*r**3 - 325*b*d**2*n*r
**2 + 750*b*d**2*n*r - 625*b*d**2*n)/(25*x**5*(4*r**4 - 60*r**3 + 325*r**2
 - 750*r + 625))
```

3.389 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^8}\,dx$

Optimal result . . . 2893
Mathematica [A] (verified) . . . 2893
Rubi [A] (verified) . . . 2894
Maple [B] (verified) . . . 2896
Fricas [B] (verification not implemented) . . . 2896
Sympy [F(-1)] . . . 2897
Maxima [F(-2)] . . . 2897
Giac [F] . . . 2898
Mupad [F(-1)] . . . 2898
Reduce [B] (verification not implemented) . . . 2899

Optimal result

Integrand size = 23, antiderivative size = 127

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^8}\,dx = -\frac{bd^2n}{49x^7}-\frac{2bdenx^{-7+r}}{(7-r)^2}-\frac{be^2nx^{-7+2r}}{(7-2r)^2} -\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2dex^{-7+r}(a+b\log(cx^n))}{7-r} -\frac{e^2x^{-7+2r}(a+b\log(cx^n))}{7-2r}$$

output
```
-1/49*b*d^2*n/x^7-2*b*d*e*n*x^(-7+r)/(7-r)^2-b*e^2*n*x^(-7+2*r)/(7-2*r)^2-
1/7*d^2*(a+b*ln(c*x^n))/x^7-2*d*e*x^(-7+r)*(a+b*ln(c*x^n))/(7-r)-e^2*x^(-7
+2*r)*(a+b*ln(c*x^n))/(7-2*r)
```

Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^8}\,dx = \frac{bn\left(-d^2-\frac{98dex^r}{(-7+r)^2}-\frac{49e^2x^{2r}}{(7-2r)^2}\right)+a\left(-7d^2+\frac{98dex^r}{-7+r}+\frac{49e^2x^{2r}}{-7+2r}\right)+7b\left(-d^2+\frac{14dex^r}{-7+r}+\frac{7e^2x^{2r}}{-7+2r}\right)\log(cx^n)}{49x^7}$$

input
```
Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
(b*n*(-d^2 - (98*d*e*x^r)/(-7 + r)^2 - (49*e^2*x^(2*r))/(7 - 2*r)^2) + a*(
-7*d^2 + (98*d*e*x^r)/(-7 + r) + (49*e^2*x^(2*r))/(-7 + 2*r)) + 7*b*(-d^2
+ (14*d*e*x^r)/(-7 + r) + (7*e^2*x^(2*r))/(-7 + 2*r))*Log[c*x^n])/(49*x^7)
```

Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 128, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^8}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{\frac{14dex^r}{7-r}+\frac{7e^2x^{2r}}{7-2r}+d^2}{7x^8}dx-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2dex^{r-7}(a+b\log(cx^n))}{7-r}-\frac{e^2x^{2r-7}(a+b\log(cx^n))}{7-2r}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{7}bn\int \frac{\frac{14dex^r}{7-r}+\frac{7e^2x^{2r}}{7-2r}+d^2}{x^8}dx-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2dex^{r-7}(a+b\log(cx^n))}{7-r}-\frac{e^2x^{2r-7}(a+b\log(cx^n))}{7-2r}$$

$$\Big\downarrow \text{1691}$$

$$\frac{1}{7}bn\int \left(-\frac{14dex^{r-8}}{r-7}+\frac{7e^2x^{2(r-4)}}{7-2r}+\frac{d^2}{x^8}\right)dx-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2dex^{r-7}(a+b\log(cx^n))}{7-r}-\frac{e^2x^{2r-7}(a+b\log(cx^n))}{7-2r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2dex^{r-7}(a+b\log(cx^n))}{7-r}-\frac{e^2x^{2r-7}(a+b\log(cx^n))}{7-2r}+\frac{1}{7}bn\left(-\frac{d^2}{7x^7}-\frac{14dex^{r-7}}{(7-r)^2}-\frac{7e^2x^{2r-7}}{(7-2r)^2}\right)$$

input
```
Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
(b*n*(-1/7*d^2/x^7 - (14*d*e*x^(-7 + r))/(7 - r)^2 - (7*e^2*x^(-7 + 2*r))/
(7 - 2*r)^2))/7 - (d^2*(a + b*Log[c*x^n]))/(7*x^7) - (2*d*e*x^(-7 + r)*(a
+ b*Log[c*x^n]))/(7 - r) - (e^2*x^(-7 + 2*r)*(a + b*Log[c*x^n]))/(7 - 2*r)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 477 vs. $2(123) = 246$.

Time = 3.31 (sec) , antiderivative size = 478, normalized size of antiderivative = 3.76

method	result
parallelrisch	$-\frac{4459a\,d^2r^2-14406a\,d^2r+49b\,e^2n\,r^2x^{2r}-686b\,e^2nr\,x^{2r}-98x^{2r}\ln(c\,x^n)b\,e^2r^3+1715x^{2r}\ln(c\,x^n)b\,e^2r^2-9604x^{2r}\ln(c\,x^n)b}{}$
risch	Expression too large to display

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n))/x^8,x,method=_RETURNVERBOSE)
```

output
```
-1/49/x^7*(4459*a*d^2*r^2-14406*a*d^2*r+16807*b*ln(c*x^n)*d^2+16807*e^2*(x
^r)^2*a+16807*e^2*(x^r)^2*b*ln(c*x^n)+33614*d*e*x^r*a+2401*b*d^2*n+16807*a
*d^2+33614*d*e*x^r*b*ln(c*x^n)+28*ln(c*x^n)*b*d^2*r^4-588*ln(c*x^n)*b*d^2*
r^3+4459*ln(c*x^n)*b*d^2*r^2-14406*ln(c*x^n)*b*d^2*r+49*b*e^2*n*r^2*(x^r)^
2-392*a*d*e*r^3*x^r+5488*a*d*e*r^2*x^r+4*b*d^2*n*r^4-84*b*d^2*n*r^3-98*a*e
^2*r^3*(x^r)^2+1715*a*e^2*r^2*(x^r)^2-9604*a*e^2*r*(x^r)^2+2401*b*e^2*n*(x
^r)^2-24010*a*d*e*r*x^r-686*b*e^2*n*r*(x^r)^2+4802*b*d*e*n*x^r+637*b*d^2*n
*r^2-2058*b*d^2*n*r-98*(x^r)^2*ln(c*x^n)*b*e^2*r^3+1715*(x^r)^2*ln(c*x^n)*
b*e^2*r^2-9604*(x^r)^2*ln(c*x^n)*b*e^2*r-392*x^r*ln(c*x^n)*b*d*e*r^3+5488*
x^r*ln(c*x^n)*b*d*e*r^2-24010*x^r*ln(c*x^n)*b*d*e*r+392*b*d*e*n*r^2*x^r+28
*a*d^2*r^4-2744*b*d*e*n*r*x^r-588*a*d^2*r^3)/(-7+2*r)^2/(r^2-14*r+49)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 466 vs. $2(118) = 236$.

Time = 0.08 (sec) , antiderivative size = 466, normalized size of antiderivative = 3.67

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^8}\,dx =$$
$$-\frac{4\,(bd^2n+7\,ad^2)r^4+2401\,bd^2n-84\,(bd^2n+7\,ad^2)r^3+16807\,ad^2+637\,(bd^2n+7\,ad^2)r^2-2058\,(bd^2}{}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

output
```
-1/49*(4*(b*d^2*n + 7*a*d^2)*r^4 + 2401*b*d^2*n - 84*(b*d^2*n + 7*a*d^2)*r
^3 + 16807*a*d^2 + 637*(b*d^2*n + 7*a*d^2)*r^2 - 2058*(b*d^2*n + 7*a*d^2)*
r - 49*(2*a*e^2*r^3 - 49*b*e^2*n - 343*a*e^2 - (b*e^2*n + 35*a*e^2)*r^2 +
14*(b*e^2*n + 14*a*e^2)*r + (2*b*e^2*r^3 - 35*b*e^2*r^2 + 196*b*e^2*r - 34
3*b*e^2)*log(c) + (2*b*e^2*n*r^3 - 35*b*e^2*n*r^2 + 196*b*e^2*n*r - 343*b*
e^2*n)*log(x))*x^(2*r) - 98*(4*a*d*e*r^3 - 49*b*d*e*n - 343*a*d*e - 4*(b*d
*e*n + 14*a*d*e)*r^2 + 7*(4*b*d*e*n + 35*a*d*e)*r + (4*b*d*e*r^3 - 56*b*d*
e*r^2 + 245*b*d*e*r - 343*b*d*e)*log(c) + (4*b*d*e*n*r^3 - 56*b*d*e*n*r^2
+ 245*b*d*e*n*r - 343*b*d*e*n)*log(x))*x^r + 7*(4*b*d^2*r^4 - 84*b*d^2*r^3
 + 637*b*d^2*r^2 - 2058*b*d^2*r + 2401*b*d^2)*log(c) + 7*(4*b*d^2*n*r^4 -
84*b*d^2*n*r^3 + 637*b*d^2*n*r^2 - 2058*b*d^2*n*r + 2401*b*d^2*n)*log(x))/
((4*r^4 - 84*r^3 + 637*r^2 - 2058*r + 2401)*x^7)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^8}\, dx = \text{Timed out}$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x**8,x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^8}\, dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-8>0)', see `assume?` for more
details)Is
```

Giac [F]

$$\int \frac{(d+ex^r)^2\,(a+b\log{(cx^n)})}{x^8}\,dx = \int \frac{(ex^r+d)^2(b\log{(cx^n)}+a)}{x^8}\,dx$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(b*log(c*x^n) + a)/x^8, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2\,(a+b\log{(cx^n)})}{x^8}\,dx = \int \frac{(d+e\,x^r)^2\,(a+b\,\ln{(c\,x^n)})}{x^8}\,dx$$

input
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^8,x)
```

output
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^8, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 482, normalized size of antiderivative = 3.80

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^8} \, dx$$
$$= \frac{-16807x^{2r}a\,e^2 - 28a\,d^2r^4 + 588a\,d^2r^3 - 4459a\,d^2r^2 + 14406a\,d^2r - 16807\log(x^nc)\,b\,d^2 - 2401b\,d^2n - 4}{}$$

input
```
int((d+e*x^r)^2*(a+b*log(c*x^n))/x^8,x)
```

output
```
(98*x**(2*r)*log(x**n*c)*b*e**2*r**3 - 1715*x**(2*r)*log(x**n*c)*b*e**2*r*
*2 + 9604*x**(2*r)*log(x**n*c)*b*e**2*r - 16807*x**(2*r)*log(x**n*c)*b*e**
2 + 98*x**(2*r)*a*e**2*r**3 - 1715*x**(2*r)*a*e**2*r**2 + 9604*x**(2*r)*a*
e**2*r - 16807*x**(2*r)*a*e**2 - 49*x**(2*r)*b*e**2*n*r**2 + 686*x**(2*r)*
b*e**2*n*r - 2401*x**(2*r)*b*e**2*n + 392*x**r*log(x**n*c)*b*d*e*r**3 - 54
88*x**r*log(x**n*c)*b*d*e*r**2 + 24010*x**r*log(x**n*c)*b*d*e*r - 33614*x*
*r*log(x**n*c)*b*d*e + 392*x**r*a*d*e*r**3 - 5488*x**r*a*d*e*r**2 + 24010*
x**r*a*d*e*r - 33614*x**r*a*d*e - 392*x**r*b*d*e*n*r**2 + 2744*x**r*b*d*e*
n*r - 4802*x**r*b*d*e*n - 28*log(x**n*c)*b*d**2*r**4 + 588*log(x**n*c)*b*d
**2*r**3 - 4459*log(x**n*c)*b*d**2*r**2 + 14406*log(x**n*c)*b*d**2*r - 168
07*log(x**n*c)*b*d**2 - 28*a*d**2*r**4 + 588*a*d**2*r**3 - 4459*a*d**2*r**
2 + 14406*a*d**2*r - 16807*a*d**2 - 4*b*d**2*n*r**4 + 84*b*d**2*n*r**3 - 6
37*b*d**2*n*r**2 + 2058*b*d**2*n*r - 2401*b*d**2*n)/(49*x**7*(4*r**4 - 84*
r**3 + 637*r**2 - 2058*r + 2401))
```

3.390 $\int x^5(d+ex^r)^3(a+b\log(cx^n))\,dx$

Optimal result . . . 2900
Mathematica [A] (verified) . . . 2900
Rubi [A] (verified) . . . 2901
Maple [B] (verified) . . . 2903
Fricas [B] (verification not implemented) . . . 2904
Sympy [B] (verification not implemented) . . . 2905
Maxima [A] (verification not implemented) . . . 2906
Giac [B] (verification not implemented) . . . 2906
Mupad [F(-1)] . . . 2907
Reduce [B] (verification not implemented) . . . 2908

Optimal result

Integrand size = 23, antiderivative size = 147

$$\int x^5(d+ex^r)^3(a+b\log(cx^n))\,dx = -\frac{1}{36}bd^3nx^6-\frac{be^3nx^{3(2+r)}}{9(2+r)^2}-\frac{3bde^2nx^{2(3+r)}}{4(3+r)^2}-\frac{3bd^2enx^{6+r}}{(6+r)^2}+\frac{1}{6}\left(d^3x^6+\frac{2e^3x^{3(2+r)}}{2+r}+\frac{9de^2x^{2(3+r)}}{3+r}+\frac{18d^2ex^{6+r}}{6+r}\right)(a+b\log(cx^n))$$

output
```
-1/36*b*d^3*n*x^6-1/9*b*e^3*n*x^(6+3*r)/(2+r)^2-3/4*b*d*e^2*n*x^(6+2*r)/(3
+r)^2-3*b*d^2*e*n*x^(6+r)/(6+r)^2+1/6*(d^3*x^6+2*e^3*x^(6+3*r)/(2+r)+9*d*e
^2*x^(6+2*r)/(3+r)+18*d^2*e*x^(6+r)/(6+r))*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.43 (sec) , antiderivative size = 172, normalized size of antiderivative = 1.17

$$\int x^5(d+ex^r)^3(a+b\log(cx^n))\,dx = \frac{1}{36}x^6\left(bn\left(-d^3-\frac{108d^2ex^r}{(6+r)^2}-\frac{27de^2x^{2r}}{(3+r)^2}-\frac{4e^3x^{3r}}{(2+r)^2}\right)+6a\left(d^3+\frac{18d^2ex^r}{6+r}+\frac{9de^2x^{2r}}{3+r}+\frac{2e^3x^{3r}}{2+r}\right)+6b\left(d^3+\frac{18d^2ex^r}{6+r}+\frac{9de^2x^{2r}}{3+r}+\frac{2e^3x^{3r}}{2+r}\right)\log(cx^n)\right)$$

input
```
Integrate[x^5*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
(x^6*(b*n*(-d^3 - (108*d^2*e*x^r)/(6 + r)^2 - (27*d*e^2*x^(2*r))/(3 + r)^2
 - (4*e^3*x^(3*r))/(2 + r)^2) + 6*a*(d^3 + (18*d^2*e*x^r)/(6 + r) + (9*d*e
^2*x^(2*r))/(3 + r) + (2*e^3*x^(3*r))/(2 + r)) + 6*b*(d^3 + (18*d^2*e*x^r)
/(6 + r) + (9*d*e^2*x^(2*r))/(3 + r) + (2*e^3*x^(3*r))/(2 + r))*Log[c*x^n]
))/36
```

Rubi [A] (verified)

Time = 0.60 (sec) , antiderivative size = 146, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2771, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^5(d+ex^r)^3(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{6}\left(d^3x^6+\frac{18d^2ex^{r+6}}{r+6}+\frac{9de^2x^{2(r+3)}}{r+3}+\frac{2e^3x^{3(r+2)}}{r+2}\right)(a+b\log(cx^n))-bn\int \frac{1}{6}x^5\left(\frac{18d^2ex^r}{r+6}+\frac{9de^2x^{2r}}{r+3}+\frac{2e^3x^{3r}}{r+2}+d^3\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{6}\left(d^3x^6+\frac{18d^2ex^{r+6}}{r+6}+\frac{9de^2x^{2(r+3)}}{r+3}+\frac{2e^3x^{3(r+2)}}{r+2}\right)(a+b\log(cx^n))-\frac{1}{6}bn\int x^5\left(\frac{18d^2ex^r}{r+6}+\frac{9de^2x^{2r}}{r+3}+\frac{2e^3x^{3r}}{r+2}+d^3\right)dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{6}\left(d^3x^6+\frac{18d^2ex^{r+6}}{r+6}+\frac{9de^2x^{2(r+3)}}{r+3}+\frac{2e^3x^{3(r+2)}}{r+2}\right)(a+b\log(cx^n))-\frac{1}{6}bn\int \left(\frac{18d^2ex^{r+5}}{r+6}+\frac{9de^2x^{2r+5}}{r+3}+\frac{2e^3x^{3r+5}}{r+2}+d^3x^5\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{6}\left(d^3x^6+\frac{18d^2ex^{r+6}}{r+6}+\frac{9de^2x^{2(r+3)}}{r+3}+\frac{2e^3x^{3(r+2)}}{r+2}\right)(a+b\log(cx^n))-\frac{1}{6}bn\left(\frac{d^3x^6}{6}+\frac{18d^2ex^{r+6}}{(r+6)^2}+\frac{9de^2x^{2(r+3)}}{2(r+3)^2}+\frac{2e^3x^{3(r+2)}}{3(r+2)^2}\right)$$

input
```
Int[x^5*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/6*(b*n*((d^3*x^6)/6 + (2*e^3*x^(3*(2 + r)))/(3*(2 + r)^2) + (9*d*e^2*x^
(2*(3 + r)))/(2*(3 + r)^2) + (18*d^2*e*x^(6 + r))/(6 + r)^2)) + ((d^3*x^6
+ (2*e^3*x^(3*(2 + r)))/(2 + r) + (9*d*e^2*x^(2*(3 + r)))/(3 + r) + (18*d^
2*e*x^(6 + r))/(6 + r))*(a + b*Log[c*x^n]))/6
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1253 vs. $2(139) = 278$.

Time = 47.64 (sec) , antiderivative size = 1254, normalized size of antiderivative = 8.53

method	result	size
parallelrisch	Expression too large to display	1254
risch	Expression too large to display	4021

input
```
int(x^5*(d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/36*(-42768*x^6*x^r*a*d^2*e*r+3888*x^6*x^r*b*d^2*e*n+4*x^6*(x^r)^3*b*e^3
*n*r^4+72*x^6*(x^r)^3*b*e^3*n*r^3+468*x^6*(x^r)^3*b*e^3*n*r^2+1296*x^6*(x^
r)^3*b*e^3*n*r-12528*x^6*ln(c*x^n)*b*d^3*r^2-15552*x^6*ln(c*x^n)*b*d^3*r-1
2*x^6*(x^r)^3*a*e^3*r^5-240*x^6*(x^r)^3*a*e^3*r^4-1836*x^6*(x^r)^3*a*e^3*r
^3-7776*b*e^3*ln(c*x^n)*(x^r)^3*x^6-7776*a*d^3*x^6-6696*x^6*(x^r)^3*a*e^3*
r^2-11664*x^6*(x^r)^3*a*e^3*r+1296*x^6*(x^r)^3*b*e^3*n-23328*x^6*(x^r)^2*a
*d*e^2+x^6*b*d^3*n*r^6+22*x^6*b*d^3*n*r^5+193*x^6*b*d^3*n*r^4+864*x^6*b*d^
3*n*r^3+2088*x^6*b*d^3*n*r^2+2592*x^6*b*d^3*n*r-23328*x^6*x^r*a*d^2*e-6*x^
6*ln(c*x^n)*b*d^3*r^6-132*x^6*ln(c*x^n)*b*d^3*r^5-1158*x^6*ln(c*x^n)*b*d^3
*r^4-5184*x^6*ln(c*x^n)*b*d^3*r^3-7776*b*d^3*ln(c*x^n)*x^6-6*x^6*a*d^3*r^6
-132*x^6*a*d^3*r^5-1158*x^6*a*d^3*r^4-5184*x^6*a*d^3*r^3-12528*x^6*a*d^3*r
^2-15552*x^6*a*d^3*r-7776*x^6*(x^r)^3*a*e^3+1296*b*d^3*n*x^6-108*x^6*x^r*l
n(c*x^n)*b*d^2*e*r^5-1728*x^6*x^r*ln(c*x^n)*b*d^2*e*r^4-10476*x^6*x^r*ln(c
*x^n)*b*d^2*e*r^3-30456*x^6*x^r*ln(c*x^n)*b*d^2*e*r^2-42768*x^6*x^r*ln(c*x
^n)*b*d^2*e*r+27*x^6*(x^r)^2*b*d*e^2*n*r^4+432*x^6*(x^r)^2*b*d*e^2*n*r^3+2
376*x^6*(x^r)^2*b*d*e^2*n*r^2+5184*x^6*(x^r)^2*b*d*e^2*n*r-54*x^6*(x^r)^2*
ln(c*x^n)*b*d*e^2*r^5-1026*x^6*(x^r)^2*ln(c*x^n)*b*d*e^2*r^4-7344*x^6*(x^r
)^2*ln(c*x^n)*b*d*e^2*r^3-24624*x^6*(x^r)^2*ln(c*x^n)*b*d*e^2*r^2-38880*x^
6*(x^r)^2*ln(c*x^n)*b*d*e^2*r+108*x^6*x^r*b*d^2*e*n*r^4+1080*x^6*x^r*b*d^2
*e*n*r^3+3996*x^6*x^r*b*d^2*e*n*r^2+6480*x^6*x^r*b*d^2*e*n*r-23328*e^2*...
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1011 vs. $2(139) = 278$.

Time = 0.09 (sec) , antiderivative size = 1011, normalized size of antiderivative = 6.88

$$\int x^5(d+ex^r)^3\,(a+b\log{(cx^n)})\,dx = \text{Too large to display}$$

input
```
integrate(x^5*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/36*(6*(b*d^3*r^6 + 22*b*d^3*r^5 + 193*b*d^3*r^4 + 864*b*d^3*r^3 + 2088*b
*d^3*r^2 + 2592*b*d^3*r + 1296*b*d^3)*x^6*log(c) + 6*(b*d^3*n*r^6 + 22*b*d
^3*n*r^5 + 193*b*d^3*n*r^4 + 864*b*d^3*n*r^3 + 2088*b*d^3*n*r^2 + 2592*b*d
^3*n*r + 1296*b*d^3*n)*x^6*log(x) - ((b*d^3*n - 6*a*d^3)*r^6 + 22*(b*d^3*n
 - 6*a*d^3)*r^5 + 1296*b*d^3*n + 193*(b*d^3*n - 6*a*d^3)*r^4 - 7776*a*d^3
+ 864*(b*d^3*n - 6*a*d^3)*r^3 + 2088*(b*d^3*n - 6*a*d^3)*r^2 + 2592*(b*d^3
*n - 6*a*d^3)*r)*x^6 + 4*(3*(b*e^3*r^5 + 20*b*e^3*r^4 + 153*b*e^3*r^3 + 55
8*b*e^3*r^2 + 972*b*e^3*r + 648*b*e^3)*x^6*log(c) + 3*(b*e^3*n*r^5 + 20*b*
e^3*n*r^4 + 153*b*e^3*n*r^3 + 558*b*e^3*n*r^2 + 972*b*e^3*n*r + 648*b*e^3*
n)*x^6*log(x) + (3*a*e^3*r^5 - 324*b*e^3*n - (b*e^3*n - 60*a*e^3)*r^4 + 19
44*a*e^3 - 9*(2*b*e^3*n - 51*a*e^3)*r^3 - 9*(13*b*e^3*n - 186*a*e^3)*r^2 -
 324*(b*e^3*n - 9*a*e^3)*r)*x^6)*x^(3*r) + 27*(2*(b*d*e^2*r^5 + 19*b*d*e^2
*r^4 + 136*b*d*e^2*r^3 + 456*b*d*e^2*r^2 + 720*b*d*e^2*r + 432*b*d*e^2)*x^
6*log(c) + 2*(b*d*e^2*n*r^5 + 19*b*d*e^2*n*r^4 + 136*b*d*e^2*n*r^3 + 456*b
*d*e^2*n*r^2 + 720*b*d*e^2*n*r + 432*b*d*e^2*n)*x^6*log(x) + (2*a*d*e^2*r^
5 - 144*b*d*e^2*n - (b*d*e^2*n - 38*a*d*e^2)*r^4 + 864*a*d*e^2 - 16*(b*d*e
^2*n - 17*a*d*e^2)*r^3 - 8*(11*b*d*e^2*n - 114*a*d*e^2)*r^2 - 96*(2*b*d*e^
2*n - 15*a*d*e^2)*r)*x^6)*x^(2*r) + 108*((b*d^2*e*r^5 + 16*b*d^2*e*r^4 + 9
7*b*d^2*e*r^3 + 282*b*d^2*e*r^2 + 396*b*d^2*e*r + 216*b*d^2*e)*x^6*log(c)
+ (b*d^2*e*n*r^5 + 16*b*d^2*e*n*r^4 + 97*b*d^2*e*n*r^3 + 282*b*d^2*e*n*...
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 4100 vs. $2(143) = 286$.

Time = 91.55 (sec) , antiderivative size = 4100, normalized size of antiderivative = 27.89

$$\int x^5(d+ex^r)^3(a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x**5*(d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*d**3*x**6/6 + 3*a*d**2*e*log(c*x**n)/n - a*d*e**2/(2*x**6) -
a*e**3/(12*x**12) - b*d**3*n*x**6/36 + b*d**3*x**6*log(c*x**n)/6 + 3*b*d**
2*e*log(c*x**n)**2/(2*n) - b*d*e**2*n/(12*x**6) - b*d*e**2*log(c*x**n)/(2*
x**6) - b*e**3*n/(144*x**12) - b*e**3*log(c*x**n)/(12*x**12), Eq(r, -6)),
(a*d**3*x**6/6 + a*d**2*e*x**3 + 3*a*d*e**2*log(c*x**n)/n - a*e**3/(3*x**3
) - b*d**3*n*x**6/36 + b*d**3*x**6*log(c*x**n)/6 - b*d**2*e*n*x**3/3 + b*d
**2*e*x**3*log(c*x**n) + 3*b*d*e**2*log(c*x**n)**2/(2*n) - b*e**3*n/(9*x**
3) - b*e**3*log(c*x**n)/(3*x**3), Eq(r, -3)), (a*d**3*x**6/6 + 3*a*d**2*e*
x**4/4 + 3*a*d*e**2*x**2/2 + a*e**3*log(c*x**n)/n - b*d**3*n*x**6/36 + b*d
**3*x**6*log(c*x**n)/6 - 3*b*d**2*e*n*x**4/16 + 3*b*d**2*e*x**4*log(c*x**n
)/4 - 3*b*d*e**2*n*x**2/4 + 3*b*d*e**2*x**2*log(c*x**n)/2 + b*e**3*log(c*x
**n)**2/(2*n), Eq(r, -2)), (6*a*d**3*r**6*x**6/(36*r**6 + 792*r**5 + 6948*
r**4 + 31104*r**3 + 75168*r**2 + 93312*r + 46656) + 132*a*d**3*r**5*x**6/(
36*r**6 + 792*r**5 + 6948*r**4 + 31104*r**3 + 75168*r**2 + 93312*r + 46656
) + 1158*a*d**3*r**4*x**6/(36*r**6 + 792*r**5 + 6948*r**4 + 31104*r**3 + 7
5168*r**2 + 93312*r + 46656) + 5184*a*d**3*r**3*x**6/(36*r**6 + 792*r**5 +
 6948*r**4 + 31104*r**3 + 75168*r**2 + 93312*r + 46656) + 12528*a*d**3*r**
2*x**6/(36*r**6 + 792*r**5 + 6948*r**4 + 31104*r**3 + 75168*r**2 + 93312*r
 + 46656) + 15552*a*d**3*r*x**6/(36*r**6 + 792*r**5 + 6948*r**4 + 31104*r*
*3 + 75168*r**2 + 93312*r + 46656) + 7776*a*d**3*x**6/(36*r**6 + 792*r*...
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 218, normalized size of antiderivative = 1.48

$$\int x^5(d+ex^r)^3(a+b\log(cx^n))\,dx = -\frac{1}{36}bd^3nx^6+\frac{1}{6}bd^3x^6\log(cx^n)+\frac{1}{6}ad^3x^6+\frac{be^3x^{3r+6}\log(cx^n)}{3(r+2)}+\frac{3bde^2x^{2r+6}\log(cx^n)}{2(r+3)}+\frac{3bd^2ex^{r+6}\log(cx^n)}{r+6}-\frac{be^3nx^{3r+6}}{9(r+2)^2}+\frac{ae^3x^{3r+6}}{3(r+2)}-\frac{3bde^2nx^{2r+6}}{4(r+3)^2}+\frac{3ade^2x^{2r+6}}{2(r+3)}-\frac{3bd^2enx^{r+6}}{(r+6)^2}+\frac{3ad^2ex^{r+6}}{r+6}$$

input
```
integrate(x^5*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/36*b*d^3*n*x^6 + 1/6*b*d^3*x^6*log(c*x^n) + 1/6*a*d^3*x^6 + 1/3*b*e^3*x
^(3*r + 6)*log(c*x^n)/(r + 2) + 3/2*b*d*e^2*x^(2*r + 6)*log(c*x^n)/(r + 3)
 + 3*b*d^2*e*x^(r + 6)*log(c*x^n)/(r + 6) - 1/9*b*e^3*n*x^(3*r + 6)/(r + 2
)^2 + 1/3*a*e^3*x^(3*r + 6)/(r + 2) - 3/4*b*d*e^2*n*x^(2*r + 6)/(r + 3)^2
+ 3/2*a*d*e^2*x^(2*r + 6)/(r + 3) - 3*b*d^2*e*n*x^(r + 6)/(r + 6)^2 + 3*a*
d^2*e*x^(r + 6)/(r + 6)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1609 vs. 2(139) = 278.

Time = 0.16 (sec) , antiderivative size = 1609, normalized size of antiderivative = 10.95

$$\int x^5(d+ex^r)^3(a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x^5*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/36*(12*b*e^3*n*r^5*x^6*x^(3*r)*log(x) + 54*b*d*e^2*n*r^5*x^6*x^(2*r)*log
(x) + 108*b*d^2*e*n*r^5*x^6*x^r*log(x) + 6*b*d^3*n*r^6*x^6*log(x) - b*d^3*
n*r^6*x^6 + 12*b*e^3*r^5*x^6*x^(3*r)*log(c) + 54*b*d*e^2*r^5*x^6*x^(2*r)*l
og(c) + 108*b*d^2*e*r^5*x^6*x^r*log(c) + 6*b*d^3*r^6*x^6*log(c) + 240*b*e^
3*n*r^4*x^6*x^(3*r)*log(x) + 1026*b*d*e^2*n*r^4*x^6*x^(2*r)*log(x) + 1728*
b*d^2*e*n*r^4*x^6*x^r*log(x) + 132*b*d^3*n*r^5*x^6*log(x) - 4*b*e^3*n*r^4*
x^6*x^(3*r) + 12*a*e^3*r^5*x^6*x^(3*r) - 27*b*d*e^2*n*r^4*x^6*x^(2*r) + 54
*a*d*e^2*r^5*x^6*x^(2*r) - 108*b*d^2*e*n*r^4*x^6*x^r + 108*a*d^2*e*r^5*x^6
*x^r - 22*b*d^3*n*r^5*x^6 + 6*a*d^3*r^6*x^6 + 240*b*e^3*r^4*x^6*x^(3*r)*lo
g(c) + 1026*b*d*e^2*r^4*x^6*x^(2*r)*log(c) + 1728*b*d^2*e*r^4*x^6*x^r*log(
c) + 132*b*d^3*r^5*x^6*log(c) + 1836*b*e^3*n*r^3*x^6*x^(3*r)*log(x) + 7344
*b*d*e^2*n*r^3*x^6*x^(2*r)*log(x) + 10476*b*d^2*e*n*r^3*x^6*x^r*log(x) + 1
158*b*d^3*n*r^4*x^6*log(x) - 72*b*e^3*n*r^3*x^6*x^(3*r) + 240*a*e^3*r^4*x^
6*x^(3*r) - 432*b*d*e^2*n*r^3*x^6*x^(2*r) + 1026*a*d*e^2*r^4*x^6*x^(2*r) -
 1080*b*d^2*e*n*r^3*x^6*x^r + 1728*a*d^2*e*r^4*x^6*x^r - 193*b*d^3*n*r^4*x
^6 + 132*a*d^3*r^5*x^6 + 1836*b*e^3*r^3*x^6*x^(3*r)*log(c) + 7344*b*d*e^2*
r^3*x^6*x^(2*r)*log(c) + 10476*b*d^2*e*r^3*x^6*x^r*log(c) + 1158*b*d^3*r^4
*x^6*log(c) + 6696*b*e^3*n*r^2*x^6*x^(3*r)*log(x) + 24624*b*d*e^2*n*r^2*x^
6*x^(2*r)*log(x) + 30456*b*d^2*e*n*r^2*x^6*x^r*log(x) + 5184*b*d^3*n*r^3*x
^6*log(x) - 468*b*e^3*n*r^2*x^6*x^(3*r) + 1836*a*e^3*r^3*x^6*x^(3*r) - ...
```

Mupad [F(-1)]

Timed out.

$$\int x^5(d+ex^r)^3\,(a+b\log{(cx^n)})\;dx=\int x^5\,{(d+e\,x^r)}^3\,(a+b\,\ln{(c\,x^n)})\;dx$$

input
```
int(x^5*(d + e*x^r)^3*(a + b*log(c*x^n)),x)
```

output
```
int(x^5*(d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 1052, normalized size of antiderivative = 7.16

$$\int x^5(d+ex^r)^3(a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
int(x^5*(d+e*x^r)^3*(a+b*log(c*x^n)),x)
```

output
```
(x**6*(12*x**(3*r)*log(x**n*c)*b*e**3*r**5 + 240*x**(3*r)*log(x**n*c)*b*e*
*3*r**4 + 1836*x**(3*r)*log(x**n*c)*b*e**3*r**3 + 6696*x**(3*r)*log(x**n*c
)*b*e**3*r**2 + 11664*x**(3*r)*log(x**n*c)*b*e**3*r + 7776*x**(3*r)*log(x*
*n*c)*b*e**3 + 12*x**(3*r)*a*e**3*r**5 + 240*x**(3*r)*a*e**3*r**4 + 1836*x
**(3*r)*a*e**3*r**3 + 6696*x**(3*r)*a*e**3*r**2 + 11664*x**(3*r)*a*e**3*r
 + 7776*x**(3*r)*a*e**3 - 4*x**(3*r)*b*e**3*n*r**4 - 72*x**(3*r)*b*e**3*n*r
**3 - 468*x**(3*r)*b*e**3*n*r**2 - 1296*x**(3*r)*b*e**3*n*r - 1296*x**(3*r
)*b*e**3*n + 54*x**(2*r)*log(x**n*c)*b*d*e**2*r**5 + 1026*x**(2*r)*log(x**
n*c)*b*d*e**2*r**4 + 7344*x**(2*r)*log(x**n*c)*b*d*e**2*r**3 + 24624*x**(2
*r)*log(x**n*c)*b*d*e**2*r**2 + 38880*x**(2*r)*log(x**n*c)*b*d*e**2*r + 23
328*x**(2*r)*log(x**n*c)*b*d*e**2 + 54*x**(2*r)*a*d*e**2*r**5 + 1026*x**(2
*r)*a*d*e**2*r**4 + 7344*x**(2*r)*a*d*e**2*r**3 + 24624*x**(2*r)*a*d*e**2*
r**2 + 38880*x**(2*r)*a*d*e**2*r + 23328*x**(2*r)*a*d*e**2 - 27*x**(2*r)*b
*d*e**2*n*r**4 - 432*x**(2*r)*b*d*e**2*n*r**3 - 2376*x**(2*r)*b*d*e**2*n*r
**2 - 5184*x**(2*r)*b*d*e**2*n*r - 3888*x**(2*r)*b*d*e**2*n + 108*x**r*log
(x**n*c)*b*d**2*e*r**5 + 1728*x**r*log(x**n*c)*b*d**2*e*r**4 + 10476*x**r*
log(x**n*c)*b*d**2*e*r**3 + 30456*x**r*log(x**n*c)*b*d**2*e*r**2 + 42768*x
**r*log(x**n*c)*b*d**2*e*r + 23328*x**r*log(x**n*c)*b*d**2*e + 108*x**r*a*
d**2*e*r**5 + 1728*x**r*a*d**2*e*r**4 + 10476*x**r*a*d**2*e*r**3 + 30456*x
**r*a*d**2*e*r**2 + 42768*x**r*a*d**2*e*r + 23328*x**r*a*d**2*e - 108*x...
```

3.391 $\int x^3(d+ex^r)^3\,(a+b\log{(cx^n)})\;dx$

Optimal result 2909
Mathematica [A] (verified) 2909
Rubi [A] (verified) 2910
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Optimal result

Integrand size = 23, antiderivative size = 149

$$\int x^3(d+ex^r)^3\,(a+b\log{(cx^n)})\;dx=-\frac{1}{16}bd^3nx^4-\frac{3bde^2nx^{2(2+r)}}{4(2+r)^2}-\frac{3bd^2enx^{4+r}}{(4+r)^2}-\frac{be^3nx^{4+3r}}{(4+3r)^2}+\frac{1}{4}\left(d^3x^4+\frac{6de^2x^{2(2+r)}}{2+r}+\frac{12d^2ex^{4+r}}{4+r}+\frac{4e^3x^{4+3r}}{4+3r}\right)(a+b\log{(cx^n)})$$

output
```
-1/16*b*d^3*n*x^4-3/4*b*d*e^2*n*x^(4+2*r)/(2+r)^2-3*b*d^2*e*n*x^(4+r)/(4+r
)^2-b*e^3*n*x^(4+3*r)/(4+3*r)^2+1/4*(d^3*x^4+6*d*e^2*x^(4+2*r)/(2+r)+12*d^
2*e*x^(4+r)/(4+r)+4*e^3*x^(4+3*r)/(4+3*r))*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.43 (sec) , antiderivative size = 178, normalized size of antiderivative = 1.19

$$\int x^3(d+ex^r)^3\,(a+b\log{(cx^n)})\;dx=\frac{1}{16}x^4\left(bn\left(-d^3-\frac{48d^2ex^r}{(4+r)^2}-\frac{12de^2x^{2r}}{(2+r)^2}-\frac{16e^3x^{3r}}{(4+3r)^2}\right)+4a\left(d^3+\frac{12d^2ex^r}{4+r}+\frac{6de^2x^{2r}}{2+r}+\frac{4e^3x^{3r}}{4+3r}\right)+4b\left(d^3+\frac{12d^2ex^r}{4+r}+\frac{6de^2x^{2r}}{2+r}+\frac{4e^3x^{3r}}{4+3r}\right)\log{(cx^n)}\right)$$

input
```
Integrate[x^3*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
(x^4*(b*n*(-d^3 - (48*d^2*e*x^r)/(4 + r)^2 - (12*d*e^2*x^(2*r))/(2 + r)^2
- (16*e^3*x^(3*r))/(4 + 3*r)^2) + 4*a*(d^3 + (12*d^2*e*x^r)/(4 + r) + (6*d
*e^2*x^(2*r))/(2 + r) + (4*e^3*x^(3*r))/(4 + 3*r)) + 4*b*(d^3 + (12*d^2*e*
x^r)/(4 + r) + (6*d*e^2*x^(2*r))/(2 + r) + (4*e^3*x^(3*r))/(4 + 3*r))*Log[
c*x^n]))/16
```

Rubi [A] (verified)

Time = 0.61 (sec) , antiderivative size = 146, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2771, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3(d+ex^r)^3(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{4}\left(d^3x^4+\frac{12d^2ex^{r+4}}{r+4}+\frac{6de^2x^{2(r+2)}}{r+2}+\frac{4e^3x^{3r+4}}{3r+4}\right)(a+b\log(cx^n))-bn\int \frac{1}{4}x^3\left(\frac{12d^2ex^r}{r+4}+\frac{6de^2x^{2r}}{r+2}+\frac{4e^3x^{3r}}{3r+4}+d^3\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}\left(d^3x^4+\frac{12d^2ex^{r+4}}{r+4}+\frac{6de^2x^{2(r+2)}}{r+2}+\frac{4e^3x^{3r+4}}{3r+4}\right)(a+b\log(cx^n))-\frac{1}{4}bn\int x^3\left(\frac{12d^2ex^r}{r+4}+\frac{6de^2x^{2r}}{r+2}+\frac{4e^3x^{3r}}{3r+4}+d^3\right)dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{4}\left(d^3x^4+\frac{12d^2ex^{r+4}}{r+4}+\frac{6de^2x^{2(r+2)}}{r+2}+\frac{4e^3x^{3r+4}}{3r+4}\right)(a+b\log(cx^n))-\frac{1}{4}bn\int \left(\frac{4e^3x^{3(r+1)}}{3r+4}+\frac{12d^2ex^{r+3}}{r+4}+\frac{6de^2x^{2r+3}}{r+2}+d^3x^3\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\left(d^3x^4+\frac{12d^2ex^{r+4}}{r+4}+\frac{6de^2x^{2(r+2)}}{r+2}+\frac{4e^3x^{3r+4}}{3r+4}\right)(a+b\log(cx^n))-\frac{1}{4}bn\left(\frac{d^3x^4}{4}+\frac{12d^2ex^{r+4}}{(r+4)^2}+\frac{3de^2x^{2(r+2)}}{(r+2)^2}+\frac{4e^3x^{3r+4}}{(3r+4)^2}\right)$$

input
```
Int[x^3*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/4*(b*n*((d^3*x^4)/4 + (3*d*e^2*x^(2*(2 + r)))/(2 + r)^2 + (12*d^2*e*x^(
4 + r))/(4 + r)^2 + (4*e^3*x^(4 + 3*r))/(4 + 3*r)^2)) + ((d^3*x^4 + (6*d*e
^2*x^(2*(2 + r)))/(2 + r) + (12*d^2*e*x^(4 + r))/(4 + r) + (4*e^3*x^(4 + 3
*r))/(4 + 3*r))*(a + b*Log[c*x^n]))/4
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1261 vs. 2(143) = 286.

Time = 19.01 (sec) , antiderivative size = 1262, normalized size of antiderivative = 8.47

method	result	size
parallelrisch	Expression too large to display	1262
risch	Expression too large to display	4027

input

```
int(x^3*(d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output

```
-1/16*(-13056*x^4*(x^r)^2*ln(c*x^n)*b*d*e^2*r^3-29184*x^4*(x^r)^2*ln(c*x^n
)*b*d*e^2*r^2-30720*x^4*(x^r)^2*ln(c*x^n)*b*d*e^2*r+432*x^4*x^r*b*d^2*e*n*
r^4+2880*x^4*x^r*b*d^2*e*n*r^3-4096*a*d^3*x^4-36*x^4*a*d^3*r^6-528*x^4*a*d
^3*r^5-3088*x^4*a*d^3*r^4-9216*x^4*a*d^3*r^3-14848*x^4*a*d^3*r^2-12288*x^4
*a*d^3*r-4096*x^4*(x^r)^3*a*e^3-4096*x^4*ln(c*x^n)*b*d^3-9216*x^4*(x^r)^3*
a*e^3*r+1024*x^4*(x^r)^3*b*e^3*n-12288*x^4*x^r*a*d^2*e-12288*x^4*(x^r)^2*a
*d*e^2-36*x^4*ln(c*x^n)*b*d^3*r^6-528*x^4*ln(c*x^n)*b*d^3*r^5-3088*x^4*ln(
c*x^n)*b*d^3*r^4-9216*x^4*ln(c*x^n)*b*d^3*r^3-14848*x^4*ln(c*x^n)*b*d^3*r^
2-12288*x^4*ln(c*x^n)*b*d^3*r+9*x^4*b*d^3*n*r^6+132*x^4*b*d^3*n*r^5+772*x^
4*b*d^3*n*r^4+2304*x^4*b*d^3*n*r^3+3712*x^4*b*d^3*n*r^2+3072*x^4*b*d^3*n*r
-48*x^4*(x^r)^3*a*e^3*r^5-640*x^4*(x^r)^3*a*e^3*r^4-3264*x^4*(x^r)^3*a*e^3
*r^3-7936*x^4*(x^r)^3*a*e^3*r^2-4096*b*e^3*ln(c*x^n)*(x^r)^3*x^4-12288*e^2
*d*b*ln(c*x^n)*(x^r)^2*x^4-12288*b*d^2*e*ln(c*x^n)*x^r*x^4+16*x^4*(x^r)^3*
b*e^3*n*r^4+192*x^4*(x^r)^3*b*e^3*n*r^3+832*x^4*(x^r)^3*b*e^3*n*r^2+1536*x
^4*(x^r)^3*b*e^3*n*r+7104*x^4*x^r*b*d^2*e*n*r^2+7680*x^4*x^r*b*d^2*e*n*r+1
08*x^4*(x^r)^2*b*d*e^2*n*r^4+1152*x^4*(x^r)^2*b*d*e^2*n*r^3+4224*x^4*(x^r)
^2*b*d*e^2*n*r^2+6144*x^4*(x^r)^2*b*d*e^2*n*r-432*x^4*x^r*ln(c*x^n)*b*d^2*
e*r^5-4608*x^4*x^r*ln(c*x^n)*b*d^2*e*r^4-18624*x^4*x^r*ln(c*x^n)*b*d^2*e*r
^3-36096*x^4*x^r*ln(c*x^n)*b*d^2*e*r^2-33792*x^4*x^r*ln(c*x^n)*b*d^2*e*r-2
16*x^4*(x^r)^2*ln(c*x^n)*b*d*e^2*r^5-2736*x^4*(x^r)^2*ln(c*x^n)*b*d*e^2...
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1022 vs. $2(143) = 286$.

Time = 0.09 (sec) , antiderivative size = 1022, normalized size of antiderivative = 6.86

$$\int x^3(d+ex^r)^3(a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x^3*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/16*(4*(9*b*d^3*r^6 + 132*b*d^3*r^5 + 772*b*d^3*r^4 + 2304*b*d^3*r^3 + 37
12*b*d^3*r^2 + 3072*b*d^3*r + 1024*b*d^3)*x^4*log(c) + 4*(9*b*d^3*n*r^6 +
132*b*d^3*n*r^5 + 772*b*d^3*n*r^4 + 2304*b*d^3*n*r^3 + 3712*b*d^3*n*r^2 +
3072*b*d^3*n*r + 1024*b*d^3*n)*x^4*log(x) - (9*(b*d^3*n - 4*a*d^3)*r^6 + 1
32*(b*d^3*n - 4*a*d^3)*r^5 + 1024*b*d^3*n + 772*(b*d^3*n - 4*a*d^3)*r^4 -
4096*a*d^3 + 2304*(b*d^3*n - 4*a*d^3)*r^3 + 3712*(b*d^3*n - 4*a*d^3)*r^2 +
 3072*(b*d^3*n - 4*a*d^3)*r)*x^4 + 16*((3*b*e^3*r^5 + 40*b*e^3*r^4 + 204*b
*e^3*r^3 + 496*b*e^3*r^2 + 576*b*e^3*r + 256*b*e^3)*x^4*log(c) + (3*b*e^3*
n*r^5 + 40*b*e^3*n*r^4 + 204*b*e^3*n*r^3 + 496*b*e^3*n*r^2 + 576*b*e^3*n*r
 + 256*b*e^3*n)*x^4*log(x) + (3*a*e^3*r^5 - 64*b*e^3*n - (b*e^3*n - 40*a*e
^3)*r^4 + 256*a*e^3 - 12*(b*e^3*n - 17*a*e^3)*r^3 - 4*(13*b*e^3*n - 124*a*
e^3)*r^2 - 96*(b*e^3*n - 6*a*e^3)*r)*x^4)*x^(3*r) + 12*(2*(9*b*d*e^2*r^5 +
 114*b*d*e^2*r^4 + 544*b*d*e^2*r^3 + 1216*b*d*e^2*r^2 + 1280*b*d*e^2*r + 5
12*b*d*e^2)*x^4*log(c) + 2*(9*b*d*e^2*n*r^5 + 114*b*d*e^2*n*r^4 + 544*b*d*
e^2*n*r^3 + 1216*b*d*e^2*n*r^2 + 1280*b*d*e^2*n*r + 512*b*d*e^2*n)*x^4*log
(x) + (18*a*d*e^2*r^5 - 256*b*d*e^2*n - 3*(3*b*d*e^2*n - 76*a*d*e^2)*r^4 +
 1024*a*d*e^2 - 32*(3*b*d*e^2*n - 34*a*d*e^2)*r^3 - 32*(11*b*d*e^2*n - 76*
a*d*e^2)*r^2 - 512*(b*d*e^2*n - 5*a*d*e^2)*r)*x^4)*x^(2*r) + 48*((9*b*d^2*
e*r^5 + 96*b*d^2*e*r^4 + 388*b*d^2*e*r^3 + 752*b*d^2*e*r^2 + 704*b*d^2*e*r
 + 256*b*d^2*e)*x^4*log(c) + (9*b*d^2*e*n*r^5 + 96*b*d^2*e*n*r^4 + 388*...
```

Sympy [F(-1)]

Timed out.

$$\int x^3(d+ex^r)^3\,(a+b\log{(cx^n)})\;dx=\text{Timed out}$$

input
```
integrate(x**3*(d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 222, normalized size of antiderivative = 1.49

$$\begin{aligned}\int x^3(d+ex^r)^3\,(a+b\log{(cx^n)})\;dx=&-\frac{1}{16}\,bd^3nx^4+\frac{1}{4}\,bd^3x^4\log{(cx^n)}\\&+\frac{1}{4}\,ad^3x^4+\frac{be^3x^{3\,r+4}\log{(cx^n)}}{3\,r+4}\\&+\frac{3\,bde^2x^{2\,r+4}\log{(cx^n)}}{2\,(r+2)}+\frac{3\,bd^2ex^{r+4}\log{(cx^n)}}{r+4}\\&-\frac{be^3nx^{3\,r+4}}{(3\,r+4)^2}+\frac{ae^3x^{3\,r+4}}{3\,r+4}-\frac{3\,bde^2nx^{2\,r+4}}{4\,(r+2)^2}\\&+\frac{3\,ade^2x^{2\,r+4}}{2\,(r+2)}-\frac{3\,bd^2enx^{r+4}}{(r+4)^2}+\frac{3\,ad^2ex^{r+4}}{r+4}\end{aligned}$$

input
```
integrate(x^3*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/16*b*d^3*n*x^4 + 1/4*b*d^3*x^4*log(c*x^n) + 1/4*a*d^3*x^4 + b*e^3*x^(3*
r + 4)*log(c*x^n)/(3*r + 4) + 3/2*b*d*e^2*x^(2*r + 4)*log(c*x^n)/(r + 2) +
 3*b*d^2*e*x^(r + 4)*log(c*x^n)/(r + 4) - b*e^3*n*x^(3*r + 4)/(3*r + 4)^2
+ a*e^3*x^(3*r + 4)/(3*r + 4) - 3/4*b*d*e^2*n*x^(2*r + 4)/(r + 2)^2 + 3/2*
a*d*e^2*x^(2*r + 4)/(r + 2) - 3*b*d^2*e*n*x^(r + 4)/(r + 4)^2 + 3*a*d^2*e*
x^(r + 4)/(r + 4)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1611 vs. $2(143) = 286$.

Time = 0.14 (sec) , antiderivative size = 1611, normalized size of antiderivative = 10.81

$$\int x^3(d+ex^r)^3(a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x^3*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/16*(48*b*e^3*n*r^5*x^4*x^(3*r)*log(x) + 216*b*d*e^2*n*r^5*x^4*x^(2*r)*lo
g(x) + 432*b*d^2*e*n*r^5*x^4*x^r*log(x) + 36*b*d^3*n*r^6*x^4*log(x) - 9*b*
d^3*n*r^6*x^4 + 48*b*e^3*r^5*x^4*x^(3*r)*log(c) + 216*b*d*e^2*r^5*x^4*x^(2
*r)*log(c) + 432*b*d^2*e*r^5*x^4*x^r*log(c) + 36*b*d^3*r^6*x^4*log(c) + 64
0*b*e^3*n*r^4*x^4*x^(3*r)*log(x) + 2736*b*d*e^2*n*r^4*x^4*x^(2*r)*log(x) +
 4608*b*d^2*e*n*r^4*x^4*x^r*log(x) + 528*b*d^3*n*r^5*x^4*log(x) - 16*b*e^3
*n*r^4*x^4*x^(3*r) + 48*a*e^3*r^5*x^4*x^(3*r) - 108*b*d*e^2*n*r^4*x^4*x^(2
*r) + 216*a*d*e^2*r^5*x^4*x^(2*r) - 432*b*d^2*e*n*r^4*x^4*x^r + 432*a*d^2*
e*r^5*x^4*x^r - 132*b*d^3*n*r^5*x^4 + 36*a*d^3*r^6*x^4 + 640*b*e^3*r^4*x^4
*x^(3*r)*log(c) + 2736*b*d*e^2*r^4*x^4*x^(2*r)*log(c) + 4608*b*d^2*e*r^4*x
^4*x^r*log(c) + 528*b*d^3*r^5*x^4*log(c) + 3264*b*e^3*n*r^3*x^4*x^(3*r)*lo
g(x) + 13056*b*d*e^2*n*r^3*x^4*x^(2*r)*log(x) + 18624*b*d^2*e*n*r^3*x^4*x^
r*log(x) + 3088*b*d^3*n*r^4*x^4*log(x) - 192*b*e^3*n*r^3*x^4*x^(3*r) + 640
*a*e^3*r^4*x^4*x^(3*r) - 1152*b*d*e^2*n*r^3*x^4*x^(2*r) + 2736*a*d*e^2*r^4
*x^4*x^(2*r) - 2880*b*d^2*e*n*r^3*x^4*x^r + 4608*a*d^2*e*r^4*x^4*x^r - 772
*b*d^3*n*r^4*x^4 + 528*a*d^3*r^5*x^4 + 3264*b*e^3*r^3*x^4*x^(3*r)*log(c) +
 13056*b*d*e^2*r^3*x^4*x^(2*r)*log(c) + 18624*b*d^2*e*r^3*x^4*x^r*log(c) +
 3088*b*d^3*r^4*x^4*log(c) + 7936*b*e^3*n*r^2*x^4*x^(3*r)*log(x) + 29184*b
*d*e^2*n*r^2*x^4*x^(2*r)*log(x) + 36096*b*d^2*e*n*r^2*x^4*x^r*log(x) + 921
6*b*d^3*n*r^3*x^4*log(x) - 832*b*e^3*n*r^2*x^4*x^(3*r) + 3264*a*e^3*r^3...
```

Mupad [F(-1)]

Timed out.

$$\int x^3(d+ex^r)^3\,(a+b\log{(cx^n)})\;dx = \int x^3\,(d+e\,x^r)^3\,(a+b\,\ln{(c\,x^n)})\;dx$$

input
```
int(x^3*(d + e*x^r)^3*(a + b*log(c*x^n)),x)
```

output
```
int(x^3*(d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 1052, normalized size of antiderivative = 7.06

$$\int x^3(d+ex^r)^3\,(a+b\log{(cx^n)})\;dx = \text{Too large to display}$$

input
```
int(x^3*(d+e*x^r)^3*(a+b*log(c*x^n)),x)
```

output
```
(x**4*(48*x**(3*r)*log(x**n*c)*b*e**3*r**5 + 640*x**(3*r)*log(x**n*c)*b*e*
*3*r**4 + 3264*x**(3*r)*log(x**n*c)*b*e**3*r**3 + 7936*x**(3*r)*log(x**n*c
)*b*e**3*r**2 + 9216*x**(3*r)*log(x**n*c)*b*e**3*r + 4096*x**(3*r)*log(x**
n*c)*b*e**3 + 48*x**(3*r)*a*e**3*r**5 + 640*x**(3*r)*a*e**3*r**4 + 3264*x*
*(3*r)*a*e**3*r**3 + 7936*x**(3*r)*a*e**3*r**2 + 9216*x**(3*r)*a*e**3*r +
4096*x**(3*r)*a*e**3 - 16*x**(3*r)*b*e**3*n*r**4 - 192*x**(3*r)*b*e**3*n*r
**3 - 832*x**(3*r)*b*e**3*n*r**2 - 1536*x**(3*r)*b*e**3*n*r - 1024*x**(3*r
)*b*e**3*n + 216*x**(2*r)*log(x**n*c)*b*d*e**2*r**5 + 2736*x**(2*r)*log(x*
*n*c)*b*d*e**2*r**4 + 13056*x**(2*r)*log(x**n*c)*b*d*e**2*r**3 + 29184*x**
(2*r)*log(x**n*c)*b*d*e**2*r**2 + 30720*x**(2*r)*log(x**n*c)*b*d*e**2*r +
12288*x**(2*r)*log(x**n*c)*b*d*e**2 + 216*x**(2*r)*a*d*e**2*r**5 + 2736*x*
*(2*r)*a*d*e**2*r**4 + 13056*x**(2*r)*a*d*e**2*r**3 + 29184*x**(2*r)*a*d*e
**2*r**2 + 30720*x**(2*r)*a*d*e**2*r + 12288*x**(2*r)*a*d*e**2 - 108*x**(2
*r)*b*d*e**2*n*r**4 - 1152*x**(2*r)*b*d*e**2*n*r**3 - 4224*x**(2*r)*b*d*e*
*2*n*r**2 - 6144*x**(2*r)*b*d*e**2*n*r - 3072*x**(2*r)*b*d*e**2*n + 432*x*
*r*log(x**n*c)*b*d**2*e*r**5 + 4608*x**r*log(x**n*c)*b*d**2*e*r**4 + 18624
*x**r*log(x**n*c)*b*d**2*e*r**3 + 36096*x**r*log(x**n*c)*b*d**2*e*r**2 + 3
3792*x**r*log(x**n*c)*b*d**2*e*r + 12288*x**r*log(x**n*c)*b*d**2*e + 432*x
**r*a*d**2*e*r**5 + 4608*x**r*a*d**2*e*r**4 + 18624*x**r*a*d**2*e*r**3 + 3
6096*x**r*a*d**2*e*r**2 + 33792*x**r*a*d**2*e*r + 12288*x**r*a*d**2*e -...
```

3.392 $\int x(d+ex^r)^3 (a+b\log(cx^n)) \, dx$

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Optimal result

Integrand size = 21, antiderivative size = 149

$$\int x(d+ex^r)^3 (a+b\log(cx^n)) \, dx = -\frac{1}{4}bd^3nx^2 - \frac{3bde^2nx^{2(1+r)}}{4(1+r)^2} - \frac{3bd^2enx^{2+r}}{(2+r)^2} - \frac{be^3nx^{2+3r}}{(2+3r)^2} + \frac{1}{2}\left(d^3x^2 + \frac{3de^2x^{2(1+r)}}{1+r} + \frac{6d^2ex^{2+r}}{2+r} + \frac{2e^3x^{2+3r}}{2+3r}\right)(a+b\log(cx^n))$$

output
```
-1/4*b*d^3*n*x^2-3/4*b*d*e^2*n*x^(2+2*r)/(1+r)^2-3*b*d^2*e*n*x^(2+r)/(2+r)
^2-b*e^3*n*x^(2+3*r)/(2+3*r)^2+1/2*(d^3*x^2+3*d*e^2*x^(2+2*r)/(1+r)+6*d^2*
e*x^(2+r)/(2+r)+2*e^3*x^(2+3*r)/(2+3*r))*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.40 (sec) , antiderivative size = 178, normalized size of antiderivative = 1.19

$$\int x(d+ex^r)^3 (a+b\log(cx^n)) \, dx = \frac{1}{4}x^2\left(bn\left(-d^3 - \frac{12d^2ex^r}{(2+r)^2} - \frac{3de^2x^{2r}}{(1+r)^2} - \frac{4e^3x^{3r}}{(2+3r)^2}\right) + 2a\left(d^3 + \frac{6d^2ex^r}{2+r} + \frac{3de^2x^{2r}}{1+r} + \frac{2e^3x^{3r}}{2+3r}\right) + 2b\left(d^3 + \frac{6d^2ex^r}{2+r} + \frac{3de^2x^{2r}}{1+r} + \frac{2e^3x^{3r}}{2+3r}\right)\log(cx^n)\right)$$

input
```
Integrate[x*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
(x^2*(b*n*(-d^3 - (12*d^2*e*x^r)/(2 + r)^2 - (3*d*e^2*x^(2*r))/(1 + r)^2 -
 (4*e^3*x^(3*r))/(2 + 3*r)^2) + 2*a*(d^3 + (6*d^2*e*x^r)/(2 + r) + (3*d*e^
2*x^(2*r))/(1 + r) + (2*e^3*x^(3*r))/(2 + 3*r)) + 2*b*(d^3 + (6*d^2*e*x^r)
/(2 + r) + (3*d*e^2*x^(2*r))/(1 + r) + (2*e^3*x^(3*r))/(2 + 3*r))*Log[c*x^
n]))/4
```

Rubi [A] (verified)

Time = 0.58 (sec) , antiderivative size = 148, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2771, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex^r)^3\,(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{2}\left(d^3x^2+\frac{6d^2ex^{r+2}}{r+2}+\frac{3de^2x^{2(r+1)}}{r+1}+\frac{2e^3x^{3r+2}}{3r+2}\right)(a+b\log(cx^n))-bn\int \frac{1}{2}x\left(\frac{6d^2ex^r}{r+2}+\frac{3de^2x^{2r}}{r+1}+\frac{2e^3x^{3r}}{3r+2}+d^3\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}\left(d^3x^2+\frac{6d^2ex^{r+2}}{r+2}+\frac{3de^2x^{2(r+1)}}{r+1}+\frac{2e^3x^{3r+2}}{3r+2}\right)(a+b\log(cx^n))-\frac{1}{2}bn\int x\left(\frac{6d^2ex^r}{r+2}+\frac{3de^2x^{2r}}{r+1}+\frac{2e^3x^{3r}}{3r+2}+d^3\right)dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{2}\left(d^3x^2+\frac{6d^2ex^{r+2}}{r+2}+\frac{3de^2x^{2(r+1)}}{r+1}+\frac{2e^3x^{3r+2}}{3r+2}\right)(a+b\log(cx^n))-\frac{1}{2}bn\int \left(\frac{6d^2ex^{r+1}}{r+2}+\frac{3de^2x^{2r+1}}{r+1}+\frac{2e^3x^{3r+1}}{3r+2}+d^3x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}\left(d^3x^2+\frac{6d^2ex^{r+2}}{r+2}+\frac{3de^2x^{2(r+1)}}{r+1}+\frac{2e^3x^{3r+2}}{3r+2}\right)(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d^3x^2}{2}+\frac{6d^2ex^{r+2}}{(r+2)^2}+\frac{3de^2x^{2(r+1)}}{2(r+1)^2}+\frac{2e^3x^{3r+2}}{(3r+2)^2}\right)$$

input
```
Int[x*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/2*(b*n*((d^3*x^2)/2 + (3*d*e^2*x^(2*(1 + r)))/(2*(1 + r)^2) + (6*d^2*e*
x^(2 + r))/(2 + r)^2 + (2*e^3*x^(2 + 3*r))/(2 + 3*r)^2)) + ((d^3*x^2 + (3*
d*e^2*x^(2*(1 + r)))/(1 + r) + (6*d^2*e*x^(2 + r))/(2 + r) + (2*e^3*x^(2 +
 3*r))/(2 + 3*r))*(a + b*Log[c*x^n]))/2
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1266 vs. $2(143) = 286$.

Time = 6.14 (sec) , antiderivative size = 1267, normalized size of antiderivative = 8.50

method	result	size
parallelrisch	Expression too large to display	1267
risch	Expression too large to display	4027

input
```
int(x*(d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/4*(-32*a*d^3*x^2-576*x^2*a*d^3*r^3-464*x^2*a*d^3*r^2-192*x^2*a*d^3*r-32
*x^2*(x^r)^3*a*e^3-18*x^2*a*d^3*r^6-132*x^2*a*d^3*r^5-386*x^2*a*d^3*r^4-32
*x^2*ln(c*x^n)*b*d^3+9*x^2*b*d^3*n*r^6+66*x^2*b*d^3*n*r^5+193*x^2*b*d^3*n*
r^4+288*x^2*b*d^3*n*r^3+232*x^2*b*d^3*n*r^2+96*x^2*b*d^3*n*r-96*x^2*(x^r)^
2*a*d*e^2-12*x^2*(x^r)^3*a*e^3*r^5-80*x^2*(x^r)^3*a*e^3*r^4-204*x^2*(x^r)^
3*a*e^3*r^3-248*x^2*(x^r)^3*a*e^3*r^2-144*x^2*(x^r)^3*a*e^3*r+16*x^2*(x^r)
^3*b*e^3*n-96*x^2*x^r*a*d^2*e-18*x^2*ln(c*x^n)*b*d^3*r^6-132*x^2*ln(c*x^n)
*b*d^3*r^5-386*x^2*ln(c*x^n)*b*d^3*r^4-576*x^2*ln(c*x^n)*b*d^3*r^3-464*x^2
*ln(c*x^n)*b*d^3*r^2-192*x^2*ln(c*x^n)*b*d^3*r-32*x^2*(x^r)^3*ln(c*x^n)*b*
e^3-528*x^2*x^r*a*d^2*e*r+48*x^2*x^r*b*d^2*e*n-108*x^2*x^r*ln(c*x^n)*b*d^2
*e*r^5-576*x^2*x^r*ln(c*x^n)*b*d^2*e*r^4-1164*x^2*x^r*ln(c*x^n)*b*d^2*e*r^
3-1128*x^2*x^r*ln(c*x^n)*b*d^2*e*r^2-528*x^2*x^r*ln(c*x^n)*b*d^2*e*r-54*x^
2*(x^r)^2*ln(c*x^n)*b*d*e^2*r^5-342*x^2*(x^r)^2*ln(c*x^n)*b*d*e^2*r^4-816*
x^2*(x^r)^2*ln(c*x^n)*b*d*e^2*r^3-912*x^2*(x^r)^2*ln(c*x^n)*b*d*e^2*r^2-48
0*x^2*(x^r)^2*ln(c*x^n)*b*d*e^2*r+27*x^2*(x^r)^2*b*d*e^2*n*r^4+144*x^2*(x^
r)^2*b*d*e^2*n*r^3+264*x^2*(x^r)^2*b*d*e^2*n*r^2+192*x^2*(x^r)^2*b*d*e^2*n
*r+108*x^2*x^r*b*d^2*e*n*r^4+360*x^2*x^r*b*d^2*e*n*r^3+444*x^2*x^r*b*d^2*e
*n*r^2+240*x^2*x^r*b*d^2*e*n*r-96*x^2*x^r*ln(c*x^n)*b*d^2*e-96*x^2*(x^r)^2
*ln(c*x^n)*b*d*e^2-12*x^2*(x^r)^3*ln(c*x^n)*b*e^3*r^5-80*x^2*(x^r)^3*ln(c*
x^n)*b*e^3*r^4-204*x^2*(x^r)^3*ln(c*x^n)*b*e^3*r^3-248*x^2*(x^r)^3*ln(c...
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1024 vs. $2(143) = 286$.

Time = 0.10 (sec) , antiderivative size = 1024, normalized size of antiderivative = 6.87

$$\int x(d+ex^r)^3 (a+b\log(cx^n)) \, dx = \text{Too large to display}$$

input
```
integrate(x*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/4*(2*(9*b*d^3*r^6 + 66*b*d^3*r^5 + 193*b*d^3*r^4 + 288*b*d^3*r^3 + 232*b
*d^3*r^2 + 96*b*d^3*r + 16*b*d^3)*x^2*log(c) + 2*(9*b*d^3*n*r^6 + 66*b*d^3
*n*r^5 + 193*b*d^3*n*r^4 + 288*b*d^3*n*r^3 + 232*b*d^3*n*r^2 + 96*b*d^3*n*
r + 16*b*d^3*n)*x^2*log(x) - (9*(b*d^3*n - 2*a*d^3)*r^6 + 66*(b*d^3*n - 2*
a*d^3)*r^5 + 16*b*d^3*n + 193*(b*d^3*n - 2*a*d^3)*r^4 - 32*a*d^3 + 288*(b*
d^3*n - 2*a*d^3)*r^3 + 232*(b*d^3*n - 2*a*d^3)*r^2 + 96*(b*d^3*n - 2*a*d^3
)*r)*x^2 + 4*((3*b*e^3*r^5 + 20*b*e^3*r^4 + 51*b*e^3*r^3 + 62*b*e^3*r^2 +
36*b*e^3*r + 8*b*e^3)*x^2*log(c) + (3*b*e^3*n*r^5 + 20*b*e^3*n*r^4 + 51*b*
e^3*n*r^3 + 62*b*e^3*n*r^2 + 36*b*e^3*n*r + 8*b*e^3*n)*x^2*log(x) + (3*a*e
^3*r^5 - 4*b*e^3*n - (b*e^3*n - 20*a*e^3)*r^4 + 8*a*e^3 - 3*(2*b*e^3*n - 1
7*a*e^3)*r^3 - (13*b*e^3*n - 62*a*e^3)*r^2 - 12*(b*e^3*n - 3*a*e^3)*r)*x^2
)*x^(3*r) + 3*(2*(9*b*d*e^2*r^5 + 57*b*d*e^2*r^4 + 136*b*d*e^2*r^3 + 152*b
*d*e^2*r^2 + 80*b*d*e^2*r + 16*b*d*e^2)*x^2*log(c) + 2*(9*b*d*e^2*n*r^5 +
57*b*d*e^2*n*r^4 + 136*b*d*e^2*n*r^3 + 152*b*d*e^2*n*r^2 + 80*b*d*e^2*n*r
+ 16*b*d*e^2*n)*x^2*log(x) + (18*a*d*e^2*r^5 - 16*b*d*e^2*n - 3*(3*b*d*e^2
*n - 38*a*d*e^2)*r^4 + 32*a*d*e^2 - 16*(3*b*d*e^2*n - 17*a*d*e^2)*r^3 - 8*
(11*b*d*e^2*n - 38*a*d*e^2)*r^2 - 32*(2*b*d*e^2*n - 5*a*d*e^2)*r)*x^2)*x^(
2*r) + 12*((9*b*d^2*e*r^5 + 48*b*d^2*e*r^4 + 97*b*d^2*e*r^3 + 94*b*d^2*e*r
^2 + 44*b*d^2*e*r + 8*b*d^2*e)*x^2*log(c) + (9*b*d^2*e*n*r^5 + 48*b*d^2*e*
n*r^4 + 97*b*d^2*e*n*r^3 + 94*b*d^2*e*n*r^2 + 44*b*d^2*e*n*r + 8*b*d^2*...
```

Sympy [A] (verification not implemented)

Time = 85.26 (sec) , antiderivative size = 357, normalized size of antiderivative = 2.40

$$\int x(d+ex^r)^3\,(a+b\log{(cx^n)})\;dx = \text{Too large to display}$$

input
```
integrate(x*(d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x**2/2 + 3*a*d**2*e*Piecewise((x**2*x**r/(r + 2), Ne(r, -2)), (x**2
*x**r*log(x), True)) + 3*a*d*e**2*Piecewise((x**2*x**(2*r)/(2*r + 2), Ne(r
, -1)), (x**2*x**(2*r)*log(x), True)) + a*e**3*Piecewise((x**2*x**(3*r)/(3
*r + 2), Ne(r, -2/3)), (x**2*x**(3*r)*log(x), True)) - b*d**3*n*x**2/4 + b
*d**3*x**2*log(c*x**n)/2 - 3*b*d**2*e*n*Piecewise((Piecewise((x**(r + 2)/(
r + 2), Ne(r, -2)), (log(x), True))/(r + 2), (r > -oo) & (r < oo) & Ne(r,
-2)), (log(x)**2/2, True)) + 3*b*d**2*e*Piecewise((x**(r + 2)/(r + 2), Ne(
r, -2)), (log(x), True))*log(c*x**n) - 3*b*d*e**2*n*Piecewise((Piecewise((
x**(2*r + 2)/(2*r + 2), Ne(r, -1)), (log(x), True))/(2*r + 2), (r > -oo) &
 (r < oo) & Ne(r, -1)), (log(x)**2/2, True)) + 3*b*d*e**2*Piecewise((x**(2
*r + 2)/(2*r + 2), Ne(r, -1)), (log(x), True))*log(c*x**n) - b*e**3*n*Piec
ewise((Piecewise((x**(3*r + 2)/(3*r + 2), Ne(r, -2/3)), (log(x), True))/(3
*r + 2), (r > -oo) & (r < oo) & Ne(r, -2/3)), (log(x)**2/2, True)) + b*e**
3*Piecewise((x**(3*r + 2)/(3*r + 2), Ne(r, -2/3)), (log(x), True))*log(c*x
**n)
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 222, normalized size of antiderivative = 1.49

$$\begin{aligned}\int x(d+ex^r)^3\,(a+b\log{(cx^n)})\;dx = & -\frac{1}{4}\,bd^3nx^2+\frac{1}{2}\,bd^3x^2\log{(cx^n)} \\ & +\frac{1}{2}\,ad^3x^2+\frac{be^3x^{3\,r+2}\log{(cx^n)}}{3\,r+2} \\ & +\frac{3\,bde^2x^{2\,r+2}\log{(cx^n)}}{2\,(r+1)}+\frac{3\,bd^2ex^{r+2}\log{(cx^n)}}{r+2} \\ & -\frac{be^3nx^{3\,r+2}}{(3\,r+2)^2}+\frac{ae^3x^{3\,r+2}}{3\,r+2}-\frac{3\,bde^2nx^{2\,r+2}}{4\,(r+1)^2} \\ & +\frac{3\,ade^2x^{2\,r+2}}{2\,(r+1)}-\frac{3\,bd^2enx^{r+2}}{(r+2)^2}+\frac{3\,ad^2ex^{r+2}}{r+2}\end{aligned}$$

input
```
integrate(x*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/4*b*d^3*n*x^2 + 1/2*b*d^3*x^2*log(c*x^n) + 1/2*a*d^3*x^2 + b*e^3*x^(3*r
 + 2)*log(c*x^n)/(3*r + 2) + 3/2*b*d*e^2*x^(2*r + 2)*log(c*x^n)/(r + 1) +
3*b*d^2*e*x^(r + 2)*log(c*x^n)/(r + 2) - b*e^3*n*x^(3*r + 2)/(3*r + 2)^2 +
 a*e^3*x^(3*r + 2)/(3*r + 2) - 3/4*b*d*e^2*n*x^(2*r + 2)/(r + 1)^2 + 3/2*a
*d*e^2*x^(2*r + 2)/(r + 1) - 3*b*d^2*e*n*x^(r + 2)/(r + 2)^2 + 3*a*d^2*e*x
^(r + 2)/(r + 2)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1611 vs. $2(143) = 286$.

Time = 0.16 (sec) , antiderivative size = 1611, normalized size of antiderivative = 10.81

$$\int x(d+ex^r)^3\,(a+b\log{(cx^n)})\;dx = \text{Too large to display}$$

input
```
integrate(x*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/4*(12*b*e^3*n*r^5*x^2*x^(3*r)*log(x) + 54*b*d*e^2*n*r^5*x^2*x^(2*r)*log(
x) + 108*b*d^2*e*n*r^5*x^2*x^r*log(x) + 18*b*d^3*n*r^6*x^2*log(x) - 9*b*d^
3*n*r^6*x^2 + 12*b*e^3*r^5*x^2*x^(3*r)*log(c) + 54*b*d*e^2*r^5*x^2*x^(2*r)
*log(c) + 108*b*d^2*e*r^5*x^2*x^r*log(c) + 18*b*d^3*r^6*x^2*log(c) + 80*b*
e^3*n*r^4*x^2*x^(3*r)*log(x) + 342*b*d*e^2*n*r^4*x^2*x^(2*r)*log(x) + 576*
b*d^2*e*n*r^4*x^2*x^r*log(x) + 132*b*d^3*n*r^5*x^2*log(x) - 4*b*e^3*n*r^4*
x^2*x^(3*r) + 12*a*e^3*r^5*x^2*x^(3*r) - 27*b*d*e^2*n*r^4*x^2*x^(2*r) + 54
*a*d*e^2*r^5*x^2*x^(2*r) - 108*b*d^2*e*n*r^4*x^2*x^r + 108*a*d^2*e*r^5*x^2
*x^r - 66*b*d^3*n*r^5*x^2 + 18*a*d^3*r^6*x^2 + 80*b*e^3*r^4*x^2*x^(3*r)*lo
g(c) + 342*b*d*e^2*r^4*x^2*x^(2*r)*log(c) + 576*b*d^2*e*r^4*x^2*x^r*log(c)
 + 132*b*d^3*r^5*x^2*log(c) + 204*b*e^3*n*r^3*x^2*x^(3*r)*log(x) + 816*b*d
*e^2*n*r^3*x^2*x^(2*r)*log(x) + 1164*b*d^2*e*n*r^3*x^2*x^r*log(x) + 386*b*
d^3*n*r^4*x^2*log(x) - 24*b*e^3*n*r^3*x^2*x^(3*r) + 80*a*e^3*r^4*x^2*x^(3*
r) - 144*b*d*e^2*n*r^3*x^2*x^(2*r) + 342*a*d*e^2*r^4*x^2*x^(2*r) - 360*b*d
^2*e*n*r^3*x^2*x^r + 576*a*d^2*e*r^4*x^2*x^r - 193*b*d^3*n*r^4*x^2 + 132*a
*d^3*r^5*x^2 + 204*b*e^3*r^3*x^2*x^(3*r)*log(c) + 816*b*d*e^2*r^3*x^2*x^(2
*r)*log(c) + 1164*b*d^2*e*r^3*x^2*x^r*log(c) + 386*b*d^3*r^4*x^2*log(c) +
248*b*e^3*n*r^2*x^2*x^(3*r)*log(x) + 912*b*d*e^2*n*r^2*x^2*x^(2*r)*log(x)
+ 1128*b*d^2*e*n*r^2*x^2*x^r*log(x) + 576*b*d^3*n*r^3*x^2*log(x) - 52*b*e^
3*n*r^2*x^2*x^(3*r) + 204*a*e^3*r^3*x^2*x^(3*r) - 264*b*d*e^2*n*r^2*x^2...
```

Mupad [F(-1)]

Timed out.

$$\int x(d+ex^r)^3\,(a+b\log{(cx^n)})\;dx=\int x\,{\left(d+e\,x^r\right)}^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x*(d + e*x^r)^3*(a + b*log(c*x^n)),x)
```

output
```
int(x*(d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 1052, normalized size of antiderivative = 7.06

$$\int x(d+ex^r)^3(a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
int(x*(d+e*x^r)^3*(a+b*log(c*x^n)),x)
```

output
```
(x**2*(12*x**(3*r)*log(x**n*c)*b*e**3*r**5 + 80*x**(3*r)*log(x**n*c)*b*e**
3*r**4 + 204*x**(3*r)*log(x**n*c)*b*e**3*r**3 + 248*x**(3*r)*log(x**n*c)*b
*e**3*r**2 + 144*x**(3*r)*log(x**n*c)*b*e**3*r + 32*x**(3*r)*log(x**n*c)*b
*e**3 + 12*x**(3*r)*a*e**3*r**5 + 80*x**(3*r)*a*e**3*r**4 + 204*x**(3*r)*a
*e**3*r**3 + 248*x**(3*r)*a*e**3*r**2 + 144*x**(3*r)*a*e**3*r + 32*x**(3*r
)*a*e**3 - 4*x**(3*r)*b*e**3*n*r**4 - 24*x**(3*r)*b*e**3*n*r**3 - 52*x**(3
*r)*b*e**3*n*r**2 - 48*x**(3*r)*b*e**3*n*r - 16*x**(3*r)*b*e**3*n + 54*x**
(2*r)*log(x**n*c)*b*d*e**2*r**5 + 342*x**(2*r)*log(x**n*c)*b*d*e**2*r**4 +
 816*x**(2*r)*log(x**n*c)*b*d*e**2*r**3 + 912*x**(2*r)*log(x**n*c)*b*d*e**
2*r**2 + 480*x**(2*r)*log(x**n*c)*b*d*e**2*r + 96*x**(2*r)*log(x**n*c)*b*d
*e**2 + 54*x**(2*r)*a*d*e**2*r**5 + 342*x**(2*r)*a*d*e**2*r**4 + 816*x**(2
*r)*a*d*e**2*r**3 + 912*x**(2*r)*a*d*e**2*r**2 + 480*x**(2*r)*a*d*e**2*r +
 96*x**(2*r)*a*d*e**2 - 27*x**(2*r)*b*d*e**2*n*r**4 - 144*x**(2*r)*b*d*e**
2*n*r**3 - 264*x**(2*r)*b*d*e**2*n*r**2 - 192*x**(2*r)*b*d*e**2*n*r - 48*x
**(2*r)*b*d*e**2*n + 108*x**r*log(x**n*c)*b*d**2*e*r**5 + 576*x**r*log(x**
n*c)*b*d**2*e*r**4 + 1164*x**r*log(x**n*c)*b*d**2*e*r**3 + 1128*x**r*log(x
**n*c)*b*d**2*e*r**2 + 528*x**r*log(x**n*c)*b*d**2*e*r + 96*x**r*log(x**n*
c)*b*d**2*e + 108*x**r*a*d**2*e*r**5 + 576*x**r*a*d**2*e*r**4 + 1164*x**r*
a*d**2*e*r**3 + 1128*x**r*a*d**2*e*r**2 + 528*x**r*a*d**2*e*r + 96*x**r*a*
d**2*e - 108*x**r*b*d**2*e*n*r**4 - 360*x**r*b*d**2*e*n*r**3 - 444*x**r...
```

3.393 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x}\,dx$

Optimal result 2927
Mathematica [A] (verified) 2927
Rubi [A] (verified) 2928
Maple [A] (warning: unable to verify) 2930
Fricas [A] (verification not implemented) 2930
Sympy [A] (verification not implemented) 2931
Maxima [A] (verification not implemented) 2932
Giac [F] 2932
Mupad [F(-1)] 2933
Reduce [B] (verification not implemented) 2933

Optimal result

Integrand size = 23, antiderivative size = 152

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x}\,dx = -\frac{3bd^2enx^r}{r^2}-\frac{3bde^2nx^{2r}}{4r^2}-\frac{be^3nx^{3r}}{9r^2}-\frac{1}{2}bd^3n\log^2(x)+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}+d^3\log(x)(a+b\log(cx^n))$$

output
```
-3*b*d^2*e*n*x^r/r^2-3/4*b*d*e^2*n*x^(2*r)/r^2-1/9*b*e^3*n*x^(3*r)/r^2-1/2
*b*d^3*n*ln(x)^2+3*d^2*e*x^r*(a+b*ln(c*x^n))/r+3/2*d*e^2*x^(2*r)*(a+b*ln(c
*x^n))/r+1/3*e^3*x^(3*r)*(a+b*ln(c*x^n))/r+d^3*ln(x)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.40 (sec) , antiderivative size = 132, normalized size of antiderivative = 0.87

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x}\,dx = ad^3\log(x)+\frac{1}{36}\left(\frac{ex^r(6ar(18d^2+9dex^r+2e^2x^{2r})-bn(108d^2+27dex^r+4e^2x^{2r}))}{r^2}+\frac{6bex^r(18d^2+9dex^r+2e^2x^{2r})\log(cx^n)}{r}+\frac{18bd^3\log^2(cx^n)}{n}\right)$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x,x]
```

output
```
a*d^3*Log[x] + ((e*x^r*(6*a*r*(18*d^2 + 9*d*e*x^r + 2*e^2*x^(2*r)) - b*n*(
108*d^2 + 27*d*e*x^r + 4*e^2*x^(2*r))))/r^2 + (6*b*e*x^r*(18*d^2 + 9*d*e*x
^r + 2*e^2*x^(2*r))*Log[c*x^n])/r + (18*b*d^3*Log[c*x^n]^2)/n)/36
```

Rubi [A] (verified)

Time = 0.46 (sec) , antiderivative size = 153, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \frac{e\left(9dex^r+2e^2x^{2r}+18d^2\right)x^r+6d^3r\log(x)}{6rx}dx+d^3\log(x)(a+b\log(cx^n))+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}$$

$$\Big\downarrow \text{27}$$

$$-\frac{bn\int \frac{e\left(9dex^r+2e^2x^{2r}+18d^2\right)x^r+6d^3r\log(x)}{x}dx}{6r}+d^3\log(x)(a+b\log(cx^n))+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}$$

$$\Big\downarrow \text{2010}$$

$$-\frac{bn\int \left(18d^2ex^{r-1}+9de^2x^{2r-1}+2e^3x^{3r-1}+\frac{6d^3r\log(x)}{x}\right)dx}{6r}+d^3\log(x)(a+b\log(cx^n))+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}$$

$$\Big\downarrow \text{2009}$$

$$d^3 \log(x) (a + b \log(cx^n)) + \frac{3d^2ex^r(a + b\log(cx^n))}{r} + \frac{3de^2x^{2r}(a + b\log(cx^n))}{2r} + \frac{e^3x^{3r}(a + b\log(cx^n))}{3r} - \frac{bn\left(3d^3r\log^2(x) + \frac{18d^2ex^r}{r} + \frac{9de^2x^{2r}}{2r} + \frac{2e^3x^{3r}}{3r}\right)}{6r}$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x,x]
```

output
```
-1/6*(b*n*((18*d^2*e*x^r)/r + (9*d*e^2*x^(2*r))/(2*r) + (2*e^3*x^(3*r))/(3
*r) + 3*d^3*r*Log[x]^2))/r + (3*d^2*e*x^r*(a + b*Log[c*x^n]))/r + (3*d*e^2
*x^(2*r)*(a + b*Log[c*x^n]))/(2*r) + (e^3*x^(3*r)*(a + b*Log[c*x^n]))/(3*r
) + d^3*Log[x]*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (warning: unable to verify)

Time = 3.52 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.16

method	result
parallelrisch	$\frac{12x^{3r}\ln(c\,x^{n})b\,e^{3}nr+12x^{3r}a\,e^{3}nr-4x^{3r}b\,e^{3}n^{2}+54x^{2r}\ln(c\,x^{n})bd\,e^{2}nr+36\ln(x)a\,d^{3}n\,r^{2}+54x^{2r}ad\,e^{2}nr-27x^{2r}bd\,e^{2}n^{2}+10}{36n\,r^{2}}$
risch	$\frac{3a\,d^{2}e\,x^{r}}{r}+\ln(x)\ln(c)\,b\,d^{3}-\frac{i\pi b\,e^{3}\,\mathrm{csgn}(ic\,x^{n})^{3}x^{3r}}{6r}+\frac{i\ln(x)\pi b\,d^{3}\,\mathrm{csgn}(ic\,x^{n})^{2}\,\mathrm{csgn}(ic)}{2}+\frac{3\ln(c)b\,d^{2}e\,x^{r}}{r}+$

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/36*(12*(x^r)^3*ln(c*x^n)*b*e^3*n*r+12*(x^r)^3*a*e^3*n*r-4*(x^r)^3*b*e^3*
n^2+54*(x^r)^2*ln(c*x^n)*b*d*e^2*n*r+36*ln(x)*a*d^3*n*r^2+54*(x^r)^2*a*d*e
^2*n*r-27*(x^r)^2*b*d*e^2*n^2+108*x^r*ln(c*x^n)*b*d^2*e*n*r+18*b*d^3*ln(c*
x^n)^2*r^2+108*x^r*a*d^2*e*n*r-108*x^r*b*d^2*e*n^2)/n/r^2
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 169, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x}\,dx$$
$$=\frac{18\,bd^3nr^2\log(x)^2+4\,(3\,be^3nr\log(x)+3\,be^3r\log(c)-be^3n+3\,ae^3r)x^{3\,r}+27\,(2\,bde^2nr\log(x)+2\,bde^2}{}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/36*(18*b*d^3*n*r^2*log(x)^2 + 4*(3*b*e^3*n*r*log(x) + 3*b*e^3*r*log(c) -
 b*e^3*n + 3*a*e^3*r)*x^(3*r) + 27*(2*b*d*e^2*n*r*log(x) + 2*b*d*e^2*r*log
(c) - b*d*e^2*n + 2*a*d*e^2*r)*x^(2*r) + 108*(b*d^2*e*n*r*log(x) + b*d^2*e
*r*log(c) - b*d^2*e*n + a*d^2*e*r)*x^r + 36*(b*d^3*r^2*log(c) + a*d^3*r^2)
*log(x))/r^2
```

Sympy [A] (verification not implemented)

Time = 2.74 (sec) , antiderivative size = 299, normalized size of antiderivative = 1.97

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x} dx$$

$$= \begin{cases} (a+b\log(c))(d+e)^3\log(x) \\ (a+b\log(c))\left(d^3\log(x)+\frac{3d^2ex^r}{r}+\frac{3de^2x^{2r}}{2r}+\frac{e^3x^{3r}}{3r}\right) \\ (d+e)^3\left(\begin{cases} a\log(x) & \text{for } b=0 \\ -(-a-b\log(c))\log(x) & \text{for } n=0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}\right) \\ \frac{ad^3\log(cx^n)}{n}+\frac{3ad^2ex^r}{r}+\frac{3ade^2x^{2r}}{2r}+\frac{ae^3x^{3r}}{3r}+\frac{bd^3\log(cx^n)^2}{2n}-\frac{3bd^2enx^r}{r^2}+\frac{3bd^2ex^r\log(cx^n)}{r}-\frac{3bde^2nx^{2r}}{4r^2}+\frac{3bde^2x^{2r}\log}{2r} \end{cases}$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise(((a + b*log(c))*(d + e)**3*log(x), Eq(n, 0) & Eq(r, 0)), ((a + b
*log(c))*(d**3*log(x) + 3*d**2*e*x**r/r + 3*d*e**2*x**(2*r)/(2*r) + e**3*x
**(3*r)/(3*r)), Eq(n, 0)), ((d + e)**3*Piecewise((a*log(x), Eq(b, 0)), (-(
-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*n), True))
, Eq(r, 0)), (a*d**3*log(c*x**n)/n + 3*a*d**2*e*x**r/r + 3*a*d*e**2*x**(2*
r)/(2*r) + a*e**3*x**(3*r)/(3*r) + b*d**3*log(c*x**n)**2/(2*n) - 3*b*d**2*
e*n*x**r/r**2 + 3*b*d**2*e*x**r*log(c*x**n)/r - 3*b*d*e**2*n*x**(2*r)/(4*r
**2) + 3*b*d*e**2*x**(2*r)*log(c*x**n)/(2*r) - b*e**3*n*x**(3*r)/(9*r**2)
+ b*e**3*x**(3*r)*log(c*x**n)/(3*r), True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 172, normalized size of antiderivative = 1.13

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x} dx = \frac{be^3x^{3r}\log(cx^n)}{3r} + \frac{3bde^2x^{2r}\log(cx^n)}{2r} + \frac{3bd^2ex^r\log(cx^n)}{r} + \frac{bd^3\log(cx^n)^2}{2n} + ad^3\log(x) - \frac{be^3nx^{3r}}{9r^2} + \frac{ae^3x^{3r}}{3r} - \frac{3bde^2nx^{2r}}{4r^2} + \frac{3ade^2x^{2r}}{2r} - \frac{3bd^2enx^r}{r^2} + \frac{3ad^2ex^r}{r}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
1/3*b*e^3*x^(3*r)*log(c*x^n)/r + 3/2*b*d*e^2*x^(2*r)*log(c*x^n)/r + 3*b*d^
2*e*x^r*log(c*x^n)/r + 1/2*b*d^3*log(c*x^n)^2/n + a*d^3*log(x) - 1/9*b*e^3
*n*x^(3*r)/r^2 + 1/3*a*e^3*x^(3*r)/r - 3/4*b*d*e^2*n*x^(2*r)/r^2 + 3/2*a*d
*e^2*x^(2*r)/r - 3*b*d^2*e*n*x^r/r^2 + 3*a*d^2*e*x^r/r
```

Giac [F]

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x} dx = \int \frac{(ex^r+d)^3(b\log(cx^n)+a)}{x} dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x}\,dx = \int \frac{(d+e\,x^r)^3 (a+b\,\ln(c\,x^n))}{x}\,dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 176, normalized size of antiderivative = 1.16

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x}\,dx$$
$$= \frac{12x^{3r}\log(x^nc)\,b\,e^3nr + 12x^{3r}a\,e^3nr - 4x^{3r}b\,e^3n^2 + 54x^{2r}\log(x^nc)\,bd\,e^2nr + 54x^{2r}ad\,e^2nr - 27x^{2r}bd\,e^2n^2}{36n\,r^2}$$

input
```
int((d+e*x^r)^3*(a+b*log(c*x^n))/x,x)
```

output
```
(12*x**(3*r)*log(x**n*c)*b*e**3*n*r + 12*x**(3*r)*a*e**3*n*r - 4*x**(3*r)*
b*e**3*n**2 + 54*x**(2*r)*log(x**n*c)*b*d*e**2*n*r + 54*x**(2*r)*a*d*e**2*
n*r - 27*x**(2*r)*b*d*e**2*n**2 + 108*x**r*log(x**n*c)*b*d**2*e*n*r + 108*
x**r*a*d**2*e*n*r - 108*x**r*b*d**2*e*n**2 + 18*log(x**n*c)**2*b*d**3*r**2
 + 36*log(x)*a*d**3*n*r**2)/(36*n*r**2)
```

3.394 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^3}\,dx$

Optimal result 2934
Mathematica [A] (verified) 2935
Rubi [A] (verified) 2935
Maple [B] (verified) 2937
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Mupad [F(-1)] 2940
Reduce [B] (verification not implemented) 2941

Optimal result

Integrand size = 23, antiderivative size = 191

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x^3}\,dx = -\frac{bd^3n}{4x^2}-\frac{3bde^2nx^{-2(1-r)}}{4(1-r)^2}-\frac{3bd^2enx^{-2+r}}{(2-r)^2}-\frac{be^3nx^{-2+3r}}{(2-3r)^2}-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3de^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}-\frac{3d^2ex^{-2+r}(a+b\log(cx^n))}{2-r}-\frac{e^3x^{-2+3r}(a+b\log(cx^n))}{2-3r}$$

output

```
-1/4*b*d^3*n/x^2-3/4*b*d*e^2*n/(1-r)^2/(x^(2-2*r))-3*b*d^2*e*n*x^(-2+r)/(2
-r)^2-b*e^3*n*x^(-2+3*r)/(2-3*r)^2-1/2*d^3*(a+b*ln(c*x^n))/x^2-3/2*d*e^2*(
a+b*ln(c*x^n))/(1-r)/(x^(2-2*r))-3*d^2*e*x^(-2+r)*(a+b*ln(c*x^n))/(2-r)-e^
3*x^(-2+3*r)*(a+b*ln(c*x^n))/(2-3*r)
```

Mathematica [A] (verified)

Time = 0.49 (sec) , antiderivative size = 181, normalized size of antiderivative = 0.95

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^3} \, dx$$
$$= \frac{bn\left(-d^3-\frac{12d^2ex^r}{(-2+r)^2}-\frac{3de^2x^{2r}}{(-1+r)^2}-\frac{4e^3x^{3r}}{(2-3r)^2}\right)+a\left(-2d^3+\frac{12d^2ex^r}{-2+r}+\frac{6de^2x^{2r}}{-1+r}+\frac{4e^3x^{3r}}{-2+3r}\right)+2b\left(-d^3+\frac{6d^2ex^r}{-2+r}+\frac{3de^2}{-1}\right.}{4x^2}$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(b*n*(-d^3 - (12*d^2*e*x^r)/(-2 + r)^2 - (3*d*e^2*x^(2*r))/(-1 + r)^2 - (4
*e^3*x^(3*r))/(2 - 3*r)^2) + a*(-2*d^3 + (12*d^2*e*x^r)/(-2 + r) + (6*d*e^
2*x^(2*r))/(-1 + r) + (4*e^3*x^(3*r))/(-2 + 3*r)) + 2*b*(-d^3 + (6*d^2*e*x
^r)/(-2 + r) + (3*d*e^2*x^(2*r))/(-1 + r) + (2*e^3*x^(3*r))/(-2 + 3*r))*Lo
g[c*x^n])/(4*x^2)
```

Rubi [A] (verified)

Time = 0.66 (sec) , antiderivative size = 190, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^3} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{\frac{6d^2ex^r}{2-r}+\frac{3de^2x^{2r}}{1-r}+\frac{2e^3x^{3r}}{2-3r}+d^3}{2x^3}dx-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3d^2ex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{3de^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}-\frac{e^3x^{3r-2}(a+b\log(cx^n))}{2-3r}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}bn\int\frac{\frac{6d^2ex^r}{2-r}+\frac{3de^2x^{2r}}{1-r}+\frac{2e^3x^{3r}}{2-3r}+d^3}{x^3}dx-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3d^2ex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{3de^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}-\frac{e^3x^{3r-2}(a+b\log(cx^n))}{2-3r}$$

$$\Big\downarrow \text{ 2010}$$

$$\frac{1}{2}bn\int\left(-\frac{6d^2ex^{r-3}}{r-2}+\frac{2e^3x^{3(r-1)}}{2-3r}-\frac{3de^2x^{2r-3}}{r-1}+\frac{d^3}{x^3}\right)dx-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3d^2ex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{3de^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}-\frac{e^3x^{3r-2}(a+b\log(cx^n))}{2-3r}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3d^2ex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{3de^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}-\frac{e^3x^{3r-2}(a+b\log(cx^n))}{2-3r}+\frac{1}{2}bn\left(-\frac{d^3}{2x^2}-\frac{6d^2ex^{r-2}}{(2-r)^2}-\frac{3de^2x^{-2(1-r)}}{2(1-r)^2}-\frac{2e^3x^{3r-2}}{(2-3r)^2}\right)$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(b*n*(-1/2*d^3/x^2 - (3*d*e^2)/(2*(1 - r)^2*x^(2*(1 - r))) - (6*d^2*e*x^(-
2 + r))/(2 - r)^2 - (2*e^3*x^(-2 + 3*r))/(2 - 3*r)^2))/2 - (d^3*(a + b*Log
[c*x^n]))/(2*x^2) - (3*d*e^2*(a + b*Log[c*x^n]))/(2*(1 - r)*x^(2*(1 - r)))
 - (3*d^2*e*x^(-2 + r)*(a + b*Log[c*x^n]))/(2 - r) - (e^3*x^(-2 + 3*r)*(a
+ b*Log[c*x^n]))/(2 - 3*r)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1043 vs. $2(183) = 366$.

Time = 3.46 (sec) , antiderivative size = 1044, normalized size of antiderivative = 5.47

method	result	size
parallelrisch	Expression too large to display	1044
risch	Expression too large to display	4027

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

output
```
-1/4*(32*a*d^3+80*a*e^3*r^4*(x^r)^3+16*b*e^3*n*(x^r)^3-204*a*e^3*r^3*(x^r)
^3+248*a*e^3*r^2*(x^r)^3-144*a*e^3*r*(x^r)^3-12*a*e^3*r^5*(x^r)^3-360*b*d^
2*e*n*r^3*x^r+32*b*ln(c*x^n)*d^3+32*e^3*(x^r)^3*a+32*e^3*(x^r)^3*b*ln(c*x^
n)+96*d^2*e*x^r*a+96*d*e^2*(x^r)^2*a+18*a*d^3*r^6-132*a*d^3*r^5+386*a*d^3*
r^4-816*a*d*e^2*r^3*(x^r)^2+912*a*d*e^2*r^2*(x^r)^2-480*a*d*e^2*r*(x^r)^2+
96*d^2*e*x^r*b*ln(c*x^n)+96*d*e^2*(x^r)^2*b*ln(c*x^n)+9*b*d^3*n*r^6-66*b*d
^3*n*r^5+193*b*d^3*n*r^4-288*b*d^3*n*r^3+232*b*d^3*n*r^2-96*b*d^3*n*r-576*
a*d^3*r^3+464*a*d^3*r^2-192*a*d^3*r-1164*a*d^2*e*r^3*x^r+1128*a*d^2*e*r^2*
x^r-528*a*d^2*e*r*x^r+52*b*e^3*n*r^2*(x^r)^3+108*b*d^2*e*n*r^4*x^r+264*b*d
*e^2*n*r^2*(x^r)^2+444*b*d^2*e*n*r^2*x^r-192*b*d*e^2*n*r*(x^r)^2-240*b*d^2
*e*n*r*x^r+27*b*d*e^2*n*r^4*(x^r)^2-144*b*d*e^2*n*r^3*(x^r)^2+16*b*d^3*n+1
8*ln(c*x^n)*b*d^3*r^6-132*ln(c*x^n)*b*d^3*r^5+386*ln(c*x^n)*b*d^3*r^4-576*
ln(c*x^n)*b*d^3*r^3+464*ln(c*x^n)*b*d^3*r^2-192*ln(c*x^n)*b*d^3*r-48*b*e^3
*n*r*(x^r)^3+48*b*d*e^2*n*(x^r)^2+48*b*d^2*e*n*x^r+4*b*e^3*n*r^4*(x^r)^3-2
4*b*e^3*n*r^3*(x^r)^3-54*a*d*e^2*r^5*(x^r)^2+342*a*d*e^2*r^4*(x^r)^2-108*a
*d^2*e*r^5*x^r+576*a*d^2*e*r^4*x^r-108*x^r*ln(c*x^n)*b*d^2*e*r^5+576*x^r*l
n(c*x^n)*b*d^2*e*r^4-1164*x^r*ln(c*x^n)*b*d^2*e*r^3+1128*x^r*ln(c*x^n)*b*d
^2*e*r^2-528*x^r*ln(c*x^n)*b*d^2*e*r-144*(x^r)^3*ln(c*x^n)*b*e^3*r-12*(x^r
)^3*ln(c*x^n)*b*e^3*r^5+80*(x^r)^3*ln(c*x^n)*b*e^3*r^4-204*(x^r)^3*ln(c*x^
n)*b*e^3*r^3+248*(x^r)^3*ln(c*x^n)*b*e^3*r^2-54*(x^r)^2*ln(c*x^n)*b*d*e...
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 981 vs. $2(174) = 348$.

Time = 0.10 (sec) , antiderivative size = 981, normalized size of antiderivative = 5.14

$$\int \frac{(d + ex^r)^3 (a + b\log(cx^n))}{x^3} \, dx = \text{Too large to display}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
-1/4*(9*(b*d^3*n + 2*a*d^3)*r^6 - 66*(b*d^3*n + 2*a*d^3)*r^5 + 16*b*d^3*n
+ 193*(b*d^3*n + 2*a*d^3)*r^4 + 32*a*d^3 - 288*(b*d^3*n + 2*a*d^3)*r^3 + 2
32*(b*d^3*n + 2*a*d^3)*r^2 - 96*(b*d^3*n + 2*a*d^3)*r - 4*(3*a*e^3*r^5 - 4
*b*e^3*n - (b*e^3*n + 20*a*e^3)*r^4 - 8*a*e^3 + 3*(2*b*e^3*n + 17*a*e^3)*r
^3 - (13*b*e^3*n + 62*a*e^3)*r^2 + 12*(b*e^3*n + 3*a*e^3)*r + (3*b*e^3*r^5
 - 20*b*e^3*r^4 + 51*b*e^3*r^3 - 62*b*e^3*r^2 + 36*b*e^3*r - 8*b*e^3)*log(
c) + (3*b*e^3*n*r^5 - 20*b*e^3*n*r^4 + 51*b*e^3*n*r^3 - 62*b*e^3*n*r^2 + 3
6*b*e^3*n*r - 8*b*e^3*n)*log(x))*x^(3*r) - 3*(18*a*d*e^2*r^5 - 16*b*d*e^2*
n - 3*(3*b*d*e^2*n + 38*a*d*e^2)*r^4 - 32*a*d*e^2 + 16*(3*b*d*e^2*n + 17*a
*d*e^2)*r^3 - 8*(11*b*d*e^2*n + 38*a*d*e^2)*r^2 + 32*(2*b*d*e^2*n + 5*a*d*
e^2)*r + 2*(9*b*d*e^2*r^5 - 57*b*d*e^2*r^4 + 136*b*d*e^2*r^3 - 152*b*d*e^2
*r^2 + 80*b*d*e^2*r - 16*b*d*e^2)*log(c) + 2*(9*b*d*e^2*n*r^5 - 57*b*d*e^2
*n*r^4 + 136*b*d*e^2*n*r^3 - 152*b*d*e^2*n*r^2 + 80*b*d*e^2*n*r - 16*b*d*e
^2*n)*log(x))*x^(2*r) - 12*(9*a*d^2*e*r^5 - 4*b*d^2*e*n - 3*(3*b*d^2*e*n +
 16*a*d^2*e)*r^4 - 8*a*d^2*e + (30*b*d^2*e*n + 97*a*d^2*e)*r^3 - (37*b*d^2
*e*n + 94*a*d^2*e)*r^2 + 4*(5*b*d^2*e*n + 11*a*d^2*e)*r + (9*b*d^2*e*r^5 -
 48*b*d^2*e*r^4 + 97*b*d^2*e*r^3 - 94*b*d^2*e*r^2 + 44*b*d^2*e*r - 8*b*d^2
*e)*log(c) + (9*b*d^2*e*n*r^5 - 48*b*d^2*e*n*r^4 + 97*b*d^2*e*n*r^3 - 94*b
*d^2*e*n*r^2 + 44*b*d^2*e*n*r - 8*b*d^2*e*n)*log(x))*x^r + 2*(9*b*d^3*r^6
- 66*b*d^3*r^5 + 193*b*d^3*r^4 - 288*b*d^3*r^3 + 232*b*d^3*r^2 - 96*b*d...
```

Sympy [A] (verification not implemented)

Time = 47.47 (sec) , antiderivative size = 347, normalized size of antiderivative = 1.82

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^3} \, dx = \text{Too large to display}$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**3,x)
```

output
```
-a*d**3/(2*x**2) + 3*a*d**2*e*Piecewise((x**r/(r*x**2 - 2*x**2), Ne(r, 2))
, (x**r*log(x)/x**2, True)) + 3*a*d*e**2*Piecewise((x**(2*r)/(2*r*x**2 - 2
*x**2), Ne(r, 1)), (x**(2*r)*log(x)/x**2, True)) + a*e**3*Piecewise((x**(3
*r)/(3*r*x**2 - 2*x**2), Ne(r, 2/3)), (x**(3*r)*log(x)/x**2, True)) - b*d*
*3*n/(4*x**2) - b*d**3*log(c*x**n)/(2*x**2) - 3*b*d**2*e*n*Piecewise((Piec
ewise((x**(r - 2)/(r - 2), Ne(r, 2)), (log(x), True))/(r - 2), (r > -oo) &
 (r < oo) & Ne(r, 2)), (log(x)**2/2, True)) + 3*b*d**2*e*Piecewise((x**(r
- 2)/(r - 2), Ne(r, 2)), (log(x), True))*log(c*x**n) - 3*b*d*e**2*n*Piecew
ise((Piecewise((x**(2*r - 2)/(2*r - 2), Ne(r, 1)), (log(x), True))/(2*r -
2), (r > -oo) & (r < oo) & Ne(r, 1)), (log(x)**2/2, True)) + 3*b*d*e**2*Pi
ecewise((x**(2*r - 2)/(2*r - 2), Ne(r, 1)), (log(x), True))*log(c*x**n) -
b*e**3*n*Piecewise((Piecewise((x**(3*r - 2)/(3*r - 2), Ne(r, 2/3)), (log(x
), True))/(3*r - 2), (r > -oo) & (r < oo) & Ne(r, 2/3)), (log(x)**2/2, Tru
e)) + b*e**3*Piecewise((x**(3*r - 2)/(3*r - 2), Ne(r, 2/3)), (log(x), True
))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^3} \, dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-3>0)', see `assume?` for more
details)Is
```

Giac [F]

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^3}\,dx=\int \frac{(ex^r+d)^3 (b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)/x^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^3}\,dx=\int \frac{(d+e\,x^r)^3\,(a+b\,\ln(c\,x^n))}{x^3}\,dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^3,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^3, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 1053, normalized size of antiderivative = 5.51

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^3} dx = \text{Too large to display}$$

input
```
int((d+e*x^r)^3*(a+b*log(c*x^n))/x^3,x)
```

output
```
(12*x**(3*r)*log(x**n*c)*b*e**3*r**5 - 80*x**(3*r)*log(x**n*c)*b*e**3*r**4
 + 204*x**(3*r)*log(x**n*c)*b*e**3*r**3 - 248*x**(3*r)*log(x**n*c)*b*e**3*
r**2 + 144*x**(3*r)*log(x**n*c)*b*e**3*r - 32*x**(3*r)*log(x**n*c)*b*e**3
+ 12*x**(3*r)*a*e**3*r**5 - 80*x**(3*r)*a*e**3*r**4 + 204*x**(3*r)*a*e**3*
r**3 - 248*x**(3*r)*a*e**3*r**2 + 144*x**(3*r)*a*e**3*r - 32*x**(3*r)*a*e*
*3 - 4*x**(3*r)*b*e**3*n*r**4 + 24*x**(3*r)*b*e**3*n*r**3 - 52*x**(3*r)*b*
e**3*n*r**2 + 48*x**(3*r)*b*e**3*n*r - 16*x**(3*r)*b*e**3*n + 54*x**(2*r)*
log(x**n*c)*b*d*e**2*r**5 - 342*x**(2*r)*log(x**n*c)*b*d*e**2*r**4 + 816*x
**(2*r)*log(x**n*c)*b*d*e**2*r**3 - 912*x**(2*r)*log(x**n*c)*b*d*e**2*r**2
 + 480*x**(2*r)*log(x**n*c)*b*d*e**2*r - 96*x**(2*r)*log(x**n*c)*b*d*e**2
+ 54*x**(2*r)*a*d*e**2*r**5 - 342*x**(2*r)*a*d*e**2*r**4 + 816*x**(2*r)*a*
d*e**2*r**3 - 912*x**(2*r)*a*d*e**2*r**2 + 480*x**(2*r)*a*d*e**2*r - 96*x*
*(2*r)*a*d*e**2 - 27*x**(2*r)*b*d*e**2*n*r**4 + 144*x**(2*r)*b*d*e**2*n*r*
*3 - 264*x**(2*r)*b*d*e**2*n*r**2 + 192*x**(2*r)*b*d*e**2*n*r - 48*x**(2*r
)*b*d*e**2*n + 108*x**r*log(x**n*c)*b*d**2*e*r**5 - 576*x**r*log(x**n*c)*b
*d**2*e*r**4 + 1164*x**r*log(x**n*c)*b*d**2*e*r**3 - 1128*x**r*log(x**n*c)
*b*d**2*e*r**2 + 528*x**r*log(x**n*c)*b*d**2*e*r - 96*x**r*log(x**n*c)*b*d
**2*e + 108*x**r*a*d**2*e*r**5 - 576*x**r*a*d**2*e*r**4 + 1164*x**r*a*d**2
*e*r**3 - 1128*x**r*a*d**2*e*r**2 + 528*x**r*a*d**2*e*r - 96*x**r*a*d**2*e
 - 108*x**r*b*d**2*e*n*r**4 + 360*x**r*b*d**2*e*n*r**3 - 444*x**r*b*d**...
```

3.395 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^5}\,dx$

Optimal result 2942
Mathematica [A] (verified) 2943
Rubi [A] (verified) 2943
Maple [B] (verified) 2945
Fricas [B] (verification not implemented) 2946
Sympy [F(-1)] 2947
Maxima [F(-2)] 2947
Giac [F] 2947
Mupad [F(-1)] 2948
Reduce [B] (verification not implemented) 2948

Optimal result

Integrand size = 23, antiderivative size = 191

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x^5}\,dx = -\frac{bd^3n}{16x^4}-\frac{3bde^2nx^{-2(2-r)}}{4(2-r)^2}-\frac{3bd^2enx^{-4+r}}{(4-r)^2}-\frac{be^3nx^{-4+3r}}{(4-3r)^2}-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3de^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}-\frac{3d^2ex^{-4+r}(a+b\log(cx^n))}{4-r}-\frac{e^3x^{-4+3r}(a+b\log(cx^n))}{4-3r}$$

output
```
-1/16*b*d^3*n/x^4-3/4*b*d*e^2*n/(2-r)^2/(x^(4-2*r))-3*b*d^2*e*n*x^(-4+r)/(
4-r)^2-b*e^3*n*x^(-4+3*r)/(4-3*r)^2-1/4*d^3*(a+b*ln(c*x^n))/x^4-3/2*d*e^2*
(a+b*ln(c*x^n))/(2-r)/(x^(4-2*r))-3*d^2*e*x^(-4+r)*(a+b*ln(c*x^n))/(4-r)-e
^3*x^(-4+3*r)*(a+b*ln(c*x^n))/(4-3*r)
```

Mathematica [A] (verified)

Time = 0.51 (sec) , antiderivative size = 181, normalized size of antiderivative = 0.95

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^5}\,dx$$
$$= \frac{bn\left(-d^3-\frac{48d^2ex^r}{(-4+r)^2}-\frac{12de^2x^{2r}}{(-2+r)^2}-\frac{16e^3x^{3r}}{(4-3r)^2}\right)+a\left(-4d^3+\frac{48d^2ex^r}{-4+r}+\frac{24de^2x^{2r}}{-2+r}+\frac{16e^3x^{3r}}{-4+3r}\right)+4b\left(-d^3+\frac{12d^2ex^r}{-4+r}+\right.}{16x^4}$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(b*n*(-d^3 - (48*d^2*e*x^r)/(-4 + r)^2 - (12*d*e^2*x^(2*r))/(-2 + r)^2 - (
16*e^3*x^(3*r))/(4 - 3*r)^2) + a*(-4*d^3 + (48*d^2*e*x^r)/(-4 + r) + (24*d
*e^2*x^(2*r))/(-2 + r) + (16*e^3*x^(3*r))/(-4 + 3*r)) + 4*b*(-d^3 + (12*d^
2*e*x^r)/(-4 + r) + (6*d*e^2*x^(2*r))/(-2 + r) + (4*e^3*x^(3*r))/(-4 + 3*r
))*Log[c*x^n])/(16*x^4)
```

Rubi [A] (verified)

Time = 0.65 (sec) , antiderivative size = 188, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^5}\,dx$$
$$\Big\downarrow \text{2772}$$
$$-bn\int -\frac{\frac{12d^2ex^r}{4-r}+\frac{6de^2x^{2r}}{2-r}+\frac{4e^3x^{3r}}{4-3r}+d^3}{4x^5}dx-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2ex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{3de^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}-\frac{e^3x^{3r-4}(a+b\log(cx^n))}{4-3r}$$
$$\Big\downarrow \text{27}$$

$$\frac{1}{4}bn\int\frac{\frac{12d^2ex^r}{4-r}+\frac{6de^2x^{2r}}{2-r}+\frac{4e^3x^{3r}}{4-3r}+d^3}{x^5}dx-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2ex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{3de^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}-\frac{e^3x^{3r-4}(a+b\log(cx^n))}{4-3r}$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{4}bn\int\left(-\frac{12d^2ex^{r-5}}{r-4}-\frac{6de^2x^{2r-5}}{r-2}-\frac{4e^3x^{3r-5}}{3r-4}+\frac{d^3}{x^5}\right)dx-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2ex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{3de^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}-\frac{e^3x^{3r-4}(a+b\log(cx^n))}{4-3r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2ex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{3de^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}-\frac{e^3x^{3r-4}(a+b\log(cx^n))}{4-3r}+\frac{1}{4}bn\left(-\frac{d^3}{4x^4}-\frac{12d^2ex^{r-4}}{(4-r)^2}-\frac{3de^2x^{-2(2-r)}}{(2-r)^2}-\frac{4e^3x^{3r-4}}{(4-3r)^2}\right)$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(b*n*(-1/4*d^3/x^4 - (3*d*e^2)/((2 - r)^2*x^(2*(2 - r))) - (12*d^2*e*x^(-4
 + r))/(4 - r)^2 - (4*e^3*x^(-4 + 3*r))/(4 - 3*r)^2))/4 - (d^3*(a + b*Log[
c*x^n]))/(4*x^4) - (3*d*e^2*(a + b*Log[c*x^n]))/(2*(2 - r)*x^(2*(2 - r)))
- (3*d^2*e*x^(-4 + r)*(a + b*Log[c*x^n]))/(4 - r) - (e^3*x^(-4 + 3*r)*(a +
 b*Log[c*x^n]))/(4 - 3*r)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1043 vs. 2(183) = 366.

Time = 3.48 (sec) , antiderivative size = 1044, normalized size of antiderivative = 5.47

method	result	size
parallelrisch	Expression too large to display	1044
risch	Expression too large to display	4027

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

output
```
-1/16*(4096*a*d^3+640*a*e^3*r^4*(x^r)^3+1024*b*e^3*n*(x^r)^3-3264*a*e^3*r^
3*(x^r)^3+7936*a*e^3*r^2*(x^r)^3-9216*a*e^3*r*(x^r)^3-48*a*e^3*r^5*(x^r)^3
-2880*b*d^2*e*n*r^3*x^r+4096*b*ln(c*x^n)*d^3+4096*e^3*(x^r)^3*a+4096*e^3*(
x^r)^3*b*ln(c*x^n)+12288*d^2*e*x^r*a+12288*d*e^2*(x^r)^2*a+36*a*d^3*r^6-52
8*a*d^3*r^5+3088*a*d^3*r^4-13056*a*d*e^2*r^3*(x^r)^2+29184*a*d*e^2*r^2*(x^
r)^2-30720*a*d*e^2*r*(x^r)^2+12288*d^2*e*x^r*b*ln(c*x^n)+12288*d*e^2*(x^r)
^2*b*ln(c*x^n)+9*b*d^3*n*r^6-132*b*d^3*n*r^5+772*b*d^3*n*r^4-2304*b*d^3*n*
r^3+3712*b*d^3*n*r^2-3072*b*d^3*n*r-9216*a*d^3*r^3+14848*a*d^3*r^2-12288*a
*d^3*r-18624*a*d^2*e*r^3*x^r+36096*a*d^2*e*r^2*x^r-33792*a*d^2*e*r*x^r+832
*b*e^3*n*r^2*(x^r)^3+432*b*d^2*e*n*r^4*x^r+4224*b*d*e^2*n*r^2*(x^r)^2+7104
*b*d^2*e*n*r^2*x^r-6144*b*d*e^2*n*r*(x^r)^2-7680*b*d^2*e*n*r*x^r+108*b*d*e
^2*n*r^4*(x^r)^2-1152*b*d*e^2*n*r^3*(x^r)^2+1024*b*d^3*n+36*ln(c*x^n)*b*d^
3*r^6-528*ln(c*x^n)*b*d^3*r^5+3088*ln(c*x^n)*b*d^3*r^4-9216*ln(c*x^n)*b*d^
3*r^3+14848*ln(c*x^n)*b*d^3*r^2-12288*ln(c*x^n)*b*d^3*r-1536*b*e^3*n*r*(x^
r)^3+3072*b*d*e^2*n*(x^r)^2+3072*b*d^2*e*n*x^r+16*b*e^3*n*r^4*(x^r)^3-192*
b*e^3*n*r^3*(x^r)^3-216*a*d*e^2*r^5*(x^r)^2+2736*a*d*e^2*r^4*(x^r)^2-432*a
*d^2*e*r^5*x^r+4608*a*d^2*e*r^4*x^r-432*x^r*ln(c*x^n)*b*d^2*e*r^5+4608*x^r
*ln(c*x^n)*b*d^2*e*r^4-18624*x^r*ln(c*x^n)*b*d^2*e*r^3+36096*x^r*ln(c*x^n)
*b*d^2*e*r^2-33792*x^r*ln(c*x^n)*b*d^2*e*r-9216*(x^r)^3*ln(c*x^n)*b*e^3*r-
48*(x^r)^3*ln(c*x^n)*b*e^3*r^5+640*(x^r)^3*ln(c*x^n)*b*e^3*r^4-3264*(x^...
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 980 vs. $2(174) = 348$.

Time = 0.10 (sec) , antiderivative size = 980, normalized size of antiderivative = 5.13

$$\int \frac{(d + ex^r)^3 (a + b \log(cx^n))}{x^5} dx = \text{Too large to display}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

output
```
-1/16*(9*(b*d^3*n + 4*a*d^3)*r^6 - 132*(b*d^3*n + 4*a*d^3)*r^5 + 1024*b*d^
3*n + 772*(b*d^3*n + 4*a*d^3)*r^4 + 4096*a*d^3 - 2304*(b*d^3*n + 4*a*d^3)*
r^3 + 3712*(b*d^3*n + 4*a*d^3)*r^2 - 3072*(b*d^3*n + 4*a*d^3)*r - 16*(3*a*
e^3*r^5 - 64*b*e^3*n - (b*e^3*n + 40*a*e^3)*r^4 - 256*a*e^3 + 12*(b*e^3*n
+ 17*a*e^3)*r^3 - 4*(13*b*e^3*n + 124*a*e^3)*r^2 + 96*(b*e^3*n + 6*a*e^3)*
r + (3*b*e^3*r^5 - 40*b*e^3*r^4 + 204*b*e^3*r^3 - 496*b*e^3*r^2 + 576*b*e^
3*r - 256*b*e^3)*log(c) + (3*b*e^3*n*r^5 - 40*b*e^3*n*r^4 + 204*b*e^3*n*r^
3 - 496*b*e^3*n*r^2 + 576*b*e^3*n*r - 256*b*e^3*n)*log(x))*x^(3*r) - 12*(1
8*a*d*e^2*r^5 - 256*b*d*e^2*n - 3*(3*b*d*e^2*n + 76*a*d*e^2)*r^4 - 1024*a*
d*e^2 + 32*(3*b*d*e^2*n + 34*a*d*e^2)*r^3 - 32*(11*b*d*e^2*n + 76*a*d*e^2)
*r^2 + 512*(b*d*e^2*n + 5*a*d*e^2)*r + 2*(9*b*d*e^2*r^5 - 114*b*d*e^2*r^4
+ 544*b*d*e^2*r^3 - 1216*b*d*e^2*r^2 + 1280*b*d*e^2*r - 512*b*d*e^2)*log(c
) + 2*(9*b*d*e^2*n*r^5 - 114*b*d*e^2*n*r^4 + 544*b*d*e^2*n*r^3 - 1216*b*d*
e^2*n*r^2 + 1280*b*d*e^2*n*r - 512*b*d*e^2*n)*log(x))*x^(2*r) - 48*(9*a*d^
2*e*r^5 - 64*b*d^2*e*n - 3*(3*b*d^2*e*n + 32*a*d^2*e)*r^4 - 256*a*d^2*e +
4*(15*b*d^2*e*n + 97*a*d^2*e)*r^3 - 4*(37*b*d^2*e*n + 188*a*d^2*e)*r^2 + 3
2*(5*b*d^2*e*n + 22*a*d^2*e)*r + (9*b*d^2*e*r^5 - 96*b*d^2*e*r^4 + 388*b*d
^2*e*r^3 - 752*b*d^2*e*r^2 + 704*b*d^2*e*r - 256*b*d^2*e)*log(c) + (9*b*d^
2*e*n*r^5 - 96*b*d^2*e*n*r^4 + 388*b*d^2*e*n*r^3 - 752*b*d^2*e*n*r^2 + 704
*b*d^2*e*n*r - 256*b*d^2*e*n)*log(x))*x^r + 4*(9*b*d^3*r^6 - 132*b*d^3*...
```

Sympy [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^5} dx = \text{Timed out}$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**5,x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^5} dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-5>0)', see `assume?` for more
details)Is
```

Giac [F]

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^5} dx = \int \frac{(ex^r+d)^3(b\log(cx^n)+a)}{x^5} dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)/x^5, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^5}\,dx = \int \frac{(d+e\,x^r)^3\,(a+b\,\ln(c\,x^n))}{x^5}\,dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^5,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^5, x)
```

Reduce [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 1053, normalized size of antiderivative = 5.51

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^5}\,dx = \text{Too large to display}$$

input
```
int((d+e*x^r)^3*(a+b*log(c*x^n))/x^5,x)
```

output

```
(48*x**(3*r)*log(x**n*c)*b*e**3*r**5 - 640*x**(3*r)*log(x**n*c)*b*e**3*r**
4 + 3264*x**(3*r)*log(x**n*c)*b*e**3*r**3 - 7936*x**(3*r)*log(x**n*c)*b*e*
*3*r**2 + 9216*x**(3*r)*log(x**n*c)*b*e**3*r - 4096*x**(3*r)*log(x**n*c)*b
*e**3 + 48*x**(3*r)*a*e**3*r**5 - 640*x**(3*r)*a*e**3*r**4 + 3264*x**(3*r)
*a*e**3*r**3 - 7936*x**(3*r)*a*e**3*r**2 + 9216*x**(3*r)*a*e**3*r - 4096*x
**(3*r)*a*e**3 - 16*x**(3*r)*b*e**3*n*r**4 + 192*x**(3*r)*b*e**3*n*r**3 -
832*x**(3*r)*b*e**3*n*r**2 + 1536*x**(3*r)*b*e**3*n*r - 1024*x**(3*r)*b*e*
*3*n + 216*x**(2*r)*log(x**n*c)*b*d*e**2*r**5 - 2736*x**(2*r)*log(x**n*c)*
b*d*e**2*r**4 + 13056*x**(2*r)*log(x**n*c)*b*d*e**2*r**3 - 29184*x**(2*r)*
log(x**n*c)*b*d*e**2*r**2 + 30720*x**(2*r)*log(x**n*c)*b*d*e**2*r - 12288*
x**(2*r)*log(x**n*c)*b*d*e**2 + 216*x**(2*r)*a*d*e**2*r**5 - 2736*x**(2*r)
*a*d*e**2*r**4 + 13056*x**(2*r)*a*d*e**2*r**3 - 29184*x**(2*r)*a*d*e**2*r*
*2 + 30720*x**(2*r)*a*d*e**2*r - 12288*x**(2*r)*a*d*e**2 - 108*x**(2*r)*b*
d*e**2*n*r**4 + 1152*x**(2*r)*b*d*e**2*n*r**3 - 4224*x**(2*r)*b*d*e**2*n*r
**2 + 6144*x**(2*r)*b*d*e**2*n*r - 3072*x**(2*r)*b*d*e**2*n + 432*x**r*log
(x**n*c)*b*d**2*e*r**5 - 4608*x**r*log(x**n*c)*b*d**2*e*r**4 + 18624*x**r*
log(x**n*c)*b*d**2*e*r**3 - 36096*x**r*log(x**n*c)*b*d**2*e*r**2 + 33792*x
**r*log(x**n*c)*b*d**2*e*r - 12288*x**r*log(x**n*c)*b*d**2*e + 432*x**r*a*
d**2*e*r**5 - 4608*x**r*a*d**2*e*r**4 + 18624*x**r*a*d**2*e*r**3 - 36096*x
**r*a*d**2*e*r**2 + 33792*x**r*a*d**2*e*r - 12288*x**r*a*d**2*e - 432*x...
```

3.396 $\int x^4(d+ex^r)^3(a+b\log(cx^n))\,dx$

Optimal result . . . 2950
Mathematica [A] (verified) . . . 2950
Rubi [A] (verified) . . . 2951
Maple [B] (verified) . . . 2953
Fricas [B] (verification not implemented) . . . 2954
Sympy [F(-1)] . . . 2955
Maxima [A] (verification not implemented) . . . 2955
Giac [B] (verification not implemented) . . . 2956
Mupad [F(-1)] . . . 2957
Reduce [B] (verification not implemented) . . . 2957

Optimal result

Integrand size = 23, antiderivative size = 151

$$\int x^4(d+ex^r)^3(a+b\log(cx^n))\,dx=-\frac{1}{25}bd^3nx^5-\frac{3bd^2enx^{5+r}}{(5+r)^2}-\frac{3bde^2nx^{5+2r}}{(5+2r)^2}-\frac{be^3nx^{5+3r}}{(5+3r)^2}+\frac{1}{5}\left(d^3x^5+\frac{15d^2ex^{5+r}}{5+r}+\frac{15de^2x^{5+2r}}{5+2r}+\frac{5e^3x^{5+3r}}{5+3r}\right)(a+b\log(cx^n))$$

output
```
-1/25*b*d^3*n*x^5-3*b*d^2*e*n*x^(5+r)/(5+r)^2-3*b*d*e^2*n*x^(5+2*r)/(5+2*r
)^2-b*e^3*n*x^(5+3*r)/(5+3*r)^2+1/5*(d^3*x^5+15*d^2*e*x^(5+r)/(5+r)+15*d*e
^2*x^(5+2*r)/(5+2*r)+5*e^3*x^(5+3*r)/(5+3*r))*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.43 (sec) , antiderivative size = 184, normalized size of antiderivative = 1.22

$$\int x^4(d+ex^r)^3(a+b\log(cx^n))\,dx=\frac{1}{25}x^5\left(bn\left(-d^3-\frac{75d^2ex^r}{(5+r)^2}-\frac{75de^2x^{2r}}{(5+2r)^2}-\frac{25e^3x^{3r}}{(5+3r)^2}\right)+5a\left(d^3+\frac{15d^2ex^r}{5+r}+\frac{15de^2x^{2r}}{5+2r}+\frac{5e^3x^{3r}}{5+3r}\right)+5b\left(d^3+\frac{15d^2ex^r}{5+r}+\frac{15de^2x^{2r}}{5+2r}+\frac{5e^3x^{3r}}{5+3r}\right)\log(cx^n)\right)$$

input
```
Integrate[x^4*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
(x^5*(b*n*(-d^3 - (75*d^2*e*x^r)/(5 + r)^2 - (75*d*e^2*x^(2*r))/(5 + 2*r)^
2 - (25*e^3*x^(3*r))/(5 + 3*r)^2) + 5*a*(d^3 + (15*d^2*e*x^r)/(5 + r) + (1
5*d*e^2*x^(2*r))/(5 + 2*r) + (5*e^3*x^(3*r))/(5 + 3*r)) + 5*b*(d^3 + (15*d
^2*e*x^r)/(5 + r) + (15*d*e^2*x^(2*r))/(5 + 2*r) + (5*e^3*x^(3*r))/(5 + 3*
r))*Log[c*x^n]))/25
```

Rubi [A] (verified)

Time = 0.62 (sec) , antiderivative size = 150, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2771, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^4 (d+ex^r)^3 (a+b\log(cx^n))\, dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{5}\left(d^3x^5+\frac{15d^2ex^{r+5}}{r+5}+\frac{15de^2x^{2r+5}}{2r+5}+\frac{5e^3x^{3r+5}}{3r+5}\right)(a+b\log(cx^n))-bn\int \frac{1}{5}x^4\left(\frac{15d^2ex^r}{r+5}+\frac{15de^2x^{2r}}{2r+5}+\frac{5e^3x^{3r}}{3r+5}+d^3\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\left(d^3x^5+\frac{15d^2ex^{r+5}}{r+5}+\frac{15de^2x^{2r+5}}{2r+5}+\frac{5e^3x^{3r+5}}{3r+5}\right)(a+b\log(cx^n))-\frac{1}{5}bn\int x^4\left(\frac{15d^2ex^r}{r+5}+\frac{15de^2x^{2r}}{2r+5}+\frac{5e^3x^{3r}}{3r+5}+d^3\right)dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{5}\left(d^3x^5+\frac{15d^2ex^{r+5}}{r+5}+\frac{15de^2x^{2r+5}}{2r+5}+\frac{5e^3x^{3r+5}}{3r+5}\right)(a+b\log(cx^n))-\frac{1}{5}bn\int \left(\frac{15de^2x^{2(r+2)}}{2r+5}+\frac{15d^2ex^{r+4}}{r+5}+\frac{5e^3x^{3r+4}}{3r+5}+d^3x^4\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left(d^3x^5+\frac{15d^2ex^{r+5}}{r+5}+\frac{15de^2x^{2r+5}}{2r+5}+\frac{5e^3x^{3r+5}}{3r+5}\right)(a+b\log(cx^n))-\frac{1}{5}bn\left(\frac{d^3x^5}{5}+\frac{15d^2ex^{r+5}}{(r+5)^2}+\frac{15de^2x^{2r+5}}{(2r+5)^2}+\frac{5e^3x^{3r+5}}{(3r+5)^2}\right)$$

input
```
Int[x^4*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/5*(b*n*((d^3*x^5)/5 + (15*d^2*e*x^(5 + r))/(5 + r)^2 + (15*d*e^2*x^(5 +
 2*r))/(5 + 2*r)^2 + (5*e^3*x^(5 + 3*r))/(5 + 3*r)^2)) + ((d^3*x^5 + (15*d
^2*e*x^(5 + r))/(5 + r) + (15*d*e^2*x^(5 + 2*r))/(5 + 2*r) + (5*e^3*x^(5 +
 3*r))/(5 + 3*r))*(a + b*Log[c*x^n]))/5
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1268 vs. 2(147) = 294.

Time = 29.89 (sec) , antiderivative size = 1269, normalized size of antiderivative = 8.40

method	result	size
parallelrisch	Expression too large to display	1269
risch	Expression too large to display	4031

input

```
int(x^4*(d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output

```
-1/25*(-78125*x^5*e^3*(x^r)^3*a-234375*x^5*d*e^2*(x^r)^2*b*ln(c*x^n)-23437
5*x^5*d^2*e*x^r*b*ln(c*x^n)-78125*x^5*a*d^3-234375*x^5*d^2*e*x^r*a-234375*
x^5*d*e^2*(x^r)^2*a-78125*x^5*e^3*(x^r)^3*b*ln(c*x^n)-78125*x^5*b*ln(c*x^n
)*d^3+15625*b*d^3*n*x^5+36*x^5*b*d^3*n*r^6+660*x^5*b*d^3*n*r^5+4825*x^5*b*
d^3*n*r^4+9000*x^5*(x^r)^2*b*d*e^2*n*r^3+41250*x^5*(x^r)^2*b*d*e^2*n*r^2+7
5000*x^5*(x^r)^2*b*d*e^2*n*r-2700*x^5*x^r*ln(c*x^n)*b*d^2*e*r^5-36000*x^5*
x^r*ln(c*x^n)*b*d^2*e*r^4-181875*x^5*x^r*ln(c*x^n)*b*d^2*e*r^3-440625*x^5*
x^r*ln(c*x^n)*b*d^2*e*r^2-515625*x^5*x^r*ln(c*x^n)*b*d^2*e*r-1350*x^5*(x^r
)^2*ln(c*x^n)*b*d*e^2*r^5-21375*x^5*(x^r)^2*ln(c*x^n)*b*d*e^2*r^4-127500*x
^5*(x^r)^2*ln(c*x^n)*b*d*e^2*r^3-356250*x^5*(x^r)^2*ln(c*x^n)*b*d*e^2*r^2-
468750*x^5*(x^r)^2*ln(c*x^n)*b*d*e^2*r+2700*x^5*x^r*b*d^2*e*n*r^4+22500*x^
5*x^r*b*d^2*e*n*r^3+69375*x^5*x^r*b*d^2*e*n*r^2+93750*x^5*x^r*b*d^2*e*n*r+
675*x^5*(x^r)^2*b*d*e^2*n*r^4-180*x^5*a*d^3*r^6-3300*x^5*a*d^3*r^5-24125*x
^5*a*d^3*r^4-90000*x^5*a*d^3*r^3-181250*x^5*a*d^3*r^2-187500*x^5*a*d^3*r-3
56250*x^5*(x^r)^2*a*d*e^2*r^2-468750*x^5*(x^r)^2*a*d*e^2*r+46875*x^5*(x^r)
^2*b*d*e^2*n-300*x^5*(x^r)^3*ln(c*x^n)*b*e^3*r^5-5000*x^5*(x^r)^3*ln(c*x^n
)*b*e^3*r^4-31875*x^5*(x^r)^3*ln(c*x^n)*b*e^3*r^3-96875*x^5*(x^r)^3*ln(c*x
^n)*b*e^3*r^2-140625*x^5*(x^r)^3*ln(c*x^n)*b*e^3*r+100*x^5*(x^r)^3*b*e^3*n
*r^4+1500*x^5*(x^r)^3*b*e^3*n*r^3+8125*x^5*(x^r)^3*b*e^3*n*r^2+18750*x^5*(
x^r)^3*b*e^3*n*r-2700*x^5*x^r*a*d^2*e*r^5-36000*x^5*x^r*a*d^2*e*r^4-181...
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1023 vs. $2(147) = 294$.

Time = 0.10 (sec) , antiderivative size = 1023, normalized size of antiderivative = 6.77

$$\int x^4(d+ex^r)^3(a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x^4*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/25*(5*(36*b*d^3*r^6 + 660*b*d^3*r^5 + 4825*b*d^3*r^4 + 18000*b*d^3*r^3 +
 36250*b*d^3*r^2 + 37500*b*d^3*r + 15625*b*d^3)*x^5*log(c) + 5*(36*b*d^3*n
*r^6 + 660*b*d^3*n*r^5 + 4825*b*d^3*n*r^4 + 18000*b*d^3*n*r^3 + 36250*b*d^
3*n*r^2 + 37500*b*d^3*n*r + 15625*b*d^3*n)*x^5*log(x) - (36*(b*d^3*n - 5*a
*d^3)*r^6 + 660*(b*d^3*n - 5*a*d^3)*r^5 + 15625*b*d^3*n + 4825*(b*d^3*n -
5*a*d^3)*r^4 - 78125*a*d^3 + 18000*(b*d^3*n - 5*a*d^3)*r^3 + 36250*(b*d^3*
n - 5*a*d^3)*r^2 + 37500*(b*d^3*n - 5*a*d^3)*r)*x^5 + 25*((12*b*e^3*r^5 +
200*b*e^3*r^4 + 1275*b*e^3*r^3 + 3875*b*e^3*r^2 + 5625*b*e^3*r + 3125*b*e^
3)*x^5*log(c) + (12*b*e^3*n*r^5 + 200*b*e^3*n*r^4 + 1275*b*e^3*n*r^3 + 387
5*b*e^3*n*r^2 + 5625*b*e^3*n*r + 3125*b*e^3*n)*x^5*log(x) + (12*a*e^3*r^5
- 625*b*e^3*n - 4*(b*e^3*n - 50*a*e^3)*r^4 + 3125*a*e^3 - 15*(4*b*e^3*n -
85*a*e^3)*r^3 - 25*(13*b*e^3*n - 155*a*e^3)*r^2 - 375*(2*b*e^3*n - 15*a*e^
3)*r)*x^5)*x^(3*r) + 75*((18*b*d*e^2*r^5 + 285*b*d*e^2*r^4 + 1700*b*d*e^2*
r^3 + 4750*b*d*e^2*r^2 + 6250*b*d*e^2*r + 3125*b*d*e^2)*x^5*log(c) + (18*b
*d*e^2*n*r^5 + 285*b*d*e^2*n*r^4 + 1700*b*d*e^2*n*r^3 + 4750*b*d*e^2*n*r^2
 + 6250*b*d*e^2*n*r + 3125*b*d*e^2*n)*x^5*log(x) + (18*a*d*e^2*r^5 - 625*b
*d*e^2*n - 3*(3*b*d*e^2*n - 95*a*d*e^2)*r^4 + 3125*a*d*e^2 - 20*(6*b*d*e^2
*n - 85*a*d*e^2)*r^3 - 50*(11*b*d*e^2*n - 95*a*d*e^2)*r^2 - 250*(4*b*d*e^2
*n - 25*a*d*e^2)*r)*x^5)*x^(2*r) + 75*((36*b*d^2*e*r^5 + 480*b*d^2*e*r^4 +
 2425*b*d^2*e*r^3 + 5875*b*d^2*e*r^2 + 6875*b*d^2*e*r + 3125*b*d^2*e)*x...
```

Sympy [F(-1)]

Timed out.

$$\int x^4(d+ex^r)^3(a+b\log(cx^n))\,dx=\text{Timed out}$$

input
```
integrate(x**4*(d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 228, normalized size of antiderivative = 1.51

$$\begin{aligned}\int x^4(d+ex^r)^3(a+b\log(cx^n))\,dx=&-\frac{1}{25}\,bd^3nx^5+\frac{1}{5}\,bd^3x^5\log(cx^n)\\&+\frac{1}{5}\,ad^3x^5+\frac{be^3x^{3\,r+5}\log(cx^n)}{3\,r+5}\\&+\frac{3\,bde^2x^{2\,r+5}\log(cx^n)}{2\,r+5}+\frac{3\,bd^2ex^{r+5}\log(cx^n)}{r+5}\\&-\frac{be^3nx^{3\,r+5}}{(3\,r+5)^2}+\frac{ae^3x^{3\,r+5}}{3\,r+5}-\frac{3\,bde^2nx^{2\,r+5}}{(2\,r+5)^2}\\&+\frac{3\,ade^2x^{2\,r+5}}{2\,r+5}-\frac{3\,bd^2enx^{r+5}}{(r+5)^2}+\frac{3\,ad^2ex^{r+5}}{r+5}\end{aligned}$$

input
```
integrate(x^4*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/25*b*d^3*n*x^5 + 1/5*b*d^3*x^5*log(c*x^n) + 1/5*a*d^3*x^5 + b*e^3*x^(3*
r + 5)*log(c*x^n)/(3*r + 5) + 3*b*d*e^2*x^(2*r + 5)*log(c*x^n)/(2*r + 5) +
 3*b*d^2*e*x^(r + 5)*log(c*x^n)/(r + 5) - b*e^3*n*x^(3*r + 5)/(3*r + 5)^2
+ a*e^3*x^(3*r + 5)/(3*r + 5) - 3*b*d*e^2*n*x^(2*r + 5)/(2*r + 5)^2 + 3*a*
d*e^2*x^(2*r + 5)/(2*r + 5) - 3*b*d^2*e*n*x^(r + 5)/(r + 5)^2 + 3*a*d^2*e*
x^(r + 5)/(r + 5)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1611 vs. $2(147) = 294$.

Time = 0.15 (sec) , antiderivative size = 1611, normalized size of antiderivative = 10.67

$$\int x^4(d+ex^r)^3(a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x^4*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/25*(300*b*e^3*n*r^5*x^5*x^(3*r)*log(x) + 1350*b*d*e^2*n*r^5*x^5*x^(2*r)*
log(x) + 2700*b*d^2*e*n*r^5*x^5*x^r*log(x) + 180*b*d^3*n*r^6*x^5*log(x) -
36*b*d^3*n*r^6*x^5 + 300*b*e^3*r^5*x^5*x^(3*r)*log(c) + 1350*b*d*e^2*r^5*x
^5*x^(2*r)*log(c) + 2700*b*d^2*e*r^5*x^5*x^r*log(c) + 180*b*d^3*r^6*x^5*lo
g(c) + 5000*b*e^3*n*r^4*x^5*x^(3*r)*log(x) + 21375*b*d*e^2*n*r^4*x^5*x^(2*
r)*log(x) + 36000*b*d^2*e*n*r^4*x^5*x^r*log(x) + 3300*b*d^3*n*r^5*x^5*log(
x) - 100*b*e^3*n*r^4*x^5*x^(3*r) + 300*a*e^3*r^5*x^5*x^(3*r) - 675*b*d*e^2
*n*r^4*x^5*x^(2*r) + 1350*a*d*e^2*r^5*x^5*x^(2*r) - 2700*b*d^2*e*n*r^4*x^5
*x^r + 2700*a*d^2*e*r^5*x^5*x^r - 660*b*d^3*n*r^5*x^5 + 180*a*d^3*r^6*x^5
+ 5000*b*e^3*r^4*x^5*x^(3*r)*log(c) + 21375*b*d*e^2*r^4*x^5*x^(2*r)*log(c)
 + 36000*b*d^2*e*r^4*x^5*x^r*log(c) + 3300*b*d^3*r^5*x^5*log(c) + 31875*b*
e^3*n*r^3*x^5*x^(3*r)*log(x) + 127500*b*d*e^2*n*r^3*x^5*x^(2*r)*log(x) + 1
81875*b*d^2*e*n*r^3*x^5*x^r*log(x) + 24125*b*d^3*n*r^4*x^5*log(x) - 1500*b
*e^3*n*r^3*x^5*x^(3*r) + 5000*a*e^3*r^4*x^5*x^(3*r) - 9000*b*d*e^2*n*r^3*x
^5*x^(2*r) + 21375*a*d*e^2*r^4*x^5*x^(2*r) - 22500*b*d^2*e*n*r^3*x^5*x^r +
 36000*a*d^2*e*r^4*x^5*x^r - 4825*b*d^3*n*r^4*x^5 + 3300*a*d^3*r^5*x^5 + 3
1875*b*e^3*r^3*x^5*x^(3*r)*log(c) + 127500*b*d*e^2*r^3*x^5*x^(2*r)*log(c)
+ 181875*b*d^2*e*r^3*x^5*x^r*log(c) + 24125*b*d^3*r^4*x^5*log(c) + 96875*b
*e^3*n*r^2*x^5*x^(3*r)*log(x) + 356250*b*d*e^2*n*r^2*x^5*x^(2*r)*log(x) +
440625*b*d^2*e*n*r^2*x^5*x^r*log(x) + 90000*b*d^3*n*r^3*x^5*log(x) - 81...
```

Mupad [F(-1)]

Timed out.

$$\int x^4(d+ex^r)^3\,(a+b\log{(cx^n)})\;dx=\int x^4\,\left(d+e\,x^r\right)^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x^4*(d + e*x^r)^3*(a + b*log(c*x^n)),x)
```

output
```
int(x^4*(d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 1052, normalized size of antiderivative = 6.97

$$\int x^4(d+ex^r)^3\,(a+b\log{(cx^n)})\;dx=\text{Too large to display}$$

input
```
int(x^4*(d+e*x^r)^3*(a+b*log(c*x^n)),x)
```

output

```
(x**5*(300*x**(3*r)*log(x**n*c)*b*e**3*r**5 + 5000*x**(3*r)*log(x**n*c)*b*
e**3*r**4 + 31875*x**(3*r)*log(x**n*c)*b*e**3*r**3 + 96875*x**(3*r)*log(x*
*n*c)*b*e**3*r**2 + 140625*x**(3*r)*log(x**n*c)*b*e**3*r + 78125*x**(3*r)*
log(x**n*c)*b*e**3 + 300*x**(3*r)*a*e**3*r**5 + 5000*x**(3*r)*a*e**3*r**4
+ 31875*x**(3*r)*a*e**3*r**3 + 96875*x**(3*r)*a*e**3*r**2 + 140625*x**(3*r
)*a*e**3*r + 78125*x**(3*r)*a*e**3 - 100*x**(3*r)*b*e**3*n*r**4 - 1500*x**
(3*r)*b*e**3*n*r**3 - 8125*x**(3*r)*b*e**3*n*r**2 - 18750*x**(3*r)*b*e**3*
n*r - 15625*x**(3*r)*b*e**3*n + 1350*x**(2*r)*log(x**n*c)*b*d*e**2*r**5 +
21375*x**(2*r)*log(x**n*c)*b*d*e**2*r**4 + 127500*x**(2*r)*log(x**n*c)*b*d
*e**2*r**3 + 356250*x**(2*r)*log(x**n*c)*b*d*e**2*r**2 + 468750*x**(2*r)*l
og(x**n*c)*b*d*e**2*r + 234375*x**(2*r)*log(x**n*c)*b*d*e**2 + 1350*x**(2*
r)*a*d*e**2*r**5 + 21375*x**(2*r)*a*d*e**2*r**4 + 127500*x**(2*r)*a*d*e**2
*r**3 + 356250*x**(2*r)*a*d*e**2*r**2 + 468750*x**(2*r)*a*d*e**2*r + 23437
5*x**(2*r)*a*d*e**2 - 675*x**(2*r)*b*d*e**2*n*r**4 - 9000*x**(2*r)*b*d*e**
2*n*r**3 - 41250*x**(2*r)*b*d*e**2*n*r**2 - 75000*x**(2*r)*b*d*e**2*n*r -
46875*x**(2*r)*b*d*e**2*n + 2700*x**r*log(x**n*c)*b*d**2*e*r**5 + 36000*x*
*r*log(x**n*c)*b*d**2*e*r**4 + 181875*x**r*log(x**n*c)*b*d**2*e*r**3 + 440
625*x**r*log(x**n*c)*b*d**2*e*r**2 + 515625*x**r*log(x**n*c)*b*d**2*e*r +
234375*x**r*log(x**n*c)*b*d**2*e + 2700*x**r*a*d**2*e*r**5 + 36000*x**r*a*
d**2*e*r**4 + 181875*x**r*a*d**2*e*r**3 + 440625*x**r*a*d**2*e*r**2 + 5...
```

3.397 $\int x^2(d+ex^r)^3 (a+b\log(cx^n))\,dx$

Optimal result . . . 2959
Mathematica [A] (verified) . . . 2959
Rubi [A] (verified) . . . 2960
Maple [B] (verified) . . . 2962
Fricas [B] (verification not implemented) . . . 2963
Sympy [F(-1)] . . . 2964
Maxima [A] (verification not implemented) . . . 2964
Giac [B] (verification not implemented) . . . 2965
Mupad [F(-1)] . . . 2966
Reduce [B] (verification not implemented) . . . 2966

Optimal result

Integrand size = 23, antiderivative size = 148

$$\int x^2(d+ex^r)^3 (a+b\log(cx^n))\,dx = -\frac{1}{9}bd^3nx^3-\frac{be^3nx^{3(1+r)}}{9(1+r)^2}-\frac{3bd^2enx^{3+r}}{(3+r)^2}-\frac{3bde^2nx^{3+2r}}{(3+2r)^2}+\frac{1}{3}\left(d^3x^3+\frac{e^3x^{3(1+r)}}{1+r}+\frac{9d^2ex^{3+r}}{3+r}+\frac{9de^2x^{3+2r}}{3+2r}\right)(a+b\log(cx^n))$$

output
```
-1/9*b*d^3*n*x^3-1/9*b*e^3*n*x^(3+3*r)/(1+r)^2-3*b*d^2*e*n*x^(3+r)/(3+r)^2
-3*b*d*e^2*n*x^(3+2*r)/(3+2*r)^2+1/3*(d^3*x^3+e^3*x^(3+3*r)/(1+r)+9*d^2*e*
x^(3+r)/(3+r)+9*d*e^2*x^(3+2*r)/(3+2*r))*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.43 (sec) , antiderivative size = 176, normalized size of antiderivative = 1.19

$$\int x^2(d+ex^r)^3 (a+b\log(cx^n))\,dx = \frac{1}{9}x^3\left(bn\left(-d^3-\frac{27d^2ex^r}{(3+r)^2}-\frac{27de^2x^{2r}}{(3+2r)^2}-\frac{e^3x^{3r}}{(1+r)^2}\right)+3a\left(d^3+\frac{9d^2ex^r}{3+r}+\frac{9de^2x^{2r}}{3+2r}+\frac{e^3x^{3r}}{1+r}\right)+3b\left(d^3+\frac{9d^2ex^r}{3+r}+\frac{9de^2x^{2r}}{3+2r}+\frac{e^3x^{3r}}{1+r}\right)\log(cx^n)\right)$$

input
```
Integrate[x^2*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
(x^3*(b*n*(-d^3 - (27*d^2*e*x^r)/(3 + r)^2 - (27*d*e^2*x^(2*r))/(3 + 2*r)^
2 - (e^3*x^(3*r))/(1 + r)^2) + 3*a*(d^3 + (9*d^2*e*x^r)/(3 + r) + (9*d*e^2
*x^(2*r))/(3 + 2*r) + (e^3*x^(3*r))/(1 + r)) + 3*b*(d^3 + (9*d^2*e*x^r)/(3
 + r) + (9*d*e^2*x^(2*r))/(3 + 2*r) + (e^3*x^(3*r))/(1 + r))*Log[c*x^n]))/
9
```

Rubi [A] (verified)

Time = 0.61 (sec) , antiderivative size = 147, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2771, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2(d+ex^r)^3\left(a+b\log\left(cx^n\right)\right)dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{3}\left(d^3x^3+\frac{9d^2ex^{r+3}}{r+3}+\frac{9de^2x^{2r+3}}{2r+3}+\frac{e^3x^{3(r+1)}}{r+1}\right)\left(a+b\log\left(cx^n\right)\right)-bn\int\frac{1}{3}x^2\left(\frac{9d^2ex^r}{r+3}+\frac{9de^2x^{2r}}{2r+3}+\frac{e^3x^{3r}}{r+1}+d^3\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{3}\left(d^3x^3+\frac{9d^2ex^{r+3}}{r+3}+\frac{9de^2x^{2r+3}}{2r+3}+\frac{e^3x^{3(r+1)}}{r+1}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{3}bn\int x^2\left(\frac{9d^2ex^r}{r+3}+\frac{9de^2x^{2r}}{2r+3}+\frac{e^3x^{3r}}{r+1}+d^3\right)dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{3}\left(d^3x^3+\frac{9d^2ex^{r+3}}{r+3}+\frac{9de^2x^{2r+3}}{2r+3}+\frac{e^3x^{3(r+1)}}{r+1}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{3}bn\int\left(\frac{9de^2x^{2(r+1)}}{2r+3}+\frac{9d^2ex^{r+2}}{r+3}+\frac{e^3x^{3r+2}}{r+1}+d^3x^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{3}\left(d^3x^3+\frac{9d^2ex^{r+3}}{r+3}+\frac{9de^2x^{2r+3}}{2r+3}+\frac{e^3x^{3(r+1)}}{r+1}\right)(a+b\log(cx^n))-\frac{1}{3}bn\left(\frac{d^3x^3}{3}+\frac{9d^2ex^{r+3}}{(r+3)^2}+\frac{9de^2x^{2r+3}}{(2r+3)^2}+\frac{e^3x^{3(r+1)}}{3(r+1)^2}\right)$$

input
```
Int[x^2*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/3*(b*n*((d^3*x^3)/3 + (e^3*x^(3*(1 + r)))/(3*(1 + r)^2) + (9*d^2*e*x^(3
 + r))/(3 + r)^2 + (9*d*e^2*x^(3 + 2*r))/(3 + 2*r)^2)) + ((d^3*x^3 + (e^3*
x^(3*(1 + r)))/(1 + r) + (9*d^2*e*x^(3 + r))/(3 + r) + (9*d*e^2*x^(3 + 2*r
))/(3 + 2*r))*(a + b*Log[c*x^n]))/3
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1266 vs. $2(142) = 284$.

Time = 10.99 (sec) , antiderivative size = 1267, normalized size of antiderivative = 8.56

method	result	size
parallelrisch	Expression too large to display	1267
risch	Expression too large to display	4027

input
```
int(x^2*(d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/9*(-243*x^3*a*d^3-243*x^3*e^3*(x^r)^3*a-729*x^3*d*e^2*(x^r)^2*a-729*x^3
*d^2*e*x^r*a-12*x^3*a*d^3*r^6-132*x^3*a*d^3*r^5-579*x^3*a*d^3*r^4-1296*x^3
*a*d^3*r^3-1566*x^3*a*d^3*r^2-972*x^3*a*d^3*r-243*b*d^3*ln(c*x^n)*x^3-54*x
^3*(x^r)^2*a*d*e^2*r^5-513*x^3*(x^r)^2*a*d*e^2*r^4-1836*x^3*(x^r)^2*a*d*e^
2*r^3-3078*x^3*(x^r)^2*a*d*e^2*r^2-2430*x^3*(x^r)^2*a*d*e^2*r+243*x^3*(x^r
)^2*b*d*e^2*n-12*x^3*(x^r)^3*ln(c*x^n)*b*e^3*r^5-120*x^3*(x^r)^3*ln(c*x^n)
*b*e^3*r^4-459*x^3*(x^r)^3*ln(c*x^n)*b*e^3*r^3-837*x^3*(x^r)^3*ln(c*x^n)*b
*e^3*r^2-729*x^3*(x^r)^3*ln(c*x^n)*b*e^3*r+4*x^3*(x^r)^3*b*e^3*n*r^4+36*x^
3*(x^r)^3*b*e^3*n*r^3+117*x^3*(x^r)^3*b*e^3*n*r^2-12*x^3*ln(c*x^n)*b*d^3*r
^6-132*x^3*ln(c*x^n)*b*d^3*r^5-579*x^3*ln(c*x^n)*b*d^3*r^4-1296*x^3*ln(c*x
^n)*b*d^3*r^3-1566*x^3*ln(c*x^n)*b*d^3*r^2-972*x^3*ln(c*x^n)*b*d^3*r+4*x^3
*b*d^3*n*r^6-243*b*e^3*ln(c*x^n)*(x^r)^3*x^3-108*x^3*x^r*ln(c*x^n)*b*d^2*e
*r^5-864*x^3*x^r*ln(c*x^n)*b*d^2*e*r^4-2619*x^3*x^r*ln(c*x^n)*b*d^2*e*r^3-
3807*x^3*x^r*ln(c*x^n)*b*d^2*e*r^2-2673*x^3*x^r*ln(c*x^n)*b*d^2*e*r-54*x^3
*(x^r)^2*ln(c*x^n)*b*d*e^2*r^5-513*x^3*(x^r)^2*ln(c*x^n)*b*d*e^2*r^4-1836*
x^3*(x^r)^2*ln(c*x^n)*b*d*e^2*r^3-3078*x^3*(x^r)^2*ln(c*x^n)*b*d*e^2*r^2-2
430*x^3*(x^r)^2*ln(c*x^n)*b*d*e^2*r+27*x^3*(x^r)^2*b*d*e^2*n*r^4+216*x^3*(
x^r)^2*b*d*e^2*n*r^3+594*x^3*(x^r)^2*b*d*e^2*n*r^2+648*x^3*(x^r)^2*b*d*e^2
*n*r+108*x^3*x^r*b*d^2*e*n*r^4+540*x^3*x^r*b*d^2*e*n*r^3+999*x^3*x^r*b*d^2
*e*n*r^2+810*x^3*x^r*b*d^2*e*n*r+162*x^3*(x^r)^3*b*e^3*n*r-108*x^3*x^r*...
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1022 vs. $2(142) = 284$.

Time = 0.09 (sec) , antiderivative size = 1022, normalized size of antiderivative = 6.91

$$\int x^2(d+ex^r)^3 (a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x^2*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/9*(3*(4*b*d^3*r^6 + 44*b*d^3*r^5 + 193*b*d^3*r^4 + 432*b*d^3*r^3 + 522*b
*d^3*r^2 + 324*b*d^3*r + 81*b*d^3)*x^3*log(c) + 3*(4*b*d^3*n*r^6 + 44*b*d^
3*n*r^5 + 193*b*d^3*n*r^4 + 432*b*d^3*n*r^3 + 522*b*d^3*n*r^2 + 324*b*d^3*
n*r + 81*b*d^3*n)*x^3*log(x) - (4*(b*d^3*n - 3*a*d^3)*r^6 + 44*(b*d^3*n -
3*a*d^3)*r^5 + 81*b*d^3*n + 193*(b*d^3*n - 3*a*d^3)*r^4 - 243*a*d^3 + 432*
(b*d^3*n - 3*a*d^3)*r^3 + 522*(b*d^3*n - 3*a*d^3)*r^2 + 324*(b*d^3*n - 3*a
*d^3)*r)*x^3 + (3*(4*b*e^3*r^5 + 40*b*e^3*r^4 + 153*b*e^3*r^3 + 279*b*e^3*
r^2 + 243*b*e^3*r + 81*b*e^3)*x^3*log(c) + 3*(4*b*e^3*n*r^5 + 40*b*e^3*n*r
^4 + 153*b*e^3*n*r^3 + 279*b*e^3*n*r^2 + 243*b*e^3*n*r + 81*b*e^3*n)*x^3*l
og(x) + (12*a*e^3*r^5 - 81*b*e^3*n - 4*(b*e^3*n - 30*a*e^3)*r^4 + 243*a*e^
3 - 9*(4*b*e^3*n - 51*a*e^3)*r^3 - 9*(13*b*e^3*n - 93*a*e^3)*r^2 - 81*(2*b
*e^3*n - 9*a*e^3)*r)*x^3)*x^(3*r) + 27*((2*b*d*e^2*r^5 + 19*b*d*e^2*r^4 +
68*b*d*e^2*r^3 + 114*b*d*e^2*r^2 + 90*b*d*e^2*r + 27*b*d*e^2)*x^3*log(c) +
 (2*b*d*e^2*n*r^5 + 19*b*d*e^2*n*r^4 + 68*b*d*e^2*n*r^3 + 114*b*d*e^2*n*r^
2 + 90*b*d*e^2*n*r + 27*b*d*e^2*n)*x^3*log(x) + (2*a*d*e^2*r^5 - 9*b*d*e^2
*n - (b*d*e^2*n - 19*a*d*e^2)*r^4 + 27*a*d*e^2 - 4*(2*b*d*e^2*n - 17*a*d*e
^2)*r^3 - 2*(11*b*d*e^2*n - 57*a*d*e^2)*r^2 - 6*(4*b*d*e^2*n - 15*a*d*e^2)
*r)*x^3)*x^(2*r) + 27*((4*b*d^2*e*r^5 + 32*b*d^2*e*r^4 + 97*b*d^2*e*r^3 +
141*b*d^2*e*r^2 + 99*b*d^2*e*r + 27*b*d^2*e)*x^3*log(c) + (4*b*d^2*e*n*r^5
 + 32*b*d^2*e*n*r^4 + 97*b*d^2*e*n*r^3 + 141*b*d^2*e*n*r^2 + 99*b*d^2*e...
```

Sympy [F(-1)]

Timed out.

$$\int x^2(d+ex^r)^3(a+b\log(cx^n))\,dx = \text{Timed out}$$

input
```
integrate(x**2*(d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 224, normalized size of antiderivative = 1.51

$$\begin{aligned}\int x^2(d+ex^r)^3(a+b\log(cx^n))\,dx = & -\frac{1}{9}bd^3nx^3+\frac{1}{3}bd^3x^3\log(cx^n)+\frac{1}{3}ad^3x^3 \\ & +\frac{be^3x^{3r+3}\log(cx^n)}{3(r+1)}+\frac{3bde^2x^{2r+3}\log(cx^n)}{2r+3} \\ & +\frac{3bd^2ex^{r+3}\log(cx^n)}{r+3}-\frac{be^3nx^{3r+3}}{9(r+1)^2} \\ & +\frac{ae^3x^{3r+3}}{3(r+1)}-\frac{3bde^2nx^{2r+3}}{(2r+3)^2}+\frac{3ade^2x^{2r+3}}{2r+3} \\ & -\frac{3bd^2enx^{r+3}}{(r+3)^2}+\frac{3ad^2ex^{r+3}}{r+3}\end{aligned}$$

input
```
integrate(x^2*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/9*b*d^3*n*x^3 + 1/3*b*d^3*x^3*log(c*x^n) + 1/3*a*d^3*x^3 + 1/3*b*e^3*x^
(3*r + 3)*log(c*x^n)/(r + 1) + 3*b*d*e^2*x^(2*r + 3)*log(c*x^n)/(2*r + 3)
+ 3*b*d^2*e*x^(r + 3)*log(c*x^n)/(r + 3) - 1/9*b*e^3*n*x^(3*r + 3)/(r + 1)
^2 + 1/3*a*e^3*x^(3*r + 3)/(r + 1) - 3*b*d*e^2*n*x^(2*r + 3)/(2*r + 3)^2 +
 3*a*d*e^2*x^(2*r + 3)/(2*r + 3) - 3*b*d^2*e*n*x^(r + 3)/(r + 3)^2 + 3*a*d
^2*e*x^(r + 3)/(r + 3)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1611 vs. $2(142) = 284$.

Time = 0.16 (sec) , antiderivative size = 1611, normalized size of antiderivative = 10.89

$$\int x^2(d+ex^r)^3(a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x^2*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/9*(12*b*e^3*n*r^5*x^3*x^(3*r)*log(x) + 54*b*d*e^2*n*r^5*x^3*x^(2*r)*log(
x) + 108*b*d^2*e*n*r^5*x^3*x^r*log(x) + 12*b*d^3*n*r^6*x^3*log(x) - 4*b*d^
3*n*r^6*x^3 + 12*b*e^3*r^5*x^3*x^(3*r)*log(c) + 54*b*d*e^2*r^5*x^3*x^(2*r)
*log(c) + 108*b*d^2*e*r^5*x^3*x^r*log(c) + 12*b*d^3*r^6*x^3*log(c) + 120*b
*e^3*n*r^4*x^3*x^(3*r)*log(x) + 513*b*d*e^2*n*r^4*x^3*x^(2*r)*log(x) + 864
*b*d^2*e*n*r^4*x^3*x^r*log(x) + 132*b*d^3*n*r^5*x^3*log(x) - 4*b*e^3*n*r^4
*x^3*x^(3*r) + 12*a*e^3*r^5*x^3*x^(3*r) - 27*b*d*e^2*n*r^4*x^3*x^(2*r) + 5
4*a*d*e^2*r^5*x^3*x^(2*r) - 108*b*d^2*e*n*r^4*x^3*x^r + 108*a*d^2*e*r^5*x^
3*x^r - 44*b*d^3*n*r^5*x^3 + 12*a*d^3*r^6*x^3 + 120*b*e^3*r^4*x^3*x^(3*r)*
log(c) + 513*b*d*e^2*r^4*x^3*x^(2*r)*log(c) + 864*b*d^2*e*r^4*x^3*x^r*log(
c) + 132*b*d^3*r^5*x^3*log(c) + 459*b*e^3*n*r^3*x^3*x^(3*r)*log(x) + 1836*
b*d*e^2*n*r^3*x^3*x^(2*r)*log(x) + 2619*b*d^2*e*n*r^3*x^3*x^r*log(x) + 579
*b*d^3*n*r^4*x^3*log(x) - 36*b*e^3*n*r^3*x^3*x^(3*r) + 120*a*e^3*r^4*x^3*x
^(3*r) - 216*b*d*e^2*n*r^3*x^3*x^(2*r) + 513*a*d*e^2*r^4*x^3*x^(2*r) - 540
*b*d^2*e*n*r^3*x^3*x^r + 864*a*d^2*e*r^4*x^3*x^r - 193*b*d^3*n*r^4*x^3 + 1
32*a*d^3*r^5*x^3 + 459*b*e^3*r^3*x^3*x^(3*r)*log(c) + 1836*b*d*e^2*r^3*x^3
*x^(2*r)*log(c) + 2619*b*d^2*e*r^3*x^3*x^r*log(c) + 579*b*d^3*r^4*x^3*log(
c) + 837*b*e^3*n*r^2*x^3*x^(3*r)*log(x) + 3078*b*d*e^2*n*r^2*x^3*x^(2*r)*l
og(x) + 3807*b*d^2*e*n*r^2*x^3*x^r*log(x) + 1296*b*d^3*n*r^3*x^3*log(x) -
117*b*e^3*n*r^2*x^3*x^(3*r) + 459*a*e^3*r^3*x^3*x^(3*r) - 594*b*d*e^2*n...
```

Mupad [F(-1)]

Timed out.

$$\int x^2(d+ex^r)^3\,(a+b\log{(cx^n)})\;dx = \int x^2\,(d+e\,x^r)^3\,(a+b\,\ln{(c\,x^n)})\;dx$$

input
```
int(x^2*(d + e*x^r)^3*(a + b*log(c*x^n)),x)
```

output
```
int(x^2*(d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 1052, normalized size of antiderivative = 7.11

$$\int x^2(d+ex^r)^3\,(a+b\log{(cx^n)})\;dx = \text{Too large to display}$$

input
```
int(x^2*(d+e*x^r)^3*(a+b*log(c*x^n)),x)
```

output

```
(x**3*(12*x**(3*r)*log(x**n*c)*b*e**3*r**5 + 120*x**(3*r)*log(x**n*c)*b*e*
*3*r**4 + 459*x**(3*r)*log(x**n*c)*b*e**3*r**3 + 837*x**(3*r)*log(x**n*c)*
b*e**3*r**2 + 729*x**(3*r)*log(x**n*c)*b*e**3*r + 243*x**(3*r)*log(x**n*c)
*b*e**3 + 12*x**(3*r)*a*e**3*r**5 + 120*x**(3*r)*a*e**3*r**4 + 459*x**(3*r
)*a*e**3*r**3 + 837*x**(3*r)*a*e**3*r**2 + 729*x**(3*r)*a*e**3*r + 243*x**
(3*r)*a*e**3 - 4*x**(3*r)*b*e**3*n*r**4 - 36*x**(3*r)*b*e**3*n*r**3 - 117*
x**(3*r)*b*e**3*n*r**2 - 162*x**(3*r)*b*e**3*n*r - 81*x**(3*r)*b*e**3*n +
54*x**(2*r)*log(x**n*c)*b*d*e**2*r**5 + 513*x**(2*r)*log(x**n*c)*b*d*e**2*
r**4 + 1836*x**(2*r)*log(x**n*c)*b*d*e**2*r**3 + 3078*x**(2*r)*log(x**n*c)
*b*d*e**2*r**2 + 2430*x**(2*r)*log(x**n*c)*b*d*e**2*r + 729*x**(2*r)*log(x
**n*c)*b*d*e**2 + 54*x**(2*r)*a*d*e**2*r**5 + 513*x**(2*r)*a*d*e**2*r**4 +
 1836*x**(2*r)*a*d*e**2*r**3 + 3078*x**(2*r)*a*d*e**2*r**2 + 2430*x**(2*r)
*a*d*e**2*r + 729*x**(2*r)*a*d*e**2 - 27*x**(2*r)*b*d*e**2*n*r**4 - 216*x*
*(2*r)*b*d*e**2*n*r**3 - 594*x**(2*r)*b*d*e**2*n*r**2 - 648*x**(2*r)*b*d*e
**2*n*r - 243*x**(2*r)*b*d*e**2*n + 108*x**r*log(x**n*c)*b*d**2*e*r**5 + 8
64*x**r*log(x**n*c)*b*d**2*e*r**4 + 2619*x**r*log(x**n*c)*b*d**2*e*r**3 +
3807*x**r*log(x**n*c)*b*d**2*e*r**2 + 2673*x**r*log(x**n*c)*b*d**2*e*r + 7
29*x**r*log(x**n*c)*b*d**2*e + 108*x**r*a*d**2*e*r**5 + 864*x**r*a*d**2*e*
r**4 + 2619*x**r*a*d**2*e*r**3 + 3807*x**r*a*d**2*e*r**2 + 2673*x**r*a*d**
2*e*r + 729*x**r*a*d**2*e - 108*x**r*b*d**2*e*n*r**4 - 540*x**r*b*d**2*...
```

3.398 $\int (d+ex^r)^3 (a+b\log(cx^n))\,dx$

Optimal result 2968
Mathematica [A] (verified) 2969
Rubi [A] (verified) 2969
Maple [B] (verified) 2970
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Optimal result

Integrand size = 20, antiderivative size = 169

$$\int (d+ex^r)^3 (a+b\log(cx^n))\,dx = -bd^3nx - \frac{3bd^2enx^{1+r}}{(1+r)^2} - \frac{3bde^2nx^{1+2r}}{(1+2r)^2} - \frac{be^3nx^{1+3r}}{(1+3r)^2} + d^3x(a+b\log(cx^n)) + \frac{3d^2ex^{1+r}(a+b\log(cx^n))}{1+r} + \frac{3de^2x^{1+2r}(a+b\log(cx^n))}{1+2r} + \frac{e^3x^{1+3r}(a+b\log(cx^n))}{1+3r}$$

output
```
-b*d^3*n*x-3*b*d^2*e*n*x^(1+r)/(1+r)^2-3*b*d*e^2*n*x^(1+2*r)/(1+2*r)^2-b*e
^3*n*x^(1+3*r)/(1+3*r)^2+d^3*x*(a+b*ln(c*x^n))+3*d^2*e*x^(1+r)*(a+b*ln(c*x
^n))/(1+r)+3*d*e^2*x^(1+2*r)*(a+b*ln(c*x^n))/(1+2*r)+e^3*x^(1+3*r)*(a+b*ln
(c*x^n))/(1+3*r)
```

Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 159, normalized size of antiderivative = 0.94

$$\int (d+ex^r)^3 (a+b\log(cx^n))\,dx = x\left(ad^3-bd^3n-\frac{3bd^2enx^r}{(1+r)^2}-\frac{3bde^2nx^{2r}}{(1+2r)^2}-\frac{be^3nx^{3r}}{(1+3r)^2}+bd^3\log(cx^n)+\frac{3d^2ex^r(a+b\log(cx^n))}{1+r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{1+2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{1+3r}\right)$$

input
```
Integrate[(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
x*(a*d^3 - b*d^3*n - (3*b*d^2*e*n*x^r)/(1 + r)^2 - (3*b*d*e^2*n*x^(2*r))/(
1 + 2*r)^2 - (b*e^3*n*x^(3*r))/(1 + 3*r)^2 + b*d^3*Log[c*x^n] + (3*d^2*e*x
^r*(a + b*Log[c*x^n]))/(1 + r) + (3*d*e^2*x^(2*r)*(a + b*Log[c*x^n]))/(1 +
 2*r) + (e^3*x^(3*r)*(a + b*Log[c*x^n]))/(1 + 3*r))
```

Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 164, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {2750, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex^r)^3 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{ 2750}$$

$$-bn\int \left(\frac{3d^2ex^r}{r+1}+\frac{3de^2x^{2r}}{2r+1}+\frac{e^3x^{3r}}{3r+1}+d^3\right)dx+d^3x(a+b\log(cx^n))+\frac{3d^2ex^{r+1}(a+b\log(cx^n))}{r+1}+\frac{3de^2x^{2r+1}(a+b\log(cx^n))}{2r+1}+\frac{e^3x^{3r+1}(a+b\log(cx^n))}{3r+1}$$

$$\Big\downarrow \text{ 2009}$$

$$d^3x(a+b\log(cx^n))+\frac{3d^2ex^{r+1}(a+b\log(cx^n))}{r+1}+\frac{3de^2x^{2r+1}(a+b\log(cx^n))}{2r+1}+\frac{e^3x^{3r+1}(a+b\log(cx^n))}{3r+1}-bn\left(d^3x+\frac{3d^2ex^{r+1}}{(r+1)^2}+\frac{3de^2x^{2r+1}}{(2r+1)^2}+\frac{e^3x^{3r+1}}{(3r+1)^2}\right)$$

input
```
Int[(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*(d^3*x + (3*d^2*e*x^(1 + r))/(1 + r)^2 + (3*d*e^2*x^(1 + 2*r))/(1 +
2*r)^2 + (e^3*x^(1 + 3*r))/(1 + 3*r)^2)) + d^3*x*(a + b*Log[c*x^n]) + (3*d
^2*e*x^(1 + r)*(a + b*Log[c*x^n]))/(1 + r) + (3*d*e^2*x^(1 + 2*r)*(a + b*L
og[c*x^n]))/(1 + 2*r) + (e^3*x^(1 + 3*r)*(a + b*Log[c*x^n]))/(1 + 3*r)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2750
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Simp[(a + b*Log[c*x^n])
  u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b,
 c, d, e, n, r}, x] && IGtQ[q, 0]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1112 vs. $2(169) = 338$.

Time = 3.32 (sec) , antiderivative size = 1113, normalized size of antiderivative = 6.59

method	result	size
parallelrisch	Expression too large to display	1113
risch	Expression too large to display	4023

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-x*a*d^3-x*e^3*(x^r)^3*a-36*x*a*d^3*r^6-132*x*a*d^3*r^5-193*x*a*d^3*r^4-
144*x*a*d^3*r^3-58*x*a*d^3*r^2-12*x*a*d^3*r-x*ln(c*x^n)*b*d^3-3*x*d^2*e*x^
r*a-3*x*d*e^2*(x^r)^2*a-12*x*(x^r)^3*a*e^3*r^5-40*x*(x^r)^3*a*e^3*r^4-36*x
*ln(c*x^n)*b*d^3*r^6+36*x*b*d^3*n*r^6-51*x*(x^r)^3*a*e^3*r^3-132*x*ln(c*x^
n)*b*d^3*r^5+132*x*b*d^3*n*r^5-31*x*(x^r)^3*a*e^3*r^2-193*x*ln(c*x^n)*b*d^
3*r^4+193*x*b*d^3*n*r^4-9*x*(x^r)^3*a*e^3*r+x*(x^r)^3*b*e^3*n-144*x*ln(c*x
^n)*b*d^3*r^3+144*x*b*d^3*n*r^3-58*x*ln(c*x^n)*b*d^3*r^2+58*x*b*d^3*n*r^2-
12*x*ln(c*x^n)*b*d^3*r+12*x*b*d^3*n*r-x*(x^r)^3*ln(c*x^n)*b*e^3-3*x*(x^r)^
2*ln(c*x^n)*b*d*e^2-3*x*x^r*ln(c*x^n)*b*d^2*e-12*x*(x^r)^3*ln(c*x^n)*b*e^3
*r^5-40*x*(x^r)^3*ln(c*x^n)*b*e^3*r^4+4*x*(x^r)^3*b*e^3*n*r^4-51*x*(x^r)^3
*ln(c*x^n)*b*e^3*r^3+12*x*(x^r)^3*b*e^3*n*r^3-54*x*(x^r)^2*a*d*e^2*r^5-31*
x*(x^r)^3*ln(c*x^n)*b*e^3*r^2+13*x*(x^r)^3*b*e^3*n*r^2-171*x*(x^r)^2*a*d*e
^2*r^4-108*x*x^r*a*d^2*e*r^5-9*x*(x^r)^3*ln(c*x^n)*b*e^3*r+6*x*(x^r)^3*b*e
^3*n*r-204*x*(x^r)^2*a*d*e^2*r^3-288*x*x^r*a*d^2*e*r^4-114*x*(x^r)^2*a*d*e
^2*r^2-291*x*x^r*a*d^2*e*r^3-30*x*(x^r)^2*a*d*e^2*r+3*x*(x^r)^2*b*d*e^2*n-
141*x*x^r*a*d^2*e*r^2-33*x*x^r*a*d^2*e*r+3*x*x^r*b*d^2*e*n-141*x*x^r*ln(c*
x^n)*b*d^2*e*r^2+111*x*x^r*b*d^2*e*n*r^2-33*x*x^r*ln(c*x^n)*b*d^2*e*r+30*x
*x^r*b*d^2*e*n*r-54*x*(x^r)^2*ln(c*x^n)*b*d*e^2*r^5-171*x*(x^r)^2*ln(c*x^n
)*b*d*e^2*r^4+27*x*(x^r)^2*b*d*e^2*n*r^4-108*x*x^r*ln(c*x^n)*b*d^2*e*r^5-2
04*x*(x^r)^2*ln(c*x^n)*b*d*e^2*r^3+72*x*(x^r)^2*b*d*e^2*n*r^3-288*x*x^r...
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 983 vs. $2(169) = 338$.

Time = 0.10 (sec) , antiderivative size = 983, normalized size of antiderivative = 5.82

$$\int (d + ex^r)^3 (a + b \log (cx^n)) \, dx = \text{Too large to display}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((36*b*d^3*r^6 + 132*b*d^3*r^5 + 193*b*d^3*r^4 + 144*b*d^3*r^3 + 58*b*d^3*
r^2 + 12*b*d^3*r + b*d^3)*x*log(c) + (36*b*d^3*n*r^6 + 132*b*d^3*n*r^5 + 1
93*b*d^3*n*r^4 + 144*b*d^3*n*r^3 + 58*b*d^3*n*r^2 + 12*b*d^3*n*r + b*d^3*n
)*x*log(x) - (36*(b*d^3*n - a*d^3)*r^6 + 132*(b*d^3*n - a*d^3)*r^5 + b*d^3
*n + 193*(b*d^3*n - a*d^3)*r^4 - a*d^3 + 144*(b*d^3*n - a*d^3)*r^3 + 58*(b
*d^3*n - a*d^3)*r^2 + 12*(b*d^3*n - a*d^3)*r)*x + ((12*b*e^3*r^5 + 40*b*e^
3*r^4 + 51*b*e^3*r^3 + 31*b*e^3*r^2 + 9*b*e^3*r + b*e^3)*x*log(c) + (12*b*
e^3*n*r^5 + 40*b*e^3*n*r^4 + 51*b*e^3*n*r^3 + 31*b*e^3*n*r^2 + 9*b*e^3*n*r
 + b*e^3*n)*x*log(x) + (12*a*e^3*r^5 - b*e^3*n - 4*(b*e^3*n - 10*a*e^3)*r^
4 + a*e^3 - 3*(4*b*e^3*n - 17*a*e^3)*r^3 - (13*b*e^3*n - 31*a*e^3)*r^2 - 3
*(2*b*e^3*n - 3*a*e^3)*r)*x)*x^(3*r) + 3*((18*b*d*e^2*r^5 + 57*b*d*e^2*r^4
 + 68*b*d*e^2*r^3 + 38*b*d*e^2*r^2 + 10*b*d*e^2*r + b*d*e^2)*x*log(c) + (1
8*b*d*e^2*n*r^5 + 57*b*d*e^2*n*r^4 + 68*b*d*e^2*n*r^3 + 38*b*d*e^2*n*r^2 +
 10*b*d*e^2*n*r + b*d*e^2*n)*x*log(x) + (18*a*d*e^2*r^5 - b*d*e^2*n - 3*(3
*b*d*e^2*n - 19*a*d*e^2)*r^4 + a*d*e^2 - 4*(6*b*d*e^2*n - 17*a*d*e^2)*r^3
- 2*(11*b*d*e^2*n - 19*a*d*e^2)*r^2 - 2*(4*b*d*e^2*n - 5*a*d*e^2)*r)*x)*x^
(2*r) + 3*((36*b*d^2*e*r^5 + 96*b*d^2*e*r^4 + 97*b*d^2*e*r^3 + 47*b*d^2*e*
r^2 + 11*b*d^2*e*r + b*d^2*e)*x*log(c) + (36*b*d^2*e*n*r^5 + 96*b*d^2*e*n*
r^4 + 97*b*d^2*e*n*r^3 + 47*b*d^2*e*n*r^2 + 11*b*d^2*e*n*r + b*d^2*e*n)*x*
log(x) + (36*a*d^2*e*r^5 - b*d^2*e*n - 12*(3*b*d^2*e*n - 8*a*d^2*e)*r^4...
```

Sympy [A] (verification not implemented)

Time = 3.64 (sec) , antiderivative size = 325, normalized size of antiderivative = 1.92

$$\int (d+ex^r)^3 (a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x + 3*a*d**2*e*Piecewise((x**(r + 1)/(r + 1), Ne(r, -1)), (log(x),
True)) + 3*a*d*e**2*Piecewise((x**(2*r + 1)/(2*r + 1), Ne(r, -1/2)), (log(
x), True)) + a*e**3*Piecewise((x**(3*r + 1)/(3*r + 1), Ne(r, -1/3)), (log(
x), True)) - b*d**3*n*x + b*d**3*x*log(c*x**n) - 3*b*d**2*e*n*Piecewise((P
iecewise((x**(r + 1)/(r + 1), Ne(r, -1)), (log(x), True))/(r + 1), (r > -o
o) & (r < oo) & Ne(r, -1)), (log(x)**2/2, True)) + 3*b*d**2*e*Piecewise((x
**(r + 1)/(r + 1), Ne(r, -1)), (log(x), True))*log(c*x**n) - 3*b*d*e**2*n*
Piecewise((Piecewise((x**(2*r + 1)/(2*r + 1), Ne(r, -1/2)), (log(x), True)
)/(2*r + 1), (r > -oo) & (r < oo) & Ne(r, -1/2)), (log(x)**2/2, True)) + 3
*b*d*e**2*Piecewise((x**(2*r + 1)/(2*r + 1), Ne(r, -1/2)), (log(x), True))
*log(c*x**n) - b*e**3*n*Piecewise((Piecewise((x**(3*r + 1)/(3*r + 1), Ne(r
, -1/3)), (log(x), True))/(3*r + 1), (r > -oo) & (r < oo) & Ne(r, -1/3)),
(log(x)**2/2, True)) + b*e**3*Piecewise((x**(3*r + 1)/(3*r + 1), Ne(r, -1/
3)), (log(x), True))*log(c*x**n)
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 220, normalized size of antiderivative = 1.30

$$\int (d+ex^r)^3 (a+b\log(cx^n))\,dx = -bd^3nx + bd^3x\log(cx^n) + ad^3x + \frac{be^3x^{3r+1}\log(cx^n)}{3r+1} + \frac{3\,bde^2x^{2r+1}\log(cx^n)}{2r+1} + \frac{3\,bd^2ex^{r+1}\log(cx^n)}{r+1} - \frac{be^3nx^{3r+1}}{(3r+1)^2} + \frac{ae^3x^{3r+1}}{3r+1} - \frac{3\,bde^2nx^{2r+1}}{(2r+1)^2} + \frac{3\,ade^2x^{2r+1}}{2r+1} - \frac{3\,bd^2enx^{r+1}}{(r+1)^2} + \frac{3\,ad^2ex^{r+1}}{r+1}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-b*d^3*n*x + b*d^3*x*log(c*x^n) + a*d^3*x + b*e^3*x^(3*r + 1)*log(c*x^n)/(
3*r + 1) + 3*b*d*e^2*x^(2*r + 1)*log(c*x^n)/(2*r + 1) + 3*b*d^2*e*x^(r + 1
)*log(c*x^n)/(r + 1) - b*e^3*n*x^(3*r + 1)/(3*r + 1)^2 + a*e^3*x^(3*r + 1)
/(3*r + 1) - 3*b*d*e^2*n*x^(2*r + 1)/(2*r + 1)^2 + 3*a*d*e^2*x^(2*r + 1)/(
2*r + 1) - 3*b*d^2*e*n*x^(r + 1)/(r + 1)^2 + 3*a*d^2*e*x^(r + 1)/(r + 1)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 379 vs. $2(169) = 338$.

Time = 0.13 (sec) , antiderivative size = 379, normalized size of antiderivative = 2.24

$$\int (d+ex^r)^3 (a+b\log(cx^n))\,dx = \frac{3\,be^3nrxx^{3\,r}\log(x)}{9\,r^2+6\,r+1} + \frac{6\,bde^2nrxx^{2\,r}\log(x)}{4\,r^2+4\,r+1} + \frac{3\,bd^2enrxx^r\log(x)}{r^2+2\,r+1} + bd^3nx\log(x) + \frac{be^3nxx^{3\,r}\log(x)}{9\,r^2+6\,r+1} + \frac{3\,bde^2nxx^{2\,r}\log(x)}{4\,r^2+4\,r+1} + \frac{3\,bd^2enxx^r\log(x)}{r^2+2\,r+1} - bd^3nx - \frac{be^3nxx^{3\,r}}{9\,r^2+6\,r+1} - \frac{3\,bde^2nxx^{2\,r}}{4\,r^2+4\,r+1} - \frac{3\,bd^2enxx^r}{r^2+2\,r+1} + bd^3x\log(c) + \frac{be^3xx^{3\,r}\log(c)}{3\,r+1} + \frac{3\,bde^2xx^{2\,r}\log(c)}{2\,r+1} + \frac{3\,bd^2exx^r\log(c)}{r+1} + ad^3x + \frac{ae^3xx^{3\,r}}{3\,r+1} + \frac{3\,ade^2xx^{2\,r}}{2\,r+1} + \frac{3\,ad^2exx^r}{r+1}$$

input

```
integrate((d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output

```
3*b*e^3*n*r*x*x^(3*r)*log(x)/(9*r^2 + 6*r + 1) + 6*b*d*e^2*n*r*x*x^(2*r)*l
og(x)/(4*r^2 + 4*r + 1) + 3*b*d^2*e*n*r*x*x^r*log(x)/(r^2 + 2*r + 1) + b*d
^3*n*x*log(x) + b*e^3*n*x*x^(3*r)*log(x)/(9*r^2 + 6*r + 1) + 3*b*d*e^2*n*x
*x^(2*r)*log(x)/(4*r^2 + 4*r + 1) + 3*b*d^2*e*n*x*x^r*log(x)/(r^2 + 2*r +
1) - b*d^3*n*x - b*e^3*n*x*x^(3*r)/(9*r^2 + 6*r + 1) - 3*b*d*e^2*n*x*x^(2*
r)/(4*r^2 + 4*r + 1) - 3*b*d^2*e*n*x*x^r/(r^2 + 2*r + 1) + b*d^3*x*log(c)
+ b*e^3*x*x^(3*r)*log(c)/(3*r + 1) + 3*b*d*e^2*x*x^(2*r)*log(c)/(2*r + 1)
+ 3*b*d^2*e*x*x^r*log(c)/(r + 1) + a*d^3*x + a*e^3*x*x^(3*r)/(3*r + 1) + 3
*a*d*e^2*x*x^(2*r)/(2*r + 1) + 3*a*d^2*e*x*x^r/(r + 1)
```

Mupad [F(-1)]

Timed out.

$$\int (d + ex^r)^3 (a + b\log(cx^n)) \, dx = \int (d + e\,x^r)^3 \left(a + b\,\ln\left(c\,x^n\right)\right) \, dx$$

input
```
int((d + e*x^r)^3*(a + b*log(c*x^n)),x)
```

output
```
int((d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 1046, normalized size of antiderivative = 6.19

$$\int (d + ex^r)^3 (a + b\log(cx^n)) \, dx = \text{Too large to display}$$

input
```
int((d+e*x^r)^3*(a+b*log(c*x^n)),x)
```

output
```
(x*(12*x**(3*r)*log(x**n*c)*b*e**3*r**5 + 40*x**(3*r)*log(x**n*c)*b*e**3*r
**4 + 51*x**(3*r)*log(x**n*c)*b*e**3*r**3 + 31*x**(3*r)*log(x**n*c)*b*e**3
*r**2 + 9*x**(3*r)*log(x**n*c)*b*e**3*r + x**(3*r)*log(x**n*c)*b*e**3 + 12
*x**(3*r)*a*e**3*r**5 + 40*x**(3*r)*a*e**3*r**4 + 51*x**(3*r)*a*e**3*r**3
+ 31*x**(3*r)*a*e**3*r**2 + 9*x**(3*r)*a*e**3*r + x**(3*r)*a*e**3 - 4*x**(
3*r)*b*e**3*n*r**4 - 12*x**(3*r)*b*e**3*n*r**3 - 13*x**(3*r)*b*e**3*n*r**2
 - 6*x**(3*r)*b*e**3*n*r - x**(3*r)*b*e**3*n + 54*x**(2*r)*log(x**n*c)*b*d
*e**2*r**5 + 171*x**(2*r)*log(x**n*c)*b*d*e**2*r**4 + 204*x**(2*r)*log(x**
n*c)*b*d*e**2*r**3 + 114*x**(2*r)*log(x**n*c)*b*d*e**2*r**2 + 30*x**(2*r)*
log(x**n*c)*b*d*e**2*r + 3*x**(2*r)*log(x**n*c)*b*d*e**2 + 54*x**(2*r)*a*d
*e**2*r**5 + 171*x**(2*r)*a*d*e**2*r**4 + 204*x**(2*r)*a*d*e**2*r**3 + 114
*x**(2*r)*a*d*e**2*r**2 + 30*x**(2*r)*a*d*e**2*r + 3*x**(2*r)*a*d*e**2 - 2
7*x**(2*r)*b*d*e**2*n*r**4 - 72*x**(2*r)*b*d*e**2*n*r**3 - 66*x**(2*r)*b*d
*e**2*n*r**2 - 24*x**(2*r)*b*d*e**2*n*r - 3*x**(2*r)*b*d*e**2*n + 108*x**r
*log(x**n*c)*b*d**2*e*r**5 + 288*x**r*log(x**n*c)*b*d**2*e*r**4 + 291*x**r
*log(x**n*c)*b*d**2*e*r**3 + 141*x**r*log(x**n*c)*b*d**2*e*r**2 + 33*x**r*
log(x**n*c)*b*d**2*e*r + 3*x**r*log(x**n*c)*b*d**2*e + 108*x**r*a*d**2*e*r
**5 + 288*x**r*a*d**2*e*r**4 + 291*x**r*a*d**2*e*r**3 + 141*x**r*a*d**2*e*
r**2 + 33*x**r*a*d**2*e*r + 3*x**r*a*d**2*e - 108*x**r*b*d**2*e*n*r**4 - 1
80*x**r*b*d**2*e*n*r**3 - 111*x**r*b*d**2*e*n*r**2 - 30*x**r*b*d**2*e*n...
```

3.399 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^2}\,dx$

Optimal result 2977
Mathematica [A] (verified) 2978
Rubi [A] (verified) 2978
Maple [B] (verified) 2980
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Sympy [A] (verification not implemented) 2982
Maxima [F(-2)] 2982
Giac [F] 2983
Mupad [F(-1)] 2983
Reduce [B] (verification not implemented) 2983

Optimal result

Integrand size = 23, antiderivative size = 179

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^2}\,dx = -\frac{bd^3n}{x} - \frac{3bd^2enx^{-1+r}}{(1-r)^2} - \frac{3bde^2nx^{-1+2r}}{(1-2r)^2} - \frac{be^3nx^{-1+3r}}{(1-3r)^2} - \frac{d^3(a+b\log(cx^n))}{x} - \frac{3d^2ex^{-1+r}(a+b\log(cx^n))}{1-r} - \frac{3de^2x^{-1+2r}(a+b\log(cx^n))}{1-2r} - \frac{e^3x^{-1+3r}(a+b\log(cx^n))}{1-3r}$$

output
```
-b*d^3*n/x-3*b*d^2*e*n*x^(-1+r)/(1-r)^2-3*b*d*e^2*n*x^(-1+2*r)/(1-2*r)^2-b
*e^3*n*x^(-1+3*r)/(1-3*r)^2-d^3*(a+b*ln(c*x^n))/x-3*d^2*e*x^(-1+r)*(a+b*ln
(c*x^n))/(1-r)-3*d*e^2*x^(-1+2*r)*(a+b*ln(c*x^n))/(1-2*r)-e^3*x^(-1+3*r)*(
a+b*ln(c*x^n))/(1-3*r)
```

Mathematica [A] (verified)

Time = 0.44 (sec) , antiderivative size = 181, normalized size of antiderivative = 1.01

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^2}\,dx = \frac{bn\left(-d^3-\frac{3d^2ex^r}{(-1+r)^2}-\frac{3de^2x^{2r}}{(1-2r)^2}-\frac{e^3x^{3r}}{(1-3r)^2}\right)+a\left(-d^3+\frac{3d^2ex^r}{-1+r}+\frac{3de^2x^{2r}}{-1+2r}+\frac{e^3x^{3r}}{-1+3r}\right)+b\left(-d^3+\frac{3d^2ex^r}{-1+r}+\frac{3de^2x^{2r}}{-1+2r}\right.}{x}$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
(b*n*(-d^3 - (3*d^2*e*x^r)/(-1 + r)^2 - (3*d*e^2*x^(2*r))/(1 - 2*r)^2 - (e
^3*x^(3*r))/(1 - 3*r)^2) + a*(-d^3 + (3*d^2*e*x^r)/(-1 + r) + (3*d*e^2*x^(
2*r))/(-1 + 2*r) + (e^3*x^(3*r))/(-1 + 3*r)) + b*(-d^3 + (3*d^2*e*x^r)/(-1
 + r) + (3*d*e^2*x^(2*r))/(-1 + 2*r) + (e^3*x^(3*r))/(-1 + 3*r))*Log[c*x^n
])/x
```

Rubi [A] (verified)

Time = 0.67 (sec) , antiderivative size = 175, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^2}\,dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{\frac{3d^2ex^r}{1-r}+\frac{3de^2x^{2r}}{1-2r}+\frac{e^3x^{3r}}{1-3r}+d^3}{x^2}dx-\frac{d^3(a+b\log(cx^n))}{x}-\frac{3d^2ex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{3de^2x^{2r-1}(a+b\log(cx^n))}{1-2r}-\frac{e^3x^{3r-1}(a+b\log(cx^n))}{1-3r}$$

$$\Big\downarrow \text{25}$$

$$bn\int \frac{\frac{3d^2ex^r}{1-r}+\frac{3de^2x^{2r}}{1-2r}+\frac{e^3x^{3r}}{1-3r}+d^3}{x^2}dx-\frac{d^3(a+b\log(cx^n))}{x}-\frac{3d^2ex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{3de^2x^{2r-1}(a+b\log(cx^n))}{1-2r}-\frac{e^3x^{3r-1}(a+b\log(cx^n))}{1-3r}$$

$$\Big\downarrow \text{2010}$$

$$bn\int\left(-\frac{3d^2ex^{r-2}}{r-1}+\frac{3de^2x^{2(r-1)}}{1-2r}-\frac{e^3x^{3r-2}}{3r-1}+\frac{d^3}{x^2}\right)dx-\frac{d^3(a+b\log(cx^n))}{x}-\frac{3d^2ex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{3de^2x^{2r-1}(a+b\log(cx^n))}{1-2r}-\frac{e^3x^{3r-1}(a+b\log(cx^n))}{1-3r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{x}-\frac{3d^2ex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{3de^2x^{2r-1}(a+b\log(cx^n))}{1-2r}-\frac{e^3x^{3r-1}(a+b\log(cx^n))}{1-3r}+bn\left(-\frac{d^3}{x}-\frac{3d^2ex^{r-1}}{(1-r)^2}-\frac{3de^2x^{2r-1}}{(1-2r)^2}-\frac{e^3x^{3r-1}}{(1-3r)^2}\right)$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
b*n*(-(d^3/x) - (3*d^2*e*x^(-1 + r))/(1 - r)^2 - (3*d*e^2*x^(-1 + 2*r))/(1
 - 2*r)^2 - (e^3*x^(-1 + 3*r))/(1 - 3*r)^2) - (d^3*(a + b*Log[c*x^n]))/x -
 (3*d^2*e*x^(-1 + r)*(a + b*Log[c*x^n]))/(1 - r) - (3*d*e^2*x^(-1 + 2*r)*(
a + b*Log[c*x^n]))/(1 - 2*r) - (e^3*x^(-1 + 3*r)*(a + b*Log[c*x^n]))/(1 -
3*r)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1039 vs. 2(179) = 358.

Time = 3.39 (sec) , antiderivative size = 1040, normalized size of antiderivative = 5.81

method	result	size
parallelrisch	Expression too large to display	1040
risch	Expression too large to display	4031

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

output
```
-(a*d^3+40*a*e^3*r^4*(x^r)^3+b*e^3*n*(x^r)^3-51*a*e^3*r^3*(x^r)^3+31*a*e^3
*r^2*(x^r)^3-9*a*e^3*r*(x^r)^3-12*a*e^3*r^5*(x^r)^3-180*b*d^2*e*n*r^3*x^r+
b*ln(c*x^n)*d^3+e^3*(x^r)^3*a+e^3*(x^r)^3*b*ln(c*x^n)+3*d^2*e*x^r*a+3*d*e^
2*(x^r)^2*a+36*a*d^3*r^6-132*a*d^3*r^5+193*a*d^3*r^4-204*a*d*e^2*r^3*(x^r)
^2+114*a*d*e^2*r^2*(x^r)^2-30*a*d*e^2*r*(x^r)^2+3*d^2*e*x^r*b*ln(c*x^n)+3*
d*e^2*(x^r)^2*b*ln(c*x^n)+36*b*d^3*n*r^6-132*b*d^3*n*r^5+193*b*d^3*n*r^4-1
44*b*d^3*n*r^3+58*b*d^3*n*r^2-12*b*d^3*n*r-144*a*d^3*r^3+58*a*d^3*r^2-12*a
*d^3*r-291*a*d^2*e*r^3*x^r+141*a*d^2*e*r^2*x^r-33*a*d^2*e*r*x^r+13*b*e^3*n
*r^2*(x^r)^3+108*b*d^2*e*n*r^4*x^r+66*b*d*e^2*n*r^2*(x^r)^2+111*b*d^2*e*n*
r^2*x^r-24*b*d*e^2*n*r*(x^r)^2-30*b*d^2*e*n*r*x^r+27*b*d*e^2*n*r^4*(x^r)^2
-72*b*d*e^2*n*r^3*(x^r)^2+b*d^3*n+36*ln(c*x^n)*b*d^3*r^6-132*ln(c*x^n)*b*d
^3*r^5+193*ln(c*x^n)*b*d^3*r^4-144*ln(c*x^n)*b*d^3*r^3+58*ln(c*x^n)*b*d^3*
r^2-12*ln(c*x^n)*b*d^3*r-6*b*e^3*n*r*(x^r)^3+3*b*d*e^2*n*(x^r)^2+3*b*d^2*e
*n*x^r+4*b*e^3*n*r^4*(x^r)^3-12*b*e^3*n*r^3*(x^r)^3-54*a*d*e^2*r^5*(x^r)^2
+171*a*d*e^2*r^4*(x^r)^2-108*a*d^2*e*r^5*x^r+288*a*d^2*e*r^4*x^r-108*x^r*l
n(c*x^n)*b*d^2*e*r^5+288*x^r*ln(c*x^n)*b*d^2*e*r^4-291*x^r*ln(c*x^n)*b*d^2
*e*r^3+141*x^r*ln(c*x^n)*b*d^2*e*r^2-33*x^r*ln(c*x^n)*b*d^2*e*r-9*(x^r)^3*
ln(c*x^n)*b*e^3*r-12*(x^r)^3*ln(c*x^n)*b*e^3*r^5+40*(x^r)^3*ln(c*x^n)*b*e^
3*r^4-51*(x^r)^3*ln(c*x^n)*b*e^3*r^3+31*(x^r)^3*ln(c*x^n)*b*e^3*r^2-54*(x^
r)^2*ln(c*x^n)*b*d*e^2*r^5+171*(x^r)^2*ln(c*x^n)*b*d*e^2*r^4-204*(x^r)^...
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 967 vs. $2(174) = 348$.

Time = 0.10 (sec) , antiderivative size = 967, normalized size of antiderivative = 5.40

$$\int \frac{(d + ex^r)^3 (a + b\log(cx^n))}{x^2} dx = \text{Too large to display}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
-(36*(b*d^3*n + a*d^3)*r^6 - 132*(b*d^3*n + a*d^3)*r^5 + b*d^3*n + 193*(b*
d^3*n + a*d^3)*r^4 + a*d^3 - 144*(b*d^3*n + a*d^3)*r^3 + 58*(b*d^3*n + a*d
^3)*r^2 - 12*(b*d^3*n + a*d^3)*r - (12*a*e^3*r^5 - b*e^3*n - 4*(b*e^3*n +
10*a*e^3)*r^4 - a*e^3 + 3*(4*b*e^3*n + 17*a*e^3)*r^3 - (13*b*e^3*n + 31*a*
e^3)*r^2 + 3*(2*b*e^3*n + 3*a*e^3)*r + (12*b*e^3*r^5 - 40*b*e^3*r^4 + 51*b
*e^3*r^3 - 31*b*e^3*r^2 + 9*b*e^3*r - b*e^3)*log(c) + (12*b*e^3*n*r^5 - 40
*b*e^3*n*r^4 + 51*b*e^3*n*r^3 - 31*b*e^3*n*r^2 + 9*b*e^3*n*r - b*e^3*n)*lo
g(x))*x^(3*r) - 3*(18*a*d*e^2*r^5 - b*d*e^2*n - 3*(3*b*d*e^2*n + 19*a*d*e^
2)*r^4 - a*d*e^2 + 4*(6*b*d*e^2*n + 17*a*d*e^2)*r^3 - 2*(11*b*d*e^2*n + 19
*a*d*e^2)*r^2 + 2*(4*b*d*e^2*n + 5*a*d*e^2)*r + (18*b*d*e^2*r^5 - 57*b*d*e
^2*r^4 + 68*b*d*e^2*r^3 - 38*b*d*e^2*r^2 + 10*b*d*e^2*r - b*d*e^2)*log(c)
+ (18*b*d*e^2*n*r^5 - 57*b*d*e^2*n*r^4 + 68*b*d*e^2*n*r^3 - 38*b*d*e^2*n*r
^2 + 10*b*d*e^2*n*r - b*d*e^2*n)*log(x))*x^(2*r) - 3*(36*a*d^2*e*r^5 - b*d
^2*e*n - 12*(3*b*d^2*e*n + 8*a*d^2*e)*r^4 - a*d^2*e + (60*b*d^2*e*n + 97*a
*d^2*e)*r^3 - (37*b*d^2*e*n + 47*a*d^2*e)*r^2 + (10*b*d^2*e*n + 11*a*d^2*e
)*r + (36*b*d^2*e*r^5 - 96*b*d^2*e*r^4 + 97*b*d^2*e*r^3 - 47*b*d^2*e*r^2 +
 11*b*d^2*e*r - b*d^2*e)*log(c) + (36*b*d^2*e*n*r^5 - 96*b*d^2*e*n*r^4 + 9
7*b*d^2*e*n*r^3 - 47*b*d^2*e*n*r^2 + 11*b*d^2*e*n*r - b*d^2*e*n)*log(x))*x
^r + (36*b*d^3*r^6 - 132*b*d^3*r^5 + 193*b*d^3*r^4 - 144*b*d^3*r^3 + 58*b*
d^3*r^2 - 12*b*d^3*r + b*d^3)*log(c) + (36*b*d^3*n*r^6 - 132*b*d^3*n*r^...
```

Sympy [A] (verification not implemented)

Time = 10.83 (sec) , antiderivative size = 323, normalized size of antiderivative = 1.80

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^2} dx = \text{Too large to display}$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**2,x)
```

output
```
-a*d**3/x + 3*a*d**2*e*Piecewise((x**r/(r*x - x), Ne(r, 1)), (x**r*log(x)/
x, True)) + 3*a*d*e**2*Piecewise((x**(2*r)/(2*r*x - x), Ne(r, 1/2)), (x**(
2*r)*log(x)/x, True)) + a*e**3*Piecewise((x**(3*r)/(3*r*x - x), Ne(r, 1/3)
), (x**(3*r)*log(x)/x, True)) - b*d**3*n/x - b*d**3*log(c*x**n)/x - 3*b*d*
*2*e*n*Piecewise((Piecewise((x**(r - 1)/(r - 1), Ne(r, 1)), (log(x), True)
)/(r - 1), (r > -oo) & (r < oo) & Ne(r, 1)), (log(x)**2/2, True)) + 3*b*d*
*2*e*Piecewise((x**(r - 1)/(r - 1), Ne(r, 1)), (log(x), True))*log(c*x**n)
 - 3*b*d*e**2*n*Piecewise((Piecewise((x**(2*r - 1)/(2*r - 1), Ne(r, 1/2)),
 (log(x), True))/(2*r - 1), (r > -oo) & (r < oo) & Ne(r, 1/2)), (log(x)**2
/2, True)) + 3*b*d*e**2*Piecewise((x**(2*r - 1)/(2*r - 1), Ne(r, 1/2)), (l
og(x), True))*log(c*x**n) - b*e**3*n*Piecewise((Piecewise((x**(3*r - 1)/(3
*r - 1), Ne(r, 1/3)), (log(x), True))/(3*r - 1), (r > -oo) & (r < oo) & Ne
(r, 1/3)), (log(x)**2/2, True)) + b*e**3*Piecewise((x**(3*r - 1)/(3*r - 1)
, Ne(r, 1/3)), (log(x), True))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^2} dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-2>0)', see `assume?` for more
details)Is
```

Giac [F]

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^2} dx = \int \frac{(ex^r+d)^3(b\log(cx^n)+a)}{x^2} dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)/x^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^2} dx = \int \frac{(d+e\,x^r)^3 (a+b\,\ln(c\,x^n))}{x^2} dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^2,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^2, x)
```

Reduce [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 1052, normalized size of antiderivative = 5.88

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^2} dx = \text{Too large to display}$$

input
```
int((d+e*x^r)^3*(a+b*log(c*x^n))/x^2,x)
```

output

```
(12*x**(3*r)*log(x**n*c)*b*e**3*r**5 - 40*x**(3*r)*log(x**n*c)*b*e**3*r**4
 + 51*x**(3*r)*log(x**n*c)*b*e**3*r**3 - 31*x**(3*r)*log(x**n*c)*b*e**3*r*
*2 + 9*x**(3*r)*log(x**n*c)*b*e**3*r - x**(3*r)*log(x**n*c)*b*e**3 + 12*x*
*(3*r)*a*e**3*r**5 - 40*x**(3*r)*a*e**3*r**4 + 51*x**(3*r)*a*e**3*r**3 - 3
1*x**(3*r)*a*e**3*r**2 + 9*x**(3*r)*a*e**3*r - x**(3*r)*a*e**3 - 4*x**(3*r
)*b*e**3*n*r**4 + 12*x**(3*r)*b*e**3*n*r**3 - 13*x**(3*r)*b*e**3*n*r**2 +
6*x**(3*r)*b*e**3*n*r - x**(3*r)*b*e**3*n + 54*x**(2*r)*log(x**n*c)*b*d*e*
*2*r**5 - 171*x**(2*r)*log(x**n*c)*b*d*e**2*r**4 + 204*x**(2*r)*log(x**n*c
)*b*d*e**2*r**3 - 114*x**(2*r)*log(x**n*c)*b*d*e**2*r**2 + 30*x**(2*r)*log
(x**n*c)*b*d*e**2*r - 3*x**(2*r)*log(x**n*c)*b*d*e**2 + 54*x**(2*r)*a*d*e*
*2*r**5 - 171*x**(2*r)*a*d*e**2*r**4 + 204*x**(2*r)*a*d*e**2*r**3 - 114*x*
*(2*r)*a*d*e**2*r**2 + 30*x**(2*r)*a*d*e**2*r - 3*x**(2*r)*a*d*e**2 - 27*x
**(2*r)*b*d*e**2*n*r**4 + 72*x**(2*r)*b*d*e**2*n*r**3 - 66*x**(2*r)*b*d*e*
*2*n*r**2 + 24*x**(2*r)*b*d*e**2*n*r - 3*x**(2*r)*b*d*e**2*n + 108*x**r*lo
g(x**n*c)*b*d**2*e*r**5 - 288*x**r*log(x**n*c)*b*d**2*e*r**4 + 291*x**r*lo
g(x**n*c)*b*d**2*e*r**3 - 141*x**r*log(x**n*c)*b*d**2*e*r**2 + 33*x**r*log
(x**n*c)*b*d**2*e*r - 3*x**r*log(x**n*c)*b*d**2*e + 108*x**r*a*d**2*e*r**5
 - 288*x**r*a*d**2*e*r**4 + 291*x**r*a*d**2*e*r**3 - 141*x**r*a*d**2*e*r**
2 + 33*x**r*a*d**2*e*r - 3*x**r*a*d**2*e - 108*x**r*b*d**2*e*n*r**4 + 180*
x**r*b*d**2*e*n*r**3 - 111*x**r*b*d**2*e*n*r**2 + 30*x**r*b*d**2*e*n*r ...
```

3.400 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^4}\,dx$

Optimal result 2985
Mathematica [A] (verified) 2986
Rubi [A] (verified) 2986
Maple [B] (verified) 2988
Fricas [B] (verification not implemented) 2989
Sympy [A] (verification not implemented) 2990
Maxima [F(-2)] 2990
Giac [F] 2991
Mupad [F(-1)] 2991
Reduce [B] (verification not implemented) 2992

Optimal result

Integrand size = 23, antiderivative size = 191

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x^4}\,dx = -\frac{bd^3n}{9x^3} - \frac{be^3nx^{-3(1-r)}}{9(1-r)^2} - \frac{3bd^2enx^{-3+r}}{(3-r)^2} - \frac{3bde^2nx^{-3+2r}}{(3-2r)^2} - \frac{d^3(a+b\log(cx^n))}{3x^3} - \frac{e^3x^{-3(1-r)}(a+b\log(cx^n))}{3(1-r)} - \frac{3d^2ex^{-3+r}(a+b\log(cx^n))}{3-r} - \frac{3de^2x^{-3+2r}(a+b\log(cx^n))}{3-2r}$$

output
```
-1/9*b*d^3*n/x^3-1/9*b*e^3*n/(1-r)^2/(x^(3-3*r))-3*b*d^2*e*n*x^(-3+r)/(3-r
)^2-3*b*d*e^2*n*x^(-3+2*r)/(3-2*r)^2-1/3*d^3*(a+b*ln(c*x^n))/x^3-1/3*e^3*(
a+b*ln(c*x^n))/(1-r)/(x^(3-3*r))-3*d^2*e*x^(-3+r)*(a+b*ln(c*x^n))/(3-r)-3*
d*e^2*x^(-3+2*r)*(a+b*ln(c*x^n))/(3-2*r)
```

Mathematica [A] (verified)

Time = 0.47 (sec) , antiderivative size = 180, normalized size of antiderivative = 0.94

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^4} dx = \frac{bn\left(-d^3-\frac{27d^2ex^r}{(-3+r)^2}-\frac{27de^2x^{2r}}{(3-2r)^2}-\frac{e^3x^{3r}}{(-1+r)^2}\right)+3a\left(-d^3+\frac{9d^2ex^r}{-3+r}+\frac{9de^2x^{2r}}{-3+2r}+\frac{e^3x^{3r}}{-1+r}\right)+3b\left(-d^3+\frac{9d^2ex^r}{-3+r}+\frac{9de^2x^{2r}}{-3+2r}+\dots\right)}{9x^3}$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(b*n*(-d^3 - (27*d^2*e*x^r)/(-3 + r)^2 - (27*d*e^2*x^(2*r))/(3 - 2*r)^2 -
(e^3*x^(3*r))/(-1 + r)^2) + 3*a*(-d^3 + (9*d^2*e*x^r)/(-3 + r) + (9*d*e^2*
x^(2*r))/(-3 + 2*r) + (e^3*x^(3*r))/(-1 + r)) + 3*b*(-d^3 + (9*d^2*e*x^r)/
(-3 + r) + (9*d*e^2*x^(2*r))/(-3 + 2*r) + (e^3*x^(3*r))/(-1 + r))*Log[c*x^
n])/(9*x^3)
```

Rubi [A] (verified)

Time = 0.66 (sec) , antiderivative size = 190, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^4} dx$$

$$\Big\downarrow \text{ 2772}$$

$$-bn\int -\frac{\frac{9d^2ex^r}{3-r}+\frac{9de^2x^{2r}}{3-2r}+\frac{e^3x^{3r}}{1-r}+d^3}{3x^4}dx-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2ex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{3de^2x^{2r-3}(a+b\log(cx^n))}{3-2r}-\frac{e^3x^{-3(1-r)}(a+b\log(cx^n))}{3(1-r)}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{3}bn\int \frac{\frac{9d^2ex^r}{3-r}+\frac{9de^2x^{2r}}{3-2r}+\frac{e^3x^{3r}}{1-r}+d^3}{x^4}dx-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2ex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{3de^2x^{2r-3}(a+b\log(cx^n))}{3-2r}-\frac{e^3x^{-3(1-r)}(a+b\log(cx^n))}{3(1-r)}$$

$$\Big\downarrow \text{ 2010}$$

$$\frac{1}{3}bn\int \left(-\frac{9d^2ex^{r-4}}{r-3}+\frac{9de^2x^{2(r-2)}}{3-2r}-\frac{e^3x^{3r-4}}{r-1}+\frac{d^3}{x^4}\right)dx-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2ex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{3de^2x^{2r-3}(a+b\log(cx^n))}{3-2r}-\frac{e^3x^{-3(1-r)}(a+b\log(cx^n))}{3(1-r)}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2ex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{3de^2x^{2r-3}(a+b\log(cx^n))}{3-2r}-\frac{e^3x^{-3(1-r)}(a+b\log(cx^n))}{3(1-r)}+\frac{1}{3}bn\left(-\frac{d^3}{3x^3}-\frac{9d^2ex^{r-3}}{(3-r)^2}-\frac{9de^2x^{2r-3}}{(3-2r)^2}-\frac{e^3x^{-3(1-r)}}{3(1-r)^2}\right)$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(b*n*(-1/3*d^3/x^3 - e^3/(3*(1 - r)^2*x^(3*(1 - r))) - (9*d^2*e*x^(-3 + r)
)/(3 - r)^2 - (9*d*e^2*x^(-3 + 2*r))/(3 - 2*r)^2))/3 - (d^3*(a + b*Log[c*x
^n]))/(3*x^3) - (e^3*(a + b*Log[c*x^n]))/(3*(1 - r)*x^(3*(1 - r))) - (3*d^
2*e*x^(-3 + r)*(a + b*Log[c*x^n]))/(3 - r) - (3*d*e^2*x^(-3 + 2*r)*(a + b*
Log[c*x^n]))/(3 - 2*r)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1043 vs. $2(183) = 366$.

Time = 3.42 (sec) , antiderivative size = 1044, normalized size of antiderivative = 5.47

method	result	size
parallelrisch	Expression too large to display	1044
risch	Expression too large to display	4027

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/9*(243*a*d^3+120*a*e^3*r^4*(x^r)^3+81*b*e^3*n*(x^r)^3-459*a*e^3*r^3*(x^
r)^3+837*a*e^3*r^2*(x^r)^3-729*a*e^3*r*(x^r)^3-12*a*e^3*r^5*(x^r)^3-540*b*
d^2*e*n*r^3*x^r+243*b*ln(c*x^n)*d^3+243*e^3*(x^r)^3*a+243*e^3*(x^r)^3*b*ln
(c*x^n)+729*d^2*e*x^r*a+729*d*e^2*(x^r)^2*a+12*a*d^3*r^6-132*a*d^3*r^5+579
*a*d^3*r^4-1836*a*d*e^2*r^3*(x^r)^2+3078*a*d*e^2*r^2*(x^r)^2-2430*a*d*e^2*
r*(x^r)^2+729*d^2*e*x^r*b*ln(c*x^n)+729*d*e^2*(x^r)^2*b*ln(c*x^n)+4*b*d^3*
n*r^6-44*b*d^3*n*r^5+193*b*d^3*n*r^4-432*b*d^3*n*r^3+522*b*d^3*n*r^2-324*b
*d^3*n*r-1296*a*d^3*r^3+1566*a*d^3*r^2-972*a*d^3*r-2619*a*d^2*e*r^3*x^r+38
07*a*d^2*e*r^2*x^r-2673*a*d^2*e*r*x^r+117*b*e^3*n*r^2*(x^r)^3+108*b*d^2*e*
n*r^4*x^r+594*b*d*e^2*n*r^2*(x^r)^2+999*b*d^2*e*n*r^2*x^r-648*b*d*e^2*n*r*
(x^r)^2-810*b*d^2*e*n*r*x^r+27*b*d*e^2*n*r^4*(x^r)^2-216*b*d*e^2*n*r^3*(x^
r)^2+81*b*d^3*n+12*ln(c*x^n)*b*d^3*r^6-132*ln(c*x^n)*b*d^3*r^5+579*ln(c*x^
n)*b*d^3*r^4-1296*ln(c*x^n)*b*d^3*r^3+1566*ln(c*x^n)*b*d^3*r^2-972*ln(c*x^
n)*b*d^3*r-162*b*e^3*n*r*(x^r)^3+243*b*d*e^2*n*(x^r)^2+243*b*d^2*e*n*x^r+4
*b*e^3*n*r^4*(x^r)^3-36*b*e^3*n*r^3*(x^r)^3-54*a*d*e^2*r^5*(x^r)^2+513*a*d
*e^2*r^4*(x^r)^2-108*a*d^2*e*r^5*x^r+864*a*d^2*e*r^4*x^r-108*x^r*ln(c*x^n)
*b*d^2*e*r^5+864*x^r*ln(c*x^n)*b*d^2*e*r^4-2619*x^r*ln(c*x^n)*b*d^2*e*r^3+
3807*x^r*ln(c*x^n)*b*d^2*e*r^2-2673*x^r*ln(c*x^n)*b*d^2*e*r-729*(x^r)^3*ln
(c*x^n)*b*e^3*r-12*(x^r)^3*ln(c*x^n)*b*e^3*r^5+120*(x^r)^3*ln(c*x^n)*b*e^3
*r^4-459*(x^r)^3*ln(c*x^n)*b*e^3*r^3+837*(x^r)^3*ln(c*x^n)*b*e^3*r^2-54...
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 980 vs. $2(175) = 350$.

Time = 0.09 (sec) , antiderivative size = 980, normalized size of antiderivative = 5.13

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^4} dx = \text{Too large to display}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
-1/9*(4*(b*d^3*n + 3*a*d^3)*r^6 - 44*(b*d^3*n + 3*a*d^3)*r^5 + 81*b*d^3*n
+ 193*(b*d^3*n + 3*a*d^3)*r^4 + 243*a*d^3 - 432*(b*d^3*n + 3*a*d^3)*r^3 +
522*(b*d^3*n + 3*a*d^3)*r^2 - 324*(b*d^3*n + 3*a*d^3)*r - (12*a*e^3*r^5 -
81*b*e^3*n - 4*(b*e^3*n + 30*a*e^3)*r^4 - 243*a*e^3 + 9*(4*b*e^3*n + 51*a*
e^3)*r^3 - 9*(13*b*e^3*n + 93*a*e^3)*r^2 + 81*(2*b*e^3*n + 9*a*e^3)*r + 3*
(4*b*e^3*r^5 - 40*b*e^3*r^4 + 153*b*e^3*r^3 - 279*b*e^3*r^2 + 243*b*e^3*r
- 81*b*e^3)*log(c) + 3*(4*b*e^3*n*r^5 - 40*b*e^3*n*r^4 + 153*b*e^3*n*r^3 -
 279*b*e^3*n*r^2 + 243*b*e^3*n*r - 81*b*e^3*n)*log(x))*x^(3*r) - 27*(2*a*d
*e^2*r^5 - 9*b*d*e^2*n - (b*d*e^2*n + 19*a*d*e^2)*r^4 - 27*a*d*e^2 + 4*(2*
b*d*e^2*n + 17*a*d*e^2)*r^3 - 2*(11*b*d*e^2*n + 57*a*d*e^2)*r^2 + 6*(4*b*d
*e^2*n + 15*a*d*e^2)*r + (2*b*d*e^2*r^5 - 19*b*d*e^2*r^4 + 68*b*d*e^2*r^3
- 114*b*d*e^2*r^2 + 90*b*d*e^2*r - 27*b*d*e^2)*log(c) + (2*b*d*e^2*n*r^5 -
 19*b*d*e^2*n*r^4 + 68*b*d*e^2*n*r^3 - 114*b*d*e^2*n*r^2 + 90*b*d*e^2*n*r
- 27*b*d*e^2*n)*log(x))*x^(2*r) - 27*(4*a*d^2*e*r^5 - 9*b*d^2*e*n - 4*(b*d
^2*e*n + 8*a*d^2*e)*r^4 - 27*a*d^2*e + (20*b*d^2*e*n + 97*a*d^2*e)*r^3 - (
37*b*d^2*e*n + 141*a*d^2*e)*r^2 + 3*(10*b*d^2*e*n + 33*a*d^2*e)*r + (4*b*d
^2*e*r^5 - 32*b*d^2*e*r^4 + 97*b*d^2*e*r^3 - 141*b*d^2*e*r^2 + 99*b*d^2*e*
r - 27*b*d^2*e)*log(c) + (4*b*d^2*e*n*r^5 - 32*b*d^2*e*n*r^4 + 97*b*d^2*e*
n*r^3 - 141*b*d^2*e*n*r^2 + 99*b*d^2*e*n*r - 27*b*d^2*e*n)*log(x))*x^r + 3
*(4*b*d^3*r^6 - 44*b*d^3*r^5 + 193*b*d^3*r^4 - 432*b*d^3*r^3 + 522*b*d^...
```

Sympy [A] (verification not implemented)

Time = 48.33 (sec) , antiderivative size = 347, normalized size of antiderivative = 1.82

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^4}\,dx = \text{Too large to display}$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**4,x)
```

output
```
-a*d**3/(3*x**3) + 3*a*d**2*e*Piecewise((x**r/(r*x**3 - 3*x**3), Ne(r, 3))
, (x**r*log(x)/x**3, True)) + 3*a*d*e**2*Piecewise((x**(2*r)/(2*r*x**3 - 3
*x**3), Ne(r, 3/2)), (x**(2*r)*log(x)/x**3, True)) + a*e**3*Piecewise((x**
(3*r)/(3*r*x**3 - 3*x**3), Ne(r, 1)), (x**(3*r)*log(x)/x**3, True)) - b*d*
*3*n/(9*x**3) - b*d**3*log(c*x**n)/(3*x**3) - 3*b*d**2*e*n*Piecewise((Piec
ewise((x**(r - 3)/(r - 3), Ne(r, 3)), (log(x), True))/(r - 3), (r > -oo) &
 (r < oo) & Ne(r, 3)), (log(x)**2/2, True)) + 3*b*d**2*e*Piecewise((x**(r
- 3)/(r - 3), Ne(r, 3)), (log(x), True))*log(c*x**n) - 3*b*d*e**2*n*Piecew
ise((Piecewise((x**(2*r - 3)/(2*r - 3), Ne(r, 3/2)), (log(x), True))/(2*r
- 3), (r > -oo) & (r < oo) & Ne(r, 3/2)), (log(x)**2/2, True)) + 3*b*d*e**
2*Piecewise((x**(2*r - 3)/(2*r - 3), Ne(r, 3/2)), (log(x), True))*log(c*x*
*n) - b*e**3*n*Piecewise((Piecewise((x**(3*r - 3)/(3*r - 3), Ne(r, 1)), (l
og(x), True))/(3*r - 3), (r > -oo) & (r < oo) & Ne(r, 1)), (log(x)**2/2, T
rue)) + b*e**3*Piecewise((x**(3*r - 3)/(3*r - 3), Ne(r, 1)), (log(x), True
))*log(c*x**n)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^4}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-4>0)', see `assume?` for more
details)Is
```

Giac [F]

$$\int \frac{(d + ex^r)^3 (a + b\log(cx^n))}{x^4} dx = \int \frac{(ex^r + d)^3 (b\log(cx^n) + a)}{x^4} dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)/x^4, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d + ex^r)^3 (a + b\log(cx^n))}{x^4} dx = \int \frac{(d + e\,x^r)^3 (a + b\,\ln(c\,x^n))}{x^4} dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^4,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^4, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 1053, normalized size of antiderivative = 5.51

$$\int \frac{(d+ex^r)^3 (a+b\log (cx^n))}{x^4} \, dx = \text{Too large to display}$$

input
```
int((d+e*x^r)^3*(a+b*log(c*x^n))/x^4,x)
```

output
```
(12*x**(3*r)*log(x**n*c)*b*e**3*r**5 - 120*x**(3*r)*log(x**n*c)*b*e**3*r**
4 + 459*x**(3*r)*log(x**n*c)*b*e**3*r**3 - 837*x**(3*r)*log(x**n*c)*b*e**3
*r**2 + 729*x**(3*r)*log(x**n*c)*b*e**3*r - 243*x**(3*r)*log(x**n*c)*b*e**
3 + 12*x**(3*r)*a*e**3*r**5 - 120*x**(3*r)*a*e**3*r**4 + 459*x**(3*r)*a*e*
*3*r**3 - 837*x**(3*r)*a*e**3*r**2 + 729*x**(3*r)*a*e**3*r - 243*x**(3*r)*
a*e**3 - 4*x**(3*r)*b*e**3*n*r**4 + 36*x**(3*r)*b*e**3*n*r**3 - 117*x**(3*
r)*b*e**3*n*r**2 + 162*x**(3*r)*b*e**3*n*r - 81*x**(3*r)*b*e**3*n + 54*x**
(2*r)*log(x**n*c)*b*d*e**2*r**5 - 513*x**(2*r)*log(x**n*c)*b*d*e**2*r**4 +
 1836*x**(2*r)*log(x**n*c)*b*d*e**2*r**3 - 3078*x**(2*r)*log(x**n*c)*b*d*e
**2*r**2 + 2430*x**(2*r)*log(x**n*c)*b*d*e**2*r - 729*x**(2*r)*log(x**n*c)
*b*d*e**2 + 54*x**(2*r)*a*d*e**2*r**5 - 513*x**(2*r)*a*d*e**2*r**4 + 1836*
x**(2*r)*a*d*e**2*r**3 - 3078*x**(2*r)*a*d*e**2*r**2 + 2430*x**(2*r)*a*d*e
**2*r - 729*x**(2*r)*a*d*e**2 - 27*x**(2*r)*b*d*e**2*n*r**4 + 216*x**(2*r)
*b*d*e**2*n*r**3 - 594*x**(2*r)*b*d*e**2*n*r**2 + 648*x**(2*r)*b*d*e**2*n*
r - 243*x**(2*r)*b*d*e**2*n + 108*x**r*log(x**n*c)*b*d**2*e*r**5 - 864*x**
r*log(x**n*c)*b*d**2*e*r**4 + 2619*x**r*log(x**n*c)*b*d**2*e*r**3 - 3807*x
**r*log(x**n*c)*b*d**2*e*r**2 + 2673*x**r*log(x**n*c)*b*d**2*e*r - 729*x**
r*log(x**n*c)*b*d**2*e + 108*x**r*a*d**2*e*r**5 - 864*x**r*a*d**2*e*r**4 +
 2619*x**r*a*d**2*e*r**3 - 3807*x**r*a*d**2*e*r**2 + 2673*x**r*a*d**2*e*r
- 729*x**r*a*d**2*e - 108*x**r*b*d**2*e*n*r**4 + 540*x**r*b*d**2*e*n*r*...
```

3.401 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^6}\,dx$

Optimal result 2993
Mathematica [A] (verified) 2994
Rubi [A] (verified) 2994
Maple [B] (verified) 2996
Fricas [B] (verification not implemented) 2997
Sympy [F(-1)] 2998
Maxima [F(-2)] 2998
Giac [F] 2998
Mupad [F(-1)] 2999
Reduce [B] (verification not implemented) 2999

Optimal result

Integrand size = 23, antiderivative size = 183

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^6}\,dx = -\frac{bd^3n}{25x^5}-\frac{3bd^2enx^{-5+r}}{(5-r)^2}-\frac{3bde^2nx^{-5+2r}}{(5-2r)^2}-\frac{be^3nx^{-5+3r}}{(5-3r)^2} -\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{3d^2ex^{-5+r}(a+b\log(cx^n))}{5-r} -\frac{3de^2x^{-5+2r}(a+b\log(cx^n))}{5-2r} -\frac{e^3x^{-5+3r}(a+b\log(cx^n))}{5-3r}$$

output
```
-1/25*b*d^3*n/x^5-3*b*d^2*e*n*x^(-5+r)/(5-r)^2-3*b*d*e^2*n*x^(-5+2*r)/(5-2
*r)^2-b*e^3*n*x^(-5+3*r)/(5-3*r)^2-1/5*d^3*(a+b*ln(c*x^n))/x^5-3*d^2*e*x^(
-5+r)*(a+b*ln(c*x^n))/(5-r)-3*d*e^2*x^(-5+2*r)*(a+b*ln(c*x^n))/(5-2*r)-e^3
*x^(-5+3*r)*(a+b*ln(c*x^n))/(5-3*r)
```

Mathematica [A] (verified)

Time = 0.48 (sec) , antiderivative size = 187, normalized size of antiderivative = 1.02

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^6}\,dx = \frac{bn\left(-d^3-\frac{75d^2ex^r}{(-5+r)^2}-\frac{75de^2x^{2r}}{(5-2r)^2}-\frac{25e^3x^{3r}}{(5-3r)^2}\right)+a\left(-5d^3+\frac{75d^2ex^r}{-5+r}+\frac{75de^2x^{2r}}{-5+2r}+\frac{25e^3x^{3r}}{-5+3r}\right)+5b\left(-d^3+\frac{15d^2ex^r}{-5+r}+\cdots\right.}{25x^5}$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*(-d^3 - (75*d^2*e*x^r)/(-5 + r)^2 - (75*d*e^2*x^(2*r))/(5 - 2*r)^2 -
(25*e^3*x^(3*r))/(5 - 3*r)^2) + a*(-5*d^3 + (75*d^2*e*x^r)/(-5 + r) + (75*
d*e^2*x^(2*r))/(-5 + 2*r) + (25*e^3*x^(3*r))/(-5 + 3*r)) + 5*b*(-d^3 + (15
*d^2*e*x^r)/(-5 + r) + (15*d*e^2*x^(2*r))/(-5 + 2*r) + (5*e^3*x^(3*r))/(-5
 + 3*r))*Log[c*x^n])/(25*x^5)
```

Rubi [A] (verified)

Time = 0.67 (sec) , antiderivative size = 182, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^6}\,dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{\frac{15d^2ex^r}{5-r}+\frac{15de^2x^{2r}}{5-2r}+\frac{5e^3x^{3r}}{5-3r}+d^3}{5x^6}dx-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{3d^2ex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{3de^2x^{2r-5}(a+b\log(cx^n))}{5-2r}-\frac{e^3x^{3r-5}(a+b\log(cx^n))}{5-3r}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}bn\int\frac{\frac{15d^2ex^r}{5-r}+\frac{15de^2x^{2r}}{5-2r}+\frac{5e^3x^{3r}}{5-3r}+d^3}{x^6}dx-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{3d^2ex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{3de^2x^{2r-5}(a+b\log(cx^n))}{5-2r}-\frac{e^3x^{3r-5}(a+b\log(cx^n))}{5-3r}$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{5}bn\int\left(-\frac{15d^2ex^{r-6}}{r-5}+\frac{15de^2x^{2(r-3)}}{5-2r}+\frac{5e^3x^{3(r-2)}}{5-3r}+\frac{d^3}{x^6}\right)dx-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{3d^2ex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{3de^2x^{2r-5}(a+b\log(cx^n))}{5-2r}-\frac{e^3x^{3r-5}(a+b\log(cx^n))}{5-3r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{3d^2ex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{3de^2x^{2r-5}(a+b\log(cx^n))}{5-2r}-\frac{e^3x^{3r-5}(a+b\log(cx^n))}{5-3r}+\frac{1}{5}bn\left(-\frac{d^3}{5x^5}-\frac{15d^2ex^{r-5}}{(5-r)^2}-\frac{15de^2x^{2r-5}}{(5-2r)^2}-\frac{5e^3x^{3r-5}}{(5-3r)^2}\right)$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*(-1/5*d^3/x^5 - (15*d^2*e*x^(-5 + r))/(5 - r)^2 - (15*d*e^2*x^(-5 + 2
*r))/(5 - 2*r)^2 - (5*e^3*x^(-5 + 3*r))/(5 - 3*r)^2))/5 - (d^3*(a + b*Log[
c*x^n]))/(5*x^5) - (3*d^2*e*x^(-5 + r)*(a + b*Log[c*x^n]))/(5 - r) - (3*d*
e^2*x^(-5 + 2*r)*(a + b*Log[c*x^n]))/(5 - 2*r) - (e^3*x^(-5 + 3*r)*(a + b*
Log[c*x^n]))/(5 - 3*r)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1045 vs. 2(179) = 358.

Time = 3.62 (sec) , antiderivative size = 1046, normalized size of antiderivative = 5.72

method	result	size
parallelrisch	Expression too large to display	1046
risch	Expression too large to display	4031

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

output
```
-1/25*(78125*a*d^3+5000*a*e^3*r^4*(x^r)^3+15625*b*e^3*n*(x^r)^3-31875*a*e^
3*r^3*(x^r)^3+96875*a*e^3*r^2*(x^r)^3-140625*a*e^3*r*(x^r)^3-300*a*e^3*r^5
*(x^r)^3-22500*b*d^2*e*n*r^3*x^r+78125*b*ln(c*x^n)*d^3+78125*e^3*(x^r)^3*a
+78125*e^3*(x^r)^3*b*ln(c*x^n)+234375*d^2*e*x^r*a+234375*d*e^2*(x^r)^2*a+1
80*a*d^3*r^6-3300*a*d^3*r^5+24125*a*d^3*r^4-127500*a*d*e^2*r^3*(x^r)^2+356
250*a*d*e^2*r^2*(x^r)^2-468750*a*d*e^2*r*(x^r)^2+234375*d^2*e*x^r*b*ln(c*x
^n)+234375*d*e^2*(x^r)^2*b*ln(c*x^n)+36*b*d^3*n*r^6-660*b*d^3*n*r^5+4825*b
*d^3*n*r^4-18000*b*d^3*n*r^3+36250*b*d^3*n*r^2-37500*b*d^3*n*r-90000*a*d^3
*r^3+181250*a*d^3*r^2-187500*a*d^3*r-181875*a*d^2*e*r^3*x^r+440625*a*d^2*e
*r^2*x^r-515625*a*d^2*e*r*x^r+8125*b*e^3*n*r^2*(x^r)^3+2700*b*d^2*e*n*r^4*
x^r+41250*b*d*e^2*n*r^2*(x^r)^2+69375*b*d^2*e*n*r^2*x^r-75000*b*d*e^2*n*r*
(x^r)^2-93750*b*d^2*e*n*r*x^r+675*b*d*e^2*n*r^4*(x^r)^2-9000*b*d*e^2*n*r^3
*(x^r)^2+15625*b*d^3*n+180*ln(c*x^n)*b*d^3*r^6-3300*ln(c*x^n)*b*d^3*r^5+24
125*ln(c*x^n)*b*d^3*r^4-90000*ln(c*x^n)*b*d^3*r^3+181250*ln(c*x^n)*b*d^3*r
^2-187500*ln(c*x^n)*b*d^3*r-18750*b*e^3*n*r*(x^r)^3+46875*b*d*e^2*n*(x^r)^
2+46875*b*d^2*e*n*x^r+100*b*e^3*n*r^4*(x^r)^3-1500*b*e^3*n*r^3*(x^r)^3-135
0*a*d*e^2*r^5*(x^r)^2+21375*a*d*e^2*r^4*(x^r)^2-2700*a*d^2*e*r^5*x^r+36000
*a*d^2*e*r^4*x^r-2700*x^r*ln(c*x^n)*b*d^2*e*r^5+36000*x^r*ln(c*x^n)*b*d^2*
e*r^4-181875*x^r*ln(c*x^n)*b*d^2*e*r^3+440625*x^r*ln(c*x^n)*b*d^2*e*r^2-51
5625*x^r*ln(c*x^n)*b*d^2*e*r-140625*(x^r)^3*ln(c*x^n)*b*e^3*r-300*(x^r)...
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 981 vs. $2(174) = 348$.

Time = 0.23 (sec) , antiderivative size = 981, normalized size of antiderivative = 5.36

$$\int \frac{(d + ex^r)^3 (a + b \log (cx^n))}{x^6} \, dx = \text{Too large to display}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
-1/25*(36*(b*d^3*n + 5*a*d^3)*r^6 - 660*(b*d^3*n + 5*a*d^3)*r^5 + 15625*b*
d^3*n + 4825*(b*d^3*n + 5*a*d^3)*r^4 + 78125*a*d^3 - 18000*(b*d^3*n + 5*a*
d^3)*r^3 + 36250*(b*d^3*n + 5*a*d^3)*r^2 - 37500*(b*d^3*n + 5*a*d^3)*r - 2
5*(12*a*e^3*r^5 - 625*b*e^3*n - 4*(b*e^3*n + 50*a*e^3)*r^4 - 3125*a*e^3 +
15*(4*b*e^3*n + 85*a*e^3)*r^3 - 25*(13*b*e^3*n + 155*a*e^3)*r^2 + 375*(2*b
*e^3*n + 15*a*e^3)*r + (12*b*e^3*r^5 - 200*b*e^3*r^4 + 1275*b*e^3*r^3 - 38
75*b*e^3*r^2 + 5625*b*e^3*r - 3125*b*e^3)*log(c) + (12*b*e^3*n*r^5 - 200*b
*e^3*n*r^4 + 1275*b*e^3*n*r^3 - 3875*b*e^3*n*r^2 + 5625*b*e^3*n*r - 3125*b
*e^3*n)*log(x))*x^(3*r) - 75*(18*a*d*e^2*r^5 - 625*b*d*e^2*n - 3*(3*b*d*e^
2*n + 95*a*d*e^2)*r^4 - 3125*a*d*e^2 + 20*(6*b*d*e^2*n + 85*a*d*e^2)*r^3 -
 50*(11*b*d*e^2*n + 95*a*d*e^2)*r^2 + 250*(4*b*d*e^2*n + 25*a*d*e^2)*r + (
18*b*d*e^2*r^5 - 285*b*d*e^2*r^4 + 1700*b*d*e^2*r^3 - 4750*b*d*e^2*r^2 + 6
250*b*d*e^2*r - 3125*b*d*e^2)*log(c) + (18*b*d*e^2*n*r^5 - 285*b*d*e^2*n*r
^4 + 1700*b*d*e^2*n*r^3 - 4750*b*d*e^2*n*r^2 + 6250*b*d*e^2*n*r - 3125*b*d
*e^2*n)*log(x))*x^(2*r) - 75*(36*a*d^2*e*r^5 - 625*b*d^2*e*n - 12*(3*b*d^2
*e*n + 40*a*d^2*e)*r^4 - 3125*a*d^2*e + 25*(12*b*d^2*e*n + 97*a*d^2*e)*r^3
 - 25*(37*b*d^2*e*n + 235*a*d^2*e)*r^2 + 625*(2*b*d^2*e*n + 11*a*d^2*e)*r
+ (36*b*d^2*e*r^5 - 480*b*d^2*e*r^4 + 2425*b*d^2*e*r^3 - 5875*b*d^2*e*r^2
+ 6875*b*d^2*e*r - 3125*b*d^2*e)*log(c) + (36*b*d^2*e*n*r^5 - 480*b*d^2*e*
n*r^4 + 2425*b*d^2*e*n*r^3 - 5875*b*d^2*e*n*r^2 + 6875*b*d^2*e*n*r - 31...
```

Sympy [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^6} dx = \text{Timed out}$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**6,x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^6} dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-6>0)', see `assume?` for more
details)Is
```

Giac [F]

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^6} dx = \int \frac{(ex^r+d)^3 (b\log(cx^n)+a)}{x^6} dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)/x^6, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^6}\,dx = \int \frac{(d+e\,x^r)^3 (a+b\,\ln(c\,x^n))}{x^6}\,dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^6,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^6, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 1053, normalized size of antiderivative = 5.75

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^6}\,dx = \text{Too large to display}$$

input
```
int((d+e*x^r)^3*(a+b*log(c*x^n))/x^6,x)
```

output
```
(300*x**(3*r)*log(x**n*c)*b*e**3*r**5 - 5000*x**(3*r)*log(x**n*c)*b*e**3*r
**4 + 31875*x**(3*r)*log(x**n*c)*b*e**3*r**3 - 96875*x**(3*r)*log(x**n*c)*
b*e**3*r**2 + 140625*x**(3*r)*log(x**n*c)*b*e**3*r - 78125*x**(3*r)*log(x*
*n*c)*b*e**3 + 300*x**(3*r)*a*e**3*r**5 - 5000*x**(3*r)*a*e**3*r**4 + 3187
5*x**(3*r)*a*e**3*r**3 - 96875*x**(3*r)*a*e**3*r**2 + 140625*x**(3*r)*a*e*
*3*r - 78125*x**(3*r)*a*e**3 - 100*x**(3*r)*b*e**3*n*r**4 + 1500*x**(3*r)*
b*e**3*n*r**3 - 8125*x**(3*r)*b*e**3*n*r**2 + 18750*x**(3*r)*b*e**3*n*r -
15625*x**(3*r)*b*e**3*n + 1350*x**(2*r)*log(x**n*c)*b*d*e**2*r**5 - 21375*
x**(2*r)*log(x**n*c)*b*d*e**2*r**4 + 127500*x**(2*r)*log(x**n*c)*b*d*e**2*
r**3 - 356250*x**(2*r)*log(x**n*c)*b*d*e**2*r**2 + 468750*x**(2*r)*log(x**
n*c)*b*d*e**2*r - 234375*x**(2*r)*log(x**n*c)*b*d*e**2 + 1350*x**(2*r)*a*d
*e**2*r**5 - 21375*x**(2*r)*a*d*e**2*r**4 + 127500*x**(2*r)*a*d*e**2*r**3
- 356250*x**(2*r)*a*d*e**2*r**2 + 468750*x**(2*r)*a*d*e**2*r - 234375*x**(
2*r)*a*d*e**2 - 675*x**(2*r)*b*d*e**2*n*r**4 + 9000*x**(2*r)*b*d*e**2*n*r*
*3 - 41250*x**(2*r)*b*d*e**2*n*r**2 + 75000*x**(2*r)*b*d*e**2*n*r - 46875*
x**(2*r)*b*d*e**2*n + 2700*x**r*log(x**n*c)*b*d**2*e*r**5 - 36000*x**r*log
(x**n*c)*b*d**2*e*r**4 + 181875*x**r*log(x**n*c)*b*d**2*e*r**3 - 440625*x*
*r*log(x**n*c)*b*d**2*e*r**2 + 515625*x**r*log(x**n*c)*b*d**2*e*r - 234375
*x**r*log(x**n*c)*b*d**2*e + 2700*x**r*a*d**2*e*r**5 - 36000*x**r*a*d**2*e
*r**4 + 181875*x**r*a*d**2*e*r**3 - 440625*x**r*a*d**2*e*r**2 + 515625*...
```

3.402 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^8}\,dx$

Optimal result 3001
Mathematica [A] (verified) 3002
Rubi [A] (verified) 3002
Maple [B] (verified) 3004
Fricas [B] (verification not implemented) 3005
Sympy [F(-1)] 3006
Maxima [F(-2)] 3006
Giac [F] 3006
Mupad [F(-1)] 3007
Reduce [B] (verification not implemented) 3007

Optimal result

Integrand size = 23, antiderivative size = 183

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x^8}\,dx = -\frac{bd^3n}{49x^7}-\frac{3bd^2enx^{-7+r}}{(7-r)^2}-\frac{3bde^2nx^{-7+2r}}{(7-2r)^2}-\frac{be^3nx^{-7+3r}}{(7-3r)^2} -\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2ex^{-7+r}(a+b\log(cx^n))}{7-r} -\frac{3de^2x^{-7+2r}(a+b\log(cx^n))}{7-2r} -\frac{e^3x^{-7+3r}(a+b\log(cx^n))}{7-3r}$$

output

```
-1/49*b*d^3*n/x^7-3*b*d^2*e*n*x^(-7+r)/(7-r)^2-3*b*d*e^2*n*x^(-7+2*r)/(7-2
*r)^2-b*e^3*n*x^(-7+3*r)/(7-3*r)^2-1/7*d^3*(a+b*ln(c*x^n))/x^7-3*d^2*e*x^(
-7+r)*(a+b*ln(c*x^n))/(7-r)-3*d*e^2*x^(-7+2*r)*(a+b*ln(c*x^n))/(7-2*r)-e^3
*x^(-7+3*r)*(a+b*ln(c*x^n))/(7-3*r)
```

Mathematica [A] (verified)

Time = 0.47 (sec) , antiderivative size = 188, normalized size of antiderivative = 1.03

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^8}\,dx = \frac{bn\left(-d^3-\frac{147d^2ex^r}{(-7+r)^2}-\frac{147de^2x^{2r}}{(7-2r)^2}-\frac{49e^3x^{3r}}{(7-3r)^2}\right)+7a\left(-d^3+\frac{21d^2ex^r}{-7+r}+\frac{21de^2x^{2r}}{-7+2r}+\frac{7e^3x^{3r}}{-7+3r}\right)+7b\left(-d^3+\frac{21d^2ex^r}{-7+r}+\right.}{49x^7}$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
(b*n*(-d^3 - (147*d^2*e*x^r)/(-7 + r)^2 - (147*d*e^2*x^(2*r))/(7 - 2*r)^2
- (49*e^3*x^(3*r))/(7 - 3*r)^2) + 7*a*(-d^3 + (21*d^2*e*x^r)/(-7 + r) + (2
1*d*e^2*x^(2*r))/(-7 + 2*r) + (7*e^3*x^(3*r))/(-7 + 3*r)) + 7*b*(-d^3 + (2
1*d^2*e*x^r)/(-7 + r) + (21*d*e^2*x^(2*r))/(-7 + 2*r) + (7*e^3*x^(3*r))/(-
7 + 3*r))*Log[c*x^n])/(49*x^7)
```

Rubi [A] (verified)

Time = 0.67 (sec) , antiderivative size = 182, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^8}\,dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{\frac{21d^2ex^r}{7-r}+\frac{21de^2x^{2r}}{7-2r}+\frac{7e^3x^{3r}}{7-3r}+d^3}{7x^8}dx-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2ex^{r-7}(a+b\log(cx^n))}{7-r}-\frac{3de^2x^{2r-7}(a+b\log(cx^n))}{7-2r}-\frac{e^3x^{3r-7}(a+b\log(cx^n))}{7-3r}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{7}bn\int \frac{\frac{21d^2ex^r}{7-r}+\frac{21de^2x^{2r}}{7-2r}+\frac{7e^3x^{3r}}{7-3r}+d^3}{x^8}dx-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2ex^{r-7}(a+b\log(cx^n))}{7-r}-\frac{3de^2x^{2r-7}(a+b\log(cx^n))}{7-2r}-\frac{e^3x^{3r-7}(a+b\log(cx^n))}{7-3r}$$

$$\Big\downarrow \text{ 2010}$$

$$\frac{1}{7}bn\int \left(-\frac{21d^2ex^{r-8}}{r-7}+\frac{21de^2x^{2(r-4)}}{7-2r}-\frac{7e^3x^{3r-8}}{3r-7}+\frac{d^3}{x^8}\right)dx-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2ex^{r-7}(a+b\log(cx^n))}{7-r}-\frac{3de^2x^{2r-7}(a+b\log(cx^n))}{7-2r}-\frac{e^3x^{3r-7}(a+b\log(cx^n))}{7-3r}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2ex^{r-7}(a+b\log(cx^n))}{7-r}-\frac{3de^2x^{2r-7}(a+b\log(cx^n))}{7-2r}-\frac{e^3x^{3r-7}(a+b\log(cx^n))}{7-3r}+\frac{1}{7}bn\left(-\frac{d^3}{7x^7}-\frac{21d^2ex^{r-7}}{(7-r)^2}-\frac{21de^2x^{2r-7}}{(7-2r)^2}-\frac{7e^3x^{3r-7}}{(7-3r)^2}\right)$$

input

```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^8,x]
```

output

```
(b*n*(-1/7*d^3/x^7 - (21*d^2*e*x^(-7 + r))/(7 - r)^2 - (21*d*e^2*x^(-7 + 2
*r))/(7 - 2*r)^2 - (7*e^3*x^(-7 + 3*r))/(7 - 3*r)^2))/7 - (d^3*(a + b*Log[
c*x^n]))/(7*x^7) - (3*d^2*e*x^(-7 + r)*(a + b*Log[c*x^n]))/(7 - r) - (3*d*
e^2*x^(-7 + 2*r)*(a + b*Log[c*x^n]))/(7 - 2*r) - (e^3*x^(-7 + 3*r)*(a + b*
Log[c*x^n]))/(7 - 3*r)
```

Defintions of rubi rules used

rule 27

```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009

```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] && !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1045 vs. $2(179) = 358$.

Time = 3.54 (sec) , antiderivative size = 1046, normalized size of antiderivative = 5.72

method	result	size
parallelrisch	Expression too large to display	1046
risch	Expression too large to display	4031

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^8,x,method=_RETURNVERBOSE)
```

output
```
-1/49*(823543*a*d^3+13720*a*e^3*r^4*(x^r)^3+117649*b*e^3*n*(x^r)^3-122451*
a*e^3*r^3*(x^r)^3+521017*a*e^3*r^2*(x^r)^3-1058841*a*e^3*r*(x^r)^3-588*a*e
^3*r^5*(x^r)^3-61740*b*d^2*e*n*r^3*x^r+823543*b*ln(c*x^n)*d^3+823543*e^3*(
x^r)^3*a+823543*e^3*(x^r)^3*b*ln(c*x^n)+2470629*d^2*e*x^r*a+2470629*d*e^2*
(x^r)^2*a+252*a*d^3*r^6-6468*a*d^3*r^5+66199*a*d^3*r^4-489804*a*d*e^2*r^3*
(x^r)^2+1915998*a*d*e^2*r^2*(x^r)^2-3529470*a*d*e^2*r*(x^r)^2+2470629*d^2*
e*x^r*b*ln(c*x^n)+2470629*d*e^2*(x^r)^2*b*ln(c*x^n)+36*b*d^3*n*r^6-924*b*d
^3*n*r^5+9457*b*d^3*n*r^4-49392*b*d^3*n*r^3+139258*b*d^3*n*r^2-201684*b*d^
3*n*r-345744*a*d^3*r^3+974806*a*d^3*r^2-1411788*a*d^3*r-698691*a*d^2*e*r^3
*x^r+2369787*a*d^2*e*r^2*x^r-3882417*a*d^2*e*r*x^r+31213*b*e^3*n*r^2*(x^r)
^3+5292*b*d^2*e*n*r^4*x^r+158466*b*d*e^2*n*r^2*(x^r)^2+266511*b*d^2*e*n*r^
2*x^r-403368*b*d*e^2*n*r*(x^r)^2-504210*b*d^2*e*n*r*x^r+1323*b*d*e^2*n*r^4
*(x^r)^2-24696*b*d*e^2*n*r^3*(x^r)^2+117649*b*d^3*n+252*ln(c*x^n)*b*d^3*r^
6-6468*ln(c*x^n)*b*d^3*r^5+66199*ln(c*x^n)*b*d^3*r^4-345744*ln(c*x^n)*b*d^
3*r^3+974806*ln(c*x^n)*b*d^3*r^2-1411788*ln(c*x^n)*b*d^3*r-100842*b*e^3*n*
r*(x^r)^3+352947*b*d*e^2*n*(x^r)^2+352947*b*d^2*e*n*x^r+196*b*e^3*n*r^4*(x
^r)^3-4116*b*e^3*n*r^3*(x^r)^3-2646*a*d*e^2*r^5*(x^r)^2+58653*a*d*e^2*r^4*
(x^r)^2-5292*a*d^2*e*r^5*x^r+98784*a*d^2*e*r^4*x^r-5292*x^r*ln(c*x^n)*b*d^
2*e*r^5+98784*x^r*ln(c*x^n)*b*d^2*e*r^4-698691*x^r*ln(c*x^n)*b*d^2*e*r^3+2
369787*x^r*ln(c*x^n)*b*d^2*e*r^2-3882417*x^r*ln(c*x^n)*b*d^2*e*r-105884...
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 981 vs. $2(174) = 348$.

Time = 0.10 (sec) , antiderivative size = 981, normalized size of antiderivative = 5.36

$$\int \frac{(d + ex^r)^3 (a + b \log(cx^n))}{x^8} dx = \text{Too large to display}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

output
```
-1/49*(36*(b*d^3*n + 7*a*d^3)*r^6 - 924*(b*d^3*n + 7*a*d^3)*r^5 + 117649*b
*d^3*n + 9457*(b*d^3*n + 7*a*d^3)*r^4 + 823543*a*d^3 - 49392*(b*d^3*n + 7*
a*d^3)*r^3 + 139258*(b*d^3*n + 7*a*d^3)*r^2 - 201684*(b*d^3*n + 7*a*d^3)*r
 - 49*(12*a*e^3*r^5 - 2401*b*e^3*n - 4*(b*e^3*n + 70*a*e^3)*r^4 - 16807*a*
e^3 + 21*(4*b*e^3*n + 119*a*e^3)*r^3 - 49*(13*b*e^3*n + 217*a*e^3)*r^2 + 1
029*(2*b*e^3*n + 21*a*e^3)*r + (12*b*e^3*r^5 - 280*b*e^3*r^4 + 2499*b*e^3*
r^3 - 10633*b*e^3*r^2 + 21609*b*e^3*r - 16807*b*e^3)*log(c) + (12*b*e^3*n*
r^5 - 280*b*e^3*n*r^4 + 2499*b*e^3*n*r^3 - 10633*b*e^3*n*r^2 + 21609*b*e^3
*n*r - 16807*b*e^3*n)*log(x))*x^(3*r) - 147*(18*a*d*e^2*r^5 - 2401*b*d*e^2
*n - 3*(3*b*d*e^2*n + 133*a*d*e^2)*r^4 - 16807*a*d*e^2 + 28*(6*b*d*e^2*n +
 119*a*d*e^2)*r^3 - 98*(11*b*d*e^2*n + 133*a*d*e^2)*r^2 + 686*(4*b*d*e^2*n
 + 35*a*d*e^2)*r + (18*b*d*e^2*r^5 - 399*b*d*e^2*r^4 + 3332*b*d*e^2*r^3 -
13034*b*d*e^2*r^2 + 24010*b*d*e^2*r - 16807*b*d*e^2)*log(c) + (18*b*d*e^2*
n*r^5 - 399*b*d*e^2*n*r^4 + 3332*b*d*e^2*n*r^3 - 13034*b*d*e^2*n*r^2 + 240
10*b*d*e^2*n*r - 16807*b*d*e^2*n)*log(x))*x^(2*r) - 147*(36*a*d^2*e*r^5 -
2401*b*d^2*e*n - 12*(3*b*d^2*e*n + 56*a*d^2*e)*r^4 - 16807*a*d^2*e + 7*(60
*b*d^2*e*n + 679*a*d^2*e)*r^3 - 49*(37*b*d^2*e*n + 329*a*d^2*e)*r^2 + 343*
(10*b*d^2*e*n + 77*a*d^2*e)*r + (36*b*d^2*e*r^5 - 672*b*d^2*e*r^4 + 4753*b
*d^2*e*r^3 - 16121*b*d^2*e*r^2 + 26411*b*d^2*e*r - 16807*b*d^2*e)*log(c) +
 (36*b*d^2*e*n*r^5 - 672*b*d^2*e*n*r^4 + 4753*b*d^2*e*n*r^3 - 16121*b*d...
```

Sympy [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^8} dx = \text{Timed out}$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**8,x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^8} dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-8>0)', see `assume?` for more
details)Is
```

Giac [F]

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^8} dx = \int \frac{(ex^r+d)^3 (b\log(cx^n)+a)}{x^8} dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)/x^8, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^8}\,dx = \int \frac{(d+e\,x^r)^3 \,(a+b\,\ln(c\,x^n))}{x^8}\,dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^8,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^8, x)
```

Reduce [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 1053, normalized size of antiderivative = 5.75

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^8}\,dx = \text{Too large to display}$$

input
```
int((d+e*x^r)^3*(a+b*log(c*x^n))/x^8,x)
```

output
```
(588*x**(3*r)*log(x**n*c)*b*e**3*r**5 - 13720*x**(3*r)*log(x**n*c)*b*e**3*
r**4 + 122451*x**(3*r)*log(x**n*c)*b*e**3*r**3 - 521017*x**(3*r)*log(x**n*
c)*b*e**3*r**2 + 1058841*x**(3*r)*log(x**n*c)*b*e**3*r - 823543*x**(3*r)*l
og(x**n*c)*b*e**3 + 588*x**(3*r)*a*e**3*r**5 - 13720*x**(3*r)*a*e**3*r**4
+ 122451*x**(3*r)*a*e**3*r**3 - 521017*x**(3*r)*a*e**3*r**2 + 1058841*x**(
3*r)*a*e**3*r - 823543*x**(3*r)*a*e**3 - 196*x**(3*r)*b*e**3*n*r**4 + 4116
*x**(3*r)*b*e**3*n*r**3 - 31213*x**(3*r)*b*e**3*n*r**2 + 100842*x**(3*r)*b
*e**3*n*r - 117649*x**(3*r)*b*e**3*n + 2646*x**(2*r)*log(x**n*c)*b*d*e**2*
r**5 - 58653*x**(2*r)*log(x**n*c)*b*d*e**2*r**4 + 489804*x**(2*r)*log(x**n
*c)*b*d*e**2*r**3 - 1915998*x**(2*r)*log(x**n*c)*b*d*e**2*r**2 + 3529470*x
**(2*r)*log(x**n*c)*b*d*e**2*r - 2470629*x**(2*r)*log(x**n*c)*b*d*e**2 + 2
646*x**(2*r)*a*d*e**2*r**5 - 58653*x**(2*r)*a*d*e**2*r**4 + 489804*x**(2*r
)*a*d*e**2*r**3 - 1915998*x**(2*r)*a*d*e**2*r**2 + 3529470*x**(2*r)*a*d*e*
*2*r - 2470629*x**(2*r)*a*d*e**2 - 1323*x**(2*r)*b*d*e**2*n*r**4 + 24696*x
**(2*r)*b*d*e**2*n*r**3 - 158466*x**(2*r)*b*d*e**2*n*r**2 + 403368*x**(2*r
)*b*d*e**2*n*r - 352947*x**(2*r)*b*d*e**2*n + 5292*x**r*log(x**n*c)*b*d**2
*e*r**5 - 98784*x**r*log(x**n*c)*b*d**2*e*r**4 + 698691*x**r*log(x**n*c)*b
*d**2*e*r**3 - 2369787*x**r*log(x**n*c)*b*d**2*e*r**2 + 3882417*x**r*log(x
**n*c)*b*d**2*e*r - 2470629*x**r*log(x**n*c)*b*d**2*e + 5292*x**r*a*d**2*e
*r**5 - 98784*x**r*a*d**2*e*r**4 + 698691*x**r*a*d**2*e*r**3 - 2369787*...
```

3.403 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^{10}}\,dx$

Optimal result . . . 3009
Mathematica [A] (verified) . . . 3010
Rubi [A] (verified) . . . 3010
Maple [B] (verified) . . . 3012
Fricas [B] (verification not implemented) . . . 3013
Sympy [F(-1)] . . . 3014
Maxima [F(-2)] . . . 3014
Giac [F] . . . 3014
Mupad [F(-1)] . . . 3015
Reduce [B] (verification not implemented) . . . 3015

Optimal result

Integrand size = 23, antiderivative size = 191

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^{10}}\,dx = -\frac{bd^3n}{81x^9}-\frac{be^3nx^{-3(3-r)}}{9(3-r)^2}-\frac{3bd^2enx^{-9+r}}{(9-r)^2}-\frac{3bde^2nx^{-9+2r}}{(9-2r)^2}-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{e^3x^{-3(3-r)}(a+b\log(cx^n))}{3(3-r)}-\frac{3d^2ex^{-9+r}(a+b\log(cx^n))}{9-r}-\frac{3de^2x^{-9+2r}(a+b\log(cx^n))}{9-2r}$$

output
```
-1/81*b*d^3*n/x^9-1/9*b*e^3*n/(3-r)^2/(x^(9-3*r))-3*b*d^2*e*n*x^(-9+r)/(9-
r)^2-3*b*d*e^2*n*x^(-9+2*r)/(9-2*r)^2-1/9*d^3*(a+b*ln(c*x^n))/x^9-1/3*e^3*
(a+b*ln(c*x^n))/(3-r)/(x^(9-3*r))-3*d^2*e*x^(-9+r)*(a+b*ln(c*x^n))/(9-r)-3
*d*e^2*x^(-9+2*r)*(a+b*ln(c*x^n))/(9-2*r)
```

Mathematica [A] (verified)

Time = 0.50 (sec) , antiderivative size = 182, normalized size of antiderivative = 0.95

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^{10}}\,dx = \frac{bn\left(-d^3-\frac{243d^2ex^r}{(-9+r)^2}-\frac{243de^2x^{2r}}{(9-2r)^2}-\frac{9e^3x^{3r}}{(-3+r)^2}\right)+9a\left(-d^3+\frac{27d^2ex^r}{-9+r}+\frac{27de^2x^{2r}}{-9+2r}+\frac{3e^3x^{3r}}{-3+r}\right)+9b\left(-d^3+\frac{27d^2ex^r}{-9+r}+\right.}{81x^9}$$

input

```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^10,x]
```

output

```
(b*n*(-d^3 - (243*d^2*e*x^r)/(-9 + r)^2 - (243*d*e^2*x^(2*r))/(9 - 2*r)^2
- (9*e^3*x^(3*r))/(-3 + r)^2) + 9*a*(-d^3 + (27*d^2*e*x^r)/(-9 + r) + (27*
d*e^2*x^(2*r))/(-9 + 2*r) + (3*e^3*x^(3*r))/(-3 + r)) + 9*b*(-d^3 + (27*d^
2*e*x^r)/(-9 + r) + (27*d*e^2*x^(2*r))/(-9 + 2*r) + (3*e^3*x^(3*r))/(-3 +
r))*Log[c*x^n])/(81*x^9)
```

Rubi [A] (verified)

Time = 0.68 (sec) , antiderivative size = 188, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^{10}}\,dx$$

$$\Big\downarrow \text{ 2772}$$

$$-bn\int -\frac{\frac{27d^2ex^r}{9-r}+\frac{27de^2x^{2r}}{9-2r}+\frac{3e^3x^{3r}}{3-r}+d^3}{9x^{10}}dx-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2ex^{r-9}(a+b\log(cx^n))}{9-r}-\frac{3de^2x^{2r-9}(a+b\log(cx^n))}{9-2r}-\frac{e^3x^{-3(3-r)}(a+b\log(cx^n))}{3(3-r)}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{9}bn\int \frac{\frac{27d^2ex^r}{9-r}+\frac{27de^2x^{2r}}{9-2r}+\frac{3e^3x^{3r}}{3-r}+d^3}{x^{10}}dx-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2ex^{r-9}(a+b\log(cx^n))}{9-r}-\frac{3de^2x^{2r-9}(a+b\log(cx^n))}{9-2r}-\frac{e^3x^{-3(3-r)}(a+b\log(cx^n))}{3(3-r)}$$

$$\Big\downarrow \text{ 2010}$$

$$\frac{1}{9}bn\int \left(-\frac{27d^2ex^{r-10}}{r-9}+\frac{27de^2x^{2(r-5)}}{9-2r}-\frac{3e^3x^{3r-10}}{r-3}+\frac{d^3}{x^{10}}\right)dx-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2ex^{r-9}(a+b\log(cx^n))}{9-r}-\frac{3de^2x^{2r-9}(a+b\log(cx^n))}{9-2r}-\frac{e^3x^{-3(3-r)}(a+b\log(cx^n))}{3(3-r)}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2ex^{r-9}(a+b\log(cx^n))}{9-r}-\frac{3de^2x^{2r-9}(a+b\log(cx^n))}{9-2r}-\frac{e^3x^{-3(3-r)}(a+b\log(cx^n))}{3(3-r)}+\frac{1}{9}bn\left(-\frac{d^3}{9x^9}-\frac{27d^2ex^{r-9}}{(9-r)^2}-\frac{27de^2x^{2r-9}}{(9-2r)^2}-\frac{e^3x^{-3(3-r)}}{(3-r)^2}\right)$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^10,x]
```

output
```
(b*n*(-1/9*d^3/x^9 - e^3/((3 - r)^2*x^(3*(3 - r))) - (27*d^2*e*x^(-9 + r))
/(9 - r)^2 - (27*d*e^2*x^(-9 + 2*r))/(9 - 2*r)^2))/9 - (d^3*(a + b*Log[c*x
^n]))/(9*x^9) - (e^3*(a + b*Log[c*x^n]))/(3*(3 - r)*x^(3*(3 - r))) - (3*d^
2*e*x^(-9 + r)*(a + b*Log[c*x^n]))/(9 - r) - (3*d*e^2*x^(-9 + 2*r)*(a + b*
Log[c*x^n]))/(9 - 2*r)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1048 vs. 2(183) = 366.

Time = 10.49 (sec) , antiderivative size = 1049, normalized size of antiderivative = 5.49

method	result	size
parallelrisch	Expression too large to display	1049
risch	Expression too large to display	4027

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^10,x,method=_RETURNVERBOSE)
```

output
```
-1/81*(531441*a*d^3+3240*a*e^3*r^4*(x^r)^3+59049*b*e^3*n*(x^r)^3-37179*a*e
^3*r^3*(x^r)^3+203391*a*e^3*r^2*(x^r)^3-531441*a*e^3*r*(x^r)^3-108*a*e^3*r
^5*(x^r)^3-14580*b*d^2*e*n*r^3*x^r+531441*b*ln(c*x^n)*d^3+531441*e^3*(x^r)
^3*a+531441*e^3*(x^r)^3*b*ln(c*x^n)+1594323*d^2*e*x^r*a+1594323*d*e^2*(x^r
)^2*a+36*a*d^3*r^6-1188*a*d^3*r^5+15633*a*d^3*r^4-148716*a*d*e^2*r^3*(x^r)
^2+747954*a*d*e^2*r^2*(x^r)^2-1771470*a*d*e^2*r*(x^r)^2+1594323*d^2*e*x^r*
b*ln(c*x^n)+1594323*d*e^2*(x^r)^2*b*ln(c*x^n)+4*b*d^3*n*r^6-132*b*d^3*n*r^
5+1737*b*d^3*n*r^4-11664*b*d^3*n*r^3+42282*b*d^3*n*r^2-78732*b*d^3*n*r-104
976*a*d^3*r^3+380538*a*d^3*r^2-708588*a*d^3*r-212139*a*d^2*e*r^3*x^r+92510
1*a*d^2*e*r^2*x^r-1948617*a*d^2*e*r*x^r+9477*b*e^3*n*r^2*(x^r)^3+972*b*d^2
*e*n*r^4*x^r+48114*b*d*e^2*n*r^2*(x^r)^2+80919*b*d^2*e*n*r^2*x^r-157464*b*
d*e^2*n*r*(x^r)^2-196830*b*d^2*e*n*r*x^r+243*b*d*e^2*n*r^4*(x^r)^2-5832*b*
d*e^2*n*r^3*(x^r)^2+59049*b*d^3*n+36*ln(c*x^n)*b*d^3*r^6-1188*ln(c*x^n)*b*
d^3*r^5+15633*ln(c*x^n)*b*d^3*r^4-104976*ln(c*x^n)*b*d^3*r^3+380538*ln(c*x
^n)*b*d^3*r^2-708588*ln(c*x^n)*b*d^3*r-39366*b*e^3*n*r*(x^r)^3+177147*b*d*
e^2*n*(x^r)^2+177147*b*d^2*e*n*x^r+36*b*e^3*n*r^4*(x^r)^3-972*b*e^3*n*r^3*
(x^r)^3-486*a*d*e^2*r^5*(x^r)^2+13851*a*d*e^2*r^4*(x^r)^2-972*a*d^2*e*r^5*
x^r+23328*a*d^2*e*r^4*x^r-972*x^r*ln(c*x^n)*b*d^2*e*r^5+23328*x^r*ln(c*x^n
)*b*d^2*e*r^4-212139*x^r*ln(c*x^n)*b*d^2*e*r^3+925101*x^r*ln(c*x^n)*b*d^2*
e*r^2-1948617*x^r*ln(c*x^n)*b*d^2*e*r-531441*(x^r)^3*ln(c*x^n)*b*e^3*r-...
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 981 vs. $2(175) = 350$.

Time = 0.11 (sec) , antiderivative size = 981, normalized size of antiderivative = 5.14

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^{10}}\,dx = \text{Too large to display}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^10,x, algorithm="fricas")
```

output
```
-1/81*(4*(b*d^3*n + 9*a*d^3)*r^6 - 132*(b*d^3*n + 9*a*d^3)*r^5 + 59049*b*d
^3*n + 1737*(b*d^3*n + 9*a*d^3)*r^4 + 531441*a*d^3 - 11664*(b*d^3*n + 9*a*
d^3)*r^3 + 42282*(b*d^3*n + 9*a*d^3)*r^2 - 78732*(b*d^3*n + 9*a*d^3)*r - 9
*(12*a*e^3*r^5 - 6561*b*e^3*n - 4*(b*e^3*n + 90*a*e^3)*r^4 - 59049*a*e^3 +
 27*(4*b*e^3*n + 153*a*e^3)*r^3 - 81*(13*b*e^3*n + 279*a*e^3)*r^2 + 2187*(
2*b*e^3*n + 27*a*e^3)*r + 3*(4*b*e^3*r^5 - 120*b*e^3*r^4 + 1377*b*e^3*r^3
- 7533*b*e^3*r^2 + 19683*b*e^3*r - 19683*b*e^3)*log(c) + 3*(4*b*e^3*n*r^5
- 120*b*e^3*n*r^4 + 1377*b*e^3*n*r^3 - 7533*b*e^3*n*r^2 + 19683*b*e^3*n*r
- 19683*b*e^3*n)*log(x))*x^(3*r) - 243*(2*a*d*e^2*r^5 - 729*b*d*e^2*n - (b
*d*e^2*n + 57*a*d*e^2)*r^4 - 6561*a*d*e^2 + 12*(2*b*d*e^2*n + 51*a*d*e^2)*
r^3 - 18*(11*b*d*e^2*n + 171*a*d*e^2)*r^2 + 162*(4*b*d*e^2*n + 45*a*d*e^2)
*r + (2*b*d*e^2*r^5 - 57*b*d*e^2*r^4 + 612*b*d*e^2*r^3 - 3078*b*d*e^2*r^2
+ 7290*b*d*e^2*r - 6561*b*d*e^2)*log(c) + (2*b*d*e^2*n*r^5 - 57*b*d*e^2*n*
r^4 + 612*b*d*e^2*n*r^3 - 3078*b*d*e^2*n*r^2 + 7290*b*d*e^2*n*r - 6561*b*d
*e^2*n)*log(x))*x^(2*r) - 243*(4*a*d^2*e*r^5 - 729*b*d^2*e*n - 4*(b*d^2*e*
n + 24*a*d^2*e)*r^4 - 6561*a*d^2*e + 3*(20*b*d^2*e*n + 291*a*d^2*e)*r^3 -
9*(37*b*d^2*e*n + 423*a*d^2*e)*r^2 + 81*(10*b*d^2*e*n + 99*a*d^2*e)*r + (4
*b*d^2*e*r^5 - 96*b*d^2*e*r^4 + 873*b*d^2*e*r^3 - 3807*b*d^2*e*r^2 + 8019*
b*d^2*e*r - 6561*b*d^2*e)*log(c) + (4*b*d^2*e*n*r^5 - 96*b*d^2*e*n*r^4 + 8
73*b*d^2*e*n*r^3 - 3807*b*d^2*e*n*r^2 + 8019*b*d^2*e*n*r - 6561*b*d^2*e...
```

Sympy [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^{10}}\,dx = \text{Timed out}$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**10,x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^{10}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^10,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-10>0)', see `assume?` for more
 details)I
```

Giac [F]

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^{10}}\,dx = \int \frac{(ex^r+d)^3 (b\log(cx^n)+a)}{x^{10}}\,dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^10,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)/x^10, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^{10}}\,dx = \int \frac{(d+e\,x^r)^3 (a+b\,\ln(c\,x^n))}{x^{10}}\,dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^10,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^10, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 1053, normalized size of antiderivative = 5.51

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^{10}}\,dx = \text{Too large to display}$$

input
```
int((d+e*x^r)^3*(a+b*log(c*x^n))/x^10,x)
```

output

```
(108*x**(3*r)*log(x**n*c)*b*e**3*r**5 - 3240*x**(3*r)*log(x**n*c)*b*e**3*r
**4 + 37179*x**(3*r)*log(x**n*c)*b*e**3*r**3 - 203391*x**(3*r)*log(x**n*c)
*b*e**3*r**2 + 531441*x**(3*r)*log(x**n*c)*b*e**3*r - 531441*x**(3*r)*log(
x**n*c)*b*e**3 + 108*x**(3*r)*a*e**3*r**5 - 3240*x**(3*r)*a*e**3*r**4 + 37
179*x**(3*r)*a*e**3*r**3 - 203391*x**(3*r)*a*e**3*r**2 + 531441*x**(3*r)*a
*e**3*r - 531441*x**(3*r)*a*e**3 - 36*x**(3*r)*b*e**3*n*r**4 + 972*x**(3*r
)*b*e**3*n*r**3 - 9477*x**(3*r)*b*e**3*n*r**2 + 39366*x**(3*r)*b*e**3*n*r
- 59049*x**(3*r)*b*e**3*n + 486*x**(2*r)*log(x**n*c)*b*d*e**2*r**5 - 13851
*x**(2*r)*log(x**n*c)*b*d*e**2*r**4 + 148716*x**(2*r)*log(x**n*c)*b*d*e**2
*r**3 - 747954*x**(2*r)*log(x**n*c)*b*d*e**2*r**2 + 1771470*x**(2*r)*log(x
**n*c)*b*d*e**2*r - 1594323*x**(2*r)*log(x**n*c)*b*d*e**2 + 486*x**(2*r)*a
*d*e**2*r**5 - 13851*x**(2*r)*a*d*e**2*r**4 + 148716*x**(2*r)*a*d*e**2*r**
3 - 747954*x**(2*r)*a*d*e**2*r**2 + 1771470*x**(2*r)*a*d*e**2*r - 1594323*
x**(2*r)*a*d*e**2 - 243*x**(2*r)*b*d*e**2*n*r**4 + 5832*x**(2*r)*b*d*e**2*
n*r**3 - 48114*x**(2*r)*b*d*e**2*n*r**2 + 157464*x**(2*r)*b*d*e**2*n*r - 1
77147*x**(2*r)*b*d*e**2*n + 972*x**r*log(x**n*c)*b*d**2*e*r**5 - 23328*x**
r*log(x**n*c)*b*d**2*e*r**4 + 212139*x**r*log(x**n*c)*b*d**2*e*r**3 - 9251
01*x**r*log(x**n*c)*b*d**2*e*r**2 + 1948617*x**r*log(x**n*c)*b*d**2*e*r -
1594323*x**r*log(x**n*c)*b*d**2*e + 972*x**r*a*d**2*e*r**5 - 23328*x**r*a*
d**2*e*r**4 + 212139*x**r*a*d**2*e*r**3 - 925101*x**r*a*d**2*e*r**2 + 1...
```

3.404 $\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx$

Optimal result 3017
Mathematica [B] (verified) 3017
Rubi [N/A] 3018
Maple [N/A] 3019
Fricas [N/A] 3019
Sympy [N/A] 3019
Maxima [N/A] 3020
Giac [N/A] 3020
Mupad [N/A] 3020
Reduce [N/A] 3021

Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx=\text{Int}\left(\frac{x^3(a+b\log(cx^n))}{d+ex^r},x\right)$$

output
```
Defer(Int)(x^3*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 87 vs. 2(26) = 52.

Time = 0.17 (sec) , antiderivative size = 87, normalized size of antiderivative = 3.78

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx =\frac{x^4\left(-bn\,{}_3F_2\left(1,\frac{4}{r},\frac{4}{r};1+\frac{4}{r},1+\frac{4}{r};-\frac{ex^r}{d}\right)+4\,\text{Hypergeometric2F1}\left(1,\frac{4}{r},\frac{4+r}{r},-\frac{ex^r}{d}\right)(a+b\log(cx^n))\right)}{16d}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

output
```
(x^4*(-(b*n*HypergeometricPFQ[{1, 4/r, 4/r}, {1 + 4/r, 1 + 4/r}, -((e*x^r)
/d)]) + 4*Hypergeometric2F1[1, 4/r, (4 + r)/r, -((e*x^r)/d)]*(a + b*Log[c*
x^n])))/(16*d)
```

Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx$$
$$\Big\downarrow \text{2796}$$
$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}dx$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{x^3(a+b\ln(c\,x^n))}{d+e\,x^r}dx$$

input
```
int(x^3*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

output
```
int(x^3*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx=\int \frac{(b\log(cx^n)+a)x^3}{ex^r+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x^n) + a*x^3)/(e*x^r + d), x)
```

Sympy [N/A]

Not integrable

Time = 7.90 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx=\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(d+e*x**r),x)
```

output
```
Integral(x**3*(a + b*log(c*x**n))/(d + e*x**r), x)
```

Maxima [N/A]

Not integrable

Time = 0.09 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^3(a + b\log{(cx^n)})}{d + ex^r}\, dx = \int \frac{(b\log{(cx^n)} + a)x^3}{ex^r + d}\, dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x^r + d), x)
```

Giac [N/A]

Not integrable

Time = 0.11 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^3(a + b\log{(cx^n)})}{d + ex^r}\, dx = \int \frac{(b\log{(cx^n)} + a)x^3}{ex^r + d}\, dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x^r + d), x)
```

Mupad [N/A]

Not integrable

Time = 26.17 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^3(a + b\log{(cx^n)})}{d + ex^r}\, dx = \int \frac{x^3\,(a + b\,\ln{(c\,x^n)})}{d + e\,x^r}\, dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^r),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^r), x)
```

Reduce [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.78

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx = \left(\int \frac{x^3}{x^r e+d}dx\right)a+\left(\int \frac{\log(x^n c)\,x^3}{x^r e+d}dx\right)b$$

input
```
int(x^3*(a+b*log(c*x^n))/(d+e*x^r),x)
```

output
```
int(x**3/(x**r*e + d),x)*a + int((log(x**n*c)*x**3)/(x**r*e + d),x)*b
```

3.405 $\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx$

Optimal result 3022
Mathematica [B] (verified) 3022
Rubi [N/A] 3023
Maple [N/A] 3024
Fricas [N/A] 3024
Sympy [N/A] 3024
Maxima [N/A] 3025
Giac [N/A] 3025
Mupad [N/A] 3025
Reduce [N/A] 3026

Optimal result

Integrand size = 21, antiderivative size = 21

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx = \text{Int}\left(\frac{x(a+b\log(cx^n))}{d+ex^r},x\right)$$

output
```
Defer(Int)(x*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 87 vs. 2(24) = 48.

Time = 0.15 (sec) , antiderivative size = 87, normalized size of antiderivative = 4.14

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx = \frac{x^2\left(-bn\,{}_3F_2\left(1,\frac{2}{r},\frac{2}{r};1+\frac{2}{r},1+\frac{2}{r};-\frac{ex^r}{d}\right)+2\,\text{Hypergeometric2F1}\left(1,\frac{2}{r},\frac{2+r}{r},-\frac{ex^r}{d}\right)(a+b\log(cx^n))\right)}{4d}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

output
```
(x^2*(-(b*n*HypergeometricPFQ[{1, 2/r, 2/r}, {1 + 2/r, 1 + 2/r}, -((e*x^r)
/d)]) + 2*Hypergeometric2F1[1, 2/r, (2 + r)/r, -((e*x^r)/d)]*(a + b*Log[c*
x^n])))/(4*d)
```

Rubi [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx$$

$$\Big\downarrow \text{ 2796}$$

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}dx$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{x(a+b\ln(c\,x^n))}{d+e\,x^r}dx$$

input
```
int(x*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

output
```
int(x*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

Fricas [N/A]

Not integrable

Time = 0.09 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.19

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{(b\log(cx^n)+a)x}{ex^r+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="fricas")
```

output
```
integral((b*x*log(c*x^n) + a*x)/(e*x^r + d), x)
```

Sympy [N/A]

Not integrable

Time = 2.58 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx$$

input
```
integrate(x*(a+b*ln(c*x**n))/(d+e*x**r),x)
```

output
```
Integral(x*(a + b*log(c*x**n))/(d + e*x**r), x)
```

Maxima [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{(b\log(cx^n)+a)x}{ex^r+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x^r + d), x)
```

Giac [N/A]

Not integrable

Time = 0.12 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{(b\log(cx^n)+a)x}{ex^r+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x^r + d), x)
```

Mupad [N/A]

Not integrable

Time = 25.31 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{d+e\,x^r}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x^r),x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x^r), x)
```

Reduce [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.76

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx = \left(\int \frac{\log(x^n c)\,x}{x^r e+d}dx\right)b + \left(\int \frac{x}{x^r e+d}dx\right)a$$

input
```
int(x*(a+b*log(c*x^n))/(d+e*x^r),x)
```

output
```
int((log(x**n*c)*x)/(x**r*e + d),x)*b + int(x/(x**r*e + d),x)*a
```

3.406 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx$

Optimal result 3027
Mathematica [A] (warning: unable to verify) 3027
Rubi [A] (verified) 3028
Maple [C] (warning: unable to verify) 3029
Fricas [A] (verification not implemented) 3029
Sympy [A] (verification not implemented) 3030
Maxima [F] 3030
Giac [F] 3031
Mupad [F(-1)] 3031
Reduce [F] 3031

Optimal result

Integrand size = 23, antiderivative size = 54

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx = -\frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{dr} + \frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}$$

output
```
-(a+b*ln(c*x^n))*ln(1+d/e/(x^r))/d/r+b*n*polylog(2,-d/e/(x^r))/d/r^2
```

Mathematica [A] (warning: unable to verify)

Time = 0.20 (sec) , antiderivative size = 108, normalized size of antiderivative = 2.00

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx = \frac{bnr^2\log^2(x) - 2r(a+b\log(cx^n))\log(d-dx^r) + 2bnr\log(x)(\log(d-dx^r) - \log(d+ex^r)) + 2bn\log(}{2dr^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)),x]
```

output
```
(b*n*r^2*Log[x]^2 - 2*r*(a + b*Log[c*x^n])*Log[d - d*x^r] + 2*b*n*r*Log[x]
*(Log[d - d*x^r] - Log[d + e*x^r]) + 2*b*n*Log[-((e*x^r)/d)]*Log[d + e*x^r
] + 2*b*n*PolyLog[2, 1 + (e*x^r)/d])/(2*d*r^2)
```

Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}dx$$

$$\Big\downarrow \text{2779}$$

$$\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}$$

$$\Big\downarrow \text{2838}$$

$$\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)),x]
```

output
```
-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^r)])/(d*r)) + (b*n*PolyLog[2, -(d/(e*
x^r))])/(d*r^2)
```

Defintions of rubi rules used

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.64 (sec) , antiderivative size = 246, normalized size of antiderivative = 4.56

method	result
risch	$\frac{b\ln(d+e\,x^r)n\ln(x)}{rd}-\frac{b\ln(d+e\,x^r)\ln(x^n)}{rd}-\frac{b\ln(x^r)n\ln(x)}{rd}+\frac{b\ln(x^r)\ln(x^n)}{rd}+\frac{bn\ln(x)^2}{2d}-\frac{bn\ln(x)\ln\left(1+\frac{e\,x^r}{d}\right)}{rd}-\frac{bn\,\mathrm{po}}{}$

input
```
int((a+b*ln(c*x^n))/x/(d+e*x^r),x,method=_RETURNVERBOSE)
```

output
```
b/r/d*ln(d+e*x^r)*n*ln(x)-b/r/d*ln(d+e*x^r)*ln(x^n)-b/r/d*ln(x^r)*n*ln(x)+
b/r/d*ln(x^r)*ln(x^n)+1/2*b*n/d*ln(x)^2-b/r*n/d*ln(x)*ln(1+e*x^r/d)-b/r^2*
n/d*polylog(2,-e*x^r/d)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b
*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b
*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(-1/r/d*ln(d+e*x^r)+1/r/d*ln(x^r))
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 93, normalized size of antiderivative = 1.72

$$\int \frac{a+b\log(cx^n)}{x\left(d+ex^r\right)}\,dx = \frac{bnr^2\log(x)^2-2\,bnr\log(x)\log\left(\frac{ex^r+d}{d}\right)-2\,bn\mathrm{Li}_2\left(-\frac{ex^r+d}{d}+1\right)-2\,(br\log(c)+ar)\log(ex^r+d)+2\,(br}{2\,dr^2}$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r),x, algorithm="fricas")
```

output
```
1/2*(b*n*r^2*log(x)^2 - 2*b*n*r*log(x)*log((e*x^r + d)/d) - 2*b*n*dilog(-(
e*x^r + d)/d + 1) - 2*(b*r*log(c) + a*r)*log(e*x^r + d) + 2*(b*r^2*log(c)
+ a*r^2)*log(x))/(d*r^2)
```

Sympy [A] (verification not implemented)

Time = 148.83 (sec) , antiderivative size = 452, normalized size of antiderivative = 8.37

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x/(d+e*x**r),x)
```

output
```
-2*a*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (-log(-2*e*x**r)/(2*e), Tru
e))/(d*r) - 2*a*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (log(2*d + 2*e*x
**r)/(2*e), True))/(d*r) + 2*b*e*n*Piecewise((Piecewise((log(x)/(2*e) + x*
*r/(d*r), Ne(r, 0)), (log(x)/(2*e) + log(x)/d, True)), Eq(e, 0)), (-Piecew
ise((0, (Abs(e*x**r) < 1) & (1/Abs(e*x**r) < 1)), (log(e*x**r)**2/(2*r) +
I*pi*log(e*x**r)/r, Abs(e*x**r) < 1), (log(1/(e*x**r))**2/(2*r) - I*pi*log
(1/(e*x**r))/r, 1/Abs(e*x**r) < 1), (meijerg(((), (1, 1, 1)), ((0, 0, 0),
()), e*x**r*exp_polar(I*pi))/r + meijerg(((1, 1, 1), ()), ((), (0, 0, 0)),
 e*x**r*exp_polar(I*pi))/r, True))/(2*e) - log(2)*log(x)/(2*e), True))/(d*
r) + 2*b*e*n*Piecewise((Piecewise((log(x)/(2*e) + x**r/(d*r), Ne(r, 0)), (
log(x)/(2*e) + log(x)/d, True)), Eq(e, 0)), (Piecewise((-polylog(2, e*x**r
*exp_polar(I*pi)/d)/r, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - po
lylog(2, e*x**r*exp_polar(I*pi)/d)/r, Abs(x) < 1), (-log(d)*log(1/x) - pol
ylog(2, e*x**r*exp_polar(I*pi)/d)/r, 1/Abs(x) < 1), (-meijerg(((), (1, 1))
, ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d)
- polylog(2, e*x**r*exp_polar(I*pi)/d)/r, True))/(2*e) + log(2)*log(x)/(2*
e), True))/(d*r) - 2*b*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (-log(-2*
e*x**r)/(2*e), True))*log(c*x**n)/(d*r) - 2*b*e*Piecewise((1/(2*e) + x**r/
d, Eq(e, 0)), (log(2*d + 2*e*x**r)/(2*e), True))*log(c*x**n)/(d*r)
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r),x, algorithm="maxima")
```

output
```
a*(log(x)/d - log((e*x^r + d)/e)/(d*r)) + b*integrate((log(c) + log(x^n))/
(e*x*x^r + d*x), x)
```

Giac [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{r}\right)}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{(ex^{r}+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{r}\right)}\,dx=\int \frac{a+b\,\ln\left(c\,x^{n}\right)}{x\,\left(d+e\,x^{r}\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)), x)
```

Reduce [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{r}\right)}\,dx=\frac{\left(\int \frac{\log(x^{n}c)}{x^{r}ex+dx}dx\right)bdr-\log(x^{r}e+d)\,a+\log(x)\,ar}{dr}$$

input
```
int((a+b*log(c*x^n))/x/(d+e*x^r),x)
```

output
```
(int(log(x**n*c)/(x**r*e*x + d*x),x)*b*d*r - log(x**r*e + d)*a + log(x)*a*
r)/(d*r)
```

3.407 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)}\,dx$

Optimal result 3032
Mathematica [B] (verified) 3032
Rubi [N/A] 3033
Maple [N/A] 3034
Fricas [N/A] 3034
Sympy [N/A] 3034
Maxima [N/A] 3035
Giac [N/A] 3035
Mupad [N/A] 3036
Reduce [N/A] 3036

Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)}\,dx=\text{Int}\left(\frac{a+b\log(cx^n)}{x^3(d+ex^r)},x\right)$$

output
```
Defer(Int)((a+b*ln(c*x^n))/x^3/(d+e*x^r),x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 86 vs. 2(26) = 52.

Time = 0.17 (sec) , antiderivative size = 86, normalized size of antiderivative = 3.74

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)}\,dx = -\frac{bn\,{}_3F_2\left(1,-\frac{2}{r},-\frac{2}{r};1-\frac{2}{r},1-\frac{2}{r};-\frac{ex^r}{d}\right)+2\,\text{Hypergeometric2F1}\left(1,-\frac{2}{r},\frac{-2+r}{r},-\frac{ex^r}{d}\right)(a+b\log(cx^n))}{4dx^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^r)),x]
```

output
```
-1/4*(b*n*HypergeometricPFQ[{1, -2/r, -2/r}, {1 - 2/r, 1 - 2/r}, -((e*x^r)
/d)] + 2*Hypergeometric2F1[1, -2/r, (-2 + r)/r, -((e*x^r)/d)]*(a + b*Log[c
*x^n]))/(d*x^2)
```

Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a + b\log(cx^n)}{x^3(d + ex^r)} dx$$
$$\Big\downarrow \text{2796}$$
$$\int \frac{a + b\log(cx^n)}{x^3(d + ex^r)} dx$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^r)),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{3}\left(d+e\,x^{r}\right)}dx$$

input
```
int((a+b*ln(c*x^n))/x^3/(d+e*x^r),x)
```

output
```
int((a+b*ln(c*x^n))/x^3/(d+e*x^r),x)
```

Fricas [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{3}\left(d+ex^{r}\right)}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{(ex^{r}+d)x^{3}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(d+e*x^r),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^3*x^r + d*x^3), x)
```

Sympy [N/A]

Not integrable

Time = 6.70 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{3}\left(d+ex^{r}\right)}\,dx=\int \frac{a+b\log\left(cx^{n}\right)}{x^{3}\left(d+ex^{r}\right)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(d+e*x**r),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**3*(d + e*x**r)), x)
```

Maxima [N/A]

Not integrable

Time = 0.09 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^r\right)}\,dx=\int \frac{b\log\left(cx^n\right)+a}{(ex^r+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(d+e*x^r),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)*x^3), x)
```

Giac [N/A]

Not integrable

Time = 0.11 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^r\right)}\,dx=\int \frac{b\log\left(cx^n\right)+a}{(ex^r+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)*x^3), x)
```

Mupad [N/A]

Not integrable

Time = 25.00 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{x^3\,(d+e\,x^r)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^r)),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^r)), x)
```

Reduce [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.09

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)}\,dx=\left(\int \frac{\log(x^nc)}{x^re\,x^3+d\,x^3}dx\right)b+\left(\int \frac{1}{x^re\,x^3+d\,x^3}dx\right)a$$

input
```
int((a+b*log(c*x^n))/x^3/(d+e*x^r),x)
```

output
```
int(log(x**n*c)/(x**r*e*x**3 + d*x**3),x)*b + int(1/(x**r*e*x**3 + d*x**3)
,x)*a
```

3.408 $\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx$

Optimal result 3037
Mathematica [B] (verified) 3037
Rubi [N/A] 3038
Maple [N/A] 3039
Fricas [N/A] 3039
Sympy [N/A] 3039
Maxima [N/A] 3040
Giac [N/A] 3040
Mupad [N/A] 3040
Reduce [N/A] 3041

Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx=\text{Int}\left(\frac{x^2(a+b\log(cx^n))}{d+ex^r},x\right)$$

output
```
Defer(Int)(x^2*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 87 vs. 2(26) = 52.

Time = 0.17 (sec) , antiderivative size = 87, normalized size of antiderivative = 3.78

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx = \frac{x^3\left(-bn\,{}_3F_2\left(1,\frac{3}{r},\frac{3}{r};1+\frac{3}{r},1+\frac{3}{r};-\frac{ex^r}{d}\right)+3\,\text{Hypergeometric2F1}\left(1,\frac{3}{r},\frac{3+r}{r},-\frac{ex^r}{d}\right)(a+b\log(cx^n))\right)}{9d}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

output
```
(x^3*(-(b*n*HypergeometricPFQ[{1, 3/r, 3/r}, {1 + 3/r, 1 + 3/r}, -((e*x^r)
/d)]) + 3*Hypergeometric2F1[1, 3/r, (3 + r)/r, -((e*x^r)/d)]*(a + b*Log[c*
x^n])))/(9*d)
```

Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r} dx$$

$$\Big\downarrow \text{ 2796}$$

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r} dx$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{x^2(a+b\ln(c\,x^n))}{d+e\,x^r}dx$$

input
```
int(x^2*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

output
```
int(x^2*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{ex^r+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x^n) + a*x^2)/(e*x^r + d), x)
```

Sympy [N/A]

Not integrable

Time = 4.46 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(d+e*x**r),x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))/(d + e*x**r), x)
```

Maxima [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx=\int \frac{(b\log(cx^n)+a)x^2}{ex^r+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x^r + d), x)
```

Giac [N/A]

Not integrable

Time = 0.12 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx=\int \frac{(b\log(cx^n)+a)x^2}{ex^r+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x^r + d), x)
```

Mupad [N/A]

Not integrable

Time = 24.97 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx=\int \frac{x^2\,(a+b\,\ln(c\,x^n))}{d+e\,x^r}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^r),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^r), x)
```

Reduce [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.78

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx = \left(\int \frac{x^2}{x^r e+d}dx\right)a + \left(\int \frac{\log(x^n c)\,x^2}{x^r e+d}dx\right)b$$

input
```
int(x^2*(a+b*log(c*x^n))/(d+e*x^r),x)
```

output
```
int(x**2/(x**r*e + d),x)*a + int((log(x**n*c)*x**2)/(x**r*e + d),x)*b
```

3.409 $\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx$

Optimal result . . . 3042
Mathematica [B] (verified) . . . 3042
Rubi [N/A] . . . 3043
Maple [N/A] . . . 3044
Fricas [N/A] . . . 3044
Sympy [N/A] . . . 3044
Maxima [N/A] . . . 3045
Giac [N/A] . . . 3045
Mupad [N/A] . . . 3045
Reduce [N/A] . . . 3046

Optimal result

Integrand size = 20, antiderivative size = 20

$$\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx = \operatorname{Int}\left(\frac{a+b\log(cx^n)}{d+ex^r},x\right)$$

output
```
Defer(Int)((a+b*ln(c*x^n))/(d+e*x^r),x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 69 vs. 2(23) = 46.

Time = 0.12 (sec) , antiderivative size = 69, normalized size of antiderivative = 3.45

$$\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx = \frac{x\left(-bn\,{}_3F_2\left(1,\frac{1}{r},\frac{1}{r};1+\frac{1}{r},1+\frac{1}{r};-\frac{ex^r}{d}\right)+\text{Hypergeometric2F1}\left(1,\frac{1}{r},1+\frac{1}{r},-\frac{ex^r}{d}\right)(a+b\log(cx^n))\right)}{d}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x^r),x]
```

output
```
(x*(-(b*n*HypergeometricPFQ[{1, r^(-1), r^(-1)}, {1 + r^(-1), 1 + r^(-1)},
 -((e*x^r)/d)]) + Hypergeometric2F1[1, r^(-1), 1 + r^(-1), -((e*x^r)/d)]*(
a + b*Log[c*x^n])))/d
```

Rubi [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2768}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx$$
$$\Big\downarrow \; 2768$$
$$\int \frac{a+b\log(cx^n)}{d+ex^r}dx$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x^r),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2768
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> Unintegrable[(d + e*x^r)^q*(a + b*Log[c*x^n])^p, x] /; F
reeQ[{a, b, c, d, e, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{d+e\,x^{r}}dx$$

input
```
int((a+b*ln(c*x^n))/(d+e*x^r),x)
```

output
```
int((a+b*ln(c*x^n))/(d+e*x^r),x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log\left(cx^{n}\right)}{d+ex^{r}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{ex^{r}+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e*x^r),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^r + d), x)
```

Sympy [N/A]

Not integrable

Time = 1.70 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{a+b\log\left(cx^{n}\right)}{d+ex^{r}}\,dx=\int \frac{a+b\log\left(cx^{n}\right)}{d+ex^{r}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(d+e*x**r),x)
```

output
```
Integral((a + b*log(c*x**n))/(d + e*x**r), x)
```

Maxima [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx = \int \frac{b\log(cx^n)+a}{ex^r+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e*x^r),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^r + d), x)
```

Giac [N/A]

Not integrable

Time = 0.12 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx = \int \frac{b\log(cx^n)+a}{ex^r+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^r + d), x)
```

Mupad [N/A]

Not integrable

Time = 25.09 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx = \int \frac{a+b\,\ln\left(c\,x^n\right)}{d+e\,x^r}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x^r),x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x^r), x)
```

Reduce [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.70

$$\int \frac{a+b\log\left(cx^n\right)}{d+ex^r}\,dx=\left(\int \frac{\log(x^n c)}{x^r e+d}dx\right)b+\left(\int \frac{1}{x^r e+d}dx\right)a$$

input
```
int((a+b*log(c*x^n))/(d+e*x^r),x)
```

output
```
int(log(x**n*c)/(x**r*e + d),x)*b + int(1/(x**r*e + d),x)*a
```

3.410 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}\,dx$

Optimal result 3047
Mathematica [B] (verified) 3047
Rubi [N/A] 3048
Maple [N/A] 3049
Fricas [N/A] 3049
Sympy [N/A] 3049
Maxima [N/A] 3050
Giac [N/A] 3050
Mupad [N/A] 3051
Reduce [N/A] 3051

Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}\,dx = \text{Int}\left(\frac{a+b\log(cx^n)}{x^2(d+ex^r)},x\right)$$

output
```
Defer(Int)((a+b*ln(c*x^n))/x^2/(d+e*x^r),x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 83 vs. 2(26) = 52.

Time = 0.15 (sec) , antiderivative size = 83, normalized size of antiderivative = 3.61

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}\,dx = -\frac{bn\,{}_3F_2\left(1,-\frac{1}{r},-\frac{1}{r};1-\frac{1}{r},1-\frac{1}{r};-\frac{ex^r}{d}\right)+\text{Hypergeometric2F1}\left(1,-\frac{1}{r},\frac{-1+r}{r},-\frac{ex^r}{d}\right)(a+b\log(cx^n))}{dx}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^r)),x]
```

output
```
-((b*n*HypergeometricPFQ[{1, -r^(-1), -r^(-1)}, {1 - r^(-1), 1 - r^(-1)},
-((e*x^r)/d)] + Hypergeometric2F1[1, -r^(-1), (-1 + r)/r, -((e*x^r)/d)]*(a
 + b*Log[c*x^n]))/(d*x))
```

Rubi [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}dx$$
$$\Big\downarrow \text{2796}$$
$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}dx$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^r)),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{2}\left(d+e\,x^{r}\right)}dx$$

input
```
int((a+b*ln(c*x^n))/x^2/(d+e*x^r),x)
```

output
```
int((a+b*ln(c*x^n))/x^2/(d+e*x^r),x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{2}\left(d+ex^{r}\right)}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{(ex^{r}+d)x^{2}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(d+e*x^r),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^2*x^r + d*x^2), x)
```

Sympy [N/A]

Not integrable

Time = 4.31 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{2}\left(d+ex^{r}\right)}\,dx=\int \frac{a+b\log\left(cx^{n}\right)}{x^{2}\left(d+ex^{r}\right)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(d+e*x**r),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*(d + e*x**r)), x)
```

Maxima [N/A]

Not integrable

Time = 0.09 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(d+e*x^r),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)*x^2), x)
```

Giac [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)*x^2), x)
```

Mupad [N/A]

Not integrable

Time = 24.84 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^2\,(d+e\,x^r)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^r)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^r)), x)
```

Reduce [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.09

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}\,dx = \left(\int \frac{\log(x^n c)}{x^r e\,x^2+d\,x^2}dx\right)b+\left(\int \frac{1}{x^r e\,x^2+d\,x^2}dx\right)a$$

input
```
int((a+b*log(c*x^n))/x^2/(d+e*x^r),x)
```

output
```
int(log(x**n*c)/(x**r*e*x**2 + d*x**2),x)*b + int(1/(x**r*e*x**2 + d*x**2)
,x)*a
```

3.411 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$

Optimal result 3052
Mathematica [B] (verified) 3052
Rubi [N/A] 3053
Maple [N/A] 3054
Fricas [N/A] 3054
Sympy [N/A] 3054
Maxima [N/A] 3055
Giac [N/A] 3055
Mupad [N/A] 3056
Reduce [N/A] 3056

Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \text{Int}\left(\frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2},x\right)$$

output
```
Defer(Int)(x^3*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 140 vs. 2(26) = 52.

Time = 0.30 (sec) , antiderivative size = 140, normalized size of antiderivative = 6.09

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$$
$$= \frac{x^4\left(-bn(-4+r)\,(d+ex^r)\ {}_3F_2\left(1,\frac{4}{r},\frac{4}{r};1+\frac{4}{r},1+\frac{4}{r};-\frac{ex^r}{d}\right)+16d(a+b\log(cx^n))+4(d+ex^r)\,\text{Hypergeo}\right.}{16d^2r\,(d+ex^r)}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

output
```
(x^4*(-(b*n*(-4 + r)*(d + e*x^r)*HypergeometricPFQ[{1, 4/r, 4/r}, {1 + 4/r
, 1 + 4/r}, -((e*x^r)/d)]) + 16*d*(a + b*Log[c*x^n]) + 4*(d + e*x^r)*Hyper
geometric2F1[1, 4/r, (4 + r)/r, -((e*x^r)/d)]*(-(b*n) + a*(-4 + r) + b*(-4
 + r)*Log[c*x^n])))/(16*d^2*r*(d + e*x^r))
```

Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = $\{2796\}$

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}dx$$
$$\Big\downarrow \text{2796}$$
$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}dx$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{x^3(a+b\ln(c\,x^n))}{(d+e\,x^r)^2}dx$$

input
```
int(x^3*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

output
```
int(x^3*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.83

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex^r+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x^n) + a*x^3)/(e^2*x^(2*r) + 2*d*e*x^r + d^2), x)
```

Sympy [N/A]

Not integrable

Time = 99.09 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(d+e*x**r)**2,x)
```

output
```
Integral(x**3*(a + b*log(c*x**n))/(d + e*x**r)**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.09 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex^r+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x^r + d)^2, x)
```

Giac [N/A]

Not integrable

Time = 0.12 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex^r+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x^r + d)^2, x)
```

Mupad [N/A]

Not integrable

Time = 25.05 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^3(a + b\log{(cx^n)})}{(d + ex^r)^2}\,dx = \int \frac{x^3\,(a + b\,\ln{(c\,x^n)})}{(d + e\,x^r)^2}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^r)^2,x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^r)^2, x)
```

Reduce [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.91

$$\int \frac{x^3(a + b\log{(cx^n)})}{(d + ex^r)^2}\,dx = \left(\int \frac{x^3}{x^{2r}e^2 + 2x^r de + d^2}dx\right) a + \left(\int \frac{\log(x^n c)\,x^3}{x^{2r}e^2 + 2x^r de + d^2}dx\right) b$$

input
```
int(x^3*(a+b*log(c*x^n))/(d+e*x^r)^2,x)
```

output
```
int(x**3/(x**(2*r)*e**2 + 2*x**r*d*e + d**2),x)*a + int((log(x**n*c)*x**3)
/(x**(2*r)*e**2 + 2*x**r*d*e + d**2),x)*b
```

3.412 $\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$

Optimal result 3057
Mathematica [B] (verified) 3057
Rubi [N/A] 3058
Maple [N/A] 3059
Fricas [N/A] 3059
Sympy [N/A] 3059
Maxima [N/A] 3060
Giac [N/A] 3060
Mupad [N/A] 3061
Reduce [N/A] 3061

Optimal result

Integrand size = 21, antiderivative size = 21

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \text{Int}\left(\frac{x(a+b\log(cx^n))}{(d+ex^r)^2},x\right)$$

output
```
Defer(Int)(x*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 140 vs. 2(24) = 48.

Time = 0.30 (sec) , antiderivative size = 140, normalized size of antiderivative = 6.67

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$$
$$= \frac{x^2\left(-bn(-2+r)\left(d+ex^r\right)\,{}_3F_2\left(1,\frac{2}{r},\frac{2}{r};1+\frac{2}{r},1+\frac{2}{r};-\frac{ex^r}{d}\right)+4d(a+b\log(cx^n))+2(d+ex^r)\,\text{Hypergeor}}{4d^2r\,(d+ex^r)}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

output
```
(x^2*(-(b*n*(-2 + r)*(d + e*x^r)*HypergeometricPFQ[{1, 2/r, 2/r}, {1 + 2/r
, 1 + 2/r}, -((e*x^r)/d)]) + 4*d*(a + b*Log[c*x^n]) + 2*(d + e*x^r)*Hyperg
eometric2F1[1, 2/r, (2 + r)/r, -((e*x^r)/d)]*(-(b*n) + a*(-2 + r) + b*(-2
+ r)*Log[c*x^n])))/(4*d^2*r*(d + e*x^r))
```

Rubi [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2} dx$$
$$\Big\downarrow \text{2796}$$
$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2} dx$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{x(a+b\ln{(c\,x^{n})})}{(d+e\,x^{r})^{2}}dx$$

input
```
int(x*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

output
```
int(x*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.81

$$\int \frac{x(a+b\log{(cx^{n})})}{(d+ex^{r})^{2}}\,dx=\int \frac{(b\log{(cx^{n})}+a)x}{(ex^{r}+d)^{2}}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
integral((b*x*log(c*x^n) + a*x)/(e^2*x^(2*r) + 2*d*e*x^r + d^2), x)
```

Sympy [N/A]

Not integrable

Time = 13.58 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int \frac{x(a+b\log{(cx^{n})})}{(d+ex^{r})^{2}}\,dx=\int \frac{x(a+b\log{(cx^{n})})}{(d+ex^{r})^{2}}\,dx$$

input
```
integrate(x*(a+b*ln(c*x**n))/(d+e*x**r)**2,x)
```

output
```
Integral(x*(a + b*log(c*x**n))/(d + e*x**r)**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)x}{(ex^r+d)^2}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x^r + d)^2, x)
```

Giac [N/A]

Not integrable

Time = 0.13 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)x}{(ex^r+d)^2}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x^r + d)^2, x)
```

Mupad [N/A]

Not integrable

Time = 25.02 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{(d+e\,x^r)^2}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x^r)^2,x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x^r)^2, x)
```

Reduce [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 63, normalized size of antiderivative = 3.00

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \left(\int \frac{\log(x^n c)\,x}{x^{2r}e^2+2x^r de+d^2}dx\right)b + \left(\int \frac{x}{x^{2r}e^2+2x^r de+d^2}dx\right)a$$

input
```
int(x*(a+b*log(c*x^n))/(d+e*x^r)^2,x)
```

output
```
int((log(x**n*c)*x)/(x**(2*r)*e**2 + 2*x**r*d*e + d**2),x)*b + int(x/(x**(
2*r)*e**2 + 2*x**r*d*e + d**2),x)*a
```

3.413 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx$

Optimal result 3062
Mathematica [A] (warning: unable to verify) 3062
Rubi [A] (verified) 3063
Maple [C] (warning: unable to verify) 3065
Fricas [B] (verification not implemented) 3065
Sympy [A] (verification not implemented) 3066
Maxima [F] 3067
Giac [F] 3067
Mupad [F(-1)] 3067
Reduce [F] 3068

Optimal result

Integrand size = 23, antiderivative size = 102

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx = -\frac{ex^r(a+b\log(cx^n))}{d^2r(d+ex^r)} - \frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r} + \frac{bn\log(d+ex^r)}{d^2r^2} + \frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^2r^2}$$

output
```
-e*x^r*(a+b*ln(c*x^n))/d^2/r/(d+e*x^r)-(a+b*ln(c*x^n))*ln(1+d/e/(x^r))/d^2
/r+b*n*ln(d+e*x^r)/d^2/r^2+b*n*polylog(2,-d/e/(x^r))/d^2/r^2
```

Mathematica [A] (warning: unable to verify)

Time = 0.39 (sec) , antiderivative size = 132, normalized size of antiderivative = 1.29

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx = \frac{\frac{dr(a+b\log(cx^n))}{d+ex^r} + bn\log(d-dx^r) - ar\log(d-dx^r) + br(n\log(x)-\log(cx^n))\log(d-dx^r) + bn\bigl(\frac{1}{2}r^2\log}{d^2r^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^2),x]
```

output
```
((d*r*(a + b*Log[c*x^n]))/(d + e*x^r) + b*n*Log[d - d*x^r] - a*r*Log[d - d
*x^r] + b*r*(n*Log[x] - Log[c*x^n])*Log[d - d*x^r] + b*n*((r^2*Log[x]^2)/2
 + (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^
r)/d]))/(d^2*r^2)
```

Rubi [A] (verified)

Time = 0.60 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.14, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {2791, 2773, 792, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}dx$$

$$\Big\downarrow \text{2791}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\int \frac{x^{r-1}(a+b\log(cx^n))}{(ex^r+d)^2}dx}{d}$$

$$\Big\downarrow \text{2773}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\int \frac{x^{r-1}}{ex^r+d}dx}{dr}\right)}{d}$$

$$\Big\downarrow \text{792}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)^2),x]
```

output
```
-((e*((x^r*(a + b*Log[c*x^n]))/(d*r*(d + e*x^r)) - (b*n*Log[d + e*x^r])/(d
*e*r^2)))/d) + (-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^r)])/(d*r)) + (b*n*Po
lyLog[2, -(d/(e*x^r))])/(d*r^2))/d
```

Defintions of rubi rules used

rule 792
```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2791
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x
^n])^p/x), x], x] - Simp[e/d   Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n
])^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1
]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.37 (sec) , antiderivative size = 342, normalized size of antiderivative = 3.35

method	result
risch	$\frac{b\ln(d+e\,x^r)n\ln(x)}{r\,d^2}-\frac{b\ln(d+e\,x^r)\ln(x^n)}{r\,d^2}-\frac{bn\ln(x)}{rd(d+e\,x^r)}+\frac{b\ln(x^n)}{rd(d+e\,x^r)}-\frac{b\ln(x^r)n\ln(x)}{r\,d^2}+\frac{b\ln(x^r)\ln(x^n)}{r\,d^2}+\frac{bn\ln(d+e\,x^r)}{d^2r^2}$

input
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^2,x,method=_RETURNVERBOSE)
```

output
```
b/r/d^2*ln(d+e*x^r)*n*ln(x)-b/r/d^2*ln(d+e*x^r)*ln(x^n)-b/r/d/(d+e*x^r)*n*
ln(x)+b/r/d/(d+e*x^r)*ln(x^n)-b/r/d^2*ln(x^r)*n*ln(x)+b/r/d^2*ln(x^r)*ln(x
^n)+b*n*ln(d+e*x^r)/d^2/r^2-b/r*n*e/d^2*ln(x)*x^r/(d+e*x^r)-b/r^2*n/d^2*di
log((d+e*x^r)/d)-b/r*n/d^2*ln(x)*ln((d+e*x^r)/d)+1/2*b*n/d^2*ln(x)^2+(1/2*
I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*cs
gn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*
ln(c)+a)/r*(-1/d^2*ln(d+e*x^r)+1/d/(d+e*x^r)+1/d^2*ln(x^r))
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 214 vs. $2(101) = 202$.

Time = 0.08 (sec) , antiderivative size = 214, normalized size of antiderivative = 2.10

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx$$
$$=\frac{bdnr^2\log(x)^2+2\,bdr\log(c)+2\,adr+\left(benr^2\log(x)^2+2\left(ber^2\log(c)-benr+aer^2\right)\log(x)\right)x^r-2\,(be$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
1/2*(b*d*n*r^2*log(x)^2 + 2*b*d*r*log(c) + 2*a*d*r + (b*e*n*r^2*log(x)^2 +
 2*(b*e*r^2*log(c) - b*e*n*r + a*e*r^2)*log(x))*x^r - 2*(b*e*n*x^r + b*d*n
)*dilog(-(e*x^r + d)/d + 1) - 2*(b*d*r*log(c) - b*d*n + a*d*r + (b*e*r*log
(c) - b*e*n + a*e*r)*x^r)*log(e*x^r + d) + 2*(b*d*r^2*log(c) + a*d*r^2)*lo
g(x) - 2*(b*e*n*r*x^r*log(x) + b*d*n*r*log(x))*log((e*x^r + d)/d))/(d^2*e*
r^2*x^r + d^3*r^2)
```

Sympy [A] (verification not implemented)

Time = 143.96 (sec) , antiderivative size = 360, normalized size of antiderivative = 3.53

$$\int \frac{a + b\log(cx^n)}{x(d + ex^r)^2} \, dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**2,x)
```

output
```
-a*e*Piecewise((x**r/d**2, Eq(e, 0)), (-1/(d*e + e**2*x**r), True))/(d*r)
- a*e*Piecewise((x**r/d, Eq(e, 0)), (log(d + e*x**r)/e, True))/(d**2*r) +
a*log(x**r)/(d**2*r) + b*e*n*Piecewise((Piecewise((x**r/r, Ne(r, 0)), (log
(x), True))/d**2, Eq(e, 0)), (-Piecewise((log(x)/e**2, Eq(d, 0) & Eq(r, 0)
), (-1/(e**2*r*x**r), Eq(d, 0)), (log(x)/(d*e + e**2), Eq(r, 0)), (log(x)/
(d*e) - log(d/e + x**r)/(d*e*r), True)), True))/(d*r) - b*e*Piecewise((x**
r/d**2, Eq(e, 0)), (-1/(d*e + e**2*x**r), True))*log(c*x**n)/(d*r) + b*e*n
*Piecewise((Piecewise((x**r/r, Ne(r, 0)), (log(x), True))/d, Eq(e, 0)), (P
iecewise((-polylog(2, e*x**r*exp_polar(I*pi)/d)/r, (Abs(x) < 1) & (1/Abs(x
) < 1)), (log(d)*log(x) - polylog(2, e*x**r*exp_polar(I*pi)/d)/r, Abs(x) <
 1), (-log(d)*log(1/x) - polylog(2, e*x**r*exp_polar(I*pi)/d)/r, 1/Abs(x)
< 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), (
)), ((), (0, 0)), x)*log(d) - polylog(2, e*x**r*exp_polar(I*pi)/d)/r, True
))/e, True))/(d**2*r) - b*e*Piecewise((x**r/d, Eq(e, 0)), (log(d + e*x**r)
/e, True))*log(c*x**n)/(d**2*r) + b*n*Piecewise((0, Eq(r, 0)), (-log(x**r)
**2/(2*r), True))/(d**2*r) + b*log(x**r)*log(c*x**n)/(d**2*r)
```

Maxima [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^2}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^r+d\right)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
a*(1/(d*e*r*x^r + d^2*r) + log(x)/d^2 - log((e*x^r + d)/e)/(d^2*r)) + b*in
tegrate((log(c) + log(x^n))/(e^2*x*x^(2*r) + 2*d*e*x*x^r + d^2*x), x)
```

Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^2}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^r+d\right)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^2*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^2}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(d+e\,x^r\right)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^2), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx$$
$$= \frac{x^r\left(\int \frac{\log(x^n c)}{x^{2r}e^2x+2x^r dex+d^2x}dx\right) b\,d^2er - x^r\log(x^r e+d)\,ae + x^r\log(x)\,aer - x^r ae + \left(\int \frac{\log(x^n c)}{x^{2r}e^2x+2x^r dex+d^2x}dx\right) b}{d^2r\,(x^r e+d)}$$

input
```
int((a+b*log(c*x^n))/x/(d+e*x^r)^2,x)
```

output
```
(x**r*int(log(x**n*c)/(x**(2*r)*e**2*x + 2*x**r*d*e*x + d**2*x),x)*b*d**2*
e*r - x**r*log(x**r*e + d)*a*e + x**r*log(x)*a*e*r - x**r*a*e + int(log(x*
*n*c)/(x**(2*r)*e**2*x + 2*x**r*d*e*x + d**2*x),x)*b*d**3*r - log(x**r*e +
 d)*a*d + log(x)*a*d*r)/(d**2*r*(x**r*e + d))
```

3.414 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}\,dx$

Optimal result 3069
Mathematica [B] (verified) 3069
Rubi [N/A] 3070
Maple [N/A] 3071
Fricas [N/A] 3071
Sympy [F(-1)] 3071
Maxima [N/A] 3072
Giac [N/A] 3072
Mupad [N/A] 3072
Reduce [N/A] 3073

Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}\,dx = \text{Int}\left(\frac{a+b\log(cx^n)}{x^3(d+ex^r)^2},x\right)$$

output
```
Defer(Int)((a+b*ln(c*x^n))/x^3/(d+e*x^r)^2,x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 139 vs. 2(26) = 52.

Time = 0.30 (sec) , antiderivative size = 139, normalized size of antiderivative = 6.04

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}\,dx = -\frac{bn(2+r)(d+ex^r)\,{}_3F_2\left(1,-\frac{2}{r},-\frac{2}{r};1-\frac{2}{r},1-\frac{2}{r};-\frac{ex^r}{d}\right)-4d(a+b\log(cx^n))+2(d+ex^r)\,\text{Hypergeom}}{4d^2rx^2(d+ex^r)}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^r)^2),x]
```

output
```
-1/4*(b*n*(2 + r)*(d + e*x^r)*HypergeometricPFQ[{1, -2/r, -2/r}, {1 - 2/r,
 1 - 2/r}, -((e*x^r)/d)] - 4*d*(a + b*Log[c*x^n]) + 2*(d + e*x^r)*Hypergeo
metric2F1[1, -2/r, (-2 + r)/r, -((e*x^r)/d)]*(-(b*n) + a*(2 + r) + b*(2 +
r)*Log[c*x^n]))/(d^2*r*x^2*(d + e*x^r))
```

Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}\,dx$$

$$\Big\downarrow \text{2796}$$

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}dx$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^r)^2),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{3}\left(d+e\,x^{r}\right)^{2}}dx$$

input
```
int((a+b*ln(c*x^n))/x^3/(d+e*x^r)^2,x)
```

output
```
int((a+b*ln(c*x^n))/x^3/(d+e*x^r)^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.96

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{3}\left(d+ex^{r}\right)^{2}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\left(ex^{r}+d\right)^{2}x^{3}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^3*x^(2*r) + 2*d*e*x^3*x^r + d^2*x^3), x
)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{3}\left(d+ex^{r}\right)^{2}}\,dx=\text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(d+e*x**r)**2,x)
```

output
```
Timed out
```

Maxima [N/A]

Not integrable

Time = 0.09 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a + b \log(cx^n)}{x^3 (d + ex^r)^2} \, dx = \int \frac{b \log(cx^n) + a}{(ex^r + d)^2 x^3} \, dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^2*x^3), x)
```

Giac [N/A]

Not integrable

Time = 0.12 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a + b \log(cx^n)}{x^3 (d + ex^r)^2} \, dx = \int \frac{b \log(cx^n) + a}{(ex^r + d)^2 x^3} \, dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^2*x^3), x)
```

Mupad [N/A]

Not integrable

Time = 24.91 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a + b \log(cx^n)}{x^3 (d + ex^r)^2} \, dx = \int \frac{a + b \ln(c\, x^n)}{x^3 \left(d + e\, x^r\right)^2} \, dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^r)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^r)^2), x)
```

Reduce [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 80, normalized size of antiderivative = 3.48

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}\,dx = \left(\int \frac{\log(x^n c)}{x^{2r}e^2x^3+2x^r de\,x^3+d^2x^3}dx\right)b + \left(\int \frac{1}{x^{2r}e^2x^3+2x^r de\,x^3+d^2x^3}dx\right)a$$

input
```
int((a+b*log(c*x^n))/x^3/(d+e*x^r)^2,x)
```

output
```
int(log(x**n*c)/(x**(2*r)*e**2*x**3 + 2*x**r*d*e*x**3 + d**2*x**3),x)*b +
int(1/(x**(2*r)*e**2*x**3 + 2*x**r*d*e*x**3 + d**2*x**3),x)*a
```

3.415 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$

Optimal result . . . 3074
Mathematica [B] (verified) . . . 3074
Rubi [N/A] . . . 3075
Maple [N/A] . . . 3076
Fricas [N/A] . . . 3076
Sympy [N/A] . . . 3076
Maxima [N/A] . . . 3077
Giac [N/A] . . . 3077
Mupad [N/A] . . . 3078
Reduce [N/A] . . . 3078

Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \text{Int}\left(\frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2},x\right)$$

output
```
Defer(Int)(x^2*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 140 vs. 2(26) = 52.

Time = 0.30 (sec) , antiderivative size = 140, normalized size of antiderivative = 6.09

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \frac{x^3\left(-bn(-3+r)(d+ex^r)\,{}_3F_2\left(1,\frac{3}{r},\frac{3}{r};1+\frac{3}{r},1+\frac{3}{r};-\frac{ex^r}{d}\right)+9d(a+b\log(cx^n))+3(d+ex^r)\,\text{Hypergeor}\right.}{9d^2r(d+ex^r)}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

output
```
(x^3*(-(b*n*(-3 + r)*(d + e*x^r)*HypergeometricPFQ[{1, 3/r, 3/r}, {1 + 3/r
, 1 + 3/r}, -((e*x^r)/d)]) + 9*d*(a + b*Log[c*x^n]) + 3*(d + e*x^r)*Hyperg
eometric2F1[1, 3/r, (3 + r)/r, -((e*x^r)/d)]*(-(b*n) + a*(-3 + r) + b*(-3
+ r)*Log[c*x^n])))/(9*d^2*r*(d + e*x^r))
```

Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$$
$$\Big\downarrow \text{ 2796}$$
$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}dx$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{x^2(a+b\ln(c\,x^n))}{(d+e\,x^r)^2}dx$$

input
```
int(x^2*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

output
```
int(x^2*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.83

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex^r+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x^n) + a*x^2)/(e^2*x^(2*r) + 2*d*e*x^r + d^2), x)
```

Sympy [N/A]

Not integrable

Time = 35.83 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(d+e*x**r)**2,x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))/(d + e*x**r)**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.09 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex^r+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x^r + d)^2, x)
```

Giac [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex^r+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x^r + d)^2, x)
```

Mupad [N/A]

Not integrable

Time = 25.56 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{(d+e\,x^r)^2}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^r)^2,x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^r)^2, x)
```

Reduce [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.91

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \left(\int \frac{x^2}{x^{2r}e^2+2x^rde+d^2}dx\right)a+\left(\int \frac{\log(x^nc)\,x^2}{x^{2r}e^2+2x^rde+d^2}dx\right)b$$

input
```
int(x^2*(a+b*log(c*x^n))/(d+e*x^r)^2,x)
```

output
```
int(x**2/(x**(2*r)*e**2 + 2*x**r*d*e + d**2),x)*a + int((log(x**n*c)*x**2)
/(x**(2*r)*e**2 + 2*x**r*d*e + d**2),x)*b
```

3.416 $\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\,dx$

Optimal result 3079
Mathematica [B] (verified) 3079
Rubi [N/A] 3080
Maple [N/A] 3081
Fricas [N/A] 3081
Sympy [N/A] 3082
Maxima [N/A] 3082
Giac [N/A] 3082
Mupad [N/A] 3083
Reduce [N/A] 3083

Optimal result

Integrand size = 20, antiderivative size = 20

$$\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\,dx = \text{Int}\left(\frac{a+b\log(cx^n)}{(d+ex^r)^2},x\right)$$

output
```
Defer(Int)((a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 161 vs. 2(23) = 46.

Time = 2.98 (sec) , antiderivative size = 161, normalized size of antiderivative = 8.05

$$\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\,dx = \frac{x\left(adr\,\text{Hypergeometric2F1}\left(2,\frac{1}{r},1+\frac{1}{r},-\frac{ex^r}{d}\right)+aerx^r\,\text{Hypergeometric2F1}\left(2,\frac{1}{r},1+\frac{1}{r},-\frac{ex^r}{d}\right)-bn(-1\right.}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x^r)^2,x]
```

output
```
(x*(a*d*r*Hypergeometric2F1[2, r^(-1), 1 + r^(-1), -((e*x^r)/d)] + a*e*r*x
^r*Hypergeometric2F1[2, r^(-1), 1 + r^(-1), -((e*x^r)/d)] - b*n*(-1 + r)*(
d + e*x^r)*HypergeometricPFQ[{1, r^(-1), r^(-1)}, {1 + r^(-1), 1 + r^(-1)}
, -((e*x^r)/d)] + b*d*Log[c*x^n] - b*(d + e*x^r)*Hypergeometric2F1[1, r^(-
1), 1 + r^(-1), -((e*x^r)/d)]*(n - (-1 + r)*Log[c*x^n])))/(d^2*r*(d + e*x^
r))
```

Rubi [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2768}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\,dx$$

$$\Big\downarrow \text{2768}$$

$$\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}dx$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x^r)^2,x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2768
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> Unintegrable[(d + e*x^r)^q*(a + b*Log[c*x^n])^p, x] /; F
reeQ[{a, b, c, d, e, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{\left(d+e\,x^{r}\right)^{2}}dx$$

input
```
int((a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

output
```
int((a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.75

$$\int \frac{a+b\log\left(cx^{n}\right)}{\left(d+ex^{r}\right)^{2}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\left(ex^{r}+d\right)^{2}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^(2*r) + 2*d*e*x^r + d^2), x)
```

Sympy [N/A]

Not integrable

Time = 11.75 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\,dx=\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(d+e*x**r)**2,x)
```

output
```
Integral((a + b*log(c*x**n))/(d + e*x**r)**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.09 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\,dx=\int \frac{b\log(cx^n)+a}{(ex^r+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^r + d)^2, x)
```

Giac [N/A]

Not integrable

Time = 0.13 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\,dx=\int \frac{b\log(cx^n)+a}{(ex^r+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^r + d)^2, x)
```

Mupad [N/A]

Not integrable

Time = 25.54 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{(d+e\,x^r)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x^r)^2,x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x^r)^2, x)
```

Reduce [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 60, normalized size of antiderivative = 3.00

$$\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\,dx=\left(\int \frac{\log(x^n c)}{x^{2r}e^2+2x^r de+d^2}dx\right)b+\left(\int \frac{1}{x^{2r}e^2+2x^r de+d^2}dx\right)a$$

input
```
int((a+b*log(c*x^n))/(d+e*x^r)^2,x)
```

output
```
int(log(x**n*c)/(x**(2*r)*e**2 + 2*x**r*d*e + d**2),x)*b + int(1/(x**(2*r)
*e**2 + 2*x**r*d*e + d**2),x)*a
```

3.417 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)^2}\,dx$

Optimal result 3084
Mathematica [B] (verified) 3084
Rubi [N/A] 3085
Maple [N/A] 3086
Fricas [N/A] 3086
Sympy [N/A] 3086
Maxima [N/A] 3087
Giac [N/A] 3087
Mupad [N/A] 3088
Reduce [N/A] 3088

Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)^2}\,dx = \text{Int}\left(\frac{a+b\log(cx^n)}{x^2(d+ex^r)^2},x\right)$$

output
```
Defer(Int)((a+b*ln(c*x^n))/x^2/(d+e*x^r)^2,x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 135 vs. 2(26) = 52.

Time = 0.27 (sec) , antiderivative size = 135, normalized size of antiderivative = 5.87

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)^2}\,dx = \frac{-bn(1+r)(d+ex^r)\,{}_3F_2\left(1,-\frac{1}{r},-\frac{1}{r};1-\frac{1}{r},1-\frac{1}{r};-\frac{ex^r}{d}\right)+d(a+b\log(cx^n))-(d+ex^r)\,\text{Hypergeometr}}{d^2rx(d+ex^r)}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^r)^2),x]
```

output
```
(-(b*n*(1 + r)*(d + e*x^r)*HypergeometricPFQ[{1, -r^(-1), -r^(-1)}, {1 - r
^(-1), 1 - r^(-1)}, -((e*x^r)/d)]) + d*(a + b*Log[c*x^n]) - (d + e*x^r)*Hy
pergeometric2F1[1, -r^(-1), (-1 + r)/r, -((e*x^r)/d)]*(a - b*n + a*r + b*(
1 + r)*Log[c*x^n]))/(d^2*r*x*(d + e*x^r))
```

Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)^2}dx$$
$$\Big\downarrow \text{2796}$$
$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)^2}dx$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^r)^2),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{2}\left(d+e\,x^{r}\right)^{2}}dx$$

input
```
int((a+b*ln(c*x^n))/x^2/(d+e*x^r)^2,x)
```

output
```
int((a+b*ln(c*x^n))/x^2/(d+e*x^r)^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.96

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{2}\left(d+ex^{r}\right)^{2}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\left(ex^{r}+d\right)^{2}x^{2}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^2*x^(2*r) + 2*d*e*x^2*x^r + d^2*x^2), x
)
```

Sympy [N/A]

Not integrable

Time = 86.22 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{2}\left(d+ex^{r}\right)^{2}}\,dx=\int \frac{a+b\log\left(cx^{n}\right)}{x^{2}\left(d+ex^{r}\right)^{2}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(d+e*x**r)**2,x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*(d + e*x**r)**2), x)
```

Maxima [N/A]

Not integrable

Time = 0.09 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^r\right)^2}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^r+d\right)^2x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^2*x^2), x)
```

Giac [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^r\right)^2}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^r+d\right)^2x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^2*x^2), x)
```

Mupad [N/A]

Not integrable

Time = 25.50 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log (cx^n)}{x^2 (d+ex^r)^2} dx = \int \frac{a+b\,\ln (c\,x^n)}{x^2\,(d+e\,x^r)^2} dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^r)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^r)^2), x)
```

Reduce [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 80, normalized size of antiderivative = 3.48

$$\int \frac{a+b\log (cx^n)}{x^2 (d+ex^r)^2} dx = \left(\int \frac{\log(x^n c)}{x^{2r}e^2x^2+2x^r de\,x^2+d^2x^2}dx\right) b + \left(\int \frac{1}{x^{2r}e^2x^2+2x^r de\,x^2+d^2x^2}dx\right) a$$

input
```
int((a+b*log(c*x^n))/x^2/(d+e*x^r)^2,x)
```

output
```
int(log(x**n*c)/(x**(2*r)*e**2*x**2 + 2*x**r*d*e*x**2 + d**2*x**2),x)*b +
int(1/(x**(2*r)*e**2*x**2 + 2*x**r*d*e*x**2 + d**2*x**2),x)*a
```

3.418 $\int \frac{a+b\log(cx^n)}{x(c-x^{-n})}\,dx$

Optimal result . . . 3089
Mathematica [A] (verified) . . . 3089
Rubi [A] (verified) . . . 3090
Maple [A] (verified) . . . 3091
Fricas [A] (verification not implemented) . . . 3092
Sympy [F(-2)] . . . 3092
Maxima [F] . . . 3093
Giac [F] . . . 3093
Mupad [F(-1)] . . . 3093
Reduce [F] . . . 3094

Optimal result

Integrand size = 25, antiderivative size = 37

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(c-x^{-n}\right)}\,dx=\frac{a\log\left(1-cx^n\right)}{cn}-\frac{b\,\text{PolyLog}\left(2,1-cx^n\right)}{cn}$$

output
```
a*ln(1-c*x^n)/c/n-b*polylog(2,1-c*x^n)/c/n
```

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.00

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(c-x^{-n}\right)}\,dx=\frac{\left(a+b\log\left(cx^n\right)\right)\log\left(1-cx^n\right)+b\,\text{PolyLog}\left(2,cx^n\right)}{cn}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(c - x^(-n))),x]
```

output
```
((a + b*Log[c*x^n])*Log[1 - c*x^n] + b*PolyLog[2, c*x^n])/(c*n)
```

Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 35, normalized size of antiderivative = 0.95, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {2005, 2774, 25, 2753, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(c-x^{-n})}dx$$

$$\Big\downarrow \text{ 2005}$$

$$\int \frac{x^{n-1}(a+b\log(cx^n))}{cx^n-1}dx$$

$$\Big\downarrow \text{ 2774}$$

$$\frac{\int -\frac{a+b\log(cx^n)}{1-cx^n}dx^n}{n}$$

$$\Big\downarrow \text{ 25}$$

$$-\frac{\int \frac{a+b\log(cx^n)}{1-cx^n}dx^n}{n}$$

$$\Big\downarrow \text{ 2753}$$

$$\frac{\frac{a\log(1-cx^n)}{c}-b\int \frac{\log(cx^n)}{1-cx^n}dx^n}{n}$$

$$\Big\downarrow \text{ 2752}$$

$$\frac{\frac{a\log(1-cx^n)}{c}-\frac{b\,\text{PolyLog}(2,1-cx^n)}{c}}{n}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(c - x^(-n))),x]
```

output
```
((a*Log[1 - c*x^n])/c - (b*PolyLog[2, 1 - c*x^n])/c)/n
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2753
```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[
(a + b*Log[(-c)*(d/e)])*(Log[d + e*x]/e), x] + Simp[b   Int[Log[(-e)*(x/d)]
/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e}, x] && GtQ[(-c)*(d/e), 0]
```

rule 2774
```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m/n   Subst[Int[(d + e*x)^q*(a +
 b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
 && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

Maple [A] (verified)

Time = 0.58 (sec) , antiderivative size = 33, normalized size of antiderivative = 0.89

method	result
default	$\frac{a\ln\left(c\,x^{n}-1\right)}{nc}-\frac{b\,\mathrm{dilog}\left(c\,x^{n}\right)}{cn}$
parts	$\frac{a\left(-\frac{\ln\left(x^{-n}\right)}{c}+\frac{\ln\left(-c+x^{-n}\right)}{c}\right)}{n}-\frac{b\,\mathrm{dilog}\left(c\,x^{n}\right)}{cn}$
risch	$\frac{b\ln\left(1-c\,x^{n}\right)\ln\left(x^{n}\right)}{nc}-\frac{b\ln\left(1-c\,x^{n}\right)\ln\left(c\,x^{n}\right)}{nc}-\frac{b\,\mathrm{dilog}\left(c\,x^{n}\right)}{cn}+\frac{\left(\frac{ib\pi\ \mathrm{csgn}\left(ix^{n}\right)\mathrm{csgn}\left(ic\,x^{n}\right)^{2}}{2}-\frac{ib\pi\ \mathrm{csgn}\left(ix^{n}\right)\mathrm{csgn}\left(ic\,x^{n}\right)\mathrm{csgn}\left(ic\right)}{2}-\cdots\right.}{n\cdots}$

input
```
int((a+b*ln(c*x^n))/x/(c-x^(-n)),x,method=_RETURNVERBOSE)
```

output
```
a/n*ln(c*x^n-1)/c-b/c/n*dilog(c*x^n)
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.22

$$\int \frac{a+b\log(cx^n)}{x(c-x^{-n})}\,dx = \frac{bn\log(-cx^n+1)\log(x)+b\mathrm{Li}_2(cx^n)+(b\log(c)+a)\log(cx^n-1)}{cn}$$

input
```
integrate((a+b*log(c*x^n))/x/(c-x^(-n)),x, algorithm="fricas")
```

output
```
(b*n*log(-c*x^n + 1)*log(x) + b*dilog(c*x^n) + (b*log(c) + a)*log(c*x^n -
1))/(c*n)
```

Sympy [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x(c-x^{-n})}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*ln(c*x**n))/x/(c-x**(-n)),x)
```

output
```
Exception raised: TypeError >> Invalid comparison of non-real zoo
```

Maxima [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(c-x^{-n}\right)}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(c-\frac{1}{x^n}\right)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(c-x^(-n)),x, algorithm="maxima")
```

output
```
b*integrate((x^n*log(c) + x^n*log(x^n))/(c*x*x^n - x), x) + a*log((c*x^n -
 1)/c)/(c*n)
```

Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(c-x^{-n}\right)}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(c-\frac{1}{x^n}\right)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(c-x^(-n)),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((c - 1/x^n)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(c-x^{-n}\right)}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(c-\frac{1}{x^n}\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(c - 1/x^n)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(c - 1/x^n)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x(c-x^{-n})}\,dx = \frac{2\left(\int \frac{\log(x^n c)}{x^n cx-x}dx\right)bn+2\log(x^n c-1)\,a+\log(x^n c)^2\,b}{2cn}$$

input
```
int((a+b*log(c*x^n))/x/(c-x^(-n)),x)
```

output
```
(2*int(log(x**n*c)/(x**n*c*x - x),x)*b*n + 2*log(x**n*c - 1)*a + log(x**n*
c)**2*b)/(2*c*n)
```

3.419 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x}\,dx$

Optimal result . . . 3095
Mathematica [A] (verified) . . . 3095
Rubi [A] (verified) . . . 3096
Maple [A] (warning: unable to verify) . . . 3098
Fricas [A] (verification not implemented) . . . 3098
Sympy [A] (verification not implemented) . . . 3099
Maxima [A] (verification not implemented) . . . 3100
Giac [F] . . . 3100
Mupad [F(-1)] . . . 3101
Reduce [B] (verification not implemented) . . . 3101

Optimal result

Integrand size = 23, antiderivative size = 152

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x}\,dx = -\frac{3bd^2enx^r}{r^2}-\frac{3bde^2nx^{2r}}{4r^2}-\frac{be^3nx^{3r}}{9r^2}-\frac{1}{2}bd^3n\log^2(x)+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}+d^3\log(x)\,(a+b\log(cx^n))$$

output

```
-3*b*d^2*e*n*x^r/r^2-3/4*b*d*e^2*n*x^(2*r)/r^2-1/9*b*e^3*n*x^(3*r)/r^2-1/2
*b*d^3*n*ln(x)^2+3*d^2*e*x^r*(a+b*ln(c*x^n))/r+3/2*d*e^2*x^(2*r)*(a+b*ln(c
*x^n))/r+1/3*e^3*x^(3*r)*(a+b*ln(c*x^n))/r+d^3*ln(x)*(a+b*ln(c*x^n))
```

Mathematica [A] (verified)

Time = 0.32 (sec) , antiderivative size = 132, normalized size of antiderivative = 0.87

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x}\,dx = ad^3\log(x)+\frac{1}{36}\left(\frac{ex^r(6ar(18d^2+9dex^r+2e^2x^{2r})-bn(108d^2+27dex^r+4e^2x^{2r}))}{r^2}+\frac{6bex^r(18d^2+9dex^r+2e^2x^{2r})\log(cx^n)}{r}+\frac{18bd^3\log^2(cx^n)}{n}\right)$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x,x]
```

output
```
a*d^3*Log[x] + ((e*x^r*(6*a*r*(18*d^2 + 9*d*e*x^r + 2*e^2*x^(2*r)) - b*n*(
108*d^2 + 27*d*e*x^r + 4*e^2*x^(2*r))))/r^2 + (6*b*e*x^r*(18*d^2 + 9*d*e*x
^r + 2*e^2*x^(2*r))*Log[c*x^n])/r + (18*b*d^3*Log[c*x^n]^2)/n)/36
```

Rubi [A] (verified)

Time = 0.45 (sec) , antiderivative size = 153, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x} dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \frac{e\left(9dex^r+2e^2x^{2r}+18d^2\right)x^r+6d^3r\log(x)}{6rx}dx+d^3\log(x)(a+b\log(cx^n))+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}$$

$$\Big\downarrow \text{27}$$

$$-\frac{bn\int \frac{e\left(9dex^r+2e^2x^{2r}+18d^2\right)x^r+6d^3r\log(x)}{x}dx}{6r}+d^3\log(x)(a+b\log(cx^n))+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}$$

$$\Big\downarrow \text{2010}$$

$$-\frac{bn\int \left(18d^2ex^{r-1}+9de^2x^{2r-1}+2e^3x^{3r-1}+\frac{6d^3r\log(x)}{x}\right)dx}{6r}+d^3\log(x)(a+b\log(cx^n))+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}$$

$$\Big\downarrow \text{2009}$$

$$d^3\log(x)\left(a+b\log\left(cx^n\right)\right)+\frac{3d^2ex^r\left(a+b\log\left(cx^n\right)\right)}{r}+\frac{3de^2x^{2r}\left(a+b\log\left(cx^n\right)\right)}{2r}+\frac{e^3x^{3r}\left(a+b\log\left(cx^n\right)\right)}{3r}-\frac{bn\left(3d^3r\log^2(x)+\frac{18d^2ex^r}{r}+\frac{9de^2x^{2r}}{2r}+\frac{2e^3x^{3r}}{3r}\right)}{6r}$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x,x]
```

output
```
-1/6*(b*n*((18*d^2*e*x^r)/r + (9*d*e^2*x^(2*r))/(2*r) + (2*e^3*x^(3*r))/(3
*r) + 3*d^3*r*Log[x]^2))/r + (3*d^2*e*x^r*(a + b*Log[c*x^n]))/r + (3*d*e^2
*x^(2*r)*(a + b*Log[c*x^n]))/(2*r) + (e^3*x^(3*r)*(a + b*Log[c*x^n]))/(3*r
) + d^3*Log[x]*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (warning: unable to verify)

Time = 3.00 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.16

method	result
parallelrisch	$\frac{12x^{3r}\ln(c\,x^n)b\,e^3nr+12x^{3r}a\,e^3nr-4x^{3r}b\,e^3n^2+54x^{2r}\ln(c\,x^n)bd\,e^2nr+36\ln(x)a\,d^3n\,r^2+54x^{2r}ad\,e^2nr-27x^{2r}bd\,e^2n^2+108}{36n\,r^2}$
risch	$\frac{3a\,d^2e\,x^r}{r}+\ln(x)\ln(c)\,b\,d^3-\frac{3i\pi bd\,e^2\,\mathrm{csgn}(ic\,x^n)^3x^{2r}}{4r}-\frac{i\pi b\,e^3\,\mathrm{csgn}(ic\,x^n)^3x^{3r}}{6r}+\frac{i\ln(x)\pi b\,d^3\,\mathrm{csgn}(ic\,x^n)^2\,\mathrm{csgr}}{2}$

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/36*(12*(x^r)^3*ln(c*x^n)*b*e^3*n*r+12*(x^r)^3*a*e^3*n*r-4*(x^r)^3*b*e^3*
n^2+54*(x^r)^2*ln(c*x^n)*b*d*e^2*n*r+36*ln(x)*a*d^3*n*r^2+54*(x^r)^2*a*d*e
^2*n*r-27*(x^r)^2*b*d*e^2*n^2+108*x^r*ln(c*x^n)*b*d^2*e*n*r+18*b*d^3*ln(c*
x^n)^2*r^2+108*x^r*a*d^2*e*n*r-108*x^r*b*d^2*e*n^2)/n/r^2
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 169, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x}\,dx$$
$$= \frac{18\,bd^3nr^2\log(x)^2+4\,(3\,be^3nr\log(x)+3\,be^3r\log(c)-be^3n+3\,ae^3r)x^{3\,r}+27\,(2\,bde^2nr\log(x)+2\,bde^2}{}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/36*(18*b*d^3*n*r^2*log(x)^2 + 4*(3*b*e^3*n*r*log(x) + 3*b*e^3*r*log(c) -
 b*e^3*n + 3*a*e^3*r)*x^(3*r) + 27*(2*b*d*e^2*n*r*log(x) + 2*b*d*e^2*r*log
(c) - b*d*e^2*n + 2*a*d*e^2*r)*x^(2*r) + 108*(b*d^2*e*n*r*log(x) + b*d^2*e
*r*log(c) - b*d^2*e*n + a*d^2*e*r)*x^r + 36*(b*d^3*r^2*log(c) + a*d^3*r^2)
*log(x))/r^2
```

Sympy [A] (verification not implemented)

Time = 2.60 (sec) , antiderivative size = 299, normalized size of antiderivative = 1.97

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x}\,dx$$
$$= \begin{cases} (a+b\log(c))(d+e)^3\log(x) \\ (a+b\log(c))\left(d^3\log(x)+\frac{3d^2ex^r}{r}+\frac{3de^2x^{2r}}{2r}+\frac{e^3x^{3r}}{3r}\right) \\ (d+e)^3\left(\begin{cases} a\log(x) & \text{for } b=0 \\ -(-a-b\log(c))\log(x) & \text{for } n=0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}\right) \\ \frac{ad^3\log(cx^n)}{n}+\frac{3ad^2ex^r}{r}+\frac{3ade^2x^{2r}}{2r}+\frac{ae^3x^{3r}}{3r}+\frac{bd^3\log(cx^n)^2}{2n}-\frac{3bd^2enx^r}{r^2}+\frac{3bd^2ex^r\log(cx^n)}{r}-\frac{3bde^2nx^{2r}}{4r^2}+\frac{3bde^2x^{2r}\log}{2r} \end{cases}$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise(((a + b*log(c))*(d + e)**3*log(x), Eq(n, 0) & Eq(r, 0)), ((a + b
*log(c))*(d**3*log(x) + 3*d**2*e*x**r/r + 3*d*e**2*x**(2*r)/(2*r) + e**3*x
**(3*r)/(3*r)), Eq(n, 0)), ((d + e)**3*Piecewise((a*log(x), Eq(b, 0)), (-(
-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*n), True))
, Eq(r, 0)), (a*d**3*log(c*x**n)/n + 3*a*d**2*e*x**r/r + 3*a*d*e**2*x**(2*
r)/(2*r) + a*e**3*x**(3*r)/(3*r) + b*d**3*log(c*x**n)**2/(2*n) - 3*b*d**2*
e*n*x**r/r**2 + 3*b*d**2*e*x**r*log(c*x**n)/r - 3*b*d*e**2*n*x**(2*r)/(4*r
**2) + 3*b*d*e**2*x**(2*r)*log(c*x**n)/(2*r) - b*e**3*n*x**(3*r)/(9*r**2)
+ b*e**3*x**(3*r)*log(c*x**n)/(3*r), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 172, normalized size of antiderivative = 1.13

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x}\,dx = \frac{be^3x^{3r}\log(cx^n)}{3r} + \frac{3bde^2x^{2r}\log(cx^n)}{2r} + \frac{3bd^2ex^r\log(cx^n)}{r} + \frac{bd^3\log(cx^n)^2}{2n} + ad^3\log(x) - \frac{be^3nx^{3r}}{9r^2} + \frac{ae^3x^{3r}}{3r} - \frac{3bde^2nx^{2r}}{4r^2} + \frac{3ade^2x^{2r}}{2r} - \frac{3bd^2enx^r}{r^2} + \frac{3ad^2ex^r}{r}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
1/3*b*e^3*x^(3*r)*log(c*x^n)/r + 3/2*b*d*e^2*x^(2*r)*log(c*x^n)/r + 3*b*d^
2*e*x^r*log(c*x^n)/r + 1/2*b*d^3*log(c*x^n)^2/n + a*d^3*log(x) - 1/9*b*e^3
*n*x^(3*r)/r^2 + 1/3*a*e^3*x^(3*r)/r - 3/4*b*d*e^2*n*x^(2*r)/r^2 + 3/2*a*d
*e^2*x^(2*r)/r - 3*b*d^2*e*n*x^r/r^2 + 3*a*d^2*e*x^r/r
```

Giac [F]

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x}\,dx = \int \frac{(ex^r+d)^3(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x}\,dx = \int \frac{(d+e\,x^r)^3\,(a+b\,\ln(c\,x^n))}{x}\,dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 176, normalized size of antiderivative = 1.16

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x}\,dx$$
$$= \frac{12x^{3r}\log(x^n c)\,b\,e^3nr + 12x^{3r}a\,e^3nr - 4x^{3r}b\,e^3n^2 + 54x^{2r}\log(x^n c)\,bd\,e^2nr + 54x^{2r}ad\,e^2nr - 27x^{2r}bd\,e^2n^2}{36n\,r^2}$$

input
```
int((d+e*x^r)^3*(a+b*log(c*x^n))/x,x)
```

output
```
(12*x**(3*r)*log(x**n*c)*b*e**3*n*r + 12*x**(3*r)*a*e**3*n*r - 4*x**(3*r)*
b*e**3*n**2 + 54*x**(2*r)*log(x**n*c)*b*d*e**2*n*r + 54*x**(2*r)*a*d*e**2*
n*r - 27*x**(2*r)*b*d*e**2*n**2 + 108*x**r*log(x**n*c)*b*d**2*e*n*r + 108*
x**r*a*d**2*e*n*r - 108*x**r*b*d**2*e*n**2 + 18*log(x**n*c)**2*b*d**3*r**2
 + 36*log(x)*a*d**3*n*r**2)/(36*n*r**2)
```

3.420 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x} dx$

Optimal result 3102
Mathematica [A] (verified) 3102
Rubi [A] (verified) 3103
Maple [A] (warning: unable to verify) 3104
Fricas [A] (verification not implemented) 3105
Sympy [B] (verification not implemented) 3105
Maxima [A] (verification not implemented) 3106
Giac [F] 3106
Mupad [F(-1)] 3107
Reduce [B] (verification not implemented) 3107

Optimal result

Integrand size = 23, antiderivative size = 104

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x} dx = -\frac{2bdenx^r}{r^2} - \frac{be^2nx^{2r}}{4r^2} - \frac{1}{2}bd^2n\log^2(x) + \frac{2dex^r(a+b\log(cx^n))}{r} + \frac{e^2x^{2r}(a+b\log(cx^n))}{2r} + d^2\log(x)(a+b\log(cx^n))$$

output
```
-2*b*d*e*n*x^r/r^2-1/4*b*e^2*n*x^(2*r)/r^2-1/2*b*d^2*n*ln(x)^2+2*d*e*x^r*(
a+b*ln(c*x^n))/r+1/2*e^2*x^(2*r)*(a+b*ln(c*x^n))/r+d^2*ln(x)*(a+b*ln(c*x^n
))
```

Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 90, normalized size of antiderivative = 0.87

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x} dx = \frac{1}{4}\left(\frac{ex^r(2ar(4d+ex^r)-bn(8d+ex^r))}{r^2} + 4ad^2\log(x) + \frac{2bex^r(4d+ex^r)\log(cx^n)}{r} + \frac{2bd^2\log^2(cx^n)}{n}\right)$$

input
```
Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x,x]
```

output
```
((e*x^r*(2*a*r*(4*d + e*x^r) - b*n*(8*d + e*x^r)))/r^2 + 4*a*d^2*Log[x] +
(2*b*e*x^r*(4*d + e*x^r)*Log[c*x^n])/r + (2*b*d^2*Log[c*x^n]^2)/n)/4
```

Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 106, normalized size of antiderivative = 1.02, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x}\,dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \frac{e(ex^r+4d)x^r+2d^2r\log(x)}{2rx}dx+d^2\log(x)(a+b\log(cx^n))+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}$$

$$\Big\downarrow \text{27}$$

$$-\frac{bn\int \frac{e(ex^r+4d)x^r+2d^2r\log(x)}{x}dx}{2r}+d^2\log(x)(a+b\log(cx^n))+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}$$

$$\Big\downarrow \text{2010}$$

$$-\frac{bn\int \left(4dex^{r-1}+e^2x^{2r-1}+\frac{2d^2r\log(x)}{x}\right)dx}{2r}+d^2\log(x)(a+b\log(cx^n))+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}$$

$$\Big\downarrow \text{2009}$$

$$d^2\log(x)(a+b\log(cx^n))+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}-\frac{bn\left(d^2r\log^2(x)+\frac{4dex^r}{r}+\frac{e^2x^{2r}}{2r}\right)}{2r}$$

input
```
Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x,x]
```

output
```
-1/2*(b*n*((4*d*e*x^r)/r + (e^2*x^(2*r))/(2*r) + d^2*r*Log[x]^2))/r + (2*d
*e*x^r*(a + b*Log[c*x^n]))/r + (e^2*x^(2*r)*(a + b*Log[c*x^n]))/(2*r) + d^
2*Log[x]*(a + b*Log[c*x^n])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

Maple [A] (warning: unable to verify)

Time = 0.97 (sec) , antiderivative size = 122, normalized size of antiderivative = 1.17

method	result
parallelrisch	$\frac{2x^{2r}\ln(c\,x^{n})b\,e^{2}rn+4\ln(x)a\,d^{2}n\,r^{2}+2x^{2r}a\,e^{2}nr-x^{2r}b\,e^{2}n^{2}+8x^{r}\ln(c\,x^{n})bdern+2b\,d^{2}\ln(c\,x^{n})^{2}r^{2}+8x^{r}adenr-8x^{r}bde\,n^{2}}{4r^{2}n}$
risch	$\frac{b\left(2d^{2}\ln(x)r+e^{2}x^{2r}+4de\,x^{r}\right)\ln(x^{n})}{2r}+\frac{i\pi b\,e^{2}\,\mathrm{csgn}(ix^{n})\,\mathrm{csgn}(ic\,x^{n})^{2}x^{2r}}{4r}-\frac{i\pi\ln(x)b\,d^{2}\,\mathrm{csgn}(ix^{n})\,\mathrm{csgn}(ic\,x^{n})\,\mathrm{csgn}(ic)}{2}-$

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/4*(2*(x^r)^2*ln(c*x^n)*b*e^2*r*n+4*ln(x)*a*d^2*n*r^2+2*(x^r)^2*a*e^2*n*r
-(x^r)^2*b*e^2*n^2+8*x^r*ln(c*x^n)*b*d*e*r*n+2*b*d^2*ln(c*x^n)^2*r^2+8*x^r
*a*d*e*n*r-8*x^r*b*d*e*n^2)/r^2/n
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 115, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex^r)^2\,(a+b\log{(cx^n)})}{x}\,dx$$
$$= \frac{2\,bd^2nr^2\log{(x)}^2+(2\,be^2nr\log{(x)}+2\,be^2r\log{(c)}-be^2n+2\,ae^2r)x^{2\,r}+8\,(bdenr\log{(x)}+bder\log{(c)}}{4\,r^2}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/4*(2*b*d^2*n*r^2*log(x)^2 + (2*b*e^2*n*r*log(x) + 2*b*e^2*r*log(c) - b*e
^2*n + 2*a*e^2*r)*x^(2*r) + 8*(b*d*e*n*r*log(x) + b*d*e*r*log(c) - b*d*e*n
 + a*d*e*r)*x^r + 4*(b*d^2*r^2*log(c) + a*d^2*r^2)*log(x))/r^2
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 216 vs. 2(104) = 208.

Time = 2.22 (sec) , antiderivative size = 216, normalized size of antiderivative = 2.08

$$\int \frac{(d+ex^r)^2\,(a+b\log{(cx^n)})}{x}\,dx$$
$$= \begin{cases} (a+b\log{(c)})\,(d+e)^2\log{(x)} & \text{for } n=0 \\ (a+b\log{(c)})\left(d^2\log{(x)}+\frac{2dex^r}{r}+\frac{e^2x^{2r}}{2r}\right) & \text{for } n=0 \\ (d+e)^2\left(\begin{cases} a\log{(x)} & \text{for } b=0 \\ -(-a-b\log{(c)})\log{(x)} & \text{for } n=0 \\ \frac{(-a-b\log{(cx^n)})^2}{2bn} & \text{otherwise} \end{cases}\right) & \text{for } r=0 \\ \frac{ad^2\log{(cx^n)}}{n}+\frac{2adex^r}{r}+\frac{ae^2x^{2r}}{2r}+\frac{bd^2\log{(cx^n)}^2}{2n}-\frac{2bdenx^r}{r^2}+\frac{2bdex^r\log{(cx^n)}}{r}-\frac{be^2nx^{2r}}{4r^2}+\frac{be^2x^{2r}\log{(cx^n)}}{2r} & \text{otherwise} \end{cases}$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise(((a + b*log(c))*(d + e)**2*log(x), Eq(n, 0) & Eq(r, 0)), ((a + b
*log(c))*(d**2*log(x) + 2*d*e*x**r/r + e**2*x**(2*r)/(2*r)), Eq(n, 0)), ((
d + e)**2*Piecewise((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n,
0)), ((-a - b*log(c*x**n))**2/(2*b*n), True)), Eq(r, 0)), (a*d**2*log(c*x*
*n)/n + 2*a*d*e*x**r/r + a*e**2*x**(2*r)/(2*r) + b*d**2*log(c*x**n)**2/(2*
n) - 2*b*d*e*n*x**r/r**2 + 2*b*d*e*x**r*log(c*x**n)/r - b*e**2*n*x**(2*r)/
(4*r**2) + b*e**2*x**(2*r)*log(c*x**n)/(2*r), True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.10

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x}\,dx = \frac{be^2x^{2r}\log(cx^n)}{2r} + \frac{2bdex^r\log(cx^n)}{r} + \frac{bd^2\log(cx^n)^2}{2n} + ad^2\log(x) - \frac{be^2nx^{2r}}{4r^2} + \frac{ae^2x^{2r}}{2r} - \frac{2bdenx^r}{r^2} + \frac{2adex^r}{r}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
1/2*b*e^2*x^(2*r)*log(c*x^n)/r + 2*b*d*e*x^r*log(c*x^n)/r + 1/2*b*d^2*log(
c*x^n)^2/n + a*d^2*log(x) - 1/4*b*e^2*n*x^(2*r)/r^2 + 1/2*a*e^2*x^(2*r)/r
- 2*b*d*e*n*x^r/r^2 + 2*a*d*e*x^r/r
```

Giac [F]

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x}\,dx = \int \frac{(ex^r+d)^2(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(b*log(c*x^n) + a)/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2\,(a+b\log{(cx^n)})}{x}\,dx=\int \frac{(d+e\,x^r)^2\,(a+b\,\ln{(c\,x^n)})}{x}\,dx$$

input
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 121, normalized size of antiderivative = 1.16

$$\int \frac{(d+ex^r)^2\,(a+b\log{(cx^n)})}{x}\,dx$$
$$=\frac{2x^{2r}\log(x^nc)\,b\,e^2nr+2x^{2r}a\,e^2nr-x^{2r}b\,e^2n^2+8x^r\log(x^nc)\,bdenr+8x^r adenr-8x^r bde\,n^2+2\log(x^nc)^2}{4n\,r^2}$$

input
```
int((d+e*x^r)^2*(a+b*log(c*x^n))/x,x)
```

output
```
(2*x**(2*r)*log(x**n*c)*b*e**2*n*r + 2*x**(2*r)*a*e**2*n*r - x**(2*r)*b*e*
*2*n**2 + 8*x**r*log(x**n*c)*b*d*e*n*r + 8*x**r*a*d*e*n*r - 8*x**r*b*d*e*n
**2 + 2*log(x**n*c)**2*b*d**2*r**2 + 4*log(x)*a*d**2*n*r**2)/(4*n*r**2)
```

3.421 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx$

Optimal result 3108
Mathematica [A] (verified) 3108
Rubi [A] (verified) 3109
Maple [A] (verified) 3110
Fricas [A] (verification not implemented) 3110
Sympy [B] (verification not implemented) 3111
Maxima [A] (verification not implemented) 3111
Giac [F] 3112
Mupad [F(-1)] 3112
Reduce [B] (verification not implemented) 3112

Optimal result

Integrand size = 21, antiderivative size = 53

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x}\,dx=-\frac{benx^r}{r^2}+\frac{ex^r(a+b\log(cx^n))}{r}+\frac{d(a+b\log(cx^n))^2}{2bn}$$

output
```
-b*e*n*x^r/r^2+e*x^r*(a+b*ln(c*x^n))/r+1/2*d*(a+b*ln(c*x^n))^2/b/n
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.02

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x}\,dx=\frac{e(-bn+ar)x^r}{r^2}+ad\log(x)+\frac{bex^r\log(cx^n)}{r}+\frac{bd\log^2(cx^n)}{2n}$$

input
```
Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x,x]
```

output
```
(e*(-(b*n) + a*r)*x^r)/r^2 + a*d*Log[x] + (b*e*x^r*Log[c*x^n])/r + (b*d*Lo
g[c*x^n]^2)/(2*n)
```

Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x} dx$$

$$\Big\downarrow \; 2793$$

$$\int \left(\frac{d(a+b\log(cx^n))}{x}+ex^{r-1}(a+b\log(cx^n))\right)dx$$

$$\Big\downarrow \; 2009$$

$$\frac{d(a+b\log(cx^n))^2}{2bn}+\frac{ex^r(a+b\log(cx^n))}{r}-\frac{benx^r}{r^2}$$

input
```
Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x,x]
```

output
```
-((b*e*n*x^r)/r^2) + (e*x^r*(a + b*Log[c*x^n]))/r + (d*(a + b*Log[c*x^n])^
2)/(2*b*n)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.28

method	result
parallelrisch	$\frac{2\ln(x)adn\,r^2+2x^r\ln(c\,x^n)bern+bd\ln(c\,x^n)^2r^2+2x^r aenr-2x^r be\,n^2}{2r^2n}$
risch	$\frac{b(dr\ln(x)+e\,x^r)\ln(x^n)}{r}+\frac{i\pi\ln(x)bd\ \mathrm{csgn}(ix^n)\ \mathrm{csgn}(ic\,x^n)^2}{2}-\frac{i\ \mathrm{csgn}(ic)\ \mathrm{csgn}(ic\,x^n)\ \mathrm{csgn}(ix^n)db\ln(x)\pi}{2}-\frac{i\ \mathrm{csgn}(ic\,x^n)}{2}$

input
```
int((d+e*x^r)*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/2*(2*ln(x)*a*d*n*r^2+2*x^r*ln(c*x^n)*b*e*r*n+b*d*ln(c*x^n)^2*r^2+2*x^r*a
*e*n*r-2*x^r*b*e*n^2)/r^2/n
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 64, normalized size of antiderivative = 1.21

$$\int\frac{(d+ex^r)\,(a+b\log{(cx^n)})}{x}\,dx$$
$$=\frac{bdnr^2\log{(x)}^2+2\,(benr\log{(x)}+ber\log{(c)}-ben+aer)x^r+2\,(bdr^2\log{(c)}+adr^2)\log{(x)}}{2\,r^2}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/2*(b*d*n*r^2*log(x)^2 + 2*(b*e*n*r*log(x) + b*e*r*log(c) - b*e*n + a*e*r
)*x^r + 2*(b*d*r^2*log(c) + a*d*r^2)*log(x))/r^2
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 131 vs. $2(46) = 92$.

Time = 1.98 (sec) , antiderivative size = 131, normalized size of antiderivative = 2.47

$$\int \frac{(d + ex^r)(a + b\log(cx^n))}{x}\,dx = \begin{cases} (a + b\log(c))(d + e)\log(x) & \text{for } n = 0 \wedge r = 0 \\ (a + b\log(c))\left(d\log(x) + \frac{ex^r}{r}\right) & \text{for } n = 0 \\ (d + e)\left(\begin{cases} a\log(x) & \text{for } b = 0 \\ -(-a - b\log(c))\log(x) & \text{for } n = 0 \\ \frac{(-a - b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}\right) & \text{for } r = 0 \\ \frac{ad\log(cx^n)}{n} + \frac{aex^r}{r} + \frac{bd\log(cx^n)^2}{2n} - \frac{benx^r}{r^2} + \frac{bex^r\log(cx^n)}{r} & \text{otherwise} \end{cases}$$

input
```
integrate((d+e*x**r)*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise(((a + b*log(c))*(d + e)*log(x), Eq(n, 0) & Eq(r, 0)), ((a + b*lo
g(c))*(d*log(x) + e*x**r/r), Eq(n, 0)), ((d + e)*Piecewise((a*log(x), Eq(b
, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*
n), True)), Eq(r, 0)), (a*d*log(c*x**n)/n + a*e*x**r/r + b*d*log(c*x**n)**
2/(2*n) - b*e*n*x**r/r**2 + b*e*x**r*log(c*x**n)/r, True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.06

$$\int \frac{(d + ex^r)(a + b\log(cx^n))}{x}\,dx = \frac{bex^r\log(cx^n)}{r} + \frac{bd\log(cx^n)^2}{2\,n} + ad\log(x) - \frac{benx^r}{r^2} + \frac{aex^r}{r}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
b*e*x^r*log(c*x^n)/r + 1/2*b*d*log(c*x^n)^2/n + a*d*log(x) - b*e*n*x^r/r^2
 + a*e*x^r/r
```

Giac [F]

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx=\int \frac{(ex^r+d)(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)*(b*log(c*x^n) + a)/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx=\int \frac{(d+e\,x^r)\,(a+b\,\ln(c\,x^n))}{x}\,dx$$

input
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 67, normalized size of antiderivative = 1.26

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx=\frac{2x^r\log(x^nc)\,benr+2x^r aenr-2x^r be\,n^2+\log(x^nc)^2\,bd\,r^2+2\log(x)\,adn\,r^2}{2n\,r^2}$$

input
```
int((d+e*x^r)*(a+b*log(c*x^n))/x,x)
```

output
```
(2*x**r*log(x**n*c)*b*e*n*r + 2*x**r*a*e*n*r - 2*x**r*b*e*n**2 + log(x**n*
c)**2*b*d*r**2 + 2*log(x)*a*d*n*r**2)/(2*n*r**2)
```

3.422 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx$

Optimal result 3114
Mathematica [A] (warning: unable to verify) 3114
Rubi [A] (verified) 3115
Maple [C] (warning: unable to verify) 3116
Fricas [A] (verification not implemented) 3116
Sympy [A] (verification not implemented) 3117
Maxima [F] 3117
Giac [F] 3118
Mupad [F(-1)] 3118
Reduce [F] 3118

Optimal result

Integrand size = 23, antiderivative size = 54

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx = -\frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{dr}+\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}$$

output
```
-(a+b*ln(c*x^n))*ln(1+d/e/(x^r))/d/r+b*n*polylog(2,-d/e/(x^r))/d/r^2
```

Mathematica [A] (warning: unable to verify)

Time = 0.06 (sec) , antiderivative size = 108, normalized size of antiderivative = 2.00

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx = \frac{bnr^2\log^2(x)-2r(a+b\log(cx^n))\log(d-dx^r)+2bnr\log(x)(\log(d-dx^r)-\log(d+ex^r))+2bn\log(\ldots}{2dr^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)),x]
```

output
```
(b*n*r^2*Log[x]^2 - 2*r*(a + b*Log[c*x^n])*Log[d - d*x^r] + 2*b*n*r*Log[x]
*(Log[d - d*x^r] - Log[d + e*x^r]) + 2*b*n*Log[-((e*x^r)/d)]*Log[d + e*x^r
] + 2*b*n*PolyLog[2, 1 + (e*x^r)/d])/(2*d*r^2)
```

Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}dx$$

$$\Big\downarrow \text{2779}$$

$$\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}$$

$$\Big\downarrow \text{2838}$$

$$\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)),x]
```

output
```
-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^r)])/(d*r)) + (b*n*PolyLog[2, -(d/(e*
x^r))])/(d*r^2)
```

Defintions of rubi rules used

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.50 (sec) , antiderivative size = 246, normalized size of antiderivative = 4.56

method	result
risch	$\frac{b\ln(d+e\,x^{r})n\ln(x)}{rd}-\frac{b\ln(d+e\,x^{r})\ln(x^{n})}{rd}-\frac{b\ln(x^{r})n\ln(x)}{rd}+\frac{b\ln(x^{r})\ln(x^{n})}{rd}+\frac{bn\ln(x)^{2}}{2d}-\frac{bn\ln(x)\ln\left(1+\frac{e\,x^{r}}{d}\right)}{rd}-\frac{bn\,\text{po}}{}$

input
```
int((a+b*ln(c*x^n))/x/(d+e*x^r),x,method=_RETURNVERBOSE)
```

output
```
1/r*b/d*ln(d+e*x^r)*n*ln(x)-b/r/d*ln(d+e*x^r)*ln(x^n)-1/r*b/d*ln(x^r)*n*ln
(x)+b/r/d*ln(x^r)*ln(x^n)+1/2*b/d*n*ln(x)^2-b/r*n/d*ln(x)*ln(1+e*x^r/d)-1/
r^2*b/d*n*polylog(2,-e*x^r/d)+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*
I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*
I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)*(-1/r/d*ln(d+e*x^r)+1/r/d*ln(x
^r))
```

Fricas [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 93, normalized size of antiderivative = 1.72

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx$$
$$=\frac{bnr^2\log(x)^2-2\,bnr\log(x)\log\left(\frac{ex^r+d}{d}\right)-2\,bn\text{Li}_2\left(-\frac{ex^r+d}{d}+1\right)-2\,(br\log(c)+ar)\log(ex^r+d)+2\,(br}{2\,dr^2}$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r),x, algorithm="fricas")
```

output
```
1/2*(b*n*r^2*log(x)^2 - 2*b*n*r*log(x)*log((e*x^r + d)/d) - 2*b*n*dilog(-(
e*x^r + d)/d + 1) - 2*(b*r*log(c) + a*r)*log(e*x^r + d) + 2*(b*r^2*log(c)
+ a*r^2)*log(x))/(d*r^2)
```

Sympy [A] (verification not implemented)

Time = 147.72 (sec) , antiderivative size = 452, normalized size of antiderivative = 8.37

$$\int \frac{a + b\log(cx^n)}{x(d + ex^r)}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x/(d+e*x**r),x)
```

output
```
-2*a*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (-log(-2*e*x**r)/(2*e), Tru
e))/(d*r) - 2*a*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (log(2*d + 2*e*x
**r)/(2*e), True))/(d*r) + 2*b*e*n*Piecewise((Piecewise((log(x)/(2*e) + x*
*r/(d*r), Ne(r, 0)), (log(x)/(2*e) + log(x)/d, True)), Eq(e, 0)), (-Piecew
ise((0, (Abs(e*x**r) < 1) & (1/Abs(e*x**r) < 1)), (log(e*x**r)**2/(2*r) +
I*pi*log(e*x**r)/r, Abs(e*x**r) < 1), (log(1/(e*x**r))**2/(2*r) - I*pi*log
(1/(e*x**r))/r, 1/Abs(e*x**r) < 1), (meijerg(((), (1, 1, 1)), ((0, 0, 0),
()), e*x**r*exp_polar(I*pi))/r + meijerg(((1, 1, 1), ()), ((), (0, 0, 0)),
 e*x**r*exp_polar(I*pi))/r, True))/(2*e) - log(2)*log(x)/(2*e), True))/(d*
r) + 2*b*e*n*Piecewise((Piecewise((log(x)/(2*e) + x**r/(d*r), Ne(r, 0)), (
log(x)/(2*e) + log(x)/d, True)), Eq(e, 0)), (Piecewise((-polylog(2, e*x**r
*exp_polar(I*pi)/d)/r, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - po
lylog(2, e*x**r*exp_polar(I*pi)/d)/r, Abs(x) < 1), (-log(d)*log(1/x) - pol
ylog(2, e*x**r*exp_polar(I*pi)/d)/r, 1/Abs(x) < 1), (-meijerg(((), (1, 1))
, ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d)
- polylog(2, e*x**r*exp_polar(I*pi)/d)/r, True))/(2*e) + log(2)*log(x)/(2*
e), True))/(d*r) - 2*b*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (-log(-2*
e*x**r)/(2*e), True))*log(c*x**n)/(d*r) - 2*b*e*Piecewise((1/(2*e) + x**r/
d, Eq(e, 0)), (log(2*d + 2*e*x**r)/(2*e), True))*log(c*x**n)/(d*r)
```

Maxima [F]

$$\int \frac{a + b\log(cx^n)}{x(d + ex^r)}\,dx = \int \frac{b\log(cx^n) + a}{(ex^r + d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r),x, algorithm="maxima")
```

output
```
a*(log(x)/d - log((e*x^r + d)/e)/(d*r)) + b*integrate((log(c) + log(x^n))/
(e*x*x^r + d*x), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx=\int \frac{b\log(cx^n)+a}{(ex^r+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{x\,(d+e\,x^r)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx=\frac{\left(\int \frac{\log(x^n c)}{x^r ex+dx}dx\right)bdr-\log(x^r e+d)\,a+\log(x)\,ar}{dr}$$

input
```
int((a+b*log(c*x^n))/x/(d+e*x^r),x)
```

output
```
(int(log(x**n*c)/(x**r*e*x + d*x),x)*b*d*r - log(x**r*e + d)*a + log(x)*a*
r)/(d*r)
```

3.423 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx$

Optimal result . . . 3119
Mathematica [A] (warning: unable to verify) . . . 3119
Rubi [A] (verified) . . . 3120
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Giac [F] . . . 3124
Mupad [F(-1)] . . . 3124
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Optimal result

Integrand size = 23, antiderivative size = 102

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx=-\frac{ex^r(a+b\log(cx^n))}{d^2r(d+ex^r)}-\frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r}+\frac{bn\log(d+ex^r)}{d^2r^2}+\frac{bn\,\mathrm{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^2r^2}$$

output
```
-e*x^r*(a+b*ln(c*x^n))/d^2/r/(d+e*x^r)-(a+b*ln(c*x^n))*ln(1+d/e/(x^r))/d^2
/r+b*n*ln(d+e*x^r)/d^2/r^2+b*n*polylog(2,-d/e/(x^r))/d^2/r^2
```

Mathematica [A] (warning: unable to verify)

Time = 0.27 (sec) , antiderivative size = 132, normalized size of antiderivative = 1.29

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx = \frac{\frac{dr(a+b\log(cx^n))}{d+ex^r}+bn\log(d-dx^r)-ar\log(d-dx^r)+br(n\log(x)-\log(cx^n))\log(d-dx^r)+bn\left(\frac{1}{2}r^2\log\right.}{d^2r^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^2),x]
```

output
```
((d*r*(a + b*Log[c*x^n]))/(d + e*x^r) + b*n*Log[d - d*x^r] - a*r*Log[d - d
*x^r] + b*r*(n*Log[x] - Log[c*x^n])*Log[d - d*x^r] + b*n*((r^2*Log[x]^2)/2
 + (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^
r)/d]))/(d^2*r^2)
```

Rubi [A] (verified)

Time = 0.59 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.14, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {2791, 2773, 792, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}dx$$

$$\Big\downarrow \text{ 2791}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\int \frac{x^{r-1}(a+b\log(cx^n))}{(ex^r+d)^2}dx}{d}$$

$$\Big\downarrow \text{ 2773}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\int \frac{x^{r-1}}{ex^r+d}dx}{dr}\right)}{d}$$

$$\Big\downarrow \text{ 792}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}$$

$$\Big\downarrow \text{ 2779}$$

$$\frac{\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}$$

$$\Big\downarrow \text{ 2838}$$

$$\frac{\frac{bn\operatorname{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)^2),x]
```

output
```
-((e*((x^r*(a + b*Log[c*x^n]))/(d*r*(d + e*x^r)) - (b*n*Log[d + e*x^r])/(d
*e*r^2)))/d) + (-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^r)])/(d*r)) + (b*n*Po
lyLog[2, -(d/(e*x^r))])/(d*r^2))/d
```

Defintions of rubi rules used

rule 792
```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2791
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x
^n])^p/x), x], x] - Simp[e/d   Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n
])^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1
]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.20 (sec) , antiderivative size = 342, normalized size of antiderivative = 3.35

method	result
risch	$\frac{b\ln(d+e\,x^r)n\ln(x)}{r\,d^2}-\frac{b\ln(d+e\,x^r)\ln(x^n)}{r\,d^2}-\frac{bn\ln(x)}{rd(d+e\,x^r)}+\frac{b\ln(x^n)}{rd(d+e\,x^r)}-\frac{b\ln(x^r)n\ln(x)}{r\,d^2}+\frac{b\ln(x^r)\ln(x^n)}{r\,d^2}+\frac{bn\ln(d+e\,x^r)}{d^2r^2}$

input
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^2,x,method=_RETURNVERBOSE)
```

output
```
b/r/d^2*ln(d+e*x^r)*n*ln(x)-b/r/d^2*ln(d+e*x^r)*ln(x^n)-b/r/d/(d+e*x^r)*n*
ln(x)+b/r/d/(d+e*x^r)*ln(x^n)-b/r/d^2*ln(x^r)*n*ln(x)+b/r/d^2*ln(x^r)*ln(x
^n)+b*n*ln(d+e*x^r)/d^2/r^2-b/r*n*e/d^2*ln(x)*x^r/(d+e*x^r)-b/r^2*n/d^2*di
log((d+e*x^r)/d)-b/r*n/d^2*ln(x)*ln((d+e*x^r)/d)+1/2*b*n/d^2*ln(x)^2+(1/2*
I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*cs
gn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+b*
ln(c)+a)/r*(-1/d^2*ln(d+e*x^r)+1/d/(d+e*x^r)+1/d^2*ln(x^r))
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 214 vs. 2(101) = 202.

Time = 0.08 (sec) , antiderivative size = 214, normalized size of antiderivative = 2.10

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx = \frac{bdnr^2\log(x)^2+2\,bdr\log(c)+2\,adr+\left(benr^2\log(x)^2+2\left(ber^2\log(c)-benr+aer^2\right)\log(x)\right)x^r-2\left(be\right.}{}$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
1/2*(b*d*n*r^2*log(x)^2 + 2*b*d*r*log(c) + 2*a*d*r + (b*e*n*r^2*log(x)^2 +
 2*(b*e*r^2*log(c) - b*e*n*r + a*e*r^2)*log(x))*x^r - 2*(b*e*n*x^r + b*d*n
)*dilog(-(e*x^r + d)/d + 1) - 2*(b*d*r*log(c) - b*d*n + a*d*r + (b*e*r*log
(c) - b*e*n + a*e*r)*x^r)*log(e*x^r + d) + 2*(b*d*r^2*log(c) + a*d*r^2)*lo
g(x) - 2*(b*e*n*r*x^r*log(x) + b*d*n*r*log(x))*log((e*x^r + d)/d))/(d^2*e*
r^2*x^r + d^3*r^2)
```

Sympy [A] (verification not implemented)

Time = 138.13 (sec) , antiderivative size = 360, normalized size of antiderivative = 3.53

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**2,x)
```

output
```
-a*e*Piecewise((x**r/d**2, Eq(e, 0)), (-1/(d*e + e**2*x**r), True))/(d*r)
- a*e*Piecewise((x**r/d, Eq(e, 0)), (log(d + e*x**r)/e, True))/(d**2*r) +
a*log(x**r)/(d**2*r) + b*e*n*Piecewise((Piecewise((x**r/r, Ne(r, 0)), (log
(x), True))/d**2, Eq(e, 0)), (-Piecewise((log(x)/e**2, Eq(d, 0) & Eq(r, 0)
), (-1/(e**2*r*x**r), Eq(d, 0)), (log(x)/(d*e + e**2), Eq(r, 0)), (log(x)/
(d*e) - log(d/e + x**r)/(d*e*r), True)), True))/(d*r) - b*e*Piecewise((x**
r/d**2, Eq(e, 0)), (-1/(d*e + e**2*x**r), True))*log(c*x**n)/(d*r) + b*e*n
*Piecewise((Piecewise((x**r/r, Ne(r, 0)), (log(x), True))/d, Eq(e, 0)), (P
iecewise((-polylog(2, e*x**r*exp_polar(I*pi)/d)/r, (Abs(x) < 1) & (1/Abs(x
) < 1)), (log(d)*log(x) - polylog(2, e*x**r*exp_polar(I*pi)/d)/r, Abs(x) <
 1), (-log(d)*log(1/x) - polylog(2, e*x**r*exp_polar(I*pi)/d)/r, 1/Abs(x)
< 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), (
)), ((), (0, 0)), x)*log(d) - polylog(2, e*x**r*exp_polar(I*pi)/d)/r, True
))/e, True))/(d**2*r) - b*e*Piecewise((x**r/d, Eq(e, 0)), (log(d + e*x**r)
/e, True))*log(c*x**n)/(d**2*r) + b*n*Piecewise((0, Eq(r, 0)), (-log(x**r)
**2/(2*r), True))/(d**2*r) + b*log(x**r)*log(c*x**n)/(d**2*r)
```

Maxima [F]

$$\int \frac{a + b\log\left(cx^n\right)}{x\left(d + ex^r\right)^2}\,dx = \int \frac{b\log\left(cx^n\right) + a}{\left(ex^r + d\right)^2 x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
a*(1/(d*e*r*x^r + d^2*r) + log(x)/d^2 - log((e*x^r + d)/e)/(d^2*r)) + b*in
tegrate((log(c) + log(x^n))/(e^2*x*x^(2*r) + 2*d*e*x*x^r + d^2*x), x)
```

Giac [F]

$$\int \frac{a + b\log\left(cx^n\right)}{x\left(d + ex^r\right)^2}\,dx = \int \frac{b\log\left(cx^n\right) + a}{\left(ex^r + d\right)^2 x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^2*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a + b\log\left(cx^n\right)}{x\left(d + ex^r\right)^2}\,dx = \int \frac{a + b\,\ln\left(c\,x^n\right)}{x\,\left(d + e\,x^r\right)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^2), x)
```

Reduce [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{r}\right)^{2}}\,dx$$
$$=\frac{x^{r}\left(\int \frac{\log(x^{n}c)}{x^{2r}e^{2}x+2x^{r}dex+d^{2}x}dx\right)b\,d^{2}er-x^{r}\log(x^{r}e+d)\,ae+x^{r}\log(x)\,aer-x^{r}ae+\left(\int \frac{\log(x^{n}c)}{x^{2r}e^{2}x+2x^{r}dex+d^{2}x}dx\right)b}{d^{2}r\left(x^{r}e+d\right)}$$

input
```
int((a+b*log(c*x^n))/x/(d+e*x^r)^2,x)
```

output
```
(x**r*int(log(x**n*c)/(x**(2*r)*e**2*x + 2*x**r*d*e*x + d**2*x),x)*b*d**2*
e*r - x**r*log(x**r*e + d)*a*e + x**r*log(x)*a*e*r - x**r*a*e + int(log(x*
*n*c)/(x**(2*r)*e**2*x + 2*x**r*d*e*x + d**2*x),x)*b*d**3*r - log(x**r*e +
 d)*a*d + log(x)*a*d*r)/(d**2*r*(x**r*e + d))
```

3.424 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^3}\,dx$

Optimal result . . . 3126
Mathematica [A] (warning: unable to verify) . . . 3127
Rubi [A] (verified) . . . 3127
Maple [C] (warning: unable to verify) . . . 3131
Fricas [B] (verification not implemented) . . . 3131
Sympy [F(-1)] . . . 3132
Maxima [F] . . . 3132
Giac [F] . . . 3133
Mupad [F(-1)] . . . 3133
Reduce [F] . . . 3133

Optimal result

Integrand size = 23, antiderivative size = 169

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^3}\,dx = -\frac{bn}{2d^2r^2(d+ex^r)}-\frac{bn\log(x)}{2d^3r}+\frac{a+b\log(cx^n)}{2dr(d+ex^r)^2}-\frac{ex^r(a+b\log(cx^n))}{d^3r(d+ex^r)}-\frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^3r}+\frac{3bn\log(d+ex^r)}{2d^3r^2}+\frac{bn\,\mathrm{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^3r^2}$$

output

```
-1/2*b*n/d^2/r^2/(d+e*x^r)-1/2*b*n*ln(x)/d^3/r+1/2*(a+b*ln(c*x^n))/d/r/(d+
e*x^r)^2-e*x^r*(a+b*ln(c*x^n))/d^3/r/(d+e*x^r)-(a+b*ln(c*x^n))*ln(1+d/e/(x
^r))/d^3/r+3/2*b*n*ln(d+e*x^r)/d^3/r^2+b*n*polylog(2,-d/e/(x^r))/d^3/r^2
```

Mathematica [A] (warning: unable to verify)

Time = 0.33 (sec) , antiderivative size = 170, normalized size of antiderivative = 1.01

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^3}\,dx$$
$$= \frac{\frac{d^2r(a+b\log(cx^n))}{(d+ex^r)^2} + \frac{d(-bn+2ar+2br\log(cx^n))}{d+ex^r} + 3bn\log(d-dx^r) - 2ar\log(d-dx^r) + 2br(n\log(x)-\log(cx^n)) \ldots}{2d^3r^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^3),x]
```

output
```
((d^2*r*(a + b*Log[c*x^n]))/(d + e*x^r)^2 + (d*(-(b*n) + 2*a*r + 2*b*r*Log
[c*x^n]))/(d + e*x^r) + 3*b*n*Log[d - d*x^r] - 2*a*r*Log[d - d*x^r] + 2*b*
r*(n*Log[x] - Log[c*x^n])*Log[d - d*x^r] + 2*b*n*((r^2*Log[x]^2)/2 + (-(r*
Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^r)/d]))/
(2*d^3*r^2)
```

Rubi [A] (verified)

Time = 1.04 (sec) , antiderivative size = 204, normalized size of antiderivative = 1.21, number of steps used = 11, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.435$, Rules used = {2791, 2776, 798, 54, 2009, 2791, 2773, 792, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^3}\,dx$$
$$\Big\downarrow \; 2791$$
$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)^2}dx}{d} - \frac{e\int \frac{x^{r-1}(a+b\log(cx^n))}{(ex^r+d)^3}dx}{d}$$
$$\Big\downarrow \; 2776$$
$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)^2}dx}{d} - \frac{e\left(\frac{bn\int \frac{1}{x(ex^r+d)^2}dx}{2er} - \frac{a+b\log(cx^n)}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \text{798}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{x^{-r}}{(ex^r+d)^2}dx^r}{2er^2}-\frac{a+b\log(cx^n)}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \text{54}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)^2}dx}{d}-\frac{e\left(\frac{bn\int \left(\frac{x^{-r}}{d^2}-\frac{e}{d^2(ex^r+d)}-\frac{e}{d(ex^r+d)^2}\right)dx^r}{2er^2}-\frac{a+b\log(cx^n)}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \text{2009}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)^2}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^r)}{d^2}+\frac{\log(x^r)}{d^2}+\frac{1}{d(d+ex^r)}\right)}{2er^2}-\frac{a+b\log(cx^n)}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \text{2791}$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\int \frac{x^{r-1}(a+b\log(cx^n))}{(ex^r+d)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^r)}{d^2}+\frac{\log(x^r)}{d^2}+\frac{1}{d(d+ex^r)}\right)}{2er^2}-\frac{a+b\log(cx^n)}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \text{2773}$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\int \frac{x^{r-1}}{ex^r+d}dx}{dr}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^r)}{d^2}+\frac{\log(x^r)}{d^2}+\frac{1}{d(d+ex^r)}\right)}{2er^2}-\frac{a+b\log(cx^n)}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \text{792}$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^r)}{d^2}+\frac{\log(x^r)}{d^2}+\frac{1}{d(d+ex^r)}\right)}{2er^2}-\frac{a+b\log(cx^n)}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{\frac{\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^r)}{d^2}+\frac{\log(x^r)}{d^2}+\frac{1}{d(d+ex^r)}\right)}{2er^2}-\frac{a+b\log(cx^n)}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \text{ 2838}$$

$$\frac{\frac{\frac{bn\operatorname{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^r)}{d^2}+\frac{\log(x^r)}{d^2}+\frac{1}{d(d+ex^r)}\right)}{2er^2}-\frac{a+b\log(cx^n)}{2er(d+ex^r)^2}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)^3),x]
```

output
```
-((e*(-1/2*(a + b*Log[c*x^n])/(e*r*(d + e*x^r)^2) + (b*n*(1/(d*(d + e*x^r)
) + Log[x^r]/d^2 - Log[d + e*x^r]/d^2))/(2*e*r^2)))/d) + (-((e*((x^r*(a +
b*Log[c*x^n]))/(d*r*(d + e*x^r)) - (b*n*Log[d + e*x^r])/(d*e*r^2)))/d) + (
-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^r)])/(d*r)) + (b*n*PolyLog[2, -(d/(e*
x^r))])/(d*r^2))/d)/d
```

Defintions of rubi rules used

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 792
```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

rule 798
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[1/n   Subst
[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a,
b, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2791
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x
^n])^p/x), x], x] - Simp[e/d   Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n
])^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1
]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 3.93 (sec) , antiderivative size = 473, normalized size of antiderivative = 2.80

method	result
risch	$\frac{b\ln(d+e\,x^r)n\ln(x)}{r\,d^3}-\frac{b\ln(d+e\,x^r)\ln(x^n)}{r\,d^3}-\frac{bn\ln(x)}{r\,d^2(d+e\,x^r)}+\frac{b\ln(x^n)}{r\,d^2(d+e\,x^r)}-\frac{bn\ln(x)}{2rd(d+e\,x^r)^2}+\frac{b\ln(x^n)}{2rd(d+e\,x^r)^2}-\frac{b\ln(x^r)n\ln}{r\,d^3}$

input
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^3,x,method=_RETURNVERBOSE)
```

output
```
b/r/d^3*ln(d+e*x^r)*n*ln(x)-b/r/d^3*ln(d+e*x^r)*ln(x^n)-b/r/d^2/(d+e*x^r)*
n*ln(x)+b/r/d^2/(d+e*x^r)*ln(x^n)-1/2*b/r/d/(d+e*x^r)^2*n*ln(x)+1/2*b/r/d/
(d+e*x^r)^2*ln(x^n)-b/r/d^3*ln(x^r)*n*ln(x)+b/r/d^3*ln(x^r)*ln(x^n)+3/2*b*
n*ln(d+e*x^r)/d^3/r^2-b/r*n*e/d^3*ln(x)*x^r/(d+e*x^r)-b/r^2*n/d^3*dilog((d
+e*x^r)/d)-b/r*n/d^3*ln(x)*ln((d+e*x^r)/d)+1/2*b*n*ln(x)^2/d^3-1/2*b*n/d^2
/r^2/(d+e*x^r)-1/2*b/r*n*e^2/d^3*ln(x)*(x^r)^2/(d+e*x^r)^2-b/r*n*e/d^2*ln(
x)*x^r/(d+e*x^r)^2+(1/2*I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*Pi*b*csgn
(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-1/2*I*Pi*b*csgn(I*c*x^n)^3+1/2*I*Pi*b*csgn
(I*c*x^n)^2*csgn(I*c)+b*ln(c)+a)/r*(-1/d^3*ln(d+e*x^r)+1/d^2/(d+e*x^r)+1/2
/d/(d+e*x^r)^2+1/d^3*ln(x^r))
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 401 vs. 2(160) = 320.

Time = 0.10 (sec) , antiderivative size = 401, normalized size of antiderivative = 2.37

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^3}\,dx$$
$$=\frac{bd^2nr^2\log(x)^2+3\,bd^2r\log(c)-bd^2n+3\,ad^2r+\left(be^2nr^2\log(x)^2+(2\,be^2r^2\log(c)-3\,be^2nr+2\,ae^2r^2)\right.}{}$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^3,x, algorithm="fricas")
```

output
```
1/2*(b*d^2*n*r^2*log(x)^2 + 3*b*d^2*r*log(c) - b*d^2*n + 3*a*d^2*r + (b*e^
2*n*r^2*log(x)^2 + (2*b*e^2*r^2*log(c) - 3*b*e^2*n*r + 2*a*e^2*r^2)*log(x)
)*x^(2*r) + (2*b*d*e*n*r^2*log(x)^2 + 2*b*d*e*r*log(c) - b*d*e*n + 2*a*d*e
*r + 4*(b*d*e*r^2*log(c) - b*d*e*n*r + a*d*e*r^2)*log(x))*x^r - 2*(b*e^2*n
*x^(2*r) + 2*b*d*e*n*x^r + b*d^2*n)*dilog(-(e*x^r + d)/d + 1) - (2*b*d^2*r
*log(c) - 3*b*d^2*n + 2*a*d^2*r + (2*b*e^2*r*log(c) - 3*b*e^2*n + 2*a*e^2*
r)*x^(2*r) + 2*(2*b*d*e*r*log(c) - 3*b*d*e*n + 2*a*d*e*r)*x^r)*log(e*x^r +
 d) + 2*(b*d^2*r^2*log(c) + a*d^2*r^2)*log(x) - 2*(b*e^2*n*r*x^(2*r)*log(x
) + 2*b*d*e*n*r*x^r*log(x) + b*d^2*n*r*log(x))*log((e*x^r + d)/d))/(d^3*e^
2*r^2*x^(2*r) + 2*d^4*e*r^2*x^r + d^5*r^2)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^3}\,dx=\text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**3,x)
```

output
```
Timed out
```

Maxima [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^3}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^r+d\right)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^3,x, algorithm="maxima")
```

output
```
1/2*a*((2*e*x^r + 3*d)/(d^2*e^2*r*x^(2*r) + 2*d^3*e*r*x^r + d^4*r) + 2*log
(x)/d^3 - 2*log((e*x^r + d)/e)/(d^3*r)) + b*integrate((log(c) + log(x^n))/
(e^3*x*x^(3*r) + 3*d*e^2*x*x^(2*r) + 3*d^2*e*x*x^r + d^3*x), x)
```

Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^3}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^r+d\right)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^3*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^3}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(d+e\,x^r\right)^3}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^3),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^3), x)
```

Reduce [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^3}\,dx$$
$$=\frac{2x^{2r}\left(\int\frac{\log(x^nc)}{x^{3r}e^3x+3x^{2r}d\,e^2x+3x^r d^2ex+d^3x}dx\right)b\,d^3e^2r-2x^{2r}\log(x^re+d)\,a\,e^2+2x^{2r}\log(x)\,a\,e^2r-x^{2r}a\,e^2+4x^r\left(\right.}{}$$

input
```
int((a+b*log(c*x^n))/x/(d+e*x^r)^3,x)
```

output
```
(2*x**(2*r)*int(log(x**n*c)/(x**(3*r)*e**3*x + 3*x**(2*r)*d*e**2*x + 3*x**
r*d**2*e*x + d**3*x),x)*b*d**3*e**2*r - 2*x**(2*r)*log(x**r*e + d)*a*e**2
+ 2*x**(2*r)*log(x)*a*e**2*r - x**(2*r)*a*e**2 + 4*x**r*int(log(x**n*c)/(x
**(3*r)*e**3*x + 3*x**(2*r)*d*e**2*x + 3*x**r*d**2*e*x + d**3*x),x)*b*d**4
*e*r - 4*x**r*log(x**r*e + d)*a*d*e + 4*x**r*log(x)*a*d*e*r + 2*int(log(x*
*n*c)/(x**(3*r)*e**3*x + 3*x**(2*r)*d*e**2*x + 3*x**r*d**2*e*x + d**3*x),x
)*b*d**5*r - 2*log(x**r*e + d)*a*d**2 + 2*log(x)*a*d**2*r + 2*a*d**2)/(2*d
**3*r*(x**(2*r)*e**2 + 2*x**r*d*e + d**2))
```

3.425 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))^2}{x}\,dx$

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Optimal result

Integrand size = 25, antiderivative size = 245

$$\begin{aligned}\int \frac{(d+ex^r)^3(a+b\log(cx^n))^2}{x}\,dx = {} & \frac{6b^2d^2en^2x^r}{r^3}+\frac{3b^2de^2n^2x^{2r}}{4r^3}+\frac{2b^2e^3n^2x^{3r}}{27r^3} \\ & -\frac{6bd^2enx^r(a+b\log(cx^n))}{r^2} \\ & -\frac{3bde^2nx^{2r}(a+b\log(cx^n))}{2r^2} \\ & -\frac{2be^3nx^{3r}(a+b\log(cx^n))}{9r^2} \\ & +\frac{3d^2ex^r(a+b\log(cx^n))^2}{r} \\ & +\frac{3de^2x^{2r}(a+b\log(cx^n))^2}{2r} \\ & +\frac{e^3x^{3r}(a+b\log(cx^n))^2}{3r}+\frac{d^3(a+b\log(cx^n))^3}{3bn}\end{aligned}$$

output
```
6*b^2*d^2*e*n^2*x^r/r^3+3/4*b^2*d*e^2*n^2*x^(2*r)/r^3+2/27*b^2*e^3*n^2*x^(
3*r)/r^3-6*b*d^2*e*n*x^r*(a+b*ln(c*x^n))/r^2-3/2*b*d*e^2*n*x^(2*r)*(a+b*ln
(c*x^n))/r^2-2/9*b*e^3*n*x^(3*r)*(a+b*ln(c*x^n))/r^2+3*d^2*e*x^r*(a+b*ln(c
*x^n))^2/r+3/2*d*e^2*x^(2*r)*(a+b*ln(c*x^n))^2/r+1/3*e^3*x^(3*r)*(a+b*ln(c
*x^n))^2/r+1/3*d^3*(a+b*ln(c*x^n))^3/b/n
```

Mathematica [A] (verified)

Time = 0.46 (sec) , antiderivative size = 262, normalized size of antiderivative = 1.07

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))^2}{x}\,dx$$
$$= \frac{enx^r(18a^2r^2(18d^2+9dex^r+2e^2x^{2r})-6abnr(108d^2+27dex^r+4e^2x^{2r})+b^2n^2(648d^2+81dex^r+8e^2x^{2r}}{}$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
(e*n*x^r*(18*a^2*r^2*(18*d^2 + 9*d*e*x^r + 2*e^2*x^(2*r)) - 6*a*b*n*r*(108
*d^2 + 27*d*e*x^r + 4*e^2*x^(2*r)) + b^2*n^2*(648*d^2 + 81*d*e*x^r + 8*e^2
*x^(2*r))) + 108*a^2*d^3*n*r^3*Log[x] - 6*b*e*n*r*x^r*(-6*a*r*(18*d^2 + 9*
d*e*x^r + 2*e^2*x^(2*r)) + b*n*(108*d^2 + 27*d*e*x^r + 4*e^2*x^(2*r)))*Log
[c*x^n] + 18*b*r^2*(6*a*d^3*r + b*e*n*x^r*(18*d^2 + 9*d*e*x^r + 2*e^2*x^(2
*r)))*Log[c*x^n]^2 + 36*b^2*d^3*r^3*Log[c*x^n]^3)/(108*n*r^3)
```

Rubi [A] (verified)

Time = 0.58 (sec) , antiderivative size = 245, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))^2}{x}\,dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(\frac{d^3(a+b\log(cx^n))^2}{x}+3d^2ex^{r-1}(a+b\log(cx^n))^2+3de^2x^{2r-1}(a+b\log(cx^n))^2+e^3x^{3r-1}(a+b\log(cx^n))^2\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^3(a+b\log(cx^n))^3}{3bn}-\frac{6bd^2enx^r(a+b\log(cx^n))}{r^2}+\frac{3d^2ex^r(a+b\log(cx^n))^2}{r}-\frac{3bde^2nx^{2r}(a+b\log(cx^n))}{2r^2}+\frac{3de^2x^{2r}(a+b\log(cx^n))^2}{2r}-\frac{2be^3nx^{3r}(a+b\log(cx^n))}{9r^2}+\frac{e^3x^{3r}(a+b\log(cx^n))^2}{3r}+\frac{6b^2d^2en^2x^r}{r^3}+\frac{3b^2de^2n^2x^{2r}}{4r^3}+\frac{2b^2e^3n^2x^{3r}}{27r^3}$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
(6*b^2*d^2*e*n^2*x^r)/r^3 + (3*b^2*d*e^2*n^2*x^(2*r))/(4*r^3) + (2*b^2*e^3
*n^2*x^(3*r))/(27*r^3) - (6*b*d^2*e*n*x^r*(a + b*Log[c*x^n]))/r^2 - (3*b*d
*e^2*n*x^(2*r)*(a + b*Log[c*x^n]))/(2*r^2) - (2*b*e^3*n*x^(3*r)*(a + b*Log
[c*x^n]))/(9*r^2) + (3*d^2*e*x^r*(a + b*Log[c*x^n])^2)/r + (3*d*e^2*x^(2*r
)*(a + b*Log[c*x^n])^2)/(2*r) + (e^3*x^(3*r)*(a + b*Log[c*x^n])^2)/(3*r) +
 (d^3*(a + b*Log[c*x^n])^3)/(3*b*n)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [A] (warning: unable to verify)

Time = 10.65 (sec) , antiderivative size = 418, normalized size of antiderivative = 1.71

method	result
parallelrisch	$\frac{36b^2e^3\ln(cx^n)^2x^{3r}r^2n+72x^{3r}\ln(cx^n)abe^3nr^2-24x^{3r}\ln(cx^n)b^2e^3n^2r+162b^2de^2\ln(cx^n)^2x^{2r}r^2n+36x^{3r}a^2e^3nr^2-24x^3}{}$
risch	Expression too large to display

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))^2/x,x,method=_RETURNVERBOSE)
```

output
```
1/108*(36*b^2*e^3*ln(c*x^n)^2*(x^r)^3*r^2*n+72*(x^r)^3*ln(c*x^n)*a*b*e^3*n
*r^2-24*(x^r)^3*ln(c*x^n)*b^2*e^3*n^2*r+162*b^2*d*e^2*ln(c*x^n)^2*(x^r)^2*
r^2*n+36*(x^r)^3*a^2*e^3*n*r^2-24*(x^r)^3*a*b*e^3*n^2*r+8*(x^r)^3*b^2*e^3*
n^3+324*(x^r)^2*ln(c*x^n)*a*b*d*e^2*n*r^2-162*(x^r)^2*ln(c*x^n)*b^2*d*e^2*
n^2*r+324*b^2*d^2*e*ln(c*x^n)^2*x^r*r^2*n+36*d^3*b^2*ln(c*x^n)^3*r^3+108*l
n(x)*a^2*d^3*n*r^3+162*(x^r)^2*a^2*d*e^2*n*r^2-162*(x^r)^2*a*b*d*e^2*n^2*r
+81*(x^r)^2*b^2*d*e^2*n^3+648*x^r*ln(c*x^n)*a*b*d^2*e*n*r^2-648*x^r*ln(c*x
^n)*b^2*d^2*e*n^2*r+108*d^3*a*b*ln(c*x^n)^2*r^3+324*x^r*a^2*d^2*e*n*r^2-64
8*x^r*a*b*d^2*e*n^2*r+648*x^r*b^2*d^2*e*n^3)/r^3/n
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 521 vs. $2(231) = 462$.

Time = 0.09 (sec) , antiderivative size = 521, normalized size of antiderivative = 2.13

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))^2}{x}\,dx = \frac{36\, b^2d^3n^2r^3\log(x)^3 + 108\,(b^2d^3nr^3\log(c) + abd^3nr^3)\log(x)^2 + 4\,(9\,b^2e^3n^2r^2\log(x)^2 + 9\,b^2e^3r^2\log(c)^2}{}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))^2/x,x, algorithm="fricas")
```

output
```
1/108*(36*b^2*d^3*n^2*r^3*log(x)^3 + 108*(b^2*d^3*n*r^3*log(c) + a*b*d^3*n
*r^3)*log(x)^2 + 4*(9*b^2*e^3*n^2*r^2*log(x)^2 + 9*b^2*e^3*r^2*log(c)^2 +
2*b^2*e^3*n^2 - 6*a*b*e^3*n*r + 9*a^2*e^3*r^2 - 6*(b^2*e^3*n*r - 3*a*b*e^3
*r^2)*log(c) + 6*(3*b^2*e^3*n*r^2*log(c) - b^2*e^3*n^2*r + 3*a*b*e^3*n*r^2
)*log(x))*x^(3*r) + 81*(2*b^2*d*e^2*n^2*r^2*log(x)^2 + 2*b^2*d*e^2*r^2*log
(c)^2 + b^2*d*e^2*n^2 - 2*a*b*d*e^2*n*r + 2*a^2*d*e^2*r^2 - 2*(b^2*d*e^2*n
*r - 2*a*b*d*e^2*r^2)*log(c) + 2*(2*b^2*d*e^2*n*r^2*log(c) - b^2*d*e^2*n^2
*r + 2*a*b*d*e^2*n*r^2)*log(x))*x^(2*r) + 324*(b^2*d^2*e*n^2*r^2*log(x)^2
+ b^2*d^2*e*r^2*log(c)^2 + 2*b^2*d^2*e*n^2 - 2*a*b*d^2*e*n*r + a^2*d^2*e*r
^2 - 2*(b^2*d^2*e*n*r - a*b*d^2*e*r^2)*log(c) + 2*(b^2*d^2*e*n*r^2*log(c)
- b^2*d^2*e*n^2*r + a*b*d^2*e*n*r^2)*log(x))*x^r + 108*(b^2*d^3*r^3*log(c)
^2 + 2*a*b*d^3*r^3*log(c) + a^2*d^3*r^3)*log(x))/r^3
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 588 vs. $2(246) = 492$.

Time = 7.78 (sec) , antiderivative size = 588, normalized size of antiderivative = 2.40

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))^2}{x}\,dx$$
$$= \begin{cases} (a+b\log(c))^2 (d+e)^3 \log(x) \\ (a+b\log(c))^2 \left(d^3\log(x) + \frac{3d^2ex^r}{r} + \frac{3de^2x^{2r}}{2r} + \frac{e^3x^{3r}}{3r}\right) \\ (d+e)^3 \left(\begin{cases} \frac{a^2\log(cx^n)+ab\log(cx^n)^2+\frac{b^2\log(cx^n)^3}{3}}{n} & \text{for } n\neq 0 \\ (a^2+2ab\log(c)+b^2\log(c)^2)\log(x) & \text{otherwise} \end{cases}\right) \\ \frac{a^2d^3\log(cx^n)}{n} + \frac{3a^2d^2ex^r}{r} + \frac{3a^2de^2x^{2r}}{2r} + \frac{a^2e^3x^{3r}}{3r} + \frac{abd^3\log(cx^n)^2}{n} - \frac{6abd^2enx^r}{r^2} + \frac{6abd^2ex^r\log(cx^n)}{r} - \frac{3abde^2nx^{2r}}{2r^2} + \frac{3ab}{} \end{cases}$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))**2/x,x)
```

output
```
Piecewise(((a + b*log(c))**2*(d + e)**3*log(x), Eq(n, 0) & Eq(r, 0)), ((a
+ b*log(c))**2*(d**3*log(x) + 3*d**2*e*x**r/r + 3*d*e**2*x**(2*r)/(2*r) +
e**3*x**(3*r)/(3*r)), Eq(n, 0)), ((d + e)**3*Piecewise(((a**2*log(c*x**n)
+ a*b*log(c*x**n)**2 + b**2*log(c*x**n)**3/3)/n, Ne(n, 0)), ((a**2 + 2*a*b
*log(c) + b**2*log(c)**2)*log(x), True)), Eq(r, 0)), (a**2*d**3*log(c*x**n
)/n + 3*a**2*d**2*e*x**r/r + 3*a**2*d*e**2*x**(2*r)/(2*r) + a**2*e**3*x**(
3*r)/(3*r) + a*b*d**3*log(c*x**n)**2/n - 6*a*b*d**2*e*n*x**r/r**2 + 6*a*b*
d**2*e*x**r*log(c*x**n)/r - 3*a*b*d*e**2*n*x**(2*r)/(2*r**2) + 3*a*b*d*e**
2*x**(2*r)*log(c*x**n)/r - 2*a*b*e**3*n*x**(3*r)/(9*r**2) + 2*a*b*e**3*x**
(3*r)*log(c*x**n)/(3*r) + b**2*d**3*log(c*x**n)**3/(3*n) + 6*b**2*d**2*e*n
**2*x**r/r**3 - 6*b**2*d**2*e*n*x**r*log(c*x**n)/r**2 + 3*b**2*d**2*e*x**r
*log(c*x**n)**2/r + 3*b**2*d*e**2*n**2*x**(2*r)/(4*r**3) - 3*b**2*d*e**2*n
*x**(2*r)*log(c*x**n)/(2*r**2) + 3*b**2*d*e**2*x**(2*r)*log(c*x**n)**2/(2*
r) + 2*b**2*e**3*n**2*x**(3*r)/(27*r**3) - 2*b**2*e**3*n*x**(3*r)*log(c*x*
*n)/(9*r**2) + b**2*e**3*x**(3*r)*log(c*x**n)**2/(3*r), True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 391, normalized size of antiderivative = 1.60

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))^2}{x}\,dx = \frac{b^2e^3x^{3r}\log(cx^n)^2}{3r} + \frac{3b^2de^2x^{2r}\log(cx^n)^2}{2r} + \frac{3b^2d^2ex^r\log(cx^n)^2}{r} + \frac{b^2d^3\log(cx^n)^3}{3n} - \frac{2}{27}b^2e^3\left(\frac{3nx^{3r}\log(cx^n)}{r^2} - \frac{n^2x^{3r}}{r^3}\right) - \frac{3}{4}b^2de^2\left(\frac{2nx^{2r}\log(cx^n)}{r^2} - \frac{n^2x^{2r}}{r^3}\right) - 6b^2d^2e\left(\frac{nx^r\log(cx^n)}{r^2} - \frac{n^2x^r}{r^3}\right) + \frac{2abe^3x^{3r}\log(cx^n)}{3r} + \frac{3abde^2x^{2r}\log(cx^n)}{r} + \frac{6abd^2ex^r\log(cx^n)}{r} + \frac{abd^3\log(cx^n)^2}{n} + a^2d^3\log(x) - \frac{2abe^3nx^{3r}}{9r^2} + \frac{a^2e^3x^{3r}}{3r} - \frac{3abde^2nx^{2r}}{2r^2} + \frac{3a^2de^2x^{2r}}{2r} - \frac{6abd^2enx^r}{r^2} + \frac{3a^2d^2ex^r}{r}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))^2/x,x, algorithm="maxima")
```

output
```
1/3*b^2*e^3*x^(3*r)*log(c*x^n)^2/r + 3/2*b^2*d*e^2*x^(2*r)*log(c*x^n)^2/r
+ 3*b^2*d^2*e*x^r*log(c*x^n)^2/r + 1/3*b^2*d^3*log(c*x^n)^3/n - 2/27*b^2*e
^3*(3*n*x^(3*r)*log(c*x^n)/r^2 - n^2*x^(3*r)/r^3) - 3/4*b^2*d*e^2*(2*n*x^(
2*r)*log(c*x^n)/r^2 - n^2*x^(2*r)/r^3) - 6*b^2*d^2*e*(n*x^r*log(c*x^n)/r^2
 - n^2*x^r/r^3) + 2/3*a*b*e^3*x^(3*r)*log(c*x^n)/r + 3*a*b*d*e^2*x^(2*r)*l
og(c*x^n)/r + 6*a*b*d^2*e*x^r*log(c*x^n)/r + a*b*d^3*log(c*x^n)^2/n + a^2*
d^3*log(x) - 2/9*a*b*e^3*n*x^(3*r)/r^2 + 1/3*a^2*e^3*x^(3*r)/r - 3/2*a*b*d
*e^2*n*x^(2*r)/r^2 + 3/2*a^2*d*e^2*x^(2*r)/r - 6*a*b*d^2*e*n*x^r/r^2 + 3*a
^2*d^2*e*x^r/r
```

Giac [F]

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))^2}{x}\,dx = \int \frac{(ex^r+d)^3 (b\log(cx^n)+a)^2}{x}\,dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))^2/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)^2/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))^2}{x}\,dx = \int \frac{(d+e\,x^r)^3\,(a+b\,\ln(c\,x^n))^2}{x}\,dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n))^2)/x,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n))^2)/x, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 417, normalized size of antiderivative = 1.70

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))^2}{x}\,dx$$
$$= \frac{36x^{3r}\log(x^nc)^2 b^2e^3n\,r^2 + 72x^{3r}\log(x^nc)\,ab\,e^3n\,r^2 - 24x^{3r}\log(x^nc)\,b^2e^3n^2r + 36x^{3r}a^2e^3n\,r^2 - 24x^{3r}ab\,e^3 \cdots}{\cdots}$$

input
```
int((d+e*x^r)^3*(a+b*log(c*x^n))^2/x,x)
```

output
```
(36*x**(3*r)*log(x**n*c)**2*b**2*e**3*n*r**2 + 72*x**(3*r)*log(x**n*c)*a*b
*e**3*n*r**2 - 24*x**(3*r)*log(x**n*c)*b**2*e**3*n**2*r + 36*x**(3*r)*a**2
*e**3*n*r**2 - 24*x**(3*r)*a*b*e**3*n**2*r + 8*x**(3*r)*b**2*e**3*n**3 + 1
62*x**(2*r)*log(x**n*c)**2*b**2*d*e**2*n*r**2 + 324*x**(2*r)*log(x**n*c)*a
*b*d*e**2*n*r**2 - 162*x**(2*r)*log(x**n*c)*b**2*d*e**2*n**2*r + 162*x**(2
*r)*a**2*d*e**2*n*r**2 - 162*x**(2*r)*a*b*d*e**2*n**2*r + 81*x**(2*r)*b**2
*d*e**2*n**3 + 324*x**r*log(x**n*c)**2*b**2*d**2*e*n*r**2 + 648*x**r*log(x
**n*c)*a*b*d**2*e*n*r**2 - 648*x**r*log(x**n*c)*b**2*d**2*e*n**2*r + 324*x
**r*a**2*d**2*e*n*r**2 - 648*x**r*a*b*d**2*e*n**2*r + 648*x**r*b**2*d**2*e
*n**3 + 36*log(x**n*c)**3*b**2*d**3*r**3 + 108*log(x**n*c)**2*a*b*d**3*r**
3 + 108*log(x)*a**2*d**3*n*r**3)/(108*n*r**3)
```

3.426 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))^2}{x}\,dx$

Optimal result 3143
Mathematica [A] (verified) 3143
Rubi [A] (verified) 3144
Maple [A] (warning: unable to verify) 3145
Fricas [B] (verification not implemented) 3145
Sympy [B] (verification not implemented) 3146
Maxima [A] (verification not implemented) 3147
Giac [F] 3148
Mupad [F(-1)] 3148
Reduce [B] (verification not implemented) 3149

Optimal result

Integrand size = 25, antiderivative size = 161

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))^2}{x}\,dx = \frac{4b^2den^2x^r}{r^3}+\frac{b^2e^2n^2x^{2r}}{4r^3}-\frac{4bdenx^r(a+b\log(cx^n))}{r^2}-\frac{be^2nx^{2r}(a+b\log(cx^n))}{2r^2}+\frac{2dex^r(a+b\log(cx^n))^2}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))^2}{2r}+\frac{d^2(a+b\log(cx^n))^3}{3bn}$$

output
```
4*b^2*d*e*n^2*x^r/r^3+1/4*b^2*e^2*n^2*x^(2*r)/r^3-4*b*d*e*n*x^r*(a+b*ln(c*
x^n))/r^2-1/2*b*e^2*n*x^(2*r)*(a+b*ln(c*x^n))/r^2+2*d*e*x^r*(a+b*ln(c*x^n)
)^2/r+1/2*e^2*x^(2*r)*(a+b*ln(c*x^n))^2/r+1/3*d^2*(a+b*ln(c*x^n))^3/b/n
```

Mathematica [A] (verified)

Time = 0.33 (sec) , antiderivative size = 179, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))^2}{x}\,dx$$
$$= \frac{3enx^r(2a^2r^2(4d+ex^r)-2abnr(8d+ex^r)+b^2n^2(16d+ex^r))+12a^2d^2nr^3\log(x)-6benrx^r(-2ar(4d\cdots}{12nr^3}$$

input
```
Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
(3*e*n*x^r*(2*a^2*r^2*(4*d + e*x^r) - 2*a*b*n*r*(8*d + e*x^r) + b^2*n^2*(1
6*d + e*x^r)) + 12*a^2*d^2*n*r^3*Log[x] - 6*b*e*n*r*x^r*(-2*a*r*(4*d + e*x
^r) + b*n*(8*d + e*x^r))*Log[c*x^n] + 6*b*r^2*(2*a*d^2*r + b*e*n*x^r*(4*d
+ e*x^r))*Log[c*x^n]^2 + 4*b^2*d^2*r^3*Log[c*x^n]^3)/(12*n*r^3)
```

Rubi [A] (verified)

Time = 0.48 (sec) , antiderivative size = 161, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))^2}{x} \, dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(\frac{d^2(a+b\log(cx^n))^2}{x}+2dex^{r-1}(a+b\log(cx^n))^2+e^2x^{2r-1}(a+b\log(cx^n))^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^2(a+b\log(cx^n))^3}{3bn}-\frac{4bdenx^r(a+b\log(cx^n))}{r^2}+\frac{2dex^r(a+b\log(cx^n))^2}{r}-\frac{be^2nx^{2r}(a+b\log(cx^n))}{2r^2}+\frac{e^2x^{2r}(a+b\log(cx^n))^2}{2r}+\frac{4b^2den^2x^r}{r^3}+\frac{b^2e^2n^2x^{2r}}{4r^3}$$

input
```
Int[((d + e*x^r)^2*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
(4*b^2*d*e*n^2*x^r)/r^3 + (b^2*e^2*n^2*x^(2*r))/(4*r^3) - (4*b*d*e*n*x^r*(
a + b*Log[c*x^n]))/r^2 - (b*e^2*n*x^(2*r)*(a + b*Log[c*x^n]))/(2*r^2) + (2
*d*e*x^r*(a + b*Log[c*x^n])^2)/r + (e^2*x^(2*r)*(a + b*Log[c*x^n])^2)/(2*r
) + (d^2*(a + b*Log[c*x^n])^3)/(3*b*n)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [A] (warning: unable to verify)

Time = 3.27 (sec) , antiderivative size = 281, normalized size of antiderivative = 1.75

method	result
parallelrisch	$\frac{6x^{2r}\ln(cx^n)^2b^2e^2r^2n+12x^{2r}\ln(cx^n)abe^2nr^2-6x^{2r}\ln(cx^n)b^2e^2n^2r+24x^r\ln(cx^n)^2b^2der^2n+4b^2d^2\ln(cx^n)^3r^3+12\ln(x)}{}$
risch	Expression too large to display

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n))^2/x,x,method=_RETURNVERBOSE)
```

output
```
1/12*(6*(x^r)^2*ln(c*x^n)^2*b^2*e^2*r^2*n+12*(x^r)^2*ln(c*x^n)*a*b*e^2*n*r
^2-6*(x^r)^2*ln(c*x^n)*b^2*e^2*n^2*r+24*x^r*ln(c*x^n)^2*b^2*d*e*r^2*n+4*b^
2*d^2*ln(c*x^n)^3*r^3+12*ln(x)*a^2*d^2*n*r^3+6*(x^r)^2*a^2*e^2*n*r^2-6*(x^
r)^2*a*b*e^2*n^2*r+3*(x^r)^2*b^2*e^2*n^3+48*x^r*ln(c*x^n)*a*b*d*e*n*r^2-48
*x^r*ln(c*x^n)*b^2*d*e*n^2*r+12*a*b*d^2*ln(c*x^n)^2*r^3+24*x^r*a^2*d*e*n*r
^2-48*x^r*a*b*d*e*n^2*r+48*x^r*b^2*d*e*n^3)/r^3/n
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 353 vs. $2(153) = 306$.

Time = 0.08 (sec) , antiderivative size = 353, normalized size of antiderivative = 2.19

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))^2}{x}\,dx$$
$$= \frac{4\,b^2d^2n^2r^3\log(x)^3+12\,(b^2d^2nr^3\log(c)+abd^2nr^3)\log(x)^2+3\,\left(2\,b^2e^2n^2r^2\log(x)^2+2\,b^2e^2r^2\log(c)^2+\right.}{}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))^2/x,x, algorithm="fricas")
```

output
```
1/12*(4*b^2*d^2*n^2*r^3*log(x)^3 + 12*(b^2*d^2*n*r^3*log(c) + a*b*d^2*n*r^
3)*log(x)^2 + 3*(2*b^2*e^2*n^2*r^2*log(x)^2 + 2*b^2*e^2*r^2*log(c)^2 + b^2
*e^2*n^2 - 2*a*b*e^2*n*r + 2*a^2*e^2*r^2 - 2*(b^2*e^2*n*r - 2*a*b*e^2*r^2)
*log(c) + 2*(2*b^2*e^2*n*r^2*log(c) - b^2*e^2*n^2*r + 2*a*b*e^2*n*r^2)*log
(x))*x^(2*r) + 24*(b^2*d*e*n^2*r^2*log(x)^2 + b^2*d*e*r^2*log(c)^2 + 2*b^2
*d*e*n^2 - 2*a*b*d*e*n*r + a^2*d*e*r^2 - 2*(b^2*d*e*n*r - a*b*d*e*r^2)*log
(c) + 2*(b^2*d*e*n*r^2*log(c) - b^2*d*e*n^2*r + a*b*d*e*n*r^2)*log(x))*x^r
 + 12*(b^2*d^2*r^3*log(c)^2 + 2*a*b*d^2*r^3*log(c) + a^2*d^2*r^3)*log(x))/
r^3
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 408 vs. $2(156) = 312$.

Time = 6.74 (sec) , antiderivative size = 408, normalized size of antiderivative = 2.53

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))^2}{x}\,dx$$

$$= \begin{cases} (a+b\log(c))^2 (d+e)^2 \log(x) \\ (a+b\log(c))^2 \left(d^2\log(x) + \frac{2dex^r}{r} + \frac{e^2x^{2r}}{2r}\right) \\ (d+e)^2 \left(\begin{cases} \frac{a^2\log(cx^n) + ab\log(cx^n)^2 + \frac{b^2\log(cx^n)^3}{3}}{n} & \text{for } n \neq 0 \\ (a^2+2ab\log(c)+b^2\log(c)^2)\log(x) & \text{otherwise} \end{cases}\right) \\ \frac{a^2d^2\log(cx^n)}{n} + \frac{2a^2dex^r}{r} + \frac{a^2e^2x^{2r}}{2r} + \frac{abd^2\log(cx^n)^2}{n} - \frac{4abdenx^r}{r^2} + \frac{4abdex^r\log(cx^n)}{r} - \frac{abe^2nx^{2r}}{2r^2} + \frac{abe^2x^{2r}\log(cx^n)}{r} + b^2 \end{cases}$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n))**2/x,x)
```

output
```
Piecewise(((a + b*log(c))**2*(d + e)**2*log(x), Eq(n, 0) & Eq(r, 0)), ((a
+ b*log(c))**2*(d**2*log(x) + 2*d*e*x**r/r + e**2*x**(2*r)/(2*r)), Eq(n, 0
)), ((d + e)**2*Piecewise(((a**2*log(c*x**n) + a*b*log(c*x**n)**2 + b**2*l
og(c*x**n)**3/3)/n, Ne(n, 0)), ((a**2 + 2*a*b*log(c) + b**2*log(c)**2)*log
(x), True)), Eq(r, 0)), (a**2*d**2*log(c*x**n)/n + 2*a**2*d*e*x**r/r + a**
2*e**2*x**(2*r)/(2*r) + a*b*d**2*log(c*x**n)**2/n - 4*a*b*d*e*n*x**r/r**2
+ 4*a*b*d*e*x**r*log(c*x**n)/r - a*b*e**2*n*x**(2*r)/(2*r**2) + a*b*e**2*x
**(2*r)*log(c*x**n)/r + b**2*d**2*log(c*x**n)**3/(3*n) + 4*b**2*d*e*n**2*x
**r/r**3 - 4*b**2*d*e*n*x**r*log(c*x**n)/r**2 + 2*b**2*d*e*x**r*log(c*x**n
)**2/r + b**2*e**2*n**2*x**(2*r)/(4*r**3) - b**2*e**2*n*x**(2*r)*log(c*x**
n)/(2*r**2) + b**2*e**2*x**(2*r)*log(c*x**n)**2/(2*r), True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 259, normalized size of antiderivative = 1.61

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))^2}{x}\,dx = \frac{b^2e^2x^{2r}\log(cx^n)^2}{2r} + \frac{2b^2dex^r\log(cx^n)^2}{r} + \frac{b^2d^2\log(cx^n)^3}{3n} - \frac{1}{4}b^2e^2\left(\frac{2nx^{2r}\log(cx^n)}{r^2} - \frac{n^2x^{2r}}{r^3}\right) - 4b^2de\left(\frac{nx^r\log(cx^n)}{r^2} - \frac{n^2x^r}{r^3}\right) + \frac{abe^2x^{2r}\log(cx^n)}{r} + \frac{4abdex^r\log(cx^n)}{r} + \frac{abd^2\log(cx^n)^2}{n} + a^2d^2\log(x) - \frac{abe^2nx^{2r}}{2r^2} + \frac{a^2e^2x^{2r}}{2r} - \frac{4abdenx^r}{r^2} + \frac{2a^2dex^r}{r}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))^2/x,x, algorithm="maxima")
```

output
```
1/2*b^2*e^2*x^(2*r)*log(c*x^n)^2/r + 2*b^2*d*e*x^r*log(c*x^n)^2/r + 1/3*b^
2*d^2*log(c*x^n)^3/n - 1/4*b^2*e^2*(2*n*x^(2*r)*log(c*x^n)/r^2 - n^2*x^(2*
r)/r^3) - 4*b^2*d*e*(n*x^r*log(c*x^n)/r^2 - n^2*x^r/r^3) + a*b*e^2*x^(2*r)
*log(c*x^n)/r + 4*a*b*d*e*x^r*log(c*x^n)/r + a*b*d^2*log(c*x^n)^2/n + a^2*
d^2*log(x) - 1/2*a*b*e^2*n*x^(2*r)/r^2 + 1/2*a^2*e^2*x^(2*r)/r - 4*a*b*d*e
*n*x^r/r^2 + 2*a^2*d*e*x^r/r
```

Giac [F]

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))^2}{x} \, dx = \int \frac{(ex^r+d)^2 (b\log(cx^n)+a)^2}{x} \, dx$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))^2/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(b*log(c*x^n) + a)^2/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))^2}{x} \, dx = \int \frac{(d+e\,x^r)^2 \,(a+b\,\ln(c\,x^n))^2}{x} \, dx$$

input
```
int(((d + e*x^r)^2*(a + b*log(c*x^n))^2)/x,x)
```

output
```
int(((d + e*x^r)^2*(a + b*log(c*x^n))^2)/x, x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 280, normalized size of antiderivative = 1.74

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))^2}{x}\,dx$$
$$= \frac{6x^{2r}\log(x^nc)^2 b^2e^2n\,r^2 + 12x^{2r}\log(x^nc)\,ab\,e^2n\,r^2 - 6x^{2r}\log(x^nc)\,b^2e^2n^2r + 6x^{2r}a^2e^2n\,r^2 - 6x^{2r}ab\,e^2n^2r +}{}$$

input
```
int((d+e*x^r)^2*(a+b*log(c*x^n))^2/x,x)
```

output
```
(6*x**(2*r)*log(x**n*c)**2*b**2*e**2*n*r**2 + 12*x**(2*r)*log(x**n*c)*a*b*
e**2*n*r**2 - 6*x**(2*r)*log(x**n*c)*b**2*e**2*n**2*r + 6*x**(2*r)*a**2*e*
*2*n*r**2 - 6*x**(2*r)*a*b*e**2*n**2*r + 3*x**(2*r)*b**2*e**2*n**3 + 24*x*
*r*log(x**n*c)**2*b**2*d*e*n*r**2 + 48*x**r*log(x**n*c)*a*b*d*e*n*r**2 - 4
8*x**r*log(x**n*c)*b**2*d*e*n**2*r + 24*x**r*a**2*d*e*n*r**2 - 48*x**r*a*b
*d*e*n**2*r + 48*x**r*b**2*d*e*n**3 + 4*log(x**n*c)**3*b**2*d**2*r**3 + 12
*log(x**n*c)**2*a*b*d**2*r**3 + 12*log(x)*a**2*d**2*n*r**3)/(12*n*r**3)
```

3.427 $\int \frac{(d+ex^r)(a+b\log(cx^n))^2}{x} \, dx$

Optimal result 3150
Mathematica [A] (verified) 3150
Rubi [A] (verified) 3151
Maple [A] (verified) 3152
Fricas [B] (verification not implemented) 3152
Sympy [B] (verification not implemented) 3153
Maxima [A] (verification not implemented) 3154
Giac [F] 3154
Mupad [F(-1)] 3155
Reduce [B] (verification not implemented) 3155

Optimal result

Integrand size = 23, antiderivative size = 80

$$\int \frac{(d+ex^r)(a+b\log(cx^n))^2}{x} \, dx = \frac{2b^2en^2x^r}{r^3} - \frac{2benx^r(a+b\log(cx^n))}{r^2} + \frac{ex^r(a+b\log(cx^n))^2}{r} + \frac{d(a+b\log(cx^n))^3}{3bn}$$

output
```
2*b^2*e*n^2*x^r/r^3-2*b*e*n*x^r*(a+b*ln(c*x^n))/r^2+e*x^r*(a+b*ln(c*x^n))^
2/r+1/3*d*(a+b*ln(c*x^n))^3/b/n
```

Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.36

$$\int \frac{(d+ex^r)(a+b\log(cx^n))^2}{x} \, dx = \frac{e(2b^2n^2-2abnr+a^2r^2)\,x^r}{r^3} + a^2d\log(x) - \frac{2be(bn-ar)x^r\log(cx^n)}{r^2} + \frac{b(adr+benx^r)\log^2(cx^n)}{nr} + \frac{b^2d\log^3(cx^n)}{3n}$$

input
```
Integrate[((d + e*x^r)*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
(e*(2*b^2*n^2 - 2*a*b*n*r + a^2*r^2)*x^r)/r^3 + a^2*d*Log[x] - (2*b*e*(b*n
 - a*r)*x^r*Log[c*x^n])/r^2 + (b*(a*d*r + b*e*n*x^r)*Log[c*x^n]^2)/(n*r) +
 (b^2*d*Log[c*x^n]^3)/(3*n)
```

Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 80, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)\left(a+b\log\left(cx^n\right)\right)^2}{x}\,dx$$

$$\Big\downarrow \ 2795$$

$$\int \left(\frac{d\left(a+b\log\left(cx^n\right)\right)^2}{x}+ex^{r-1}\left(a+b\log\left(cx^n\right)\right)^2\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{d\left(a+b\log\left(cx^n\right)\right)^3}{3bn}-\frac{2benx^r\left(a+b\log\left(cx^n\right)\right)}{r^2}+\frac{ex^r\left(a+b\log\left(cx^n\right)\right)^2}{r}+\frac{2b^2en^2x^r}{r^3}$$

input
```
Int[((d + e*x^r)*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
(2*b^2*e*n^2*x^r)/r^3 - (2*b*e*n*x^r*(a + b*Log[c*x^n]))/r^2 + (e*x^r*(a +
 b*Log[c*x^n])^2)/r + (d*(a + b*Log[c*x^n])^3)/(3*b*n)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [A] (verified)

Time = 1.04 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.86

method	result
parallelrisch	$\frac{3x^r \ln(c\,x^n)^2 b^2 e\,r^2 n + d\,b^2 \ln(c\,x^n)^3 r^3 + 3\ln(x) a^2 dn\,r^3 + 6x^r \ln(c\,x^n) aben\,r^2 - 6x^r \ln(c\,x^n) b^2 e\,n^2 r + 3dab\ln(c\,x^n)^2 r^3 + 3x^r a^2 e}{3r^3 n}$
risch	Expression too large to display

input
```
int((d+e*x^r)*(a+b*ln(c*x^n))^2/x,x,method=_RETURNVERBOSE)
```

output
```
1/3*(3*x^r*ln(c*x^n)^2*b^2*e*r^2*n+d*b^2*ln(c*x^n)^3*r^3+3*ln(x)*a^2*d*n*r
^3+6*x^r*ln(c*x^n)*a*b*e*n*r^2-6*x^r*ln(c*x^n)*b^2*e*n^2*r+3*d*a*b*ln(c*x^
n)^2*r^3+3*x^r*a^2*e*n*r^2-6*x^r*a*b*e*n^2*r+6*x^r*b^2*e*n^3)/r^3/n
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 193 vs. 2(78) = 156.

Time = 0.08 (sec) , antiderivative size = 193, normalized size of antiderivative = 2.41

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))^2}{x}\,dx$$
$$= \frac{b^2dn^2r^3\log(x)^3 + 3\,(b^2dnr^3\log(c) + abdnr^3)\log(x)^2 + 3\,\left(b^2en^2r^2\log(x)^2 + b^2er^2\log(c)^2 + 2\,b^2en^2 - 2\right.}{}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))^2/x,x, algorithm="fricas")
```

output
```
1/3*(b^2*d*n^2*r^3*log(x)^3 + 3*(b^2*d*n*r^3*log(c) + a*b*d*n*r^3)*log(x)^
2 + 3*(b^2*e*n^2*r^2*log(x)^2 + b^2*e*r^2*log(c)^2 + 2*b^2*e*n^2 - 2*a*b*e
*n*r + a^2*e*r^2 - 2*(b^2*e*n*r - a*b*e*r^2)*log(c) + 2*(b^2*e*n*r^2*log(c
) - b^2*e*n^2*r + a*b*e*n*r^2)*log(x))*x^r + 3*(b^2*d*r^3*log(c)^2 + 2*a*b
*d*r^3*log(c) + a^2*d*r^3)*log(x))/r^3
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 245 vs. 2(76) = 152.

Time = 6.20 (sec) , antiderivative size = 245, normalized size of antiderivative = 3.06

$$\int \frac{(d+ex^r)(a+b\log(cx^n))^2}{x}\,dx$$
$$= \begin{cases} (a+b\log(c))^2(d+e)\log(x) \\ (a+b\log(c))^2\left(d\log(x)+\frac{ex^r}{r}\right) \\ (d+e)\left(\begin{cases} \frac{a^2\log(cx^n)+ab\log(cx^n)^2+\frac{b^2\log(cx^n)^3}{3}}{n} & \text{for } n\neq 0 \\ (a^2+2ab\log(c)+b^2\log(c)^2)\log(x) & \text{otherwise} \end{cases}\right) \\ \frac{a^2d\log(cx^n)}{n}+\frac{a^2ex^r}{r}+\frac{abd\log(cx^n)^2}{n}-\frac{2abenx^r}{r^2}+\frac{2abex^r\log(cx^n)}{r}+\frac{b^2d\log(cx^n)^3}{3n}+\frac{2b^2en^2x^r}{r^3}-\frac{2b^2enx^r\log(cx^n)}{r^2}+\frac{b^2e}{} \end{cases}$$

input
```
integrate((d+e*x**r)*(a+b*ln(c*x**n))**2/x,x)
```

output
```
Piecewise(((a + b*log(c))**2*(d + e)*log(x), Eq(n, 0) & Eq(r, 0)), ((a + b
*log(c))**2*(d*log(x) + e*x**r/r), Eq(n, 0)), ((d + e)*Piecewise(((a**2*lo
g(c*x**n) + a*b*log(c*x**n)**2 + b**2*log(c*x**n)**3/3)/n, Ne(n, 0)), ((a*
*2 + 2*a*b*log(c) + b**2*log(c)**2)*log(x), True)), Eq(r, 0)), (a**2*d*log
(c*x**n)/n + a**2*e*x**r/r + a*b*d*log(c*x**n)**2/n - 2*a*b*e*n*x**r/r**2
+ 2*a*b*e*x**r*log(c*x**n)/r + b**2*d*log(c*x**n)**3/(3*n) + 2*b**2*e*n**2
*x**r/r**3 - 2*b**2*e*n*x**r*log(c*x**n)/r**2 + b**2*e*x**r*log(c*x**n)**2
/r, True))
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 131, normalized size of antiderivative = 1.64

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})^2}{x}\,dx = \frac{b^2ex^r\log{(cx^n)}^2}{r} + \frac{b^2d\log{(cx^n)}^3}{3\,n} - 2\,b^2e\left(\frac{nx^r\log{(cx^n)}}{r^2} - \frac{n^2x^r}{r^3}\right) + \frac{2\,abex^r\log{(cx^n)}}{r} + \frac{abd\log{(cx^n)}^2}{n} + a^2d\log{(x)} - \frac{2\,abenx^r}{r^2} + \frac{a^2ex^r}{r}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))^2/x,x, algorithm="maxima")
```

output
```
b^2*e*x^r*log(c*x^n)^2/r + 1/3*b^2*d*log(c*x^n)^3/n - 2*b^2*e*(n*x^r*log(c
*x^n)/r^2 - n^2*x^r/r^3) + 2*a*b*e*x^r*log(c*x^n)/r + a*b*d*log(c*x^n)^2/n
 + a^2*d*log(x) - 2*a*b*e*n*x^r/r^2 + a^2*e*x^r/r
```

Giac [F]

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})^2}{x}\,dx = \int \frac{(ex^r+d)(b\log{(cx^n)}+a)^2}{x}\,dx$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))^2/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)*(b*log(c*x^n) + a)^2/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})^2}{x}\,dx=\int \frac{(d+e\,x^r)\,\left(a+b\,\ln{(c\,x^n)}\right)^2}{x}\,dx$$

input
```
int(((d + e*x^r)*(a + b*log(c*x^n))^2)/x,x)
```

output
```
int(((d + e*x^r)*(a + b*log(c*x^n))^2)/x, x)
```

Reduce [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 148, normalized size of antiderivative = 1.85

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})^2}{x}\,dx$$
$$=\frac{3x^r\log(x^nc)^2\,b^2en\,r^2+6x^r\log(x^nc)\,aben\,r^2-6x^r\log(x^nc)\,b^2e\,n^2r+3x^ra^2en\,r^2-6x^rabe\,n^2r+6x^rb^2e\,n^3}{3n\,r^3}$$

input
```
int((d+e*x^r)*(a+b*log(c*x^n))^2/x,x)
```

output
```
(3*x**r*log(x**n*c)**2*b**2*e*n*r**2 + 6*x**r*log(x**n*c)*a*b*e*n*r**2 - 6
*x**r*log(x**n*c)*b**2*e*n**2*r + 3*x**r*a**2*e*n*r**2 - 6*x**r*a*b*e*n**2
*r + 6*x**r*b**2*e*n**3 + log(x**n*c)**3*b**2*d*r**3 + 3*log(x**n*c)**2*a*
b*d*r**3 + 3*log(x)*a**2*d*n*r**3)/(3*n*r**3)
```

3.428 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx$

Optimal result . . . 3156
Mathematica [B] (warning: unable to verify) . . . 3156
Rubi [A] (verified) . . . 3157
Maple [C] (warning: unable to verify) . . . 3158
Fricas [B] (verification not implemented) . . . 3159
Sympy [F] . . . 3160
Maxima [F] . . . 3160
Giac [F] . . . 3160
Mupad [F(-1)] . . . 3161
Reduce [F] . . . 3161

Optimal result

Integrand size = 25, antiderivative size = 94

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx = -\frac{(a+b\log(cx^n))^2\log\left(1+\frac{dx^{-r}}{e}\right)}{dr} + \frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2} + \frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{dx^{-r}}{e}\right)}{dr^3}$$

output
```
-(a+b*ln(c*x^n))^2*ln(1+d/e/(x^r))/d/r+2*b*n*(a+b*ln(c*x^n))*polylog(2,-d/
e/(x^r))/d/r^2+2*b^2*n^2*polylog(3,-d/e/(x^r))/d/r^3
```

Mathematica [B] (warning: unable to verify)

Leaf count is larger than twice the leaf count of optimal. 270 vs. 2(94) = 188.

Time = 0.35 (sec) , antiderivative size = 270, normalized size of antiderivative = 2.87

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx =$$

$$-\frac{a^2r^2\log(d-dx^r) - 2abr^2(n\log(x)-\log(cx^n))\log(d-dx^r) + b^2r^2(-n\log(x)+\log(cx^n))^2\log(d-}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x^r)),x]
```

output
```
-((a^2*r^2*Log[d - d*x^r] - 2*a*b*r^2*(n*Log[x] - Log[c*x^n])*Log[d - d*x^
r] + b^2*r^2*(-(n*Log[x]) + Log[c*x^n])^2*Log[d - d*x^r] - 2*a*b*n*r*((r^2
*Log[x]^2)/2 + (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[
2, 1 + (e*x^r)/d]) + 2*b^2*n*r*(n*Log[x] - Log[c*x^n])*((r^2*Log[x]^2)/2 +
 (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^r)
/d]) + b^2*n^2*(r^2*Log[x]^2*Log[1 + d/(e*x^r)] - 2*r*Log[x]*PolyLog[2, -(
d/(e*x^r))] - 2*PolyLog[3, -(d/(e*x^r))]))/(d*r^3))
```

Rubi [A] (verified)

Time = 0.45 (sec) , antiderivative size = 91, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.120, Rules used = {2779, 2821, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}dx$$

$$\Big\downarrow \text{2779}$$

$$\frac{2bn\int \frac{(a+b\log(cx^n))\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}$$

$$\Big\downarrow \text{2821}$$

$$\frac{2bn\left(\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{r}-\frac{bn\int \frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{x}dx}{r}\right)}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}$$

$$\Big\downarrow \text{7143}$$

$$\frac{2bn\left(\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{r}+\frac{bn\,\text{PolyLog}\left(3,-\frac{dx^{-r}}{e}\right)}{r^2}\right)}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x*(d + e*x^r)),x]
```

output
```
-(((a + b*Log[c*x^n])^2*Log[1 + d/(e*x^r)])/(d*r)) + (2*b*n*(((a + b*Log[c
*x^n])*PolyLog[2, -(d/(e*x^r))])/r + (b*n*PolyLog[3, -(d/(e*x^r))])/r^2))/
(d*r)
```

Defintions of rubi rules used

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.90 (sec) , antiderivative size = 580, normalized size of antiderivative = 6.17

method	result
risch	$-\frac{b^2\ln(d+e\,x^r)\ln(x)^2n^2}{rd}+\frac{2b^2\ln(d+e\,x^r)\ln(x)\ln(x^n)n}{rd}-\frac{b^2\ln(d+e\,x^r)\ln(x^n)^2}{rd}+\frac{b^2\ln(x^r)\ln(x)^2n^2}{rd}-\frac{2b^2\ln(x^r)\ln(x)\ln}{rd}$

input
```
int((a+b*ln(c*x^n))^2/x/(d+e*x^r),x,method=_RETURNVERBOSE)
```

output
```
-b^2/r/d*ln(d+e*x^r)*ln(x)^2*n^2+2*b^2/r/d*ln(d+e*x^r)*ln(x)*ln(x^n)*n-b^2
/r/d*ln(d+e*x^r)*ln(x^n)^2+b^2/r/d*ln(x^r)*ln(x)^2*n^2-2*b^2/r/d*ln(x^r)*l
n(x)*ln(x^n)*n+b^2/r/d*ln(x^r)*ln(x^n)^2-2/3*b^2*n^2/d*ln(x)^3+b^2/r*n^2/d
*ln(x)^2*ln(1+e*x^r/d)+2*b^2/r^3*n^2/d*polylog(3,-e*x^r/d)+b^2*n/d*ln(x)^2
*ln(x^n)-2*b^2/r*n/d*ln(x)*ln(x^n)*ln(1+e*x^r/d)-2*b^2/r^2*n/d*ln(x^n)*pol
ylog(2,-e*x^r/d)+(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*cs
gn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I
*c)+2*b*ln(c)+2*a)*b/r*((ln(x^n)-n*ln(x))*(-1/d*ln(d+e*x^r)+1/d*ln(x^r))-n
/r/d*(-1/2*r^2*ln(x)^2+r*ln(x)*ln(1+e*x^r/d)+polylog(2,-e*x^r/d)))+1/4*(I*
Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c
)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^2
*(-1/r/d*ln(d+e*x^r)+1/r/d*ln(x^r))
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 228 vs. $2(93) = 186$.

Time = 0.09 (sec) , antiderivative size = 228, normalized size of antiderivative = 2.43

$$\int \frac{(a + b\log(cx^n))^2}{x(d + ex^r)}\,dx$$
$$= \frac{b^2n^2r^3\log(x)^3 + 6\,b^2n^2\text{polylog}\left(3, -\frac{ex^r}{d}\right) + 3\left(b^2nr^3\log(c) + abnr^3\right)\log(x)^2 - 6\left(b^2n^2r\log(x) + b^2nr\log\right.}{}$$

input
```
integrate((a+b*log(c*x^n))^2/x/(d+e*x^r),x, algorithm="fricas")
```

output
```
1/3*(b^2*n^2*r^3*log(x)^3 + 6*b^2*n^2*polylog(3, -e*x^r/d) + 3*(b^2*n*r^3*
log(c) + a*b*n*r^3)*log(x)^2 - 6*(b^2*n^2*r*log(x) + b^2*n*r*log(c) + a*b*
n*r)*dilog(-(e*x^r + d)/d + 1) - 3*(b^2*r^2*log(c)^2 + 2*a*b*r^2*log(c) +
a^2*r^2)*log(e*x^r + d) + 3*(b^2*r^3*log(c)^2 + 2*a*b*r^3*log(c) + a^2*r^3
)*log(x) - 3*(b^2*n^2*r^2*log(x)^2 + 2*(b^2*n*r^2*log(c) + a*b*n*r^2)*log(
x))*log((e*x^r + d)/d))/(d*r^3)
```

Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx = \int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x/(d+e*x**r),x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x*(d + e*x**r)), x)
```

Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex^r+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(d+e*x^r),x, algorithm="maxima")
```

output
```
a^2*(log(x)/d - log((e*x^r + d)/e)/(d*r)) + integrate((b^2*log(c)^2 + b^2*
log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e*x*x^r + d*x)
, x)
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex^r+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x^r + d)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx=\int \frac{(a+b\ln(c\,x^n))^2}{x\,(d+e\,x^r)}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x*(d + e*x^r)),x)
```

output
```
int((a + b*log(c*x^n))^2/(x*(d + e*x^r)), x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx = \frac{\left(\int \frac{\log(x^n c)^2}{x^r ex+dx}dx\right)b^2dr+2\left(\int \frac{\log(x^n c)}{x^r ex+dx}dx\right)abdr-\log(x^r e+d)\,a^2+\log(x)\,a^2r}{dr}$$

input
```
int((a+b*log(c*x^n))^2/x/(d+e*x^r),x)
```

output
```
(int(log(x**n*c)**2/(x**r*e*x + d*x),x)*b**2*d*r + 2*int(log(x**n*c)/(x**r
*e*x + d*x),x)*a*b*d*r - log(x**r*e + d)*a**2 + log(x)*a**2*r)/(d*r)
```

3.429 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx$

Optimal result . . . 3162
Mathematica [B] (warning: unable to verify) . . . 3163
Rubi [A] (verified) . . . 3163
Maple [F] . . . 3166
Fricas [B] (verification not implemented) . . . 3167
Sympy [F] . . . 3167
Maxima [F] . . . 3168
Giac [F] . . . 3168
Mupad [F(-1)] . . . 3168
Reduce [F] . . . 3169

Optimal result

Integrand size = 25, antiderivative size = 182

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx = \frac{(a+b\log(cx^n))^2}{dr(d+ex^r)} + \frac{2bn(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r^2} - \frac{(a+b\log(cx^n))^2\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r} - \frac{2b^2n^2\operatorname{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^2r^3} + \frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^2r^2} + \frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{dx^{-r}}{e}\right)}{d^2r^3}$$

output

```
(a+b*ln(c*x^n))^2/d/r/(d+e*x^r)+2*b*n*(a+b*ln(c*x^n))*ln(1+d/e/(x^r))/d^2/
r^2-(a+b*ln(c*x^n))^2*ln(1+d/e/(x^r))/d^2/r-2*b^2*n^2*polylog(2,-d/e/(x^r)
)/d^2/r^3+2*b*n*(a+b*ln(c*x^n))*polylog(2,-d/e/(x^r))/d^2/r^2+2*b^2*n^2*po
lylog(3,-d/e/(x^r))/d^2/r^3
```

Mathematica [B] (warning: unable to verify)

Leaf count is larger than twice the leaf count of optimal. 397 vs. $2(182) = 364$.

Time = 0.46 (sec) , antiderivative size = 397, normalized size of antiderivative = 2.18

$$\int \frac{(a + b\log(cx^n))^2}{x(d + ex^r)^2}\,dx$$
$$= \frac{\frac{dr^2(a+b\log(cx^n))^2}{d+ex^r} + 2abnr\log(d - dx^r) - a^2r^2\log(d - dx^r) + 2abr^2(n\log(x) - \log(cx^n))\log(d - dx^r) + \cdots}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x^r)^2),x]
```

output
```
((d*r^2*(a + b*Log[c*x^n])^2)/(d + e*x^r) + 2*a*b*n*r*Log[d - d*x^r] - a^2
*r^2*Log[d - d*x^r] + 2*a*b*r^2*(n*Log[x] - Log[c*x^n])*Log[d - d*x^r] + 2
*b^2*n*r*(-(n*Log[x]) + Log[c*x^n])*Log[d - d*x^r] - b^2*r^2*(-(n*Log[x])
+ Log[c*x^n])^2*Log[d - d*x^r] - 2*b^2*n^2*((r^2*Log[x]^2)/2 + (-(r*Log[x]
) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^r)/d]) + 2*a*b
*n*r*((r^2*Log[x]^2)/2 + (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r]
+ PolyLog[2, 1 + (e*x^r)/d]) + 2*b^2*n*r*(-(n*Log[x]) + Log[c*x^n])*((r^2*
Log[x]^2)/2 + (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2
, 1 + (e*x^r)/d]) - b^2*n^2*(r^2*Log[x]^2*Log[1 + d/(e*x^r)] - 2*r*Log[x]*
PolyLog[2, -(d/(e*x^r))] - 2*PolyLog[3, -(d/(e*x^r))]))/(d^2*r^3)
```

Rubi [A] (verified)

Time = 1.04 (sec) , antiderivative size = 196, normalized size of antiderivative = 1.08, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.240$, Rules used = {2791, 2776, 2779, 2821, 2838, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a + b\log(cx^n))^2}{x(d + ex^r)^2}\,dx$$
$$\Big\downarrow \text{2791}$$

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(ex^r+d)}dx}{d} - \frac{e\int \frac{x^{r-1}(a+b\log(cx^n))^2}{(ex^r+d)^2}dx}{d}$$

$\Big\downarrow$ 2776

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(ex^r+d)}dx}{d} - \frac{e\left(\frac{2bn\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{er} - \frac{(a+b\log(cx^n))^2}{er(d+ex^r)}\right)}{d}$$

$\Big\downarrow$ 2779

$$\frac{\frac{2bn\int \frac{(a+b\log(cx^n))\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr} - \frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}}{d} - \frac{e\left(\frac{2bn\left(\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr} - \frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}\right)}{er} - \frac{(a+b\log(cx^n))^2}{er(d+ex^r)}\right)}{d}$$

$\Big\downarrow$ 2821

$$\frac{\frac{2bn\left(\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{r} - \frac{bn\int \frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{x}dx}{r}\right)}{dr} - \frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}}{d} - \frac{e\left(\frac{2bn\left(\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr} - \frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}\right)}{er} - \frac{(a+b\log(cx^n))^2}{er(d+ex^r)}\right)}{d}$$

$\Big\downarrow$ 2838

$$\frac{\frac{2bn\left(\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{r} - \frac{bn\int \frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{x}dx}{r}\right)}{dr} - \frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}}{d} - \frac{e\left(\frac{2bn\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2} - \frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}\right)}{er} - \frac{(a+b\log(cx^n))^2}{er(d+ex^r)}\right)}{d}$$

$$\Big\downarrow \text{7143}$$

$$\frac{\frac{2bn\left(\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{r}+\frac{bn\,\text{PolyLog}\left(3,-\frac{dx^{-r}}{e}\right)}{r^2}\right)}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}}{d}-\frac{e\left(\frac{2bn\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}\right)}{er}-\frac{(a+b\log(cx^n))^2}{er(d+ex^r)}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x*(d + e*x^r)^2),x]
```

output
```
-((e*(-((a + b*Log[c*x^n])^2/(e*r*(d + e*x^r))) + (2*b*n*(-(((a + b*Log[c*
x^n])*Log[1 + d/(e*x^r)])/(d*r)) + (b*n*PolyLog[2, -(d/(e*x^r))])/(d*r^2))
)/(e*r)))/d) + (-(((a + b*Log[c*x^n])^2*Log[1 + d/(e*x^r)])/(d*r)) + (2*b*
n*(((a + b*Log[c*x^n])*PolyLog[2, -(d/(e*x^r))])/r + (b*n*PolyLog[3, -(d/(
e*x^r))])/r^2))/(d*r))/d
```

Defintions of rubi rules used

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2791
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x
^n])^p/x), x], x] - Simp[e/d   Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n
])^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1
]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Maple [F]

$$\int \frac{(a+b\ln(c\,x^{n}))^{2}}{x\,(d+e\,x^{r})^{2}}dx$$

input
```
int((a+b*ln(c*x^n))^2/x/(d+e*x^r)^2,x)
```

output
```
int((a+b*ln(c*x^n))^2/x/(d+e*x^r)^2,x)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 600 vs. $2(180) = 360$.

Time = 0.09 (sec) , antiderivative size = 600, normalized size of antiderivative = 3.30

$$\int \frac{(a + b\log(cx^n))^2}{x(d + ex^r)^2}\,dx$$
$$= \frac{b^2dn^2r^3\log(x)^3 + 3\,b^2dr^2\log(c)^2 + 6\,abdr^2\log(c) + 3\,a^2dr^2 + 3\,(b^2dnr^3\log(c) + abdnr^3)\log(x)^2 + (b^2e}{}$$

input
```
integrate((a+b*log(c*x^n))^2/x/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
1/3*(b^2*d*n^2*r^3*log(x)^3 + 3*b^2*d*r^2*log(c)^2 + 6*a*b*d*r^2*log(c) +
3*a^2*d*r^2 + 3*(b^2*d*n*r^3*log(c) + a*b*d*n*r^3)*log(x)^2 + (b^2*e*n^2*r
^3*log(x)^3 + 3*(b^2*e*n*r^3*log(c) - b^2*e*n^2*r^2 + a*b*e*n*r^3)*log(x)^
2 + 3*(b^2*e*r^3*log(c)^2 - 2*a*b*e*n*r^2 + a^2*e*r^3 - 2*(b^2*e*n*r^2 - a
*b*e*r^3)*log(c))*log(x))*x^r - 6*(b^2*d*n^2*r*log(x) + b^2*d*n*r*log(c) -
 b^2*d*n^2 + a*b*d*n*r + (b^2*e*n^2*r*log(x) + b^2*e*n*r*log(c) - b^2*e*n^
2 + a*b*e*n*r)*x^r)*dilog(-(e*x^r + d)/d + 1) - 3*(b^2*d*r^2*log(c)^2 - 2*
a*b*d*n*r + a^2*d*r^2 + (b^2*e*r^2*log(c)^2 - 2*a*b*e*n*r + a^2*e*r^2 - 2*
(b^2*e*n*r - a*b*e*r^2)*log(c))*x^r - 2*(b^2*d*n*r - a*b*d*r^2)*log(c))*lo
g(e*x^r + d) + 3*(b^2*d*r^3*log(c)^2 + 2*a*b*d*r^3*log(c) + a^2*d*r^3)*log
(x) - 3*(b^2*d*n^2*r^2*log(x)^2 + (b^2*e*n^2*r^2*log(x)^2 + 2*(b^2*e*n*r^2
*log(c) - b^2*e*n^2*r + a*b*e*n*r^2)*log(x))*x^r + 2*(b^2*d*n*r^2*log(c) -
 b^2*d*n^2*r + a*b*d*n*r^2)*log(x))*log((e*x^r + d)/d) + 6*(b^2*e*n^2*x^r
+ b^2*d*n^2)*polylog(3, -e*x^r/d))/(d^2*e*r^3*x^r + d^3*r^3)
```

Sympy [F]

$$\int \frac{(a + b\log(cx^n))^2}{x(d + ex^r)^2}\,dx = \int \frac{(a + b\log(cx^n))^2}{x(d + ex^r)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x/(d+e*x**r)**2,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x*(d + e*x**r)**2), x)
```

Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex^r+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
a^2*(1/(d*e*r*x^r + d^2*r) + log(x)/d^2 - log((e*x^r + d)/e)/(d^2*r)) + in
tegrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*
b)*log(x^n))/(e^2*x*x^(2*r) + 2*d*e*x*x^r + d^2*x), x)
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex^r+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x^r + d)^2*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x\,(d+e\,x^r)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x*(d + e*x^r)^2),x)
```

output
```
int((a + b*log(c*x^n))^2/(x*(d + e*x^r)^2), x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx$$
$$= \frac{x^r\left(\int \frac{\log(x^n c)^2}{x^{2r}e^2x+2x^r dex+d^2x}dx\right)b^2d^2er + 2x^r\left(\int \frac{\log(x^n c)}{x^{2r}e^2x+2x^r dex+d^2x}dx\right)ab\,d^2er - x^r\log(x^re+d)\,a^2e + x^r\log(x)\,\cdots}{d^2\cdots}$$

input
```
int((a+b*log(c*x^n))^2/x/(d+e*x^r)^2,x)
```

output
```
(x**r*int(log(x**n*c)**2/(x**(2*r)*e**2*x + 2*x**r*d*e*x + d**2*x),x)*b**2
*d**2*e*r + 2*x**r*int(log(x**n*c)/(x**(2*r)*e**2*x + 2*x**r*d*e*x + d**2*
x),x)*a*b*d**2*e*r - x**r*log(x**r*e + d)*a**2*e + x**r*log(x)*a**2*e*r -
x**r*a**2*e + int(log(x**n*c)**2/(x**(2*r)*e**2*x + 2*x**r*d*e*x + d**2*x)
,x)*b**2*d**3*r + 2*int(log(x**n*c)/(x**(2*r)*e**2*x + 2*x**r*d*e*x + d**2
*x),x)*a*b*d**3*r - log(x**r*e + d)*a**2*d + log(x)*a**2*d*r)/(d**2*r*(x**
r*e + d))
```

3.430 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx$

Optimal result 3170
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Reduce [F] 3179

Optimal result

Integrand size = 25, antiderivative size = 267

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx = \frac{benx^r(a+b\log(cx^n))}{d^3r^2(d+ex^r)} + \frac{(a+b\log(cx^n))^2}{2dr(d+ex^r)^2} + \frac{(a+b\log(cx^n))^2}{d^2r(d+ex^r)} + \frac{3bn(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^3r^2} - \frac{(a+b\log(cx^n))^2\log\left(1+\frac{dx^{-r}}{e}\right)}{d^3r} - \frac{b^2n^2\log(d+ex^r)}{d^3r^3} - \frac{3b^2n^2\,\mathrm{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^3r^3} + \frac{2bn(a+b\log(cx^n))\,\mathrm{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^3r^2} + \frac{2b^2n^2\,\mathrm{PolyLog}\left(3,-\frac{dx^{-r}}{e}\right)}{d^3r^3}$$

output
```
b*e*n*x^r*(a+b*ln(c*x^n))/d^3/r^2/(d+e*x^r)+1/2*(a+b*ln(c*x^n))^2/d/r/(d+e
*x^r)^2+(a+b*ln(c*x^n))^2/d^2/r/(d+e*x^r)+3*b*n*(a+b*ln(c*x^n))*ln(1+d/e/(
x^r))/d^3/r^2-(a+b*ln(c*x^n))^2*ln(1+d/e/(x^r))/d^3/r-b^2*n^2*ln(d+e*x^r)/
d^3/r^3-3*b^2*n^2*polylog(2,-d/e/(x^r))/d^3/r^3+2*b*n*(a+b*ln(c*x^n))*poly
log(2,-d/e/(x^r))/d^3/r^2+2*b^2*n^2*polylog(3,-d/e/(x^r))/d^3/r^3
```

Mathematica [A] (warning: unable to verify)

Time = 0.70 (sec) , antiderivative size = 459, normalized size of antiderivative = 1.72

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx$$
$$= \frac{\frac{d^2r^2(a+b\log(cx^n))^2}{(d+ex^r)^2}+\frac{2dr(a+b\log(cx^n))(-bn+ar+br\log(cx^n))}{d+ex^r}-2b^2n^2\log(d-dx^r)+6abnr\log(d-dx^r)-2a^2r^2\,\mathrm{lo}}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x^r)^3),x]
```

output
```
((d^2*r^2*(a + b*Log[c*x^n])^2)/(d + e*x^r)^2 + (2*d*r*(a + b*Log[c*x^n])*
(-(b*n) + a*r + b*r*Log[c*x^n]))/(d + e*x^r) - 2*b^2*n^2*Log[d - d*x^r] +
6*a*b*n*r*Log[d - d*x^r] - 2*a^2*r^2*Log[d - d*x^r] + 4*a*b*r^2*(n*Log[x]
- Log[c*x^n])*Log[d - d*x^r] + 6*b^2*n*r*(-(n*Log[x]) + Log[c*x^n])*Log[d
- d*x^r] - 2*b^2*r^2*(-(n*Log[x]) + Log[c*x^n])^2*Log[d - d*x^r] - 6*b^2*n
^2*((r^2*Log[x]^2)/2 + (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] +
PolyLog[2, 1 + (e*x^r)/d]) + 4*a*b*n*r*((r^2*Log[x]^2)/2 + (-(r*Log[x]) +
Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^r)/d]) + 4*b^2*n*r
*(-(n*Log[x]) + Log[c*x^n])*((r^2*Log[x]^2)/2 + (-(r*Log[x]) + Log[-((e*x^
r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^r)/d]) - 2*b^2*n^2*(r^2*Log[x
]^2*Log[1 + d/(e*x^r)] - 2*r*Log[x]*PolyLog[2, -(d/(e*x^r))] - 2*PolyLog[3
, -(d/(e*x^r))]))/(2*d^3*r^3)
```

Rubi [A] (verified)

Time = 2.22 (sec) , antiderivative size = 364, normalized size of antiderivative = 1.36, number of steps used = 10, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.400$, Rules used = {2791, 2776, 2791, 2773, 792, 2776, 2779, 2821, 2838, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx$$

$$\Big\downarrow \text{ 2791}$$

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(ex^r+d)^2}dx}{d}-\frac{e\int \frac{x^{r-1}(a+b\log(cx^n))^2}{(ex^r+d)^3}dx}{d}$$

$\Big\downarrow$ 2776

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(ex^r+d)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{a+b\log(cx^n)}{x(ex^r+d)^2}dx}{er}-\frac{(a+b\log(cx^n))^2}{2er(d+ex^r)^2}\right)}{d}$$

$\Big\downarrow$ 2791

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(ex^r+d)}dx}{d}-\frac{e\int \frac{x^{r-1}(a+b\log(cx^n))^2}{(ex^r+d)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\int \frac{x^{r-1}(a+b\log(cx^n))}{(ex^r+d)^2}dx}{d}\right)}{er}-\frac{(a+b\log(cx^n))^2}{2er(d+ex^r)^2}\right)}{d}$$

$\Big\downarrow$ 2773

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(ex^r+d)}dx}{d}-\frac{e\int \frac{x^{r-1}(a+b\log(cx^n))^2}{(ex^r+d)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\int \frac{x^{r-1}}{ex^r+d}dx}{dr}\right)}{d}\right)}{er}-\frac{(a+b\log(cx^n))^2}{2er(d+ex^r)^2}\right)}{d}$$

$\Big\downarrow$ 792

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(ex^r+d)}dx}{d}-\frac{e\int \frac{x^{r-1}(a+b\log(cx^n))^2}{(ex^r+d)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}\right)}{er}-\frac{(a+b\log(cx^n))^2}{2er(d+ex^r)^2}\right)}{d}$$

$\Big\downarrow$ 2776

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{2bn\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{er}-\frac{(a+b\log(cx^n))^2}{er(d+ex^r)}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}\right)}{er}-\frac{(a+b\log(cx^n))^2}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \; 2779$$

$$\frac{\frac{\frac{2bn\int \frac{(a+b\log(cx^n))\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}}{d}-\frac{e\left(\frac{2bn\left(\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}\right)}{er}-\frac{(a+b\log(\cdots}{er(d+e\cdots}\right.}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}\right)}{er}-\frac{(a+b\log(cx^n))^2}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \; 2821$$

$$\frac{\frac{\frac{2bn\left(\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{r}-bn\int \frac{\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{x}}{r}dx\right)}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}}{d}-\frac{e\left(\frac{2bn\left(\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-}\cdots}{e}\cdots\right.}{\cdots}\right.}{er}\cdots\right.}{\cdots}}{d}-\frac{e\left(\frac{bn\left(\frac{\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}\right)}{er}-\frac{(a+b\log(cx^n))^2}{2er(d+ex^r)^2}\right)}{d}$$

$\Big\downarrow$ 2838

$$\frac{\frac{\frac{2bn\left(\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{r}-bn\int\frac{\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{x}}{r}dx\right)}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}}{d}-\frac{e\left(\frac{2bn\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-}}{e}\right.}{}\right.}{er}\right.}{}}{d}$$

$$\frac{e\left(\frac{bn\left(\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}\right)}{er}-\frac{(a+b\log(cx^n))^2}{2er(d+ex^r)^2}\right)}{d}$$

$\Big\downarrow$ 7143

$$\frac{\frac{\frac{2bn\left(\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{r}+\frac{bn\,\text{PolyLog}\left(3,-\frac{dx^{-r}}{e}\right)}{r^2}\right)}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}}{d}-\frac{e\left(\frac{2bn\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right.}{}\right.}{er}\right.}{d}}{d}$$

$$\frac{e\left(\frac{bn\left(\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}\right)}{er}-\frac{(a+b\log(cx^n))^2}{2er(d+ex^r)^2}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x*(d + e*x^r)^3),x]
```

output
```
-((e*(-1/2*(a + b*Log[c*x^n])^2/(e*r*(d + e*x^r)^2) + (b*n*(-((e*((x^r*(a
+ b*Log[c*x^n]))/(d*r*(d + e*x^r)) - (b*n*Log[d + e*x^r])/(d*e*r^2)))/d) +
 (-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^r)])/(d*r)) + (b*n*PolyLog[2, -(d/(
e*x^r))])/(d*r^2))/d))/(e*r)))/d) + (-((e*(-((a + b*Log[c*x^n])^2/(e*r*(d
+ e*x^r))) + (2*b*n*(-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^r)])/(d*r)) + (b
*n*PolyLog[2, -(d/(e*x^r))])/(d*r^2)))/(e*r)))/d) + (-(((a + b*Log[c*x^n])
^2*Log[1 + d/(e*x^r)])/(d*r)) + (2*b*n*(((a + b*Log[c*x^n])*PolyLog[2, -(d
/(e*x^r))])/r + (b*n*PolyLog[3, -(d/(e*x^r))])/r^2))/(d*r))/d)/d
```

Defintions of rubi rules used

rule 792
```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2791
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x
^n])^p/x), x], x] - Simp[e/d   Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n
])^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1
]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Maple [F]

$$\int \frac{(a+b\ln (c\,x^{n}))^{2}}{x\,(d+e\,x^{r})^{3}}dx$$

input
```
int((a+b*ln(c*x^n))^2/x/(d+e*x^r)^3,x)
```

output
```
int((a+b*ln(c*x^n))^2/x/(d+e*x^r)^3,x)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1165 vs. $2(263) = 526$.

Time = 0.09 (sec) , antiderivative size = 1165, normalized size of antiderivative = 4.36

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*log(c*x^n))^2/x/(d+e*x^r)^3,x, algorithm="fricas")
```

output
```
1/6*(2*b^2*d^2*n^2*r^3*log(x)^3 + 9*b^2*d^2*r^2*log(c)^2 - 6*a*b*d^2*n*r +
 9*a^2*d^2*r^2 + 6*(b^2*d^2*n*r^3*log(c) + a*b*d^2*n*r^3)*log(x)^2 + (2*b^
2*e^2*n^2*r^3*log(x)^3 + 3*(2*b^2*e^2*n*r^3*log(c) - 3*b^2*e^2*n^2*r^2 + 2
*a*b*e^2*n*r^3)*log(x)^2 + 6*(b^2*e^2*r^3*log(c)^2 + b^2*e^2*n^2*r - 3*a*b
*e^2*n*r^2 + a^2*e^2*r^3 - (3*b^2*e^2*n*r^2 - 2*a*b*e^2*r^3)*log(c))*log(x
))*x^(2*r) + 2*(2*b^2*d*e*n^2*r^3*log(x)^3 + 3*b^2*d*e*r^2*log(c)^2 - 3*a*
b*d*e*n*r + 3*a^2*d*e*r^2 + 6*(b^2*d*e*n*r^3*log(c) - b^2*d*e*n^2*r^2 + a*
b*d*e*n*r^3)*log(x)^2 - 3*(b^2*d*e*n*r - 2*a*b*d*e*r^2)*log(c) + 3*(2*b^2*
d*e*r^3*log(c)^2 + b^2*d*e*n^2*r - 4*a*b*d*e*n*r^2 + 2*a^2*d*e*r^3 - 4*(b^
2*d*e*n*r^2 - a*b*d*e*r^3)*log(c))*log(x))*x^r - 6*(2*b^2*d^2*n^2*r*log(x)
 + 2*b^2*d^2*n*r*log(c) - 3*b^2*d^2*n^2 + 2*a*b*d^2*n*r + (2*b^2*e^2*n^2*r
*log(x) + 2*b^2*e^2*n*r*log(c) - 3*b^2*e^2*n^2 + 2*a*b*e^2*n*r)*x^(2*r) +
2*(2*b^2*d*e*n^2*r*log(x) + 2*b^2*d*e*n*r*log(c) - 3*b^2*d*e*n^2 + 2*a*b*d
*e*n*r)*x^r)*dilog(-(e*x^r + d)/d + 1) - 6*(b^2*d^2*r^2*log(c)^2 + b^2*d^2
*n^2 - 3*a*b*d^2*n*r + a^2*d^2*r^2 + (b^2*e^2*r^2*log(c)^2 + b^2*e^2*n^2 -
 3*a*b*e^2*n*r + a^2*e^2*r^2 - (3*b^2*e^2*n*r - 2*a*b*e^2*r^2)*log(c))*x^(
2*r) + 2*(b^2*d*e*r^2*log(c)^2 + b^2*d*e*n^2 - 3*a*b*d*e*n*r + a^2*d*e*r^2
 - (3*b^2*d*e*n*r - 2*a*b*d*e*r^2)*log(c))*x^r - (3*b^2*d^2*n*r - 2*a*b*d^
2*r^2)*log(c))*log(e*x^r + d) - 6*(b^2*d^2*n*r - 3*a*b*d^2*r^2)*log(c) + 6
*(b^2*d^2*r^3*log(c)^2 + 2*a*b*d^2*r^3*log(c) + a^2*d^2*r^3)*log(x) - 6...
```

Sympy [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))**2/x/(d+e*x**r)**3,x)
```

output
```
Timed out
```

Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex^r+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(d+e*x^r)^3,x, algorithm="maxima")
```

output
```
1/2*a^2*((2*e*x^r + 3*d)/(d^2*e^2*r*x^(2*r) + 2*d^3*e*r*x^r + d^4*r) + 2*l
og(x)/d^3 - 2*log((e*x^r + d)/e)/(d^3*r)) + integrate((b^2*log(c)^2 + b^2*
log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e^3*x*x^(3*r)
+ 3*d*e^2*x*x^(2*r) + 3*d^2*e*x*x^r + d^3*x), x)
```

Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex^r+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(d+e*x^r)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x^r + d)^3*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x\,(d+e\,x^r)^3}\,dx$$

input

```
int((a + b*log(c*x^n))^2/(x*(d + e*x^r)^3),x)
```

output

```
int((a + b*log(c*x^n))^2/(x*(d + e*x^r)^3), x)
```

Reduce [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx = \frac{2x^{2r}\left(\int \frac{\log(x^n c)^2}{x^{3r}e^3x+3x^{2r}d\,e^2x+3x^r d^2ex+d^3x}dx\right)b^2d^3e^2r+4x^{2r}\left(\int \frac{\log(x^n c)}{x^{3r}e^3x+3x^{2r}d\,e^2x+3x^r d^2ex+d^3x}dx\right)ab\,d^3e^2r-2x^{2r}\log}{}$$

input

```
int((a+b*log(c*x^n))^2/x/(d+e*x^r)^3,x)
```

output

```
(2*x**(2*r)*int(log(x**n*c)**2/(x**(3*r)*e**3*x + 3*x**(2*r)*d*e**2*x + 3*
x**r*d**2*e*x + d**3*x),x)*b**2*d**3*e**2*r + 4*x**(2*r)*int(log(x**n*c)/(
x**(3*r)*e**3*x + 3*x**(2*r)*d*e**2*x + 3*x**r*d**2*e*x + d**3*x),x)*a*b*d
**3*e**2*r - 2*x**(2*r)*log(x**r*e + d)*a**2*e**2 + 2*x**(2*r)*log(x)*a**2
*e**2*r - x**(2*r)*a**2*e**2 + 4*x**r*int(log(x**n*c)**2/(x**(3*r)*e**3*x
+ 3*x**(2*r)*d*e**2*x + 3*x**r*d**2*e*x + d**3*x),x)*b**2*d**4*e*r + 8*x**
r*int(log(x**n*c)/(x**(3*r)*e**3*x + 3*x**(2*r)*d*e**2*x + 3*x**r*d**2*e*x
 + d**3*x),x)*a*b*d**4*e*r - 4*x**r*log(x**r*e + d)*a**2*d*e + 4*x**r*log(
x)*a**2*d*e*r + 2*int(log(x**n*c)**2/(x**(3*r)*e**3*x + 3*x**(2*r)*d*e**2*
x + 3*x**r*d**2*e*x + d**3*x),x)*b**2*d**5*r + 4*int(log(x**n*c)/(x**(3*r)
*e**3*x + 3*x**(2*r)*d*e**2*x + 3*x**r*d**2*e*x + d**3*x),x)*a*b*d**5*r -
2*log(x**r*e + d)*a**2*d**2 + 2*log(x)*a**2*d**2*r + 2*a**2*d**2)/(2*d**3*
r*(x**(2*r)*e**2 + 2*x**r*d*e + d**2))
```

3.431 $\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x}\,dx$

Optimal result . . . 3180
Mathematica [F] . . . 3181
Rubi [A] (verified) . . . 3181
Maple [F] . . . 3183
Fricas [F(-2)] . . . 3183
Sympy [F(-1)] . . . 3183
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Reduce [F] . . . 3185

Optimal result

Integrand size = 25, antiderivative size = 327

$$\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x}\,dx = -\frac{92bd^2n\sqrt{d+ex^r}}{15r^2}-\frac{32bdn(d+ex^r)^{3/2}}{45r^2} - \frac{4bn(d+ex^r)^{5/2}}{25r^2}+\frac{92bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{15r^2}+\frac{2bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{r^2} + \frac{2}{15}\left(\frac{15d^2\sqrt{d+ex^r}}{r}+\frac{5d(d+ex^r)^{3/2}}{r}+\frac{3(d+ex^r)^{5/2}}{r}-\frac{15d^{5/2}\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}\right)(a+b\log(cx^n))-\frac{4bd^{5/2}}{}$$

output
```
-92/15*b*d^2*n*(d+e*x^r)^(1/2)/r^2-32/45*b*d*n*(d+e*x^r)^(3/2)/r^2-4/25*b*
n*(d+e*x^r)^(5/2)/r^2+92/15*b*d^(5/2)*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))/r
^2+2*b*d^(5/2)*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))^2/r^2+2/15*(15*d^2*(d+e*
x^r)^(1/2)/r+5*d*(d+e*x^r)^(3/2)/r+3*(d+e*x^r)^(5/2)/r-15*d^(5/2)*arctanh(
(d+e*x^r)^(1/2)/d^(1/2))/r)*(a+b*ln(c*x^n))-4*b*d^(5/2)*n*arctanh((d+e*x^r
)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/r^2-2*b*d^(5/2)*n
*polylog(2,1-2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/r^2
```

Mathematica [F]

$$\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x}\,dx=\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x}\,dx$$

input
```
Integrate[((d + e*x^r)^(5/2)*(a + b*Log[c*x^n]))/x,x]
```

output
```
Integrate[((d + e*x^r)^(5/2)*(a + b*Log[c*x^n]))/x, x]
```

Rubi [A] (verified)

Time = 0.87 (sec) , antiderivative size = 318, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x}\,dx$$

$$\Big\downarrow \text{2790}$$

$$\frac{2}{15}\left(-\frac{15d^{5/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}+\frac{15d^2\sqrt{d+ex^r}}{r}+\frac{5d(d+ex^r)^{3/2}}{r}+\frac{3(d+ex^r)^{5/2}}{r}\right)(a+b\log(cx^n))- bn\int\left(-\frac{2\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)d^{5/2}}{rx}+\frac{2\sqrt{ex^r+d}d^2}{rx}+\frac{2(ex^r+d)^{3/2}d}{3rx}+\frac{2(ex^r+d)^{5/2}}{5rx}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{2}{15}\left(-\frac{15d^{5/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}+\frac{15d^2\sqrt{d+ex^r}}{r}+\frac{5d(d+ex^r)^{3/2}}{r}+\frac{3(d+ex^r)^{5/2}}{r}\right)(a+b\log(cx^n))-$$
$$bn\left(-\frac{2d^{5/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{r^2}-\frac{92d^{5/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{15r^2}+\frac{4d^{5/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{r^2}+\frac{2d^{5/2}\text{I}\right.$$

input
```
Int[((d + e*x^r)^(5/2)*(a + b*Log[c*x^n]))/x,x]
```

output
```
(2*((15*d^2*Sqrt[d + e*x^r])/r + (5*d*(d + e*x^r)^(3/2))/r + (3*(d + e*x^r
)^(5/2))/r - (15*d^(5/2)*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]])/r)*(a + b*Log[c
*x^n]))/15 - b*n*((92*d^2*Sqrt[d + e*x^r])/(15*r^2) + (32*d*(d + e*x^r)^(3
/2))/(45*r^2) + (4*(d + e*x^r)^(5/2))/(25*r^2) - (92*d^(5/2)*ArcTanh[Sqrt[
d + e*x^r]/Sqrt[d]])/(15*r^2) - (2*d^(5/2)*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]
]^2)/r^2 + (4*d^(5/2)*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sq
rt[d] - Sqrt[d + e*x^r])])/r^2 + (2*d^(5/2)*PolyLog[2, 1 - (2*Sqrt[d])/(Sq
rt[d] - Sqrt[d + e*x^r])])/r^2)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

Maple [F]

$$\int \frac{(d+e\,x^r)^{\frac{5}{2}}\,(a+b\ln(c\,x^n))}{x}dx$$

input
```
int((d+e*x^r)^(5/2)*(a+b*ln(c*x^n))/x,x)
```

output
```
int((d+e*x^r)^(5/2)*(a+b*ln(c*x^n))/x,x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^{5/2}\,(a+b\log(cx^n))}{x}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((d+e*x^r)^(5/2)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (has polynomial part)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^{5/2}\,(a+b\log(cx^n))}{x}\,dx = \text{Timed out}$$

input
```
integrate((d+e*x**r)**(5/2)*(a+b*ln(c*x**n))/x,x)
```

output
```
Timed out
```

Maxima [F]

$$\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(ex^r+d)^{\frac{5}{2}}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^(5/2)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
1/15*(15*d^(5/2)*log((sqrt(e*x^r + d) - sqrt(d))/(sqrt(e*x^r + d) + sqrt(d
)))/r + 2*(3*(e*x^r + d)^(5/2) + 5*(e*x^r + d)^(3/2)*d + 15*sqrt(e*x^r + d
)*d^2)/r)*a + b*integrate((e^2*x^(2*r)*log(c) + 2*d*e*x^r*log(c) + d^2*log
(c) + (e^2*x^(2*r) + 2*d*e*x^r + d^2)*log(x^n))*sqrt(e*x^r + d)/x, x)
```

Giac [F]

$$\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(ex^r+d)^{\frac{5}{2}}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^(5/2)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^(5/2)*(b*log(c*x^n) + a)/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(d+e\,x^r)^{5/2}\,(a+b\,\ln(c\,x^n))}{x}\,dx$$

input
```
int(((d + e*x^r)^(5/2)*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^r)^(5/2)*(a + b*log(c*x^n)))/x, x)
```

Reduce [F]

$$\int \frac{(d+ex^r)^{5/2}\,(a+b\log(cx^n))}{x}\,dx = \frac{90x^{2r}\sqrt{x^r e+d}\,\log(x^n c)\,b\,e^2 r + 90x^{2r}\sqrt{x^r e+d}\,a\,e^2 r - 36x^{2r}\sqrt{x^r e+}$$

input
```
int((d+e*x^r)^(5/2)*(a+b*log(c*x^n))/x,x)
```

output
```
(90*x**(2*r)*sqrt(x**r*e + d)*log(x**n*c)*b*e**2*r + 90*x**(2*r)*sqrt(x**r
*e + d)*a*e**2*r - 36*x**(2*r)*sqrt(x**r*e + d)*b*e**2*n + 330*x**r*sqrt(x
**r*e + d)*log(x**n*c)*b*d*e*r + 330*x**r*sqrt(x**r*e + d)*a*d*e*r - 232*x
**r*sqrt(x**r*e + d)*b*d*e*n + 690*sqrt(x**r*e + d)*log(x**n*c)*b*d**2*r +
 690*sqrt(x**r*e + d)*a*d**2*r - 1576*sqrt(x**r*e + d)*b*d**2*n + 225*int(
sqrt(x**r*e + d)/(x**r*e*x + d*x),x)*a*d**3*r**2 - 690*int(sqrt(x**r*e + d
)/(x**r*e*x + d*x),x)*b*d**3*n*r + 225*int((sqrt(x**r*e + d)*log(x**n*c))/
(x**r*e*x + d*x),x)*b*d**3*r**2)/(225*r**2)
```

3.432 $\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx$

Optimal result 3186
Mathematica [F] 3187
Rubi [A] (verified) 3187
Maple [F] 3188
Fricas [F(-2)] 3189
Sympy [F] 3189
Maxima [F] 3189
Giac [F] 3190
Mupad [F(-1)] 3190
Reduce [F] 3190

Optimal result

Integrand size = 25, antiderivative size = 284

$$\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx = -\frac{16bdn\sqrt{d+ex^r}}{3r^2} - \frac{4bn(d+ex^r)^{3/2}}{9r^2} + \frac{16bd^{3/2}n\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{3r^2} + \frac{2bd^{3/2}n\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{r^2} + \frac{2}{3}\left(\frac{3d\sqrt{d+ex^r}}{r} + \frac{(d+ex^r)^{3/2}}{r} - \frac{3d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}\right)(a+b\log(cx^n)) - \frac{4bd^{3/2}n\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log}{r^2}$$

output
```
-16/3*b*d*n*(d+e*x^r)^(1/2)/r^2-4/9*b*n*(d+e*x^r)^(3/2)/r^2+16/3*b*d^(3/2)
*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))/r^2+2*b*d^(3/2)*n*arctanh((d+e*x^r)^(1
/2)/d^(1/2))^2/r^2+2/3*(3*d*(d+e*x^r)^(1/2)/r+(d+e*x^r)^(3/2)/r-3*d^(3/2)*
arctanh((d+e*x^r)^(1/2)/d^(1/2))/r)*(a+b*ln(c*x^n))-4*b*d^(3/2)*n*arctanh(
(d+e*x^r)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/r^2-2*b*d
^(3/2)*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/r^2
```

Mathematica [F]

$$\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx$$

input

```
Integrate[((d + e*x^r)^(3/2)*(a + b*Log[c*x^n]))/x,x]
```

output

```
Integrate[((d + e*x^r)^(3/2)*(a + b*Log[c*x^n]))/x, x]
```

Rubi [A] (verified)

Time = 0.76 (sec) , antiderivative size = 277, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.080$, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx$$

$$\Big\downarrow \; 2790$$

$$\frac{2}{3}\left(-\frac{3d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}+\frac{3d\sqrt{d+ex^r}}{r}+\frac{(d+ex^r)^{3/2}}{r}\right)(a+b\log(cx^n))-bn\int\left(-\frac{2\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)d^{3/2}}{rx}+\frac{2\sqrt{ex^r+d}d}{rx}+\frac{2(ex^r+d)^{3/2}}{3rx}\right)dx$$

$$\Big\downarrow \; 2009$$

$$\frac{2}{3}\left(-\frac{3d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}+\frac{3d\sqrt{d+ex^r}}{r}+\frac{(d+ex^r)^{3/2}}{r}\right)(a+b\log(cx^n))-bn\left(-\frac{2d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{r^2}-\frac{16d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{3r^2}+\frac{4d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{r^2}+\frac{2d^{3/2}\text{I}\right.$$

input
```
Int[((d + e*x^r)^(3/2)*(a + b*Log[c*x^n]))/x,x]
```

output
```
(2*((3*d*Sqrt[d + e*x^r])/r + (d + e*x^r)^(3/2)/r - (3*d^(3/2)*ArcTanh[Sqr
t[d + e*x^r]/Sqrt[d]])/r)*(a + b*Log[c*x^n]))/3 - b*n*((16*d*Sqrt[d + e*x^
r])/(3*r^2) + (4*(d + e*x^r)^(3/2))/(9*r^2) - (16*d^(3/2)*ArcTanh[Sqrt[d +
 e*x^r]/Sqrt[d]])/(3*r^2) - (2*d^(3/2)*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]^2)
/r^2 + (4*d^(3/2)*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d
] - Sqrt[d + e*x^r])])/r^2 + (2*d^(3/2)*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d
] - Sqrt[d + e*x^r])])/r^2)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

Maple [F]

$$\int \frac{(d+e\,x^{r})^{\frac{3}{2}}\,(a+b\ln(c\,x^{n}))}{x}dx$$

input
```
int((d+e*x^r)^(3/2)*(a+b*ln(c*x^n))/x,x)
```

output
```
int((d+e*x^r)^(3/2)*(a+b*ln(c*x^n))/x,x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((d+e*x^r)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (has polynomial part)
```

Sympy [F]

$$\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(a+b\log(cx^n))(d+ex^r)^{\frac{3}{2}}}{x}\,dx$$

input
```
integrate((d+e*x**r)**(3/2)*(a+b*ln(c*x**n))/x,x)
```

output
```
Integral((a + b*log(c*x**n))*(d + e*x**r)**(3/2)/x, x)
```

Maxima [F]

$$\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(ex^r+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
1/3*(3*d^(3/2)*log((sqrt(e*x^r + d) - sqrt(d))/(sqrt(e*x^r + d) + sqrt(d))
)/r + 2*((e*x^r + d)^(3/2) + 3*sqrt(e*x^r + d)*d)/r)*a + b*integrate((e*x^
r*log(c) + d*log(c) + (e*x^r + d)*log(x^n))*sqrt(e*x^r + d)/x, x)
```

Giac [F]

$$\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(ex^r+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^(3/2)*(b*log(c*x^n) + a)/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(d+e\,x^r)^{3/2}\,(a+b\,\ln(c\,x^n))}{x}\,dx$$

input
```
int(((d + e*x^r)^(3/2)*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^r)^(3/2)*(a + b*log(c*x^n)))/x, x)
```

Reduce [F]

$$\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx = \frac{6x^r\sqrt{x^re+d}\log(x^nc)\,ber+6x^r\sqrt{x^re+d}\,aer-4x^r\sqrt{x^re+d}\,ben+2$$

input
```
int((d+e*x^r)^(3/2)*(a+b*log(c*x^n))/x,x)
```

output
```
(6*x**r*sqrt(x**r*e + d)*log(x**n*c)*b*e*r + 6*x**r*sqrt(x**r*e + d)*a*e*r
 - 4*x**r*sqrt(x**r*e + d)*b*e*n + 24*sqrt(x**r*e + d)*log(x**n*c)*b*d*r +
 24*sqrt(x**r*e + d)*a*d*r - 52*sqrt(x**r*e + d)*b*d*n + 9*int(sqrt(x**r*e
 + d)/(x**r*e*x + d*x),x)*a*d**2*r**2 - 24*int(sqrt(x**r*e + d)/(x**r*e*x
+ d*x),x)*b*d**2*n*r + 9*int((sqrt(x**r*e + d)*log(x**n*c))/(x**r*e*x + d*
x),x)*b*d**2*r**2)/(9*r**2)
```

3.433 $\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx$

Optimal result 3191
Mathematica [F] 3192
Rubi [A] (verified) 3192
Maple [F] 3193
Fricas [F(-2)] 3194
Sympy [F] 3194
Maxima [F] 3194
Giac [F] 3195
Mupad [F(-1)] 3195
Reduce [F] 3195

Optimal result

Integrand size = 25, antiderivative size = 240

$$\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx = -\frac{4bn\sqrt{d+ex^r}}{r^2} + \frac{4b\sqrt{d}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r^2} + \frac{2b\sqrt{d}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{r^2} + 2\left(\frac{\sqrt{d+ex^r}}{r} - \frac{\sqrt{d}\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}\right)(a+b\log(cx^n)) - \frac{4b\sqrt{d}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{r^2} - \frac{2b\sqrt{d}n\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{r^2}$$

output
```
-4*b*n*(d+e*x^r)^(1/2)/r^2+4*b*d^(1/2)*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))/
r^2+2*b*d^(1/2)*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))^2/r^2+2*((d+e*x^r)^(1/2
)/r-d^(1/2)*arctanh((d+e*x^r)^(1/2)/d^(1/2))/r)*(a+b*ln(c*x^n))-4*b*d^(1/2
)*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)
))/r^2-2*b*d^(1/2)*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/r^2
```

Mathematica [F]

$$\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx = \int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx$$

input
```
Integrate[(Sqrt[d + e*x^r]*(a + b*Log[c*x^n]))/x,x]
```

output
```
Integrate[(Sqrt[d + e*x^r]*(a + b*Log[c*x^n]))/x, x]
```

Rubi [A] (verified)

Time = 0.63 (sec) , antiderivative size = 235, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.080$, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx$$

$$\Big\downarrow \text{ 2790}$$

$$2\left(\frac{\sqrt{d+ex^r}}{r}-\frac{\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}\right)(a+b\log(cx^n))-bn\int\left(\frac{2\sqrt{ex^r+d}}{rx}-\frac{2\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{rx}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$2\left(\frac{\sqrt{d+ex^r}}{r}-\frac{\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}\right)(a+b\log(cx^n))-bn\left(-\frac{2\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{r^2}-\frac{4\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r^2}+\frac{4\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{r^2}+\frac{2\sqrt{d}\,\text{PolyI}}{}\right.$$

input
```
Int[(Sqrt[d + e*x^r]*(a + b*Log[c*x^n]))/x,x]
```

output
```
2*(Sqrt[d + e*x^r]/r - (Sqrt[d]*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]])/r)*(a +
b*Log[c*x^n]) - b*n*((4*Sqrt[d + e*x^r])/r^2 - (4*Sqrt[d]*ArcTanh[Sqrt[d +
 e*x^r]/Sqrt[d]])/r^2 - (2*Sqrt[d]*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]^2)/r^2
 + (4*Sqrt[d]*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] -
Sqrt[d + e*x^r])])/r^2 + (2*Sqrt[d]*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] -
Sqrt[d + e*x^r])])/r^2)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

Maple [F]

$$\int \frac{\sqrt{d+e\,x^{r}}\,(a+b\ln{(c\,x^{n})})}{x}dx$$

input
```
int((d+e*x^r)^(1/2)*(a+b*ln(c*x^n))/x,x)
```

output
```
int((d+e*x^r)^(1/2)*(a+b*ln(c*x^n))/x,x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((d+e*x^r)^(1/2)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (has polynomial part)
```

Sympy [F]

$$\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx = \int \frac{(a+b\log(cx^n))\sqrt{d+ex^r}}{x}\,dx$$

input
```
integrate((d+e*x**r)**(1/2)*(a+b*ln(c*x**n))/x,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x**r)/x, x)
```

Maxima [F]

$$\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx = \int \frac{\sqrt{ex^r+d}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^(1/2)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
a*(sqrt(d)*log((sqrt(e*x^r + d) - sqrt(d))/(sqrt(e*x^r + d) + sqrt(d)))/r
+ 2*sqrt(e*x^r + d)/r) + b*integrate(sqrt(e*x^r + d)*(log(c) + log(x^n))/x
, x)
```

Giac [F]

$$\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx=\int \frac{\sqrt{ex^r+d}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^(1/2)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^r + d)*(b*log(c*x^n) + a)/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx=\int \frac{\sqrt{d+e\,x^r}\,(a+b\,\ln(c\,x^n))}{x}\,dx$$

input
```
int(((d + e*x^r)^(1/2)*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^r)^(1/2)*(a + b*log(c*x^n)))/x, x)
```

Reduce [F]

$$\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx$$
$$=\frac{2\sqrt{x^re+d}\log(x^nc)\,br+2\sqrt{x^re+d}\,ar-4\sqrt{x^re+d}\,bn+\left(\int\frac{\sqrt{x^re+d}}{x^rex+dx}dx\right)adr^2-2\left(\int\frac{\sqrt{x^re+d}}{x^rex+dx}dx\right)bdnr+}{r^2}$$

input
```
int((d+e*x^r)^(1/2)*(a+b*log(c*x^n))/x,x)
```

output
```
(2*sqrt(x**r*e + d)*log(x**n*c)*b*r + 2*sqrt(x**r*e + d)*a*r - 4*sqrt(x**r
*e + d)*b*n + int(sqrt(x**r*e + d)/(x**r*e*x + d*x),x)*a*d*r**2 - 2*int(sq
rt(x**r*e + d)/(x**r*e*x + d*x),x)*b*d*n*r + int((sqrt(x**r*e + d)*log(x**
n*c))/(x**r*e*x + d*x),x)*b*d*r**2)/r**2
```

3.434 $\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx$

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Mathematica [F] . . . 3197
Rubi [A] (verified) . . . 3197
Maple [F] . . . 3201
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Sympy [F] . . . 3201
Maxima [F] . . . 3202
Giac [F] . . . 3202
Mupad [F(-1)] . . . 3202
Reduce [F] . . . 3203

Optimal result

Integrand size = 25, antiderivative size = 174

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx = \frac{2bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{\sqrt{d}r^2} - \frac{2\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r} - \frac{4bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{\sqrt{d}r^2} - \frac{2bn\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{\sqrt{d}r^2}$$

output
```
2*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))^2/d^(1/2)/r^2-2*arctanh((d+e*x^r)^(
1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(1/2)/r-4*b*n*arctanh((d+e*x^r)^(1/2)/d^(1
/2))*ln(2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/d^(1/2)/r^2-2*b*n*polylog(2,1
-2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/d^(1/2)/r^2
```

Mathematica [F]

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx=\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x^r]),x]
```

output
```
Integrate[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x^r]), x]
```

Rubi [A] (verified)

Time = 0.82 (sec) , antiderivative size = 161, normalized size of antiderivative = 0.93, number of steps used = 12, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}}=0.440$, Rules used = {2790, 27, 7282, 7267, 25, 6546, 27, 6470, 27, 2849, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx$$

$$\Big\downarrow \text{2790}$$

$$-bn\int -\frac{2\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{\sqrt{d}rx}dx-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{27}$$

$$\frac{2bn\int \frac{\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}r}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{7282}$$

$$\frac{2bn\int x^{-r}\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)dx^r}{\sqrt{d}r^2}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{7267}$$

$$\frac{4bn\int -\frac{\sqrt{ex^r+d}\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{d-x^{2r}}d\sqrt{ex^r+d}}{\sqrt{d}r^2}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{25}$$

$$-\frac{4bn\int \frac{\sqrt{ex^r+d}\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{d-x^{2r}}d\sqrt{ex^r+d}}{\sqrt{d}r^2}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{6546}$$

$$\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2-\frac{\int \frac{\sqrt{d}\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{ex^r+d}}d\sqrt{ex^r+d}}{\sqrt{d}}\right)}{\sqrt{d}r^2}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{27}$$

$$\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2-\int \frac{\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{ex^r+d}}d\sqrt{ex^r+d}\right)}{\sqrt{d}r^2}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{6470}$$

$$\frac{4bn\left(\frac{\int \frac{d\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^r+d}}\right)}{d-x^{2r}}d\sqrt{ex^r+d}}{\sqrt{d}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)\right)}{\sqrt{d}r^2}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{27}$$

$$\frac{4bn\left(\sqrt{d}\int \frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^r+d}}\right)}{d-x^{2r}}d\sqrt{ex^r+d}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)\right)}{\sqrt{d}r^2}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{2849}$$

$$\frac{4bn\left(-\sqrt{d}\int \frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^r+d}}\right)}{1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^r+d}}}d\frac{1}{\sqrt{d}-\sqrt{ex^r+d}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)\right)}{\sqrt{d}r^2}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{2752}$$

$$\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)-\frac{1}{2}\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^r+d}}\right)\right)}{\sqrt{d}r^2}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

input
```
Int[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x^r]),x]
```

output
```
(-2*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]*(a + b*Log[c*x^n]))/(Sqrt[d]*r) + (4*
b*n*(ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]^2/2 - ArcTanh[Sqrt[d + e*x^r]/Sqrt[d
]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])] - PolyLog[2, 1 - (2*Sqrt[d
])/(Sqrt[d] - Sqrt[d + e*x^r])]/2))/(Sqrt[d]*r^2)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

rule 2849
```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Simp
[-e/g   Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[
{c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

rule 6470
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Simp[b*c
*(p/e)   Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^
2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2
, 0]
```

rule 6546
```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Simp[1/
(c*d)   Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

rule 7267
```
Int[u_, x_Symbol] :> With[{lst = SubstForFractionalPowerOfLinear[u, x]}, Si
mp[lst[[2]]*lst[[4]]   Subst[Int[lst[[1]], x], x, lst[[3]]^(1/lst[[2]])], x
] /;  !FalseQ[lst] && SubstForFractionalPowerQ[u, lst[[3]], x]]
```

rule 7282
```
Int[(u_)/(x_), x_Symbol] :> With[{lst = PowerVariableExpn[u, 0, x]}, Simp[1
/lst[[2]]   Subst[Int[NormalizeIntegrand[Simplify[lst[[1]]/x], x], x], x, (
lst[[3]]*x)^lst[[2]]], x] /;  !FalseQ[lst] && NeQ[lst[[2]], 0]] /; NonsumQ[
u] &&  !RationalFunctionQ[u, x]
```

Maple [F]

$$\int \frac{a+b\ln (c\,x^{n})}{x\sqrt{d+e\,x^{r}}}dx$$

input
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^(1/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{a+b\log (cx^{n})}{x\sqrt{d+ex^{r}}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{a+b\log (cx^{n})}{x\sqrt{d+ex^{r}}}\,dx = \int \frac{a+b\log (cx^{n})}{x\sqrt{d+ex^{r}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x*sqrt(d + e*x**r)), x)
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex^r+dx}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(1/2),x, algorithm="maxima")
```

output
```
b*integrate((log(c) + log(x^n))/(sqrt(e*x^r + d)*x), x) + a*log((sqrt(e*x^
r + d) - sqrt(d))/(sqrt(e*x^r + d) + sqrt(d)))/(sqrt(d)*r)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex^r+dx}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x^r + d)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x\,\sqrt{d+e\,x^r}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^(1/2)), x)
```

Reduce [F]

$$\int \frac{a + b\log(cx^n)}{x\sqrt{d + ex^r}}\,dx = \left(\int \frac{\sqrt{x^r e + d}}{x^r ex + dx}dx\right)a + \left(\int \frac{\sqrt{x^r e + d}\,\log(x^n c)}{x^r ex + dx}dx\right)b$$

input
```
int((a+b*log(c*x^n))/x/(d+e*x^r)^(1/2),x)
```

output
```
int(sqrt(x**r*e + d)/(x**r*e*x + d*x),x)*a + int((sqrt(x**r*e + d)*log(x**
n*c))/(x**r*e*x + d*x),x)*b
```

3.435 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx$

Optimal result 3204
Mathematica [F] 3205
Rubi [A] (verified) 3205
Maple [F] 3206
Fricas [F(-2)] 3207
Sympy [F] 3207
Maxima [F] 3207
Giac [F] 3208
Mupad [F(-1)] 3208
Reduce [F] 3208

Optimal result

Integrand size = 25, antiderivative size = 225

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx = \frac{4bn\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r^2} + \frac{2bn\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{3/2}r^2} + 2\left(\frac{1}{dr\sqrt{d+ex^r}} - \frac{\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r}\right)(a+b\log(cx^n)) - \frac{4bn\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{d^{3/2}r^2} - \frac{2bn\,\text{Poly}$$

output
```
4*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))/d^(3/2)/r^2+2*b*n*arctanh((d+e*x^r)
^(1/2)/d^(1/2))^2/d^(3/2)/r^2+2*(1/d/r/(d+e*x^r)^(1/2)-arctanh((d+e*x^r)^(
1/2)/d^(1/2))/d^(3/2)/r)*(a+b*ln(c*x^n))-4*b*n*arctanh((d+e*x^r)^(1/2)/d^(
1/2))*ln(2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/d^(3/2)/r^2-2*b*n*polylog(2,
1-2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/d^(3/2)/r^2
```

Mathematica [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx=\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(3/2)),x]
```

output
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(3/2)), x]
```

Rubi [A] (verified)

Time = 0.64 (sec) , antiderivative size = 222, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx$$

$$\Big\downarrow \text{2790}$$

$$2\left(\frac{1}{dr\sqrt{d+ex^r}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r}\right)(a+b\log(cx^n))-bn\int\left(\frac{2}{drx\sqrt{ex^r+d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{d^{3/2}rx}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2\left(\frac{1}{dr\sqrt{d+ex^r}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r}\right)(a+b\log(cx^n))-bn\left(-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{3/2}r^2}-\frac{4\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r^2}+\frac{4\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{d^{3/2}r^2}+\frac{2\,\text{PolyLog}\left(2,1-\ldots\right.}{d^{3/2}r^2}\right.$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(3/2)),x]
```

output
```
2*(1/(d*r*Sqrt[d + e*x^r]) - ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]/(d^(3/2)*r))
*(a + b*Log[c*x^n]) - b*n*((-4*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]])/(d^(3/2)*
r^2) - (2*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]^2)/(d^(3/2)*r^2) + (4*ArcTanh[S
qrt[d + e*x^r]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])])/(d^(
3/2)*r^2) + (2*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])])/(d
^(3/2)*r^2))
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

Maple [F]

$$\int \frac{a + b\ln \left(c\, x^{n}\right)}{x \left(d + e\, x^{r}\right)^{\frac{3}{2}}}d x$$

input
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^{3/2}}\,dx = \int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**(3/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x*(d + e*x**r)**(3/2)), x)
```

Maxima [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^{3/2}}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\left(ex^r+d\right)^{\frac{3}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(3/2),x, algorithm="maxima")
```

output
```
a*(log((sqrt(e*x^r + d) - sqrt(d))/(sqrt(e*x^r + d) + sqrt(d)))/(d^(3/2)*r
) + 2/(sqrt(e*x^r + d)*d*r)) + b*integrate((log(c) + log(x^n))/((e*x*x^r +
 d*x)*sqrt(e*x^r + d)), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)^{\frac{3}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^(3/2)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x\,(d+e\,x^r)^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^(3/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^(3/2)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx = \left(\int \frac{\sqrt{x^r e+d}}{x^{2r}e^2x+2x^r dex+d^2x}dx\right)a + \left(\int \frac{\sqrt{x^r e+d}\,\log(x^n c)}{x^{2r}e^2x+2x^r dex+d^2x}dx\right)b$$

input
```
int((a+b*log(c*x^n))/x/(d+e*x^r)^(3/2),x)
```

output
```
int(sqrt(x**r*e + d)/(x**(2*r)*e**2*x + 2*x**r*d*e*x + d**2*x),x)*a + int(
(sqrt(x**r*e + d)*log(x**n*c))/(x**(2*r)*e**2*x + 2*x**r*d*e*x + d**2*x),x
)*b
```

3.436 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{5/2}}\,dx$

Optimal result 3209
Mathematica [F] 3210
Rubi [A] (verified) 3210
Maple [F] 3211
Fricas [F(-2)] 3212
Sympy [F(-1)] 3212
Maxima [F] 3212
Giac [F] 3213
Mupad [F(-1)] 3213
Reduce [F] 3213

Optimal result

Integrand size = 25, antiderivative size = 271

$$\int \frac{a+b\log(cx^n)}{x\,(d+ex^r)^{5/2}}\,dx = -\frac{4bn}{3d^2r^2\sqrt{d+ex^r}} + \frac{16bn\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{3d^{5/2}r^2} + \frac{2bn\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{5/2}r^2} + \frac{2}{3}\left(\frac{1}{dr\,(d+ex^r)^{3/2}} + \frac{3}{d^2r\sqrt{d+ex^r}} - \frac{3\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{5/2}r}\right)(a+b\log(cx^n)) - \frac{4bn\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{}{\sqrt{d}}\right.}{d^{5/2}r^2}$$

output
```
-4/3*b*n/d^2/r^2/(d+e*x^r)^(1/2)+16/3*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))
/d^(5/2)/r^2+2*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))^2/d^(5/2)/r^2+2/3*(1/d
/r/(d+e*x^r)^(3/2)+3/d^2/r/(d+e*x^r)^(1/2)-3*arctanh((d+e*x^r)^(1/2)/d^(1/
2))/d^(5/2)/r)*(a+b*ln(c*x^n))-4*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))*ln(2
*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/d^(5/2)/r^2-2*b*n*polylog(2,1-2*d^(1/2
)/(d^(1/2)-(d+e*x^r)^(1/2)))/d^(5/2)/r^2
```

Mathematica [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{5/2}}\,dx=\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{5/2}}\,dx$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(5/2)),x]
```

output
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(5/2)), x]
```

Rubi [A] (verified)

Time = 0.76 (sec) , antiderivative size = 266, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{5/2}}\,dx$$

$$\Big\downarrow \text{2790}$$

$$\frac{2}{3}\left(-\frac{3\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{5/2}r}+\frac{3}{d^2r\sqrt{d+ex^r}}+\frac{1}{dr(d+ex^r)^{3/2}}\right)(a+b\log(cx^n))-bn\int\left(-\frac{2\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{d^{5/2}rx}+\frac{2}{d^2rx\sqrt{ex^r+d}}+\frac{2}{3drx(ex^r+d)^{3/2}}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{2}{3}\left(-\frac{3\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{5/2}r}+\frac{3}{d^2r\sqrt{d+ex^r}}+\frac{1}{dr(d+ex^r)^{3/2}}\right)(a+b\log(cx^n))-bn\left(-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{5/2}r^2}-\frac{16\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{3d^{5/2}r^2}+\frac{4\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{d^{5/2}r^2}+\frac{2\,\text{PolyLog}\left(2,1-\right.}{d^{5/2}r^2}\right.$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(5/2)),x]
```

output
```
(2*(1/(d*r*(d + e*x^r)^(3/2)) + 3/(d^2*r*Sqrt[d + e*x^r]) - (3*ArcTanh[Sqr
t[d + e*x^r]/Sqrt[d]])/(d^(5/2)*r))*(a + b*Log[c*x^n]))/3 - b*n*(4/(3*d^2*
r^2*Sqrt[d + e*x^r]) - (16*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]])/(3*d^(5/2)*r^
2) - (2*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]^2)/(d^(5/2)*r^2) + (4*ArcTanh[Sqr
t[d + e*x^r]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])])/(d^(5/
2)*r^2) + (2*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])])/(d^(
5/2)*r^2))
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x\left(d+e\,x^{r}\right)^{\frac{5}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^(5/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^(5/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^{5/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(5/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^{5/2}}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**(5/2),x)
```

output
```
Timed out
```

Maxima [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^{5/2}}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\left(ex^r+d\right)^{\frac{5}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(5/2),x, algorithm="maxima")
```

output
```
1/3*a*(3*log((sqrt(e*x^r + d) - sqrt(d))/(sqrt(e*x^r + d) + sqrt(d)))/(d^(
5/2)*r) + 2*(3*e*x^r + 4*d)/((e*x^r + d)^(3/2)*d^2*r)) + b*integrate((log(
c) + log(x^n))/((e^2*x*x^(2*r) + 2*d*e*x*x^r + d^2*x)*sqrt(e*x^r + d)), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{5/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)^{\frac{5}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^(5/2)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{5/2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x\,(d+e\,x^r)^{5/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^(5/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^(5/2)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{5/2}}\,dx = \left(\int \frac{\sqrt{x^r e+d}}{x^{3r}e^3x+3x^{2r}d\,e^2x+3x^r d^2ex+d^3x}dx\right)a + \left(\int \frac{\sqrt{x^r e+d}\,\log(x^n c)}{x^{3r}e^3x+3x^{2r}d\,e^2x+3x^r d^2ex+d^3x}dx\right)b$$

input
```
int((a+b*log(c*x^n))/x/(d+e*x^r)^(5/2),x)
```

output
```
int(sqrt(x**r*e + d)/(x**(3*r)*e**3*x + 3*x**(2*r)*d*e**2*x + 3*x**r*d**2*
e*x + d**3*x),x)*a + int((sqrt(x**r*e + d)*log(x**n*c))/(x**(3*r)*e**3*x +
 3*x**(2*r)*d*e**2*x + 3*x**r*d**2*e*x + d**3*x),x)*b
```

3.437 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx$

Optimal result 3214
Mathematica [F] 3215
Rubi [A] (verified) 3215
Maple [F] 3217
Fricas [F(-2)] 3217
Sympy [F(-1)] 3217
Maxima [F] 3218
Giac [F] 3218
Mupad [F(-1)] 3218
Reduce [F] 3219

Optimal result

Integrand size = 25, antiderivative size = 314

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx = -\frac{4bn}{15d^2r^2(d+ex^r)^{3/2}} - \frac{32bn}{15d^3r^2\sqrt{d+ex^r}} + \frac{92bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{15d^{7/2}r^2} + \frac{2bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{7/2}r^2} + \frac{2}{15}\left(\frac{3}{dr(d+ex^r)^{5/2}} + \frac{5}{d^2r(d+ex^r)^{3/2}} + \frac{15}{d^3r\sqrt{d+ex^r}} - \frac{15\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{7/2}r}\right)(a+b\log(cx^n)) - \frac{4bn\operatorname{arcta}}{}$$

output
```
-4/15*b*n/d^2/r^2/(d+e*x^r)^(3/2)-32/15*b*n/d^3/r^2/(d+e*x^r)^(1/2)+92/15*
b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))/d^(7/2)/r^2+2*b*n*arctanh((d+e*x^r)^(
1/2)/d^(1/2))^2/d^(7/2)/r^2+2/15*(3/d/r/(d+e*x^r)^(5/2)+5/d^2/r/(d+e*x^r)^
(3/2)+15/d^3/r/(d+e*x^r)^(1/2)-15*arctanh((d+e*x^r)^(1/2)/d^(1/2))/d^(7/2)
/r)*(a+b*ln(c*x^n))-4*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d
^(1/2)-(d+e*x^r)^(1/2)))/d^(7/2)/r^2-2*b*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-
(d+e*x^r)^(1/2)))/d^(7/2)/r^2
```

Mathematica [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx=\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(7/2)),x]
```

output
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(7/2)), x]
```

Rubi [A] (verified)

Time = 0.82 (sec) , antiderivative size = 307, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx$$

$$\Big\downarrow \text{2790}$$

$$\frac{2}{15}\left(-\frac{15\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{7/2}r}+\frac{15}{d^3r\sqrt{d+ex^r}}+\frac{5}{d^2r(d+ex^r)^{3/2}}+\frac{3}{dr(d+ex^r)^{5/2}}\right)(a+b\log(cx^n))-bn\int\left(-\frac{2\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{d^{7/2}rx}+\frac{2}{d^3rx\sqrt{ex^r+d}}+\frac{2}{3d^2rx(ex^r+d)^{3/2}}+\frac{2}{5drx(ex^r+d)^{5/2}}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{2}{15}\left(-\frac{15\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{7/2}r}+\frac{15}{d^3r\sqrt{d+ex^r}}+\frac{5}{d^2r\left(d+ex^r\right)^{3/2}}+\frac{3}{dr\left(d+ex^r\right)^{5/2}}\right)\left(a+b\log\left(cx^n\right)\right)-$$
$$bn\left(-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{7/2}r^2}-\frac{92\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{15d^{7/2}r^2}+\frac{4\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{d^{7/2}r^2}+\frac{2\,\text{PolyLog}\left(2,1-\right.}{d^{7/2}r^2}\right.$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(7/2)),x]
```

output
```
(2*(3/(d*r*(d + e*x^r)^(5/2)) + 5/(d^2*r*(d + e*x^r)^(3/2)) + 15/(d^3*r*Sq
rt[d + e*x^r]) - (15*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]])/(d^(7/2)*r))*(a + b
*Log[c*x^n]))/15 - b*n*(4/(15*d^2*r^2*(d + e*x^r)^(3/2)) + 32/(15*d^3*r^2*
Sqrt[d + e*x^r]) - (92*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]])/(15*d^(7/2)*r^2)
- (2*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]^2)/(d^(7/2)*r^2) + (4*ArcTanh[Sqrt[d
 + e*x^r]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])])/(d^(7/2)*
r^2) + (2*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])])/(d^(7/2
)*r^2))
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x\left(d+e\,x^{r}\right)^{\frac{7}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^(7/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^(7/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{r}\right)^{7/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(7/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{r}\right)^{7/2}}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**(7/2),x)
```

output
```
Timed out
```

Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)^{\frac{7}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(7/2),x, algorithm="maxima")
```

output
```
1/15*a*(15*log((sqrt(e*x^r + d) - sqrt(d))/(sqrt(e*x^r + d) + sqrt(d)))/(d
^(7/2)*r) + 2*(15*(e*x^r + d)^2 + 5*(e*x^r + d)*d + 3*d^2)/((e*x^r + d)^(5
/2)*d^3*r)) + b*integrate((log(c) + log(x^n))/((e^3*x*x^(3*r) + 3*d*e^2*x*
x^(2*r) + 3*d^2*e*x*x^r + d^3*x)*sqrt(e*x^r + d)), x)
```

Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)^{\frac{7}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(7/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^(7/2)*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x\,(d+e\,x^r)^{7/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^(7/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^(7/2)), x)
```

Reduce [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx = \left(\int \frac{\sqrt{x^r e+d}}{x^{4r}e^4x+4x^{3r}d\,e^3x+6x^{2r}d^2e^2x+4x^r d^3ex+d^4x}dx\right)a + \left(\int \frac{\sqrt{x^r e+d}\,\log(x^n c)}{x^{4r}e^4x+4x^{3r}d\,e^3x+6x^{2r}d^2e^2x+4x^r d^3ex+d^4x}dx\right)b$$

input
```
int((a+b*log(c*x^n))/x/(d+e*x^r)^(7/2),x)
```

output
```
int(sqrt(x**r*e + d)/(x**(4*r)*e**4*x + 4*x**(3*r)*d*e**3*x + 6*x**(2*r)*d
**2*e**2*x + 4*x**r*d**3*e*x + d**4*x),x)*a + int((sqrt(x**r*e + d)*log(x*
*n*c))/(x**(4*r)*e**4*x + 4*x**(3*r)*d*e**3*x + 6*x**(2*r)*d**2*e**2*x + 4
*x**r*d**3*e*x + d**4*x),x)*b
```

3.438 $\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))\,dx$

Optimal result 3220
Mathematica [A] (verified) 3221
Rubi [A] (verified) 3221
Maple [B] (verified) 3223
Fricas [B] (verification not implemented) 3224
Sympy [F(-2)] 3224
Maxima [A] (verification not implemented) 3225
Giac [B] (verification not implemented) 3226
Mupad [F(-1)] 3226
Reduce [B] (verification not implemented) 3227

Optimal result

Integrand size = 25, antiderivative size = 242

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))\,dx = -\frac{3bd^2enx^{1+r}(fx)^m}{(1+m+r)^2}-\frac{3bde^2nx^{1+2r}(fx)^m}{(1+m+2r)^2}-\frac{be^3nx^{1+3r}(fx)^m}{(1+m+3r)^2}-\frac{bd^3n(fx)^{1+m}}{f(1+m)^2}+\frac{d^3(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}+\frac{3d^2ex^r(fx)^{1+m}(a+b\log(cx^n))}{f(1+m+r)}+\frac{3de^2x^{2r}(fx)^{1+m}(a+b\log(cx^n))}{f(1+m+2r)}+\frac{e^3x^{3r}(fx)^{1+m}(a+b\log(cx^n))}{f(1+m+3r)}$$

output
```
-3*b*d^2*e*n*x^(1+r)*(f*x)^m/(1+m+r)^2-3*b*d*e^2*n*x^(1+2*r)*(f*x)^m/(1+m+
2*r)^2-b*e^3*n*x^(1+3*r)*(f*x)^m/(1+m+3*r)^2-b*d^3*n*(f*x)^(1+m)/f/(1+m)^2
+d^3*(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)+3*d^2*e*x^r*(f*x)^(1+m)*(a+b*ln(c
*x^n))/f/(1+m+r)+3*d*e^2*x^(2*r)*(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m+2*r)+e
^3*x^(3*r)*(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m+3*r)
```

Mathematica [A] (verified)

Time = 0.55 (sec) , antiderivative size = 178, normalized size of antiderivative = 0.74

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))\,dx = x(fx)^m\left(-\frac{bd^3n}{(1+m)^2}-\frac{3bd^2enx^r}{(1+m+r)^2}-\frac{3bde^2nx^{2r}}{(1+m+2r)^2}-\frac{be^3nx^{3r}}{(1+m+3r)^2}+\frac{d^3(a+b\log(cx^n))}{1+m}+\frac{3d^2ex^r(a+b\log(cx^n))}{1+m+r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{1+m+2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{1+m+3r}\right)$$

input
```
Integrate[(f*x)^m*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
x*(f*x)^m*(-((b*d^3*n)/(1 + m)^2) - (3*b*d^2*e*n*x^r)/(1 + m + r)^2 - (3*b
*d*e^2*n*x^(2*r))/(1 + m + 2*r)^2 - (b*e^3*n*x^(3*r))/(1 + m + 3*r)^2 + (d
^3*(a + b*Log[c*x^n]))/(1 + m) + (3*d^2*e*x^r*(a + b*Log[c*x^n]))/(1 + m +
 r) + (3*d*e^2*x^(2*r)*(a + b*Log[c*x^n]))/(1 + m + 2*r) + (e^3*x^(3*r)*(a
 + b*Log[c*x^n]))/(1 + m + 3*r))
```

Rubi [A] (verified)

Time = 2.34 (sec) , antiderivative size = 228, normalized size of antiderivative = 0.94, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.120, Rules used = {2792, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{ 2792}$$

$$-bn\int (fx)^m\left(\frac{3d^2ex^r}{m+r+1}+\frac{3de^2x^{2r}}{m+2r+1}+\frac{e^3x^{3r}}{m+3r+1}+\frac{d^3}{m+1}\right)dx+\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2ex^{r+1}(fx)^m(a+b\log(cx^n))}{m+r+1}+\frac{3de^2x^{2r+1}(fx)^m(a+b\log(cx^n))}{m+2r+1}+\frac{e^3x^{3r+1}(fx)^m(a+b\log(cx^n))}{m+3r+1}$$

$$\Big\downarrow \text{2010}$$

$$-bn\int \left(\frac{3d^2ex^r(fx)^m}{m+r+1}+\frac{3de^2x^{2r}(fx)^m}{m+2r+1}+\frac{e^3x^{3r}(fx)^m}{m+3r+1}+\frac{d^3(fx)^m}{m+1}\right)dx+\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2ex^{r+1}(fx)^m(a+b\log(cx^n))}{m+r+1}+\frac{3de^2x^{2r+1}(fx)^m(a+b\log(cx^n))}{m+2r+1}+\frac{e^3x^{3r+1}(fx)^m(a+b\log(cx^n))}{m+3r+1}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2ex^{r+1}(fx)^m(a+b\log(cx^n))}{m+r+1}+\frac{3de^2x^{2r+1}(fx)^m(a+b\log(cx^n))}{m+2r+1}+\frac{e^3x^{3r+1}(fx)^m(a+b\log(cx^n))}{m+3r+1}-bn\left(\frac{d^3(fx)^{m+1}}{f(m+1)^2}+\frac{3d^2ex^{r+1}(fx)^m}{(m+r+1)^2}+\frac{3de^2x^{2r+1}(fx)^m}{(m+2r+1)^2}+\frac{e^3x^{3r+1}(fx)^m}{(m+3r+1)^2}\right)$$

input
```
Int[(f*x)^m*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((3*d^2*e*x^(1 + r)*(f*x)^m)/(1 + m + r)^2 + (3*d*e^2*x^(1 + 2*r)*(f
*x)^m)/(1 + m + 2*r)^2 + (e^3*x^(1 + 3*r)*(f*x)^m)/(1 + m + 3*r)^2 + (d^3*
(f*x)^(1 + m))/(f*(1 + m)^2))) + (3*d^2*e*x^(1 + r)*(f*x)^m*(a + b*Log[c*x
^n]))/(1 + m + r) + (3*d*e^2*x^(1 + 2*r)*(f*x)^m*(a + b*Log[c*x^n]))/(1 +
m + 2*r) + (e^3*x^(1 + 3*r)*(f*x)^m*(a + b*Log[c*x^n]))/(1 + m + 3*r) + (d
^3*(f*x)^(1 + m)*(a + b*Log[c*x^n]))/(f*(1 + m))
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 8187 vs. $2(242) = 484$.

Time = 65.04 (sec) , antiderivative size = 8188, normalized size of antiderivative = 33.83

method	result	size
parallelrisch	Expression too large to display	8188
risch	Expression too large to display	22640

input
```
int((f*x)^m*(d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
result too large to display
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 4918 vs. $2(242) = 484$.

Time = 0.24 (sec) , antiderivative size = 4918, normalized size of antiderivative = 20.32

$$\int (fx)^m (d + ex^r)^3 (a + b \log (cx^n)) \, dx = \text{Too large to display}$$

input
```
integrate((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
Too large to include
```

Sympy [F(-2)]

Exception generated.

$$\int (fx)^m (d + ex^r)^3 (a + b \log (cx^n)) \, dx = \text{Exception raised: TypeError}$$

input
```
integrate((f*x)**m*(d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

output
```
Exception raised: TypeError >> Invalid comparison of non-real zoo
```

Maxima [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 343, normalized size of antiderivative = 1.42

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))\,dx = \frac{be^3f^mxe^{(m\log(x)+3\,r\log(x))}\log(cx^n)}{m+3\,r+1} + \frac{3\,bde^2f^mxe^{(m\log(x)+2\,r\log(x))}\log(cx^n)}{m+2\,r+1} + \frac{3\,bd^2ef^mxe^{(m\log(x)+r\log(x))}\log(cx^n)}{m+r+1} - \frac{bd^3f^mnxx^m}{(m+1)^2} + \frac{ae^3f^mxe^{(m\log(x)+3\,r\log(x))}}{m+3\,r+1} - \frac{be^3f^mnxe^{(m\log(x)+3\,r\log(x))}}{(m+3\,r+1)^2} + \frac{3\,ade^2f^mxe^{(m\log(x)+2\,r\log(x))}}{m+2\,r+1} - \frac{3\,bde^2f^mnxe^{(m\log(x)+2\,r\log(x))}}{(m+2\,r+1)^2} + \frac{3\,ad^2ef^mxe^{(m\log(x)+r\log(x))}}{m+r+1} - \frac{3\,bd^2ef^mnxe^{(m\log(x)+r\log(x))}}{(m+r+1)^2} + \frac{(fx)^{m+1}bd^3\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1}ad^3}{f(m+1)}$$

input
```
integrate((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
b*e^3*f^m*x*e^(m*log(x) + 3*r*log(x))*log(c*x^n)/(m + 3*r + 1) + 3*b*d*e^2
*f^m*x*e^(m*log(x) + 2*r*log(x))*log(c*x^n)/(m + 2*r + 1) + 3*b*d^2*e*f^m*
x*e^(m*log(x) + r*log(x))*log(c*x^n)/(m + r + 1) - b*d^3*f^m*n*x*x^m/(m +
1)^2 + a*e^3*f^m*x*e^(m*log(x) + 3*r*log(x))/(m + 3*r + 1) - b*e^3*f^m*n*x
*e^(m*log(x) + 3*r*log(x))/(m + 3*r + 1)^2 + 3*a*d*e^2*f^m*x*e^(m*log(x) +
 2*r*log(x))/(m + 2*r + 1) - 3*b*d*e^2*f^m*n*x*e^(m*log(x) + 2*r*log(x))/(
m + 2*r + 1)^2 + 3*a*d^2*e*f^m*x*e^(m*log(x) + r*log(x))/(m + r + 1) - 3*b
*d^2*e*f^m*n*x*e^(m*log(x) + r*log(x))/(m + r + 1)^2 + (f*x)^(m + 1)*b*d^3
*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d^3/(f*(m + 1))
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 772 vs. $2(242) = 484$.

Time = 0.17 (sec) , antiderivative size = 772, normalized size of antiderivative = 3.19

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e^3*f^m*m*n*x*x^m*x^(3*r)*log(x)/(m^2 + 6*m*r + 9*r^2 + 2*m + 6*r + 1) +
 3*b*e^3*f^m*n*r*x*x^m*x^(3*r)*log(x)/(m^2 + 6*m*r + 9*r^2 + 2*m + 6*r + 1
) + 3*b*d*e^2*f^m*m*n*x*x^m*x^(2*r)*log(x)/(m^2 + 4*m*r + 4*r^2 + 2*m + 4*
r + 1) + 6*b*d*e^2*f^m*n*r*x*x^m*x^(2*r)*log(x)/(m^2 + 4*m*r + 4*r^2 + 2*m
 + 4*r + 1) + 3*b*d^2*e*f^m*m*n*x*x^m*x^r*log(x)/(m^2 + 2*m*r + r^2 + 2*m
+ 2*r + 1) + 3*b*d^2*e*f^m*n*r*x*x^m*x^r*log(x)/(m^2 + 2*m*r + r^2 + 2*m +
 2*r + 1) + b*d^3*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + b*e^3*f^m*n*x*x^m
*x^(3*r)*log(x)/(m^2 + 6*m*r + 9*r^2 + 2*m + 6*r + 1) + 3*b*d*e^2*f^m*n*x*
x^m*x^(2*r)*log(x)/(m^2 + 4*m*r + 4*r^2 + 2*m + 4*r + 1) + 3*b*d^2*e*f^m*n
*x*x^m*x^r*log(x)/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) - b*e^3*f^m*n*x*x^m*
x^(3*r)/(m^2 + 6*m*r + 9*r^2 + 2*m + 6*r + 1) - 3*b*d*e^2*f^m*n*x*x^m*x^(2
*r)/(m^2 + 4*m*r + 4*r^2 + 2*m + 4*r + 1) - 3*b*d^2*e*f^m*n*x*x^m*x^r/(m^2
 + 2*m*r + r^2 + 2*m + 2*r + 1) + b*e^3*f^m*x*x^m*x^(3*r)*log(c)/(m + 3*r
+ 1) + 3*b*d*e^2*f^m*x*x^m*x^(2*r)*log(c)/(m + 2*r + 1) + 3*b*d^2*e*f^m*x*
x^m*x^r*log(c)/(m + r + 1) + b*d^3*f^m*n*x*x^m*log(x)/(m^2 + 2*m + 1) - b*
d^3*f^m*n*x*x^m/(m^2 + 2*m + 1) + a*e^3*f^m*x*x^m*x^(3*r)/(m + 3*r + 1) +
3*a*d*e^2*f^m*x*x^m*x^(2*r)/(m + 2*r + 1) + 3*a*d^2*e*f^m*x*x^m*x^r/(m + r
 + 1) + (f*x)^m*b*d^3*x*log(c)/(m + 1) + (f*x)^m*a*d^3*x/(m + 1)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))\,dx = \int (f\,x)^m\,(d+e\,x^r)^3\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int((f*x)^m*(d + e*x^r)^3*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^m*(d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 6189, normalized size of antiderivative = 25.57

$$\int (fx)^m (d + ex^r)^3 (a + b\log (cx^n)) \, dx = \text{Too large to display}$$

input
```
int((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n)),x)
```

output
```
(x**m*f**m*x*(x**(3*r)*log(x**n*c)*b*e**3*m**7 + 9*x**(3*r)*log(x**n*c)*b*
e**3*m**6*r + 7*x**(3*r)*log(x**n*c)*b*e**3*m**6 + 31*x**(3*r)*log(x**n*c)
*b*e**3*m**5*r**2 + 54*x**(3*r)*log(x**n*c)*b*e**3*m**5*r + 21*x**(3*r)*lo
g(x**n*c)*b*e**3*m**5 + 51*x**(3*r)*log(x**n*c)*b*e**3*m**4*r**3 + 155*x**
(3*r)*log(x**n*c)*b*e**3*m**4*r**2 + 135*x**(3*r)*log(x**n*c)*b*e**3*m**4*
r + 35*x**(3*r)*log(x**n*c)*b*e**3*m**4 + 40*x**(3*r)*log(x**n*c)*b*e**3*m
**3*r**4 + 204*x**(3*r)*log(x**n*c)*b*e**3*m**3*r**3 + 310*x**(3*r)*log(x*
*n*c)*b*e**3*m**3*r**2 + 180*x**(3*r)*log(x**n*c)*b*e**3*m**3*r + 35*x**(3
*r)*log(x**n*c)*b*e**3*m**3 + 12*x**(3*r)*log(x**n*c)*b*e**3*m**2*r**5 + 1
20*x**(3*r)*log(x**n*c)*b*e**3*m**2*r**4 + 306*x**(3*r)*log(x**n*c)*b*e**3
*m**2*r**3 + 310*x**(3*r)*log(x**n*c)*b*e**3*m**2*r**2 + 135*x**(3*r)*log(
x**n*c)*b*e**3*m**2*r + 21*x**(3*r)*log(x**n*c)*b*e**3*m**2 + 24*x**(3*r)*
log(x**n*c)*b*e**3*m*r**5 + 120*x**(3*r)*log(x**n*c)*b*e**3*m*r**4 + 204*x
**(3*r)*log(x**n*c)*b*e**3*m*r**3 + 155*x**(3*r)*log(x**n*c)*b*e**3*m*r**2
 + 54*x**(3*r)*log(x**n*c)*b*e**3*m*r + 7*x**(3*r)*log(x**n*c)*b*e**3*m +
12*x**(3*r)*log(x**n*c)*b*e**3*r**5 + 40*x**(3*r)*log(x**n*c)*b*e**3*r**4
+ 51*x**(3*r)*log(x**n*c)*b*e**3*r**3 + 31*x**(3*r)*log(x**n*c)*b*e**3*r**
2 + 9*x**(3*r)*log(x**n*c)*b*e**3*r + x**(3*r)*log(x**n*c)*b*e**3 + x**(3*
r)*a*e**3*m**7 + 9*x**(3*r)*a*e**3*m**6*r + 7*x**(3*r)*a*e**3*m**6 + 31*x*
*(3*r)*a*e**3*m**5*r**2 + 54*x**(3*r)*a*e**3*m**5*r + 21*x**(3*r)*a*e**...
```

3.439 $\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))\,dx$

Optimal result 3228
Mathematica [A] (verified) 3229
Rubi [A] (verified) 3229
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Optimal result

Integrand size = 25, antiderivative size = 177

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))\,dx = -\frac{bd^2n(fx)^{1+m}}{f(1+m)^2} - \frac{2bdenx^r(fx)^{1+m}}{f(1+m+r)^2} - \frac{be^2nx^{2r}(fx)^{1+m}}{f(1+m+2r)^2} + \frac{d^2(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)} + \frac{2dex^r(fx)^{1+m}(a+b\log(cx^n))}{f(1+m+r)} + \frac{e^2x^{2r}(fx)^{1+m}(a+b\log(cx^n))}{f(1+m+2r)}$$

output
```
-b*d^2*n*(f*x)^(1+m)/f/(1+m)^2-2*b*d*e*n*x^r*(f*x)^(1+m)/f/(1+m+r)^2-b*e^2
*n*x^(2*r)*(f*x)^(1+m)/f/(1+m+2*r)^2+d^2*(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+
m)+2*d*e*x^r*(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m+r)+e^2*x^(2*r)*(f*x)^(1+m)
*(a+b*ln(c*x^n))/f/(1+m+2*r)
```

Mathematica [A] (verified)

Time = 0.32 (sec) , antiderivative size = 124, normalized size of antiderivative = 0.70

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))\, dx = x(fx)^m \left(-\frac{bd^2n}{(1+m)^2} - \frac{2bdenx^r}{(1+m+r)^2} - \frac{be^2nx^{2r}}{(1+m+2r)^2} + \frac{d^2(a+b\log(cx^n))}{1+m} + \frac{2dex^r(a+b\log(cx^n))}{1+m+r} + \frac{e^2x^{2r}(a+b\log(cx^n))}{1+m+2r}\right)$$

input
```
Integrate[(f*x)^m*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
x*(f*x)^m*(-((b*d^2*n)/(1 + m)^2) - (2*b*d*e*n*x^r)/(1 + m + r)^2 - (b*e^2
*n*x^(2*r))/(1 + m + 2*r)^2 + (d^2*(a + b*Log[c*x^n]))/(1 + m) + (2*d*e*x^
r*(a + b*Log[c*x^n]))/(1 + m + r) + (e^2*x^(2*r)*(a + b*Log[c*x^n]))/(1 +
m + 2*r))
```

Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 162, normalized size of antiderivative = 0.92, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.120$, Rules used = {2792, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))\, dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int (fx)^m \left(\frac{2dex^r}{m+r+1} + \frac{e^2x^{2r}}{m+2r+1} + \frac{d^2}{m+1}\right)dx + \frac{d^2(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)} + \frac{2dex^{r+1}(fx)^m(a+b\log(cx^n))}{m+r+1} + \frac{e^2x^{2r+1}(fx)^m(a+b\log(cx^n))}{m+2r+1}$$

$$\Big\downarrow \text{1691}$$

$$-bn\int\left(\frac{2dex^r(fx)^m}{m+r+1}+\frac{e^2x^{2r}(fx)^m}{m+2r+1}+\frac{d^2(fx)^m}{m+1}\right)dx+\frac{d^2(fx)^{m+1}\left(a+b\log\left(cx^n\right)\right)}{f(m+1)}+\frac{2dex^{r+1}(fx)^m\left(a+b\log\left(cx^n\right)\right)}{m+r+1}+\frac{e^2x^{2r+1}(fx)^m\left(a+b\log\left(cx^n\right)\right)}{m+2r+1}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^2(fx)^{m+1}\left(a+b\log\left(cx^n\right)\right)}{f(m+1)}+\frac{2dex^{r+1}(fx)^m\left(a+b\log\left(cx^n\right)\right)}{m+r+1}+\frac{e^2x^{2r+1}(fx)^m\left(a+b\log\left(cx^n\right)\right)}{m+2r+1}-bn\left(\frac{d^2(fx)^{m+1}}{f(m+1)^2}+\frac{2dex^{r+1}(fx)^m}{(m+r+1)^2}+\frac{e^2x^{2r+1}(fx)^m}{(m+2r+1)^2}\right)$$

input
```
Int[(f*x)^m*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((2*d*e*x^(1 + r)*(f*x)^m)/(1 + m + r)^2 + (e^2*x^(1 + 2*r)*(f*x)^m)
/(1 + m + 2*r)^2 + (d^2*(f*x)^(1 + m))/(f*(1 + m)^2))) + (2*d*e*x^(1 + r)*
(f*x)^m*(a + b*Log[c*x^n]))/(1 + m + r) + (e^2*x^(1 + 2*r)*(f*x)^m*(a + b*
Log[c*x^n]))/(1 + m + 2*r) + (d^2*(f*x)^(1 + m)*(a + b*Log[c*x^n]))/(f*(1
+ m))
```

Defintions of rubi rules used

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 3030 vs. 2(177) = 354.

Time = 14.14 (sec) , antiderivative size = 3031, normalized size of antiderivative = 17.12

method	result	size
parallelrisch	Expression too large to display	3031
risch	Expression too large to display	8671

input
```
int((f*x)^m*(d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(8*x*x^r*(f*x)^m*b*d*e*n*r^2-10*x*x^r*(f*x)^m*ln(c*x^n)*b*d*e*m-10*x*x^r*
(f*x)^m*ln(c*x^n)*b*d*e*r-40*x*x^r*(f*x)^m*a*d*e*m*r+8*x*x^r*(f*x)^m*b*d*e
*m*n+8*x*x^r*(f*x)^m*b*d*e*n*r-16*x*(x^r)^2*(f*x)^m*ln(c*x^n)*b*e^2*m^3*r-
15*x*(x^r)^2*(f*x)^m*ln(c*x^n)*b*e^2*m^2*r^2-4*x*(x^r)^2*(f*x)^m*ln(c*x^n)
*b*e^2*m*r^3+2*x*(x^r)^2*(f*x)^m*b*e^2*m^3*n*r+x*(x^r)^2*(f*x)^m*b*e^2*m^2
*n*r^2-2*x*x^r*(f*x)^m*ln(c*x^n)*b*d*e*m^5-24*x*(x^r)^2*(f*x)^m*ln(c*x^n)*
b*e^2*m^2*r-15*x*(x^r)^2*(f*x)^m*ln(c*x^n)*b*e^2*m*r^2+6*x*(x^r)^2*(f*x)^m
*b*e^2*m^2*n*r+2*x*(x^r)^2*(f*x)^m*b*e^2*m*n*r^2-10*x*x^r*(f*x)^m*ln(c*x^n
)*b*d*e*m^4-10*x*x^r*(f*x)^m*a*d*e*m^4*r-16*x*x^r*(f*x)^m*a*d*e*m^3*r^2-5*
x*(x^r)^2*(f*x)^m*a*e^2*m+4*x*(f*x)^m*b*d^2*m*n-12*x*(f*x)^m*ln(c*x^n)*b*d
^2*r^3-24*x*(f*x)^m*a*d^2*m^3*r-x*(f*x)^m*ln(c*x^n)*b*d^2*m^5-10*x*(f*x)^m
*ln(c*x^n)*b*d^2*m^2-5*x*(f*x)^m*ln(c*x^n)*b*d^2*m^4-6*x*(f*x)^m*a*d^2*m^4
*r-13*x*(f*x)^m*a*d^2*m^3*r^2-12*x*(f*x)^m*a*d^2*m^2*r^3-5*x*(x^r)^2*(f*x)
^m*a*e^2*r^2-5*x*(f*x)^m*ln(c*x^n)*b*d^2*m-24*x*(f*x)^m*a*d^2*m*r^3-4*x*(x
^r)^2*(f*x)^m*a*e^2*r+x*(x^r)^2*(f*x)^m*b*e^2*n-39*x*(f*x)^m*a*d^2*m^2*r^2
-4*x*(f*x)^m*ln(c*x^n)*b*d^2*r^4-e^2*b*ln(c*x^n)*(f*x)^m*x*(x^r)^2-6*x*(f*
x)^m*ln(c*x^n)*b*d^2*r-x*(x^r)^2*(f*x)^m*a*e^2*m^5+4*x*(f*x)^m*b*d^2*m^3*n
+12*x*(f*x)^m*b*d^2*n*r^3-2*x*(x^r)^2*(f*x)^m*a*e^2*r^3-13*x*(f*x)^m*ln(c*
x^n)*b*d^2*r^2-36*x*(f*x)^m*a*d^2*m^2*r-39*x*(f*x)^m*a*d^2*m*r^2+6*x*(f*x)
^m*b*d^2*m^2*n+13*x*(f*x)^m*b*d^2*n*r^2+x*(f*x)^m*b*d^2*m^4*n+4*x*(f*x)...
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1875 vs. $2(177) = 354$.

Time = 0.18 (sec) , antiderivative size = 1875, normalized size of antiderivative = 10.59

$$\int (fx)^m (d + ex^r)^2 (a + b\log(cx^n)) \, dx = \text{Too large to display}$$

input
```
integrate((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
(((b*e^2*m^5 + 5*b*e^2*m^4 + 10*b*e^2*m^3 + 10*b*e^2*m^2 + 5*b*e^2*m + 2*(
b*e^2*m^2 + 2*b*e^2*m + b*e^2)*r^3 + b*e^2 + 5*(b*e^2*m^3 + 3*b*e^2*m^2 +
3*b*e^2*m + b*e^2)*r^2 + 4*(b*e^2*m^4 + 4*b*e^2*m^3 + 6*b*e^2*m^2 + 4*b*e^
2*m + b*e^2)*r)*x*log(c) + (2*(b*e^2*m^2 + 2*b*e^2*m + b*e^2)*n*r^3 + 5*(b
*e^2*m^3 + 3*b*e^2*m^2 + 3*b*e^2*m + b*e^2)*n*r^2 + 4*(b*e^2*m^4 + 4*b*e^2
*m^3 + 6*b*e^2*m^2 + 4*b*e^2*m + b*e^2)*n*r + (b*e^2*m^5 + 5*b*e^2*m^4 + 1
0*b*e^2*m^3 + 10*b*e^2*m^2 + 5*b*e^2*m + b*e^2)*n)*x*log(x) + (a*e^2*m^5 +
 5*a*e^2*m^4 + 10*a*e^2*m^3 + 10*a*e^2*m^2 + 5*a*e^2*m + 2*(a*e^2*m^2 + 2*
a*e^2*m + a*e^2)*r^3 + a*e^2 + (5*a*e^2*m^3 + 15*a*e^2*m^2 + 15*a*e^2*m +
5*a*e^2 - (b*e^2*m^2 + 2*b*e^2*m + b*e^2)*n)*r^2 - (b*e^2*m^4 + 4*b*e^2*m^
3 + 6*b*e^2*m^2 + 4*b*e^2*m + b*e^2)*n + 2*(2*a*e^2*m^4 + 8*a*e^2*m^3 + 12
*a*e^2*m^2 + 8*a*e^2*m + 2*a*e^2 - (b*e^2*m^3 + 3*b*e^2*m^2 + 3*b*e^2*m +
b*e^2)*n)*r)*x)*x^(2*r)*e^(m*log(f) + m*log(x)) + 2*((b*d*e*m^5 + 5*b*d*e*
m^4 + 10*b*d*e*m^3 + 10*b*d*e*m^2 + 5*b*d*e*m + 4*(b*d*e*m^2 + 2*b*d*e*m +
 b*d*e)*r^3 + b*d*e + 8*(b*d*e*m^3 + 3*b*d*e*m^2 + 3*b*d*e*m + b*d*e)*r^2
+ 5*(b*d*e*m^4 + 4*b*d*e*m^3 + 6*b*d*e*m^2 + 4*b*d*e*m + b*d*e)*r)*x*log(c
) + (4*(b*d*e*m^2 + 2*b*d*e*m + b*d*e)*n*r^3 + 8*(b*d*e*m^3 + 3*b*d*e*m^2
+ 3*b*d*e*m + b*d*e)*n*r^2 + 5*(b*d*e*m^4 + 4*b*d*e*m^3 + 6*b*d*e*m^2 + 4*
b*d*e*m + b*d*e)*n*r + (b*d*e*m^5 + 5*b*d*e*m^4 + 10*b*d*e*m^3 + 10*b*d*e*
m^2 + 5*b*d*e*m + b*d*e)*n)*x*log(x) + (a*d*e*m^5 + 5*a*d*e*m^4 + 10*a*...
```

Sympy [F(-2)]

Exception generated.

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((f*x)**m*(d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

output
```
Exception raised: TypeError >> Invalid comparison of non-real zoo
```

Maxima [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 240, normalized size of antiderivative = 1.36

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))\,dx = \frac{be^2f^mxe^{(m\log(x)+2r\log(x))}\log(cx^n)}{m+2r+1} + \frac{2\,bdef^mxe^{(m\log(x)+r\log(x))}\log(cx^n)}{m+r+1} - \frac{bd^2f^mnxx^m}{(m+1)^2} + \frac{ae^2f^mxe^{(m\log(x)+2r\log(x))}}{m+2r+1} - \frac{be^2f^mnxe^{(m\log(x)+2r\log(x))}}{(m+2r+1)^2} + \frac{2\,adef^mxe^{(m\log(x)+r\log(x))}}{m+r+1} - \frac{2\,bdef^mnxe^{(m\log(x)+r\log(x))}}{(m+r+1)^2} + \frac{(fx)^{m+1}bd^2\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1}ad^2}{f(m+1)}$$

input
```
integrate((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
b*e^2*f^m*x*e^(m*log(x) + 2*r*log(x))*log(c*x^n)/(m + 2*r + 1) + 2*b*d*e*f
^m*x*e^(m*log(x) + r*log(x))*log(c*x^n)/(m + r + 1) - b*d^2*f^m*n*x*x^m/(m
 + 1)^2 + a*e^2*f^m*x*e^(m*log(x) + 2*r*log(x))/(m + 2*r + 1) - b*e^2*f^m*
n*x*e^(m*log(x) + 2*r*log(x))/(m + 2*r + 1)^2 + 2*a*d*e*f^m*x*e^(m*log(x)
+ r*log(x))/(m + r + 1) - 2*b*d*e*f^m*n*x*e^(m*log(x) + r*log(x))/(m + r +
 1)^2 + (f*x)^(m + 1)*b*d^2*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d^2/(
f*(m + 1))
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 528 vs. $2(177) = 354$.

Time = 0.15 (sec) , antiderivative size = 528, normalized size of antiderivative = 2.98

$$\begin{aligned}\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))\,dx &= \frac{be^2f^m mnxx^m x^{2r}\log(x)}{m^2+4mr+4r^2+2m+4r+1} + \frac{2be^2f^m nrxx^m x^{2r}\log(x)}{m^2+4mr+4r^2+2m+4r+1} \\ &+ \frac{2bdef^m mnxx^m x^r\log(x)}{m^2+2mr+r^2+2m+2r+1} + \frac{2bdef^m nrxx^m x^r\log(x)}{m^2+2mr+r^2+2m+2r+1} \\ &+ \frac{bd^2f^m mnxx^m\log(x)}{m^2+2m+1} + \frac{be^2f^m nxx^m x^{2r}\log(x)}{m^2+4mr+4r^2+2m+4r+1} \\ &+ \frac{2bdef^m nxx^m x^r\log(x)}{m^2+2mr+r^2+2m+2r+1} - \frac{be^2f^m nxx^m x^{2r}}{m^2+4mr+4r^2+2m+4r+1} \\ &- \frac{2bdef^m nxx^m x^r}{m^2+2mr+r^2+2m+2r+1} + \frac{be^2f^m xx^m x^{2r}\log(c)}{m+2r+1} \\ &+ \frac{2bdef^m xx^m x^r\log(c)}{m+r+1} + \frac{bd^2f^m nxx^m\log(x)}{m^2+2m+1} - \frac{bd^2f^m nxx^m}{m^2+2m+1} \\ &+ \frac{ae^2f^m xx^m x^{2r}}{m+2r+1} + \frac{2adef^m xx^m x^r}{m+r+1} + \frac{(fx)^m bd^2x\log(c)}{m+1} + \frac{(fx)^m ad^2x}{m+1}\end{aligned}$$

input
```
integrate((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e^2*f^m*m*n*x*x^m*x^(2*r)*log(x)/(m^2 + 4*m*r + 4*r^2 + 2*m + 4*r + 1) +
 2*b*e^2*f^m*n*r*x*x^m*x^(2*r)*log(x)/(m^2 + 4*m*r + 4*r^2 + 2*m + 4*r + 1
) + 2*b*d*e*f^m*m*n*x*x^m*x^r*log(x)/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) +
 2*b*d*e*f^m*n*r*x*x^m*x^r*log(x)/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) + b*
d^2*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + b*e^2*f^m*n*x*x^m*x^(2*r)*log(x
)/(m^2 + 4*m*r + 4*r^2 + 2*m + 4*r + 1) + 2*b*d*e*f^m*n*x*x^m*x^r*log(x)/(
m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) - b*e^2*f^m*n*x*x^m*x^(2*r)/(m^2 + 4*m*
r + 4*r^2 + 2*m + 4*r + 1) - 2*b*d*e*f^m*n*x*x^m*x^r/(m^2 + 2*m*r + r^2 +
2*m + 2*r + 1) + b*e^2*f^m*x*x^m*x^(2*r)*log(c)/(m + 2*r + 1) + 2*b*d*e*f^
m*x*x^m*x^r*log(c)/(m + r + 1) + b*d^2*f^m*n*x*x^m*log(x)/(m^2 + 2*m + 1)
- b*d^2*f^m*n*x*x^m/(m^2 + 2*m + 1) + a*e^2*f^m*x*x^m*x^(2*r)/(m + 2*r + 1
) + 2*a*d*e*f^m*x*x^m*x^r/(m + r + 1) + (f*x)^m*b*d^2*x*log(c)/(m + 1) + (
f*x)^m*a*d^2*x/(m + 1)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))\,dx = \int (f\,x)^m\,(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int((f*x)^m*(d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^m*(d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 2246, normalized size of antiderivative = 12.69

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
int((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n)),x)
```

output
```
(x**m*f**m*x*(x**(2*r)*log(x**n*c)*b*e**2*m**5 + 4*x**(2*r)*log(x**n*c)*b*
e**2*m**4*r + 5*x**(2*r)*log(x**n*c)*b*e**2*m**4 + 5*x**(2*r)*log(x**n*c)*
b*e**2*m**3*r**2 + 16*x**(2*r)*log(x**n*c)*b*e**2*m**3*r + 10*x**(2*r)*log
(x**n*c)*b*e**2*m**3 + 2*x**(2*r)*log(x**n*c)*b*e**2*m**2*r**3 + 15*x**(2*
r)*log(x**n*c)*b*e**2*m**2*r**2 + 24*x**(2*r)*log(x**n*c)*b*e**2*m**2*r +
10*x**(2*r)*log(x**n*c)*b*e**2*m**2 + 4*x**(2*r)*log(x**n*c)*b*e**2*m*r**3
 + 15*x**(2*r)*log(x**n*c)*b*e**2*m*r**2 + 16*x**(2*r)*log(x**n*c)*b*e**2*
m*r + 5*x**(2*r)*log(x**n*c)*b*e**2*m + 2*x**(2*r)*log(x**n*c)*b*e**2*r**3
 + 5*x**(2*r)*log(x**n*c)*b*e**2*r**2 + 4*x**(2*r)*log(x**n*c)*b*e**2*r +
x**(2*r)*log(x**n*c)*b*e**2 + x**(2*r)*a*e**2*m**5 + 4*x**(2*r)*a*e**2*m**
4*r + 5*x**(2*r)*a*e**2*m**4 + 5*x**(2*r)*a*e**2*m**3*r**2 + 16*x**(2*r)*a
*e**2*m**3*r + 10*x**(2*r)*a*e**2*m**3 + 2*x**(2*r)*a*e**2*m**2*r**3 + 15*
x**(2*r)*a*e**2*m**2*r**2 + 24*x**(2*r)*a*e**2*m**2*r + 10*x**(2*r)*a*e**2
*m**2 + 4*x**(2*r)*a*e**2*m*r**3 + 15*x**(2*r)*a*e**2*m*r**2 + 16*x**(2*r)
*a*e**2*m*r + 5*x**(2*r)*a*e**2*m + 2*x**(2*r)*a*e**2*r**3 + 5*x**(2*r)*a*
e**2*r**2 + 4*x**(2*r)*a*e**2*r + x**(2*r)*a*e**2 - x**(2*r)*b*e**2*m**4*n
 - 2*x**(2*r)*b*e**2*m**3*n*r - 4*x**(2*r)*b*e**2*m**3*n - x**(2*r)*b*e**2
*m**2*n*r**2 - 6*x**(2*r)*b*e**2*m**2*n*r - 6*x**(2*r)*b*e**2*m**2*n - 2*x
**(2*r)*b*e**2*m*n*r**2 - 6*x**(2*r)*b*e**2*m*n*r - 4*x**(2*r)*b*e**2*m*n
- x**(2*r)*b*e**2*n*r**2 - 2*x**(2*r)*b*e**2*n*r - x**(2*r)*b*e**2*n + ...
```

3.440 $\int (fx)^m (d+ex^r) (a+b\log(cx^n))\,dx$

Optimal result . . . 3237
Mathematica [A] (verified) . . . 3237
Rubi [A] (verified) . . . 3238
Maple [B] (verified) . . . 3239
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Sympy [F(-2)] . . . 3241
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Reduce [B] (verification not implemented) . . . 3243

Optimal result

Integrand size = 23, antiderivative size = 103

$$\int (fx)^m (d+ex^r) (a+b\log(cx^n))\,dx = -\frac{bdn(fx)^{1+m}}{f(1+m)^2} - \frac{benx^r(fx)^{1+m}}{f(1+m+r)^2} + \frac{d(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)} + \frac{ex^r(fx)^{1+m}(a+b\log(cx^n))}{f(1+m+r)}$$

output
```
-b*d*n*(f*x)^(1+m)/f/(1+m)^2-b*e*n*x^r*(f*x)^(1+m)/f/(1+m+r)^2+d*(f*x)^(1+
m)*(a+b*ln(c*x^n))/f/(1+m)+e*x^r*(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m+r)
```

Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 70, normalized size of antiderivative = 0.68

$$\int (fx)^m (d+ex^r) (a+b\log(cx^n))\,dx = x(fx)^m \left(-\frac{bdn}{(1+m)^2} - \frac{benx^r}{(1+m+r)^2} + \frac{d(a+b\log(cx^n))}{1+m} + \frac{ex^r(a+b\log(cx^n))}{1+m+r}\right)$$

input
```
Integrate[(f*x)^m*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
x*(f*x)^m*(-((b*d*n)/(1 + m)^2) - (b*e*n*x^r)/(1 + m + r)^2 + (d*(a + b*Lo
g[c*x^n]))/(1 + m) + (e*x^r*(a + b*Log[c*x^n]))/(1 + m + r))
```

Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 96, normalized size of antiderivative = 0.93, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {2792, 802, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m (d+ex^r) (a+b\log(cx^n)) \, dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int (fx)^m \left(\frac{ex^r}{m+r+1}+\frac{d}{m+1}\right)dx+\frac{d(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{ex^{r+1}(fx)^m(a+b\log(cx^n))}{m+r+1}$$

$$\Big\downarrow \text{802}$$

$$-bn\int \left(\frac{ex^r(fx)^m}{m+r+1}+\frac{d(fx)^m}{m+1}\right)dx+\frac{d(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{ex^{r+1}(fx)^m(a+b\log(cx^n))}{m+r+1}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{ex^{r+1}(fx)^m(a+b\log(cx^n))}{m+r+1}-bn\left(\frac{d(fx)^{m+1}}{f(m+1)^2}+\frac{ex^{r+1}(fx)^m}{(m+r+1)^2}\right)$$

input
```
Int[(f*x)^m*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((e*x^(1 + r)*(f*x)^m)/(1 + m + r)^2 + (d*(f*x)^(1 + m))/(f*(1 + m)^
2))) + (e*x^(1 + r)*(f*x)^m*(a + b*Log[c*x^n]))/(1 + m + r) + (d*(f*x)^(1
+ m)*(a + b*Log[c*x^n]))/(f*(1 + m))
```

Defintions of rubi rules used

rule 802
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 678 vs. $2(103) = 206$.

Time = 2.27 (sec) , antiderivative size = 679, normalized size of antiderivative = 6.59

method	result
parallelrisch	$-\frac{2x(fx)^m bdmnr-3x(fx)^m \ln(c\,x^n)bd\,m^2-x(fx)^m \ln(c\,x^n)bd\,r^2-2x(fx)^m ad\,m^2r-x(fx)^m adm\,r^2+x(fx)^m bd\,m^2n+x(f}{}$
risch	Expression too large to display

input
```
int((f*x)^m*(d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(2*x*(f*x)^m*b*d*m*n*r-3*x*(f*x)^m*ln(c*x^n)*b*d*m^2-x*(f*x)^m*ln(c*x^n)*
b*d*r^2-2*x*(f*x)^m*a*d*m^2*r-x*(f*x)^m*a*d*m*r^2+x*(f*x)^m*b*d*m^2*n+x*(f
*x)^m*b*d*n*r^2-3*x*x^r*(f*x)^m*a*e*m-x*x^r*(f*x)^m*a*e*r+x*x^r*(f*x)^m*b*
e*n-3*x*(f*x)^m*ln(c*x^n)*b*d*m-2*x*(f*x)^m*ln(c*x^n)*b*d*r-4*x*(f*x)^m*a*
d*m*r+2*x*(f*x)^m*b*d*m*n+2*x*(f*x)^m*b*d*n*r-x*x^r*(f*x)^m*ln(c*x^n)*b*e-
x*(f*x)^m*a*d*m^3-3*x*(f*x)^m*a*d*m^2-x*(f*x)^m*a*d*r^2-x*x^r*(f*x)^m*a*e-
3*x*(f*x)^m*a*d*m-2*x*(f*x)^m*a*d*r+x*(f*x)^m*b*d*n-x*(f*x)^m*ln(c*x^n)*b*
d-x*(f*x)^m*a*d-x*x^r*(f*x)^m*ln(c*x^n)*b*e*m^3-3*x*x^r*(f*x)^m*ln(c*x^n)*
b*e*m^2-x*x^r*(f*x)^m*a*e*m^2*r+x*x^r*(f*x)^m*b*e*m^2*n-2*x*(f*x)^m*ln(c*x
^n)*b*d*m^2*r-x*(f*x)^m*ln(c*x^n)*b*d*m*r^2-3*x*x^r*(f*x)^m*ln(c*x^n)*b*e*
m-x*x^r*(f*x)^m*ln(c*x^n)*b*e*r-2*x*x^r*(f*x)^m*a*e*m*r+2*x*x^r*(f*x)^m*b*
e*m*n-4*x*(f*x)^m*ln(c*x^n)*b*d*m*r-x*x^r*(f*x)^m*a*e*m^3-x*(f*x)^m*ln(c*x
^n)*b*d*m^3-3*x*x^r*(f*x)^m*a*e*m^2-x*x^r*(f*x)^m*ln(c*x^n)*b*e*m^2*r-2*x*
x^r*(f*x)^m*ln(c*x^n)*b*e*m*r)/(m^2+2*m*r+r^2+2*m+2*r+1)/(m^2+2*m+1)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 431 vs. $2(103) = 206$.

Time = 0.09 (sec) , antiderivative size = 431, normalized size of antiderivative = 4.18

$$\int (fx)^m (d + ex^r) (a + b\log(cx^n)) \, dx = \frac{((bem^3 + 3\,bem^2 + 3\,bem + be + (bem^2 + 2\,bem + be)r)x\log(c) + ((bem^2 + 2\,bem + be)nr + (bem^3 + 3}{}$$

input
```
integrate((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
(((b*e*m^3 + 3*b*e*m^2 + 3*b*e*m + b*e + (b*e*m^2 + 2*b*e*m + b*e)*r)*x*lo
g(c) + ((b*e*m^2 + 2*b*e*m + b*e)*n*r + (b*e*m^3 + 3*b*e*m^2 + 3*b*e*m + b
*e)*n)*x*log(x) + (a*e*m^3 + 3*a*e*m^2 + 3*a*e*m + a*e - (b*e*m^2 + 2*b*e*
m + b*e)*n + (a*e*m^2 + 2*a*e*m + a*e)*r)*x)*x^r*e^(m*log(f) + m*log(x)) +
 ((b*d*m^3 + 3*b*d*m^2 + 3*b*d*m + (b*d*m + b*d)*r^2 + b*d + 2*(b*d*m^2 +
2*b*d*m + b*d)*r)*x*log(c) + ((b*d*m + b*d)*n*r^2 + 2*(b*d*m^2 + 2*b*d*m +
 b*d)*n*r + (b*d*m^3 + 3*b*d*m^2 + 3*b*d*m + b*d)*n)*x*log(x) + (a*d*m^3 +
 3*a*d*m^2 + 3*a*d*m + (a*d*m - b*d*n + a*d)*r^2 + a*d - (b*d*m^2 + 2*b*d*
m + b*d)*n + 2*(a*d*m^2 + 2*a*d*m + a*d - (b*d*m + b*d)*n)*r)*x)*e^(m*log(
f) + m*log(x)))/(m^4 + 4*m^3 + (m^2 + 2*m + 1)*r^2 + 6*m^2 + 2*(m^3 + 3*m^
2 + 3*m + 1)*r + 4*m + 1)
```

Sympy [F(-2)]

Exception generated.

$$\int (fx)^m (d + ex^r) (a + b\log(cx^n)) \, dx = \text{Exception raised: TypeError}$$

input
```
integrate((f*x)**m*(d+e*x**r)*(a+b*ln(c*x**n)),x)
```

output
```
Exception raised: TypeError >> Invalid comparison of non-real zoo
```

Maxima [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 137, normalized size of antiderivative = 1.33

$$\int (fx)^m (d + ex^r) (a + b\log(cx^n)) \, dx = \frac{bef^m x e^{(m\log(x) + r\log(x))} \log(cx^n)}{m + r + 1} - \frac{bdf^m nx x^m}{(m + 1)^2} + \frac{aef^m x e^{(m\log(x) + r\log(x))}}{m + r + 1} - \frac{bef^m nx e^{(m\log(x) + r\log(x))}}{(m + r + 1)^2} + \frac{(fx)^{m+1} bd\log(cx^n)}{f(m + 1)} + \frac{(fx)^{m+1} ad}{f(m + 1)}$$

input
```
integrate((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
b*e*f^m*x*e^(m*log(x) + r*log(x))*log(c*x^n)/(m + r + 1) - b*d*f^m*n*x*x^m
/(m + 1)^2 + a*e*f^m*x*e^(m*log(x) + r*log(x))/(m + r + 1) - b*e*f^m*n*x*e
^(m*log(x) + r*log(x))/(m + r + 1)^2 + (f*x)^(m + 1)*b*d*log(c*x^n)/(f*(m
+ 1)) + (f*x)^(m + 1)*a*d/(f*(m + 1))
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 285 vs. $2(103) = 206$.

Time = 0.15 (sec) , antiderivative size = 285, normalized size of antiderivative = 2.77

$$\int (fx)^m (d+ex^r) (a+b\log(cx^n)) \, dx = \frac{bef^m mnxx^m x^r \log(x)}{m^2+2\,mr+r^2+2\,m+2\,r+1} + \frac{bef^m nrxx^m x^r \log(x)}{m^2+2\,mr+r^2+2\,m+2\,r+1} + \frac{bdf^m mnxx^m \log(x)}{m^2+2\,m+1} + \frac{bef^m nxx^m x^r \log(x)}{m^2+2\,mr+r^2+2\,m+2\,r+1} - \frac{bef^m nxx^m x^r}{m^2+2\,mr+r^2+2\,m+2\,r+1} + \frac{bef^m xx^m x^r \log(c)}{m+r+1} + \frac{bdf^m nxx^m \log(x)}{m^2+2\,m+1} - \frac{bdf^m nxx^m}{m^2+2\,m+1} + \frac{aef^m xx^m x^r}{m+r+1} + \frac{(fx)^m bdx \log(c)}{m+1} + \frac{(fx)^m adx}{m+1}$$

input
```
integrate((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e*f^m*m*n*x*x^m*x^r*log(x)/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) + b*e*f^m
*n*r*x*x^m*x^r*log(x)/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) + b*d*f^m*m*n*x*
x^m*log(x)/(m^2 + 2*m + 1) + b*e*f^m*n*x*x^m*x^r*log(x)/(m^2 + 2*m*r + r^2
 + 2*m + 2*r + 1) - b*e*f^m*n*x*x^m*x^r/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1
) + b*e*f^m*x*x^m*x^r*log(c)/(m + r + 1) + b*d*f^m*n*x*x^m*log(x)/(m^2 + 2
*m + 1) - b*d*f^m*n*x*x^m/(m^2 + 2*m + 1) + a*e*f^m*x*x^m*x^r/(m + r + 1)
+ (f*x)^m*b*d*x*log(c)/(m + 1) + (f*x)^m*a*d*x/(m + 1)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^m (d+ex^r) (a+b\log(cx^n)) \, dx = \int (f\,x)^m \left(d+e\,x^r\right) \left(a+b\,\ln\left(c\,x^n\right)\right) \, dx$$

input
```
int((f*x)^m*(d + e*x^r)*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^m*(d + e*x^r)*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 452, normalized size of antiderivative = 4.39

$$\int (fx)^m (d+ex^r) (a+b\log(cx^n)) \, dx = \frac{x^m f^m x(ad + x^r ae + ad\,r^2 + 2adr + x^r \log(x^n c)\,ber + 3x^r aem + 2ad\,m^2 r + 4admr + 3x^r ae\,m^2 + x^r ae\,m}{}$$

input
```
int((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n)),x)
```

output
```
(x**m*f**m*x*(x**r*log(x**n*c)*b*e*m**3 + x**r*log(x**n*c)*b*e*m**2*r + 3*
x**r*log(x**n*c)*b*e*m**2 + 2*x**r*log(x**n*c)*b*e*m*r + 3*x**r*log(x**n*c
)*b*e*m + x**r*log(x**n*c)*b*e*r + x**r*log(x**n*c)*b*e + x**r*a*e*m**3 +
x**r*a*e*m**2*r + 3*x**r*a*e*m**2 + 2*x**r*a*e*m*r + 3*x**r*a*e*m + x**r*a
*e*r + x**r*a*e - x**r*b*e*m**2*n - 2*x**r*b*e*m*n - x**r*b*e*n + log(x**n
*c)*b*d*m**3 + 2*log(x**n*c)*b*d*m**2*r + 3*log(x**n*c)*b*d*m**2 + log(x**
n*c)*b*d*m*r**2 + 4*log(x**n*c)*b*d*m*r + 3*log(x**n*c)*b*d*m + log(x**n*c
)*b*d*r**2 + 2*log(x**n*c)*b*d*r + log(x**n*c)*b*d + a*d*m**3 + 2*a*d*m**2
*r + 3*a*d*m**2 + a*d*m*r**2 + 4*a*d*m*r + 3*a*d*m + a*d*r**2 + 2*a*d*r +
a*d - b*d*m**2*n - 2*b*d*m*n*r - 2*b*d*m*n - b*d*n*r**2 - 2*b*d*n*r - b*d*
n))/(m**4 + 2*m**3*r + 4*m**3 + m**2*r**2 + 6*m**2*r + 6*m**2 + 2*m*r**2 +
 6*m*r + 4*m + r**2 + 2*r + 1)
```

3.441 $\int (fx)^m (a + b\log(cx^n)) \, dx$

Optimal result . . . 3245
Mathematica [A] (verified) . . . 3245
Rubi [A] (verified) . . . 3246
Maple [A] (verified) . . . 3246
Fricas [A] (verification not implemented) . . . 3247
Sympy [B] (verification not implemented) . . . 3247
Maxima [A] (verification not implemented) . . . 3248
Giac [B] (verification not implemented) . . . 3248
Mupad [F(-1)] . . . 3249
Reduce [B] (verification not implemented) . . . 3249

Optimal result

Integrand size = 16, antiderivative size = 46

$$\int (fx)^m (a + b\log(cx^n)) \, dx = -\frac{bn(fx)^{1+m}}{f(1+m)^2} + \frac{(fx)^{1+m}(a + b\log(cx^n))}{f(1+m)}$$

output
```
-b*n*(f*x)^(1+m)/f/(1+m)^2+(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.70

$$\int (fx)^m (a + b\log(cx^n)) \, dx = \frac{x(fx)^m(a + am - bn + b(1+m)\log(cx^n))}{(1+m)^2}$$

input
```
Integrate[(f*x)^m*(a + b*Log[c*x^n]),x]
```

output
```
(x*(f*x)^m*(a + a*m - b*n + b*(1 + m)*Log[c*x^n]))/(1 + m)^2
```

Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.062, Rules used = {2741}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m (a+b\log (cx^n))\, dx$$

$$\Big\downarrow \; 2741$$

$$\frac{(fx)^{m+1}(a+b\log (cx^n))}{f(m+1)}-\frac{bn(fx)^{m+1}}{f(m+1)^2}$$

input
```
Int[(f*x)^m*(a + b*Log[c*x^n]),x]
```

output
```
-((b*n*(f*x)^(1 + m))/(f*(1 + m)^2)) + ((f*x)^(1 + m)*(a + b*Log[c*x^n]))/
(f*(1 + m))
```

Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 73, normalized size of antiderivative = 1.59

method	result
parallelrisch	$-\frac{-x(fx)^m \ln(c\,x^n)bm-x(fx)^m \ln(c\,x^n)b-x(fx)^m am+x(fx)^m bn-a(fx)^m x}{m^2+2m+1}$
risch	$\frac{bx\,x^m f^m \mathrm{e}^{\frac{i\,\mathrm{csgn}(ifx)\pi m(\mathrm{csgn}(ifx)-\mathrm{csgn}(ix))(-\,\mathrm{csgn}(ifx)+\mathrm{csgn}(if))}{2}}\ln(x^n)}{1+m}-\frac{\left(-i\pi b\;\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2 m+i\pi b\;\mathrm{csgn}(ix^n)\right.}{}$

input
```
int((f*x)^m*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-x*(f*x)^m*ln(c*x^n)*b*m-x*(f*x)^m*ln(c*x^n)*b-x*(f*x)^m*a*m+x*(f*x)^m*b
*n-a*(f*x)^m*x)/(m^2+2*m+1)
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.13

$$\int (fx)^m (a+b\log(cx^n))\,dx = \frac{((bm+b)nx\log(x)+(bm+b)x\log(c)+(am-bn+a)x)e^{(m\log(f)+m\log(x))}}{m^2+2\,m+1}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((b*m + b)*n*x*log(x) + (b*m + b)*x*log(c) + (a*m - b*n + a)*x)*e^(m*log(f
) + m*log(x))/(m^2 + 2*m + 1)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 141 vs. 2(37) = 74.

Time = 2.05 (sec) , antiderivative size = 141, normalized size of antiderivative = 3.07

$$\int (fx)^m (a+b\log(cx^n))\,dx = \begin{cases} \frac{amx(fx)^m}{m^2+2m+1} + \frac{ax(fx)^m}{m^2+2m+1} + \frac{bmx(fx)^m\log(cx^n)}{m^2+2m+1} - \frac{bnx(fx)^m}{m^2+2m+1} + \frac{bx(fx)^m\log(cx^n)}{m^2+2m+1} & \text{for } m \neq -1 \\ \frac{\begin{cases} a\log(x) & \text{for } b = 0 \\ -(-a-b\log(c))\log(x) & \text{for } n = 0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}}{f} & \text{otherwise} \end{cases}$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*m*x*(f*x)**m/(m**2 + 2*m + 1) + a*x*(f*x)**m/(m**2 + 2*m + 1)
 + b*m*x*(f*x)**m*log(c*x**n)/(m**2 + 2*m + 1) - b*n*x*(f*x)**m/(m**2 + 2*
m + 1) + b*x*(f*x)**m*log(c*x**n)/(m**2 + 2*m + 1), Ne(m, -1)), (Piecewise
((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c
*x**n))**2/(2*b*n), True))/f, True))
```

Maxima [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.24

$$\int (fx)^m (a + b\log (cx^n)) \, dx = -\frac{bf^m nxx^m}{(m+1)^2} + \frac{(fx)^{m+1} b\log (cx^n)}{f(m+1)} + \frac{(fx)^{m+1} a}{f(m+1)}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-b*f^m*n*x*x^m/(m + 1)^2 + (f*x)^(m + 1)*b*log(c*x^n)/(f*(m + 1)) + (f*x)^
(m + 1)*a/(f*(m + 1))
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 95 vs. 2(46) = 92.

Time = 0.13 (sec) , antiderivative size = 95, normalized size of antiderivative = 2.07

$$\int (fx)^m (a + b\log (cx^n)) \, dx = \frac{bf^m mnxx^m \log (x)}{m^2 + 2m + 1} + \frac{bf^m nxx^m \log (x)}{m^2 + 2m + 1} - \frac{bf^m nxx^m}{m^2 + 2m + 1} + \frac{(fx)^m bx\log (c)}{m+1} + \frac{(fx)^m ax}{m+1}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + b*f^m*n*x*x^m*log(x)/(m^2 + 2*m +
 1) - b*f^m*n*x*x^m/(m^2 + 2*m + 1) + (f*x)^m*b*x*log(c)/(m + 1) + (f*x)^m
*a*x/(m + 1)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^m (a + b\log(cx^n))\, dx = \int (f\,x)^m \left(a + b\,\ln\left(c\,x^n\right)\right) dx$$

input
```
int((f*x)^m*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^m*(a + b*log(c*x^n)), x)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 44, normalized size of antiderivative = 0.96

$$\int (fx)^m (a + b\log(cx^n))\, dx = \frac{x^m f^m x(\log(x^n c)\, bm + \log(x^n c)\, b + am + a - bn)}{m^2 + 2m + 1}$$

input
```
int((f*x)^m*(a+b*log(c*x^n)),x)
```

output
```
(x**m*f**m*x*(log(x**n*c)*b*m + log(x**n*c)*b + a*m + a - b*n))/(m**2 + 2*
m + 1)
```

3.442 $\int \frac{(fx)^m(a+b\log(cx^n))}{d+ex^r}\,dx$

Optimal result 3250
Mathematica [B] (verified) 3250
Rubi [N/A] 3251
Maple [N/A] 3252
Fricas [N/A] 3252
Sympy [N/A] 3252
Maxima [N/A] 3253
Giac [N/A] 3253
Mupad [N/A] 3253
Reduce [N/A] 3254

Optimal result

Integrand size = 25, antiderivative size = 25

$$\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{d+ex^r}\,dx=\text{Int}\left(\frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{d+ex^r},x\right)$$

output
```
Defer(Int)((f*x)^m*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 111 vs. 2(28) = 56.

Time = 0.30 (sec) , antiderivative size = 111, normalized size of antiderivative = 4.44

$$\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{d+ex^r}\,dx$$
$$=\frac{x(fx)^m\left(-bn\,{}_3F_2\left(1,\frac{1}{r}+\frac{m}{r},\frac{1}{r}+\frac{m}{r};1+\frac{1}{r}+\frac{m}{r},1+\frac{1}{r}+\frac{m}{r};-\frac{ex^r}{d}\right)+(1+m)\,\text{Hypergeometric2F1}\left(1,\frac{1+m}{r}\right.\right.}{d(1+m)^2}$$

input
```
Integrate[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

output
```
(x*(f*x)^m*(-(b*n*HypergeometricPFQ[{1, r^(-1) + m/r, r^(-1) + m/r}, {1 +
r^(-1) + m/r, 1 + r^(-1) + m/r}, -((e*x^r)/d)]) + (1 + m)*Hypergeometric2F
1[1, (1 + m)/r, (1 + m + r)/r, -((e*x^r)/d)]*(a + b*Log[c*x^n])))/(d*(1 +
m)^2)
```

Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^m (a+b\log (cx^n))}{d+ex^r} \, dx$$

$$\Big\downarrow \; 2796$$

$$\int \frac{(fx)^m (a+b\log (cx^n))}{d+ex^r}dx$$

input
```
Int[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^m (a+b\ln(c\,x^n))}{d+e\,x^r}dx$$

input
```
int((f*x)^m*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

output
```
int((f*x)^m*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

Fricas [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.32

$$\int \frac{(fx)^m (a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{(b\log(cx^n)+a)(fx)^m}{ex^r+d}\,dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="fricas")
```

output
```
integral(((f*x)^m*b*log(c*x^n) + (f*x)^m*a)/(e*x^r + d), x)
```

Sympy [N/A]

Not integrable

Time = 6.58 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

$$\int \frac{(fx)^m (a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{(fx)^m (a+b\log(cx^n))}{d+ex^r}\,dx$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n))/(d+e*x**r),x)
```

output
```
Integral((f*x)**m*(a + b*log(c*x**n))/(d + e*x**r), x)
```

Maxima [N/A]

Not integrable

Time = 0.11 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b \log(cx^n))}{d + ex^r} \, dx = \int \frac{(b \log(cx^n) + a)(fx)^m}{ex^r + d} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x^r + d), x)
```

Giac [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b \log(cx^n))}{d + ex^r} \, dx = \int \frac{(b \log(cx^n) + a)(fx)^m}{ex^r + d} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x^r + d), x)
```

Mupad [N/A]

Not integrable

Time = 24.72 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b \log(cx^n))}{d + ex^r} \, dx = \int \frac{(f\,x)^m\,(a + b\,\ln(c\,x^n))}{d + e\,x^r} \, dx$$

input
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^r),x)
```

output
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^r), x)
```

Reduce [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.80

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex^r} dx = f^m \left(\left(\int \frac{x^m}{x^r e + d} dx \right) a + \left(\int \frac{x^m \log(x^n c)}{x^r e + d} dx \right) b \right)$$

input
```
int((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r),x)
```

output
```
f**m*(int(x**m/(x**r*e + d),x)*a + int((x**m*log(x**n*c))/(x**r*e + d),x)*
b)
```

3.443 $\int \frac{(fx)^m(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$

Optimal result 3255
Mathematica [B] (verified) 3255
Rubi [N/A] 3256
Maple [N/A] 3257
Fricas [N/A] 3257
Sympy [N/A] 3257
Maxima [N/A] 3258
Giac [N/A] 3258
Mupad [N/A] 3259
Reduce [N/A] 3259

Optimal result

Integrand size = 25, antiderivative size = 25

$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \text{Int}\left(\frac{(fx)^m (a+b\log(cx^n))}{(d+ex^r)^2},x\right)$$

output
```
Defer(Int)((f*x)^m*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 177 vs. 2(28) = 56.

Time = 0.54 (sec) , antiderivative size = 177, normalized size of antiderivative = 7.08

$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex^r)^2}\,dx$$
$$= \frac{x(fx)^m \left(bn(1+m-r)\,(d+ex^r)\;{}_3F_2\!\left(1,\frac{1}{r}+\frac{m}{r},\frac{1}{r}+\frac{m}{r};1+\frac{1}{r}+\frac{m}{r},1+\frac{1}{r}+\frac{m}{r};-\frac{ex^r}{d}\right)-(1+m)\left(-d(1+\right.\right.}{d}$$

input
```
Integrate[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

output
```
(x*(f*x)^m*(b*n*(1 + m - r)*(d + e*x^r)*HypergeometricPFQ[{1, r^(-1) + m/r
, r^(-1) + m/r}, {1 + r^(-1) + m/r, 1 + r^(-1) + m/r}, -((e*x^r)/d)] - (1
+ m)*(-(d*(1 + m)*(a + b*Log[c*x^n])) + (d + e*x^r)*Hypergeometric2F1[1, (
1 + m)/r, (1 + m + r)/r, -((e*x^r)/d)]*(b*n + a*(1 + m - r) + b*(1 + m - r
)*Log[c*x^n]))))/(d^2*(1 + m)^2*r*(d + e*x^r))
```

Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = $\{2796\}$

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex^r)^2} dx$$
$$\Big\downarrow \text{2796}$$
$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex^r)^2}dx$$

input
```
Int[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^m (a+b\ln(c\,x^n))}{(d+e\,x^r)^2}dx$$

input
```
int((f*x)^m*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

output
```
int((f*x)^m*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.10 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.84

$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)(fx)^m}{(ex^r+d)^2}\,dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
integral(((f*x)^m*b*log(c*x^n) + (f*x)^m*a)/(e^2*x^(2*r) + 2*d*e*x^r + d^2
), x)
```

Sympy [N/A]

Not integrable

Time = 26.06 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex^r)^2}\,dx$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n))/(d+e*x**r)**2,x)
```

output
```
Integral((f*x)**m*(a + b*log(c*x**n))/(d + e*x**r)**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.11 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex^r)^2} \, dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{(ex^r + d)^2} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x^r + d)^2, x)
```

Giac [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex^r)^2} \, dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{(ex^r + d)^2} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x^r + d)^2, x)
```

Mupad [N/A]

Not integrable

Time = 24.92 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{(f\,x)^m\,(a+b\,\ln(c\,x^n))}{(d+e\,x^r)^2}\,dx$$

input
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^r)^2,x)
```

output
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^r)^2, x)
```

Reduce [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.84

$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex^r)^2}\,dx = f^m\left(\left(\int \frac{x^m}{x^{2r}e^2+2x^r de+d^2}dx\right)a + \left(\int \frac{x^m \log(x^n c)}{x^{2r}e^2+2x^r de+d^2}dx\right)b\right)$$

input
```
int((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r)^2,x)
```

output
```
f**m*(int(x**m/(x**(2*r)*e**2 + 2*x**r*d*e + d**2),x)*a + int((x**m*log(x*
*n*c))/(x**(2*r)*e**2 + 2*x**r*d*e + d**2),x)*b)
```

3.444 $\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx$

Optimal result 3260
Mathematica [A] (verified) 3260
Rubi [A] (verified) 3261
Maple [F] 3262
Fricas [F] 3263
Sympy [F(-1)] 3263
Maxima [F] 3263
Giac [F] 3264
Mupad [F(-1)] 3264
Reduce [F] 3264

Optimal result

Integrand size = 26, antiderivative size = 94

$$\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx = -\frac{bnx\left(d+ex^{-\frac{1}{1+q}}\right)^{1+q}\text{Hypergeometric2F1}\left(1,-1-q,-q,\frac{ex^{-\frac{1}{1+q}}}{d+ex^{-\frac{1}{1+q}}}\right)}{d} + \frac{x\left(d+ex^{-\frac{1}{1+q}}\right)^{1+q}(a+b\log(cx^n))}{d}$$

output
```
-b*n*x*(d+e/(x^(1/(1+q))))^(1+q)*hypergeom([1, -1-q],[-q],e/(x^(1/(1+q)))/
(d+e/(x^(1/(1+q)))))/d+x*(d+e/(x^(1/(1+q))))^(1+q)*(a+b*ln(c*x^n))/d
```

Mathematica [A] (verified)

Time = 0.94 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.52

$$\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx = \frac{x^{-\frac{1}{1+q}}\left(d+ex^{-\frac{1}{1+q}}\right)^q\left(1+\frac{dx^{\frac{1}{1+q}}}{e}\right)^{-q}\left(-bdn(1+q)^2x^{\frac{2+q}{1+q}}\,{}_3F_2\left(1,1,-q;2,2;-\frac{dx^{\frac{1}{1+q}}}{e}\right)-benx\log(x)+\left(\right.\right.}{d}$$

input
```
Integrate[(d + e/x^(1 + q)^(-1))^q*(a + b*Log[c*x^n]),x]
```

output
```
((d + e/x^(1 + q)^(-1))^q*(-(b*d*n*(1 + q)^2*x^((2 + q)/(1 + q))*Hypergeom
etricPFQ[{1, 1, -q}, {2, 2}, -((d*x^(1 + q)^(-1))/e)]) - b*e*n*x*Log[x] +
(1 + (d*x^(1 + q)^(-1))/e)^q*(e*x + d*x^((2 + q)/(1 + q)))*(a + b*Log[c*x^
n])))/(d*x^(1 + q)^(-1)*(1 + (d*x^(1 + q)^(-1))/e)^q)
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 94, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.115$, Rules used = {2751, 776, 74}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d+ex^{-\frac{1}{q+1}}\right)^q (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2751}$$

$$\frac{x\left(d+ex^{-\frac{1}{q+1}}\right)^{q+1}(a+b\log(cx^n))}{d}-\frac{bn\int \left(ex^{-\frac{1}{q+1}}+d\right)^{q+1}dx}{d}$$

$$\Big\downarrow \text{776}$$

$$\frac{bn(q+1)x\left(\frac{x^{-\frac{1}{q+1}}}{d+ex^{-\frac{1}{q+1}}}\right)^{q+1}\left(d+ex^{-\frac{1}{q+1}}\right)^{q+1}\int \frac{\left(\frac{x^{-\frac{1}{q+1}}}{ex^{-\frac{1}{q+1}}+d}\right)^{-q-2}}{1-\frac{ex^{-\frac{1}{q+1}}}{ex^{-\frac{1}{q+1}}+d}}d\frac{x^{-\frac{1}{q+1}}}{ex^{-\frac{1}{q+1}}+d}}{d}+\frac{x\left(d+ex^{-\frac{1}{q+1}}\right)^{q+1}(a+b\log(cx^n))}{d}$$

$$\Big\downarrow \text{74}$$

$$\frac{x\left(d+ex^{-\frac{1}{q+1}}\right)^{q+1}(a+b\log(cx^n))}{d}-\frac{bnx\left(d+ex^{-\frac{1}{q+1}}\right)^{q+1}\text{Hypergeometric2F1}\left(1,-q-1,-q,\frac{ex^{-\frac{1}{q+1}}}{ex^{-\frac{1}{q+1}}+d}\right)}{d}$$

input
```
Int[(d + e/x^(1 + q)^(-1))^q*(a + b*Log[c*x^n]),x]
```

output
```
-((b*n*x*(d + e/x^(1 + q)^(-1))^(1 + q)*Hypergeometric2F1[1, -1 - q, -q, e
/(x^(1 + q)^(-1)*(d + e/x^(1 + q)^(-1)))])/d) + (x*(d + e/x^(1 + q)^(-1))^
(1 + q)*(a + b*Log[c*x^n]))/d
```

Defintions of rubi rules used

rule 74
```
Int[((b_.)*(x_))^(m_)*((c_) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[c^n*((b*x
)^(m + 1)/(b*(m + 1)))*Hypergeometric2F1[-n, m + 1, m + 2, (-d)*(x/c)], x]
/; FreeQ[{b, c, d, m, n}, x] && !IntegerQ[m] && (IntegerQ[n] || (GtQ[c, 0]
 && !(EqQ[n, -2^(-1)] && EqQ[c^2 - d^2, 0] && GtQ[-d/(b*c), 0])))
```

rule 776
```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x*(a + b*x^n)^p*((x^n/
(a + b*x^n))^p/n)   Subst[Int[1/(x^(p + 1)*(1 - b*x)), x], x, x^n/(a + b*x^
n)], x] /; FreeQ[{a, b, n, p}, x] && EqQ[1/n + p, 0]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

Maple [F]

$$\int \left(d+e\,x^{-\frac{1}{1+q}}\right)^{q}\left(a+b\ln \left(c\,x^{n}\right)\right)dx$$

input
```
int((d+e/(x^(1/(1+q))))^q*(a+b*ln(c*x^n)),x)
```

output
```
int((d+e/(x^(1/(1+q))))^q*(a+b*ln(c*x^n)),x)
```

Fricas [F]

$$\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx = \int (b\log(cx^n)+a)\left(d+\frac{e}{x^{\left(\frac{1}{q+1}\right)}}\right)^q dx$$

input
```
integrate((d+e/(x^(1/(1+q))))^q*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)*((d*x^(1/(q + 1)) + e)/x^(1/(q + 1)))^q, x)
```

Sympy [F(-1)]

Timed out.

$$\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx = \text{Timed out}$$

input
```
integrate((d+e/(x**(1/(1+q))))**q*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

Maxima [F]

$$\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx = \int (b\log(cx^n)+a)\left(d+\frac{e}{x^{\left(\frac{1}{q+1}\right)}}\right)^q dx$$

input
```
integrate((d+e/(x^(1/(1+q))))^q*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*(d + e/x^(1/(q + 1)))^q, x)
```

Giac [F]

$$\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx=\int (b\log(cx^n)+a)\left(d+\frac{e}{x^{\left(\frac{1}{q+1}\right)}}\right)^q dx$$

input
```
integrate((d+e/(x^(1/(1+q))))^q*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*(d + e/x^(1/(q + 1)))^q, x)
```

Mupad [F(-1)]

Timed out.

$$\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx=\int \left(d+\frac{e}{x^{\frac{1}{q+1}}}\right)^q (a+b\,\ln(c\,x^n))\,dx$$

input
```
int((d + e/x^(1/(q + 1)))^q*(a + b*log(c*x^n)),x)
```

output
```
int((d + e/x^(1/(q + 1)))^q*(a + b*log(c*x^n)), x)
```

Reduce [F]

$$\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx$$
$$=\frac{x^{\frac{1}{q+1}}\left(x^{\frac{1}{q+1}}d+e\right)^q \log(x^n c)\,bdq+x^{\frac{1}{q+1}}\left(x^{\frac{1}{q+1}}d+e\right)^q adq-x^{\frac{1}{q+1}}\left(x^{\frac{1}{q+1}}d+e\right)^q bdnq+\left(x^{\frac{1}{q+1}}d+e\right)^q \log(x}{dq}$$

input
```
int((d+e/(x^(1/(1+q))))^q*(a+b*log(c*x^n)),x)
```

output
```
(x**(1/(q + 1))*(x**(1/(q + 1))*d + e)**q*log(x**n*c)*b*d*q + x**(1/(q + 1
))*(x**(1/(q + 1))*d + e)**q*a*d*q - x**(1/(q + 1))*(x**(1/(q + 1))*d + e)
**q*b*d*n*q + (x**(1/(q + 1))*d + e)**q*log(x**n*c)*b*e*q + (x**(1/(q + 1)
)*d + e)**q*a*e*q - 2*(x**(1/(q + 1))*d + e)**q*b*e*n*q - (x**(1/(q + 1))*
d + e)**q*b*e*n - int((x**(1/(q + 1))*d + e)**q/(x**(1/(q + 1))*d*x + e*x)
,x)*b*e**2*n*q)/(d*q)
```

3.445 $\int (fx)^{-1-(1+q)r} (d+ex^r)^q (a+b\log(cx^n))\,dx$

Optimal result 3266
Mathematica [A] (verified) 3266
Rubi [A] (verified) 3267
Maple [F] 3269
Fricas [F] 3269
Sympy [F(-1)] 3269
Maxima [F] 3270
Giac [F] 3270
Mupad [F(-1)] 3270
Reduce [F] 3271

Optimal result

Integrand size = 32, antiderivative size = 111

$$\int (fx)^{-1-(1+q)r} (d+ex^r)^q (a+b\log(cx^n))\,dx = -\frac{bn(fx)^{-((1+q)r)}(d+ex^r)^{1+q}\,\text{Hypergeometric2F1}\left(1,-1-q,-q,\frac{ex^r}{d+ex^r}\right)}{df(1+q)^2r^2} - \frac{(fx)^{-((1+q)r)}(d+ex^r)^{1+q}(a+b\log(cx^n))}{df(1+q)r}$$

output
```
-b*n*(d+e*x^r)^(1+q)*hypergeom([1, -1-q],[-q],e*x^r/(d+e*x^r))/d/f/(1+q)^2
/r^2/((f*x)^((1+q)*r))-(d+e*x^r)^(1+q)*(a+b*ln(c*x^n))/d/f/(1+q)/r/((f*x)^
((1+q)*r))
```

Mathematica [A] (verified)

Time = 0.80 (sec) , antiderivative size = 98, normalized size of antiderivative = 0.88

$$\int (fx)^{-1-(1+q)r} (d+ex^r)^q (a+b\log(cx^n))\,dx = -\frac{(fx)^{-((1+q)r)}(d+ex^r)^q\left(bn\left(1+\frac{ex^r}{d}\right)^{-q}\text{Hypergeometric2F1}\left(-1-q,-1-q,-q,-\frac{ex^r}{d}\right)+\frac{(1+q)r(d+ex^r}{\ldots}\right.}{f(1+q)^2r^2}$$

input
```
Integrate[(f*x)^(-1 - (1 + q)*r)*(d + e*x^r)^q*(a + b*Log[c*x^n]),x]
```

output
```
-(((d + e*x^r)^q*((b*n*Hypergeometric2F1[-1 - q, -1 - q, -q, -((e*x^r)/d)]
)/(1 + (e*x^r)/d)^q + ((1 + q)*r*(d + e*x^r)*(a + b*Log[c*x^n]))/d))/(f*(1
 + q)^2*r^2*(f*x)^((1 + q)*r)))
```

Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 111, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2773, 883, 882, 74}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^{-((q+1)r)-1} (d+ex^r)^q (a+b\log(cx^n))\, dx$$

$$\Big\downarrow \text{ 2773}$$

$$\frac{bn\int (fx)^{-((q+1)r)-1}(ex^r+d)^{q+1}dx}{d(q+1)r}-\frac{(fx)^{-((q+1)r)}(d+ex^r)^{q+1}(a+b\log(cx^n))}{df(q+1)r}$$

$$\Big\downarrow \text{ 883}$$

$$\frac{bnx^{(q+1)r}(fx)^{-((q+1)r)}\int x^{-((q+1)r)-1}(ex^r+d)^{q+1}dx}{df(q+1)r}-\frac{(fx)^{-((q+1)r)}(d+ex^r)^{q+1}(a+b\log(cx^n))}{df(q+1)r}$$

$$\Big\downarrow \text{ 882}$$

$$\frac{bn(fx)^{-((q+1)r)}\left(\frac{x^r}{d+ex^r}\right)^{q+1}(d+ex^r)^{q+1}\int \frac{\left(\frac{x^r}{ex^r+d}\right)^{-q-2}}{1-\frac{ex^r}{ex^r+d}}d\frac{x^r}{ex^r+d}}{df(q+1)r^2}-\frac{(fx)^{-((q+1)r)}(d+ex^r)^{q+1}(a+b\log(cx^n))}{df(q+1)r}$$

$$\Big\downarrow \text{ 74}$$

$$-\frac{(fx)^{-((q+1)r)}\,(d+ex^r)^{q+1}\,(a+b\log(cx^n))}{df(q+1)r}-\frac{bn(fx)^{-((q+1)r)}\,(d+ex^r)^{q+1}\,\text{Hypergeometric2F1}\left(1,-q-1,-q,\frac{ex^r}{ex^r+d}\right)}{df(q+1)^2r^2}$$

input
```
Int[(f*x)^(-1 - (1 + q)*r)*(d + e*x^r)^q*(a + b*Log[c*x^n]),x]
```

output
```
-((b*n*(d + e*x^r)^(1 + q)*Hypergeometric2F1[1, -1 - q, -q, (e*x^r)/(d + e
*x^r)])/(d*f*(1 + q)^2*r^2*(f*x)^((1 + q)*r))) - ((d + e*x^r)^(1 + q)*(a +
 b*Log[c*x^n]))/(d*f*(1 + q)*r*(f*x)^((1 + q)*r))
```

Defintions of rubi rules used

rule 74
```
Int[((b_.)*(x_))^(m_)*((c_) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[c^n*((b*x
)^(m + 1)/(b*(m + 1)))*Hypergeometric2F1[-n, m + 1, m + 2, (-d)*(x/c)], x]
/; FreeQ[{b, c, d, m, n}, x] &&  !IntegerQ[m] && (IntegerQ[n] || (GtQ[c, 0]
 &&  !(EqQ[n, -2^(-1)] && EqQ[c^2 - d^2, 0] && GtQ[-d/(b*c), 0])))
```

rule 882
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[a^Simplify[
(m + 1)/n + p]*x^m*(a + b*x^n)^p*((x^n/(a + b*x^n))^p/(n*x^Simplify[m + n*p
]))   Subst[Int[x^((m + 1)/n - 1)/(1 - b*x)^(Simplify[(m + 1)/n + p] + 1),
x], x, x^n/(a + b*x^n)], x] /; FreeQ[{a, b, m, n, p}, x] && IntegerQ[Simpli
fy[(m + 1)/n + p]]
```

rule 883
```
Int[((c_)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^Int
Part[m]*((c*x)^FracPart[m]/x^FracPart[m])   Int[x^m*(a + b*x^n)^p, x], x] /
; FreeQ[{a, b, c, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n + p]]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Maple [F]

$$\int (fx)^{-1-(1+q)r} (d + e\,x^{r})^{q} (a + b\ln (c\,x^{n}))\,dx$$

input
```
int((f*x)^(-1-(1+q)*r)*(d+e*x^r)^q*(a+b*ln(c*x^n)),x)
```

output
```
int((f*x)^(-1-(1+q)*r)*(d+e*x^r)^q*(a+b*ln(c*x^n)),x)
```

Fricas [F]

$$\int (fx)^{-1-(1+q)r} (d + ex^{r})^{q} (a + b\log (cx^{n}))\,dx = \int (b\log (cx^{n}) + a)(ex^{r} + d)^{q}(fx)^{-(q+1)r-1}\,dx$$

input
```
integrate((f*x)^(-1-(1+q)*r)*(d+e*x^r)^q*(a+b*log(c*x^n)),x, algorithm="fr
icas")
```

output
```
integral(((f*x)^(-(q + 1)*r - 1)*b*log(c*x^n) + (f*x)^(-(q + 1)*r - 1)*a)*
(e*x^r + d)^q, x)
```

Sympy [F(-1)]

Timed out.

$$\int (fx)^{-1-(1+q)r} (d + ex^{r})^{q} (a + b\log (cx^{n}))\,dx = \text{Timed out}$$

input
```
integrate((f*x)**(-1-(1+q)*r)*(d+e*x**r)**q*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

Maxima [F]

$$\int (fx)^{-1-(1+q)r} (d + ex^r)^q (a + b\log(cx^n)) \, dx = \int (b\log(cx^n) + a)(ex^r + d)^q (fx)^{-(q+1)r-1} \, dx$$

input
```
integrate((f*x)^(-1-(1+q)*r)*(d+e*x^r)^q*(a+b*log(c*x^n)),x, algorithm="ma
xima")
```

output
```
integrate((b*log(c*x^n) + a)*(e*x^r + d)^q*(f*x)^(-(q + 1)*r - 1), x)
```

Giac [F]

$$\int (fx)^{-1-(1+q)r} (d + ex^r)^q (a + b\log(cx^n)) \, dx = \int (b\log(cx^n) + a)(ex^r + d)^q (fx)^{-(q+1)r-1} \, dx$$

input
```
integrate((f*x)^(-1-(1+q)*r)*(d+e*x^r)^q*(a+b*log(c*x^n)),x, algorithm="gi
ac")
```

output
```
integrate((b*log(c*x^n) + a)*(e*x^r + d)^q*(f*x)^(-(q + 1)*r - 1), x)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^{-1-(1+q)r} (d + ex^r)^q (a + b\log(cx^n)) \, dx = \int \frac{(d + e\,x^r)^q\,(a + b\,\ln(c\,x^n))}{(f\,x)^{r\,(q+1)+1}} \, dx$$

input
```
int(((d + e*x^r)^q*(a + b*log(c*x^n)))/(f*x)^(r*(q + 1) + 1),x)
```

output
```
int(((d + e*x^r)^q*(a + b*log(c*x^n)))/(f*x)^(r*(q + 1) + 1), x)
```

Reduce [F]

$$\int (fx)^{-1-(1+q)r} (d+ex^r)^q (a+b\log(cx^n)) \, dx$$
$$= \frac{-x^r(x^re+d)^q aer - x^r(x^re+d)^q ben - (x^re+d)^q \log(x^nc)\, bdqr - (x^re+d)^q \log(x^nc)\, bdr - (x^re+d)^q}{x^{qr+r} f^{qr+r} df\, r}$$

input
```
int((f*x)^(-1-(1+q)*r)*(d+e*x^r)^q*(a+b*log(c*x^n)),x)
```

output
```
( - (x**r*(x**r*e + d)**q*a*e*r + x**r*(x**r*e + d)**q*b*e*n + (x**r*e + d
)**q*log(x**n*c)*b*d*q*r + (x**r*e + d)**q*log(x**n*c)*b*d*r + (x**r*e + d
)**q*a*d*r + (x**r*e + d)**q*b*d*n + x**(q*r + r)*int(((x**r*e + d)**q*log
(x**n*c))/(x**(q*r + 2*r)*e*x + x**(q*r + r)*d*x),x)*b*d**2*q**2*r**2 + x*
*(q*r + r)*int(((x**r*e + d)**q*log(x**n*c))/(x**(q*r + 2*r)*e*x + x**(q*r
 + r)*d*x),x)*b*d**2*q*r**2))/(x**(q*r + r)*f**(q*r + r)*d*f*r**2*(q + 1))
```

3.446 $\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p \, dx$

Optimal result . . . 3272
Mathematica [A] (verified) . . . 3273
Rubi [A] (verified) . . . 3274
Maple [F] . . . 3275
Fricas [F] . . . 3276
Sympy [F(-1)] . . . 3276
Maxima [F(-2)] . . . 3276
Giac [F] . . . 3277
Mupad [F(-1)] . . . 3277
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Optimal result

Integrand size = 27, antiderivative size = 480

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p \, dx = \frac{d^3 e^{-\frac{a(1+m)}{bn}} (fx)^{1+m} (cx^n)^{-\frac{1+m}{n}} \Gamma\left(1+p, -\frac{(1+m)(a+b\log(cx^n))}{bn}\right) (a+b\log(cx^n))^p \left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{f(1+m)} + \frac{3d^2 e e^{-\frac{a(1+m+r)}{bn}} x^{1+r} (fx)^m (cx^n)^{-\frac{1+m+r}{n}} \Gamma\left(1+p, -\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right) (a+b\log(cx^n))^p \left(-\frac{(1+m+r)(a+b}{bn}\right.}{1+m+r} + \frac{3de^2 e^{-\frac{a(1+m+2r)}{bn}} x^{1+2r} (fx)^m (cx^n)^{-\frac{1+m+2r}{n}} \Gamma\left(1+p, -\frac{(1+m+2r)(a+b\log(cx^n))}{bn}\right) (a+b\log(cx^n))^p \left(-\frac{(1+m+2r}{}\right.}{1+m+2r} + \frac{e^3 e^{-\frac{a(1+m+3r)}{bn}} x^{1+3r} (fx)^m (cx^n)^{-\frac{1+m+3r}{n}} \Gamma\left(1+p, -\frac{(1+m+3r)(a+b\log(cx^n))}{bn}\right) (a+b\log(cx^n))^p \left(-\frac{(1+m+3r)(a}{bn}\right.}{1+m+3r}$$

output
```
d^3*(f*x)^(1+m)*GAMMA(p+1,-(1+m)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/ex
p(a*(1+m)/b/n)/f/(1+m)/((c*x^n)^((1+m)/n))/((-(1+m)*(a+b*ln(c*x^n))/b/n)^p
)+3*d^2*e*x^(1+r)*(f*x)^m*GAMMA(p+1,-(1+m+r)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(
c*x^n))^p/exp(a*(1+m+r)/b/n)/(1+m+r)/((c*x^n)^((1+m+r)/n))/((-(1+m+r)*(a+b
*ln(c*x^n))/b/n)^p)+3*d*e^2*x^(1+2*r)*(f*x)^m*GAMMA(p+1,-(1+m+2*r)*(a+b*ln
(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/exp(a*(1+m+2*r)/b/n)/(1+m+2*r)/((c*x^n)^((
1+m+2*r)/n))/((-(1+m+2*r)*(a+b*ln(c*x^n))/b/n)^p)+e^3*x^(1+3*r)*(f*x)^m*GA
MMA(p+1,-(1+m+3*r)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/exp(a*(1+m+3*r)/
b/n)/(1+m+3*r)/((c*x^n)^((1+m+3*r)/n))/((-(1+m+3*r)*(a+b*ln(c*x^n))/b/n)^p
)
```

Mathematica [A] (verified)

Time = 2.60 (sec) , antiderivative size = 408, normalized size of antiderivative = 0.85

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p\,dx = x^{-m}(fx)^m (a +b\log(cx^n))^p \left(\frac{d^3 e^{-\frac{(1+m)(a-bn\log(x)+b\log(cx^n))}{bn}}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)\left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m} +e\left(\frac{3d^2 e^{-\frac{(1+m+r)(a-bn\log(x)+b\log(cx^n))}{bn}}\Gamma\left(1+p,-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right)\left(-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m+r} +e\left(\frac{3d e^{-\frac{(1+m+2r)(a-bn\log(x)+b\log(cx^n))}{bn}}\Gamma\left(1+p,-\frac{(1+m+2r)(a+b\log(cx^n))}{bn}\right)\left(-\frac{(1+m+2r)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m+2r}+\frac{ee^{-\frac{(1+m}{}}}{}\right.\right.\right.$$

input
```
Integrate[(f*x)^m*(d + e*x^r)^3*(a + b*Log[c*x^n])^p,x]
```

output
```
((f*x)^m*(a + b*Log[c*x^n])^p*((d^3*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x
^n]))/(b*n))])/(E^(((1 + m)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*(1 + m
)*(-(((1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p) + e*((3*d^2*Gamma[1 + p, -(((
1 + m + r)*(a + b*Log[c*x^n]))/(b*n))])/(E^(((1 + m + r)*(a - b*n*Log[x] +
 b*Log[c*x^n]))/(b*n))*(1 + m + r)*(-(((1 + m + r)*(a + b*Log[c*x^n]))/(b*
n)))^p) + e*((3*d*Gamma[1 + p, -(((1 + m + 2*r)*(a + b*Log[c*x^n]))/(b*n))
])/(E^(((1 + m + 2*r)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*(1 + m + 2*r
)*(-(((1 + m + 2*r)*(a + b*Log[c*x^n]))/(b*n)))^p) + (e*Gamma[1 + p, -(((1
 + m + 3*r)*(a + b*Log[c*x^n]))/(b*n))])/(E^(((1 + m + 3*r)*(a - b*n*Log[x
] + b*Log[c*x^n]))/(b*n))*(1 + m + 3*r)*(-(((1 + m + 3*r)*(a + b*Log[c*x^n
]))/(b*n)))^p)))))/x^m
```

Rubi [A] (verified)

Time = 1.10 (sec) , antiderivative size = 480, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.074$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p \, dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(d^3(fx)^m (a+b\log(cx^n))^p+3d^2ex^r(fx)^m (a+b\log(cx^n))^p+3de^2x^{2r}(fx)^m (a+b\log(cx^n))^p+e^3x^{3r}(fx)^m$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^3(fx)^{m+1}e^{-\frac{a(m+1)}{bn}}(cx^n)^{-\frac{m+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)^{-p}\Gamma\left(p+1,-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)}{f(m+1)}+$$
$$\frac{3d^2ex^{r+1}(fx)^me^{-\frac{a(m+r+1)}{bn}}(cx^n)^{-\frac{m+r+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+r+1)(a+b\log(cx^n))}{bn}\right)^{-p}\Gamma\left(p+1,-\frac{(m+r+1)(a+b\log(cx}{bn}\right.}{m+r+1}$$
$$\frac{3de^2x^{2r+1}(fx)^me^{-\frac{a(m+2r+1)}{bn}}(cx^n)^{-\frac{m+2r+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+2r+1)(a+b\log(cx^n))}{bn}\right)^{-p}\Gamma\left(p+1,-\frac{(m+2r+1)(a+b}{bn}\right.}{m+2r+1}$$
$$\frac{e^3x^{3r+1}(fx)^me^{-\frac{a(m+3r+1)}{bn}}(cx^n)^{-\frac{m+3r+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+3r+1)(a+b\log(cx^n))}{bn}\right)^{-p}\Gamma\left(p+1,-\frac{(m+3r+1)(a+b\log}{bn}\right.}{m+3r+1}$$

input
```
Int[(f*x)^m*(d + e*x^r)^3*(a + b*Log[c*x^n])^p,x]
```

output
```
(d^3*(f*x)^(1 + m)*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n]))/(b*n))]*(a
+ b*Log[c*x^n])^p)/(E^((a*(1 + m))/(b*n))*f*(1 + m)*(c*x^n)^((1 + m)/n)*(-
(((1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p) + (3*d^2*e*x^(1 + r)*(f*x)^m*Gamm
a[1 + p, -(((1 + m + r)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p)/
(E^((a*(1 + m + r))/(b*n))*(1 + m + r)*(c*x^n)^((1 + m + r)/n)*(-(((1 + m
+ r)*(a + b*Log[c*x^n]))/(b*n)))^p) + (3*d*e^2*x^(1 + 2*r)*(f*x)^m*Gamma[1
 + p, -(((1 + m + 2*r)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p)/(
E^((a*(1 + m + 2*r))/(b*n))*(1 + m + 2*r)*(c*x^n)^((1 + m + 2*r)/n)*(-(((1
 + m + 2*r)*(a + b*Log[c*x^n]))/(b*n)))^p) + (e^3*x^(1 + 3*r)*(f*x)^m*Gamm
a[1 + p, -(((1 + m + 3*r)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p
)/(E^((a*(1 + m + 3*r))/(b*n))*(1 + m + 3*r)*(c*x^n)^((1 + m + 3*r)/n)*(-(
((1 + m + 3*r)*(a + b*Log[c*x^n]))/(b*n)))^p)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [F]

$$\int (fx)^m (d+e\,x^r)^3 (a+b\ln (c\,x^n))^p dx$$

input
```
int((f*x)^m*(d+e*x^r)^3*(a+b*ln(c*x^n))^p,x)
```

output
```
int((f*x)^m*(d+e*x^r)^3*(a+b*ln(c*x^n))^p,x)
```

Fricas [F]

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p\,dx = \int (ex^r+d)^3 (fx)^m (b\log(cx^n)+a)^p\,dx$$

input
```
integrate((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n))^p,x, algorithm="fricas")
```

output
```
integral((e^3*x^(3*r) + 3*d*e^2*x^(2*r) + 3*d^2*e*x^r + d^3)*(f*x)^m*(b*lo
g(c*x^n) + a)^p, x)
```

Sympy [F(-1)]

Timed out.

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p\,dx = \text{Timed out}$$

input
```
integrate((f*x)**m*(d+e*x**r)**3*(a+b*ln(c*x**n))**p,x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n))^p,x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

Giac [F]

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p \, dx = \int (ex^r+d)^3 (fx)^m (b\log(cx^n)+a)^p \, dx$$

input
```
integrate((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n))^p,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(f*x)^m*(b*log(c*x^n) + a)^p, x)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p \, dx = \int (f\,x)^m \left(d+e\,x^r\right)^3 \left(a+b\,\ln\left(c\,x^n\right)\right)^p \, dx$$

input
```
int((f*x)^m*(d + e*x^r)^3*(a + b*log(c*x^n))^p,x)
```

output
```
int((f*x)^m*(d + e*x^r)^3*(a + b*log(c*x^n))^p, x)
```

Reduce [F]

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p \, dx = \text{too large to display}$$

input
```
int((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n))^p,x)
```

output

```
(f**m*(x**(m + 3*r)*(log(x**n*c)*b + a)**p*a**4*e**3*m**3*x + 3*x**(m + 3*
r)*(log(x**n*c)*b + a)**p*a**4*e**3*m**2*r*x + 3*x**(m + 3*r)*(log(x**n*c)
*b + a)**p*a**4*e**3*m**2*x + 2*x**(m + 3*r)*(log(x**n*c)*b + a)**p*a**4*e
**3*m*r**2*x + 6*x**(m + 3*r)*(log(x**n*c)*b + a)**p*a**4*e**3*m*r*x + 3*x
**(m + 3*r)*(log(x**n*c)*b + a)**p*a**4*e**3*m*x + 2*x**(m + 3*r)*(log(x**
n*c)*b + a)**p*a**4*e**3*r**2*x + 3*x**(m + 3*r)*(log(x**n*c)*b + a)**p*a*
*4*e**3*r*x + x**(m + 3*r)*(log(x**n*c)*b + a)**p*a**4*e**3*x + 3*x**(m +
3*r)*(log(x**n*c)*b + a)**p*a**3*b*e**3*m**2*n*p*x + 6*x**(m + 3*r)*(log(x
**n*c)*b + a)**p*a**3*b*e**3*m*n*p*r*x + 6*x**(m + 3*r)*(log(x**n*c)*b + a
)**p*a**3*b*e**3*m*n*p*x + 2*x**(m + 3*r)*(log(x**n*c)*b + a)**p*a**3*b*e*
*3*n*p*r**2*x + 6*x**(m + 3*r)*(log(x**n*c)*b + a)**p*a**3*b*e**3*n*p*r*x
+ 3*x**(m + 3*r)*(log(x**n*c)*b + a)**p*a**3*b*e**3*n*p*x + 3*x**(m + 3*r)
*(log(x**n*c)*b + a)**p*a**2*b**2*e**3*m*n**2*p**2*x + 3*x**(m + 3*r)*(log
(x**n*c)*b + a)**p*a**2*b**2*e**3*n**2*p**2*r*x + 3*x**(m + 3*r)*(log(x**n
*c)*b + a)**p*a**2*b**2*e**3*n**2*p**2*x + x**(m + 3*r)*(log(x**n*c)*b + a
)**p*a*b**3*e**3*n**3*p**3*x + 3*x**(m + 2*r)*(log(x**n*c)*b + a)**p*a**4*
d*e**2*m**3*x + 12*x**(m + 2*r)*(log(x**n*c)*b + a)**p*a**4*d*e**2*m**2*r*
x + 9*x**(m + 2*r)*(log(x**n*c)*b + a)**p*a**4*d*e**2*m**2*x + 9*x**(m + 2
*r)*(log(x**n*c)*b + a)**p*a**4*d*e**2*m*r**2*x + 24*x**(m + 2*r)*(log(x**
n*c)*b + a)**p*a**4*d*e**2*m*r*x + 9*x**(m + 2*r)*(log(x**n*c)*b + a)**...
```

3.447 $\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p \, dx$

Optimal result 3279
Mathematica [A] (verified) 3280
Rubi [A] (verified) 3280
Maple [F] 3282
Fricas [F] 3282
Sympy [F(-1)] 3283
Maxima [F(-2)] 3283
Giac [F] 3283
Mupad [F(-1)] 3284
Reduce [F] 3284

Optimal result

Integrand size = 27, antiderivative size = 350

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p \, dx$$

$$= \frac{d^2 e^{-\frac{a(1+m)}{bn}} (fx)^{1+m} (cx^n)^{-\frac{1+m}{n}} \Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right) (a+b\log(cx^n))^p \left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{f(1+m)}$$

$$+ \frac{2dee^{-\frac{a(1+m+r)}{bn}} x^{1+r} (fx)^m (cx^n)^{-\frac{1+m+r}{n}} \Gamma\left(1+p,-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right) (a+b\log(cx^n))^p \left(-\frac{(1+m+r)(a+b\mathrm{l}}{bn}\right.}{1+m+r}$$

$$+ \frac{e^2 e^{-\frac{a(1+m+2r)}{bn}} x^{1+2r} (fx)^m (cx^n)^{-\frac{1+m+2r}{n}} \Gamma\left(1+p,-\frac{(1+m+2r)(a+b\log(cx^n))}{bn}\right) (a+b\log(cx^n))^p \left(-\frac{(1+m+2r)(a}{b\mathrm{r}}\right.}{1+m+2r}$$

output
```
d^2*(f*x)^(1+m)*GAMMA(p+1,-(1+m)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/ex
p(a*(1+m)/b/n)/f/(1+m)/((c*x^n)^((1+m)/n))/((-(1+m)*(a+b*ln(c*x^n))/b/n)^p
)+2*d*e*x^(1+r)*(f*x)^m*GAMMA(p+1,-(1+m+r)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*
x^n))^p/exp(a*(1+m+r)/b/n)/(1+m+r)/((c*x^n)^((1+m+r)/n))/((-(1+m+r)*(a+b*l
n(c*x^n))/b/n)^p)+e^2*x^(1+2*r)*(f*x)^m*GAMMA(p+1,-(1+m+2*r)*(a+b*ln(c*x^n
))/b/n)*(a+b*ln(c*x^n))^p/exp(a*(1+m+2*r)/b/n)/(1+m+2*r)/((c*x^n)^((1+m+2*
r)/n))/((-(1+m+2*r)*(a+b*ln(c*x^n))/b/n)^p)
```

Mathematica [A] (verified)

Time = 1.43 (sec) , antiderivative size = 304, normalized size of antiderivative = 0.87

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p\, dx = x^{-m}(fx)^m (a+b\log(cx^n))^p \left(\frac{d^2 e^{-\frac{(1+m)(a-bn\log(x)+b\log(cx^n))}{bn}}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)\left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m} + e\left(\frac{2de^{-\frac{(1+m+r)(a-bn\log(x)+b\log(cx^n))}{bn}}\Gamma\left(1+p,-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right)\left(-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m+r} + \frac{ee^{-\frac{(1+m+2r)(a-bn\log(x)+b\log(cx^n))}{bn}}\Gamma\left(1+p,-\frac{(1+m+2r)(a+b\log(cx^n))}{bn}\right)\left(-\frac{(1+m+2r)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m+2r}\right)\right)$$

input
```
Integrate[(f*x)^m*(d + e*x^r)^2*(a + b*Log[c*x^n])^p,x]
```

output
```
((f*x)^m*(a + b*Log[c*x^n])^p*((d^2*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x
^n]))/(b*n))])/(E^(((1 + m)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*(1 + m
)*(-(((1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p) + e*((2*d*Gamma[1 + p, -(((1
+ m + r)*(a + b*Log[c*x^n]))/(b*n))])/(E^(((1 + m + r)*(a - b*n*Log[x] + b
*Log[c*x^n]))/(b*n))*(1 + m + r)*(-(((1 + m + r)*(a + b*Log[c*x^n]))/(b*n)
))^p) + (e*Gamma[1 + p, -(((1 + m + 2*r)*(a + b*Log[c*x^n]))/(b*n))])/(E^(
((1 + m + 2*r)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*(1 + m + 2*r)*(-(((
1 + m + 2*r)*(a + b*Log[c*x^n]))/(b*n)))^p))))/x^m
```

Rubi [A] (verified)

Time = 0.81 (sec) , antiderivative size = 350, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.074$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m \left(d+ex^r\right)^2 \left(a+b\log\left(cx^n\right)\right)^p \, dx$$

$$\Big\downarrow \text{ 2795}$$

$$\int \left(d^2(fx)^m \left(a+b\log\left(cx^n\right)\right)^p+2dex^r(fx)^m \left(a+b\log\left(cx^n\right)\right)^p+e^2x^{2r}(fx)^m \left(a+b\log\left(cx^n\right)\right)^p\right) dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{d^2(fx)^{m+1}e^{-\frac{a(m+1)}{bn}}\left(cx^n\right)^{-\frac{m+1}{n}}\left(a+b\log\left(cx^n\right)\right)^p\left(-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)^{-p}\Gamma\left(p+1,-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)}{f(m+1)}+\frac{2dex^{r+1}(fx)^m e^{-\frac{a(m+r+1)}{bn}}\left(cx^n\right)^{-\frac{m+r+1}{n}}\left(a+b\log\left(cx^n\right)\right)^p\left(-\frac{(m+r+1)(a+b\log(cx^n))}{bn}\right)^{-p}\Gamma\left(p+1,-\frac{(m+r+1)(a+b\log(cx^{n}}{bn}\right.}{m+r+1}\frac{e^2x^{2r+1}(fx)^m e^{-\frac{a(m+2r+1)}{bn}}\left(cx^n\right)^{-\frac{m+2r+1}{n}}\left(a+b\log\left(cx^n\right)\right)^p\left(-\frac{(m+2r+1)(a+b\log(cx^n))}{bn}\right)^{-p}\Gamma\left(p+1,-\frac{(m+2r+1)(a+b\log}{bn}\right.}{m+2r+1}$$

input
```
Int[(f*x)^m*(d + e*x^r)^2*(a + b*Log[c*x^n])^p,x]
```

output
```
(d^2*(f*x)^(1 + m)*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n]))/(b*n))]*(a
+ b*Log[c*x^n])^p)/(E^((a*(1 + m))/(b*n))*f*(1 + m)*(c*x^n)^((1 + m)/n)*(-
(((1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p) + (2*d*e*x^(1 + r)*(f*x)^m*Gamma[
1 + p, -(((1 + m + r)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p)/(E
^((a*(1 + m + r))/(b*n))*(1 + m + r)*(c*x^n)^((1 + m + r)/n)*(-(((1 + m +
r)*(a + b*Log[c*x^n]))/(b*n)))^p) + (e^2*x^(1 + 2*r)*(f*x)^m*Gamma[1 + p,
-(((1 + m + 2*r)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p)/(E^((a*
(1 + m + 2*r))/(b*n))*(1 + m + 2*r)*(c*x^n)^((1 + m + 2*r)/n)*(-(((1 + m +
 2*r)*(a + b*Log[c*x^n]))/(b*n)))^p)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [F]

$$\int (fx)^m (d+e\,x^r)^2 (a+b\ln(c\,x^n))^p dx$$

input
```
int((f*x)^m*(d+e*x^r)^2*(a+b*ln(c*x^n))^p,x)
```

output
```
int((f*x)^m*(d+e*x^r)^2*(a+b*ln(c*x^n))^p,x)
```

Fricas [F]

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p \, dx = \int (ex^r+d)^2 (fx)^m (b\log(cx^n)+a)^p \, dx$$

input
```
integrate((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n))^p,x, algorithm="fricas")
```

output
```
integral((e^2*x^(2*r) + 2*d*e*x^r + d^2)*(f*x)^m*(b*log(c*x^n) + a)^p, x)
```

Sympy [F(-1)]

Timed out.

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p \, dx = \text{Timed out}$$

input
```
integrate((f*x)**m*(d+e*x**r)**2*(a+b*ln(c*x**n))**p,x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p \, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n))^p,x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

Giac [F]

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p \, dx = \int (ex^r+d)^2 (fx)^m (b\log(cx^n)+a)^p \, dx$$

input
```
integrate((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n))^p,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(f*x)^m*(b*log(c*x^n) + a)^p, x)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p \, dx = \int (f\,x)^m \,(d+e\,x^r)^2 \,(a+b\,\ln(c\,x^n))^p \,dx$$

input
```
int((f*x)^m*(d + e*x^r)^2*(a + b*log(c*x^n))^p,x)
```

output
```
int((f*x)^m*(d + e*x^r)^2*(a + b*log(c*x^n))^p, x)
```

Reduce [F]

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p \, dx = \text{too large to display}$$

input
```
int((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n))^p,x)
```

output
```
(f**m*(x**(m + 2*r)*(log(x**n*c)*b + a)**p*a**3*e**2*m**2*x + x**(m + 2*r)
*(log(x**n*c)*b + a)**p*a**3*e**2*m*r*x + 2*x**(m + 2*r)*(log(x**n*c)*b +
a)**p*a**3*e**2*m*x + x**(m + 2*r)*(log(x**n*c)*b + a)**p*a**3*e**2*r*x +
x**(m + 2*r)*(log(x**n*c)*b + a)**p*a**3*e**2*x + 2*x**(m + 2*r)*(log(x**n
*c)*b + a)**p*a**2*b*e**2*m*n*p*x + x**(m + 2*r)*(log(x**n*c)*b + a)**p*a*
*2*b*e**2*n*p*r*x + 2*x**(m + 2*r)*(log(x**n*c)*b + a)**p*a**2*b*e**2*n*p*
x + x**(m + 2*r)*(log(x**n*c)*b + a)**p*a*b**2*e**2*n**2*p**2*x + 2*x**(m
+ r)*(log(x**n*c)*b + a)**p*a**3*d*e*m**2*x + 4*x**(m + r)*(log(x**n*c)*b
+ a)**p*a**3*d*e*m*r*x + 4*x**(m + r)*(log(x**n*c)*b + a)**p*a**3*d*e*m*x
+ 4*x**(m + r)*(log(x**n*c)*b + a)**p*a**3*d*e*r*x + 2*x**(m + r)*(log(x**
n*c)*b + a)**p*a**3*d*e*x + 4*x**(m + r)*(log(x**n*c)*b + a)**p*a**2*b*d*e
*m*n*p*x + 4*x**(m + r)*(log(x**n*c)*b + a)**p*a**2*b*d*e*n*p*r*x + 4*x**(
m + r)*(log(x**n*c)*b + a)**p*a**2*b*d*e*n*p*x + 2*x**(m + r)*(log(x**n*c)
*b + a)**p*a*b**2*d*e*n**2*p**2*x + x**m*(log(x**n*c)*b + a)**p*a**3*d**2*
m**2*x + 3*x**m*(log(x**n*c)*b + a)**p*a**3*d**2*m*r*x + 2*x**m*(log(x**n*
c)*b + a)**p*a**3*d**2*m*x + 2*x**m*(log(x**n*c)*b + a)**p*a**3*d**2*r**2*
x + 3*x**m*(log(x**n*c)*b + a)**p*a**3*d**2*r*x + x**m*(log(x**n*c)*b + a)
**p*a**3*d**2*x + 2*x**m*(log(x**n*c)*b + a)**p*a**2*b*d**2*m*n*p*x + 3*x*
*m*(log(x**n*c)*b + a)**p*a**2*b*d**2*n*p*r*x + 2*x**m*(log(x**n*c)*b + a)
**p*a**2*b*d**2*n*p*x + x**m*(log(x**n*c)*b + a)**p*a*b**2*d**2*n**2*p*...
```

3.448 $\int (fx)^m (d+ex^r) (a+b\log(cx^n))^p \, dx$

Optimal result . . . 3286
Mathematica [A] (verified) . . . 3287
Rubi [A] (verified) . . . 3287
Maple [F] . . . 3289
Fricas [F] . . . 3289
Sympy [F] . . . 3289
Maxima [F(-2)] . . . 3290
Giac [F] . . . 3290
Mupad [F(-1)] . . . 3290
Reduce [F] . . . 3291

Optimal result

Integrand size = 25, antiderivative size = 220

$$\int (fx)^m (d+ex^r) (a+b\log(cx^n))^p \, dx = \frac{de^{-\frac{a(1+m)}{bn}}(fx)^{1+m}(cx^n)^{-\frac{1+m}{n}}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{f(1+m)} + \frac{ee^{-\frac{a(1+m+r)}{bn}}x^{1+r}(fx)^m(cx^n)^{-\frac{1+m+r}{n}}\Gamma\left(1+p,-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{(1+m+r)(a+b\log(}{bn}\right.}{1+m+r}$$

output
```
d*(f*x)^(1+m)*GAMMA(p+1,-(1+m)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/exp(
a*(1+m)/b/n)/f/(1+m)/((c*x^n)^((1+m)/n))/((-(1+m)*(a+b*ln(c*x^n))/b/n)^p)+
e*x^(1+r)*(f*x)^m*GAMMA(p+1,-(1+m+r)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^
p/exp(a*(1+m+r)/b/n)/(1+m+r)/((c*x^n)^((1+m+r)/n))/((-(1+m+r)*(a+b*ln(c*x^
n))/b/n)^p)
```

Mathematica [A] (verified)

Time = 0.66 (sec) , antiderivative size = 200, normalized size of antiderivative = 0.91

$$\int (fx)^m (d+ex^r)(a+b\log(cx^n))^p\,dx = x^{-m}(fx)^m(a+b\log(cx^n))^p\left(\frac{de^{-\frac{(1+m)(a-bn\log(x)+b\log(cx^n))}{bn}}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)\left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m}+\frac{ee^{-\frac{(1+m+r)(a-bn\log(x)+b\log(cx^n))}{bn}}\Gamma\left(1+p,-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right)\left(-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m+r}\right)$$

input
```
Integrate[(f*x)^m*(d + e*x^r)*(a + b*Log[c*x^n])^p,x]
```

output
```
((f*x)^m*(a + b*Log[c*x^n])^p*((d*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n
]))/(b*n))])/(E^(((1 + m)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*(1 + m)*
(-(((1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p) + (e*Gamma[1 + p, -(((1 + m + r
)*(a + b*Log[c*x^n]))/(b*n))])/(E^(((1 + m + r)*(a - b*n*Log[x] + b*Log[c*
x^n]))/(b*n))*(1 + m + r)*(-(((1 + m + r)*(a + b*Log[c*x^n]))/(b*n)))^p)))
/x^m
```

Rubi [A] (verified)

Time = 0.56 (sec) , antiderivative size = 220, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.080$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m (d+ex^r)(a+b\log(cx^n))^p\,dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(d(fx)^m(a+b\log(cx^n))^p + ex^r(fx)^m(a+b\log(cx^n))^p\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{d(fx)^{m+1}e^{-\frac{a(m+1)}{bn}}(cx^n)^{-\frac{m+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)^{-p}\Gamma\left(p+1,-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)}{f(m+1)}+\frac{ex^{r+1}(fx)^me^{-\frac{a(m+r+1)}{bn}}(cx^n)^{-\frac{m+r+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+r+1)(a+b\log(cx^n))}{bn}\right)^{-p}\Gamma\left(p+1,-\frac{(m+r+1)(a+b\log(cx^n))}{bn}\right)}{m+r+1}$$

input
```
Int[(f*x)^m*(d + e*x^r)*(a + b*Log[c*x^n])^p,x]
```

output
```
(d*(f*x)^(1 + m)*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n]))/(b*n))]*(a +
b*Log[c*x^n])^p)/(E^((a*(1 + m))/(b*n))*f*(1 + m)*(c*x^n)^((1 + m)/n)*(-((
(1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p) + (e*x^(1 + r)*(f*x)^m*Gamma[1 + p,
 -(((1 + m + r)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p)/(E^((a*(
1 + m + r))/(b*n))*(1 + m + r)*(c*x^n)^((1 + m + r)/n)*(-(((1 + m + r)*(a
+ b*Log[c*x^n]))/(b*n)))^p)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Maple [F]

$$\int (fx)^m (d + e\,x^r) (a + b\ln(c\,x^n))^p dx$$

input
```
int((f*x)^m*(d+e*x^r)*(a+b*ln(c*x^n))^p,x)
```

output
```
int((f*x)^m*(d+e*x^r)*(a+b*ln(c*x^n))^p,x)
```

Fricas [F]

$$\int (fx)^m (d + ex^r) (a + b\log(cx^n))^p \, dx = \int (ex^r + d)(fx)^m (b\log(cx^n) + a)^p \, dx$$

input
```
integrate((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n))^p,x, algorithm="fricas")
```

output
```
integral((e*x^r + d)*(f*x)^m*(b*log(c*x^n) + a)^p, x)
```

Sympy [F]

$$\int (fx)^m (d + ex^r) (a + b\log(cx^n))^p \, dx = \int (fx)^m (a + b\log(cx^n))^p (d + ex^r) \, dx$$

input
```
integrate((f*x)**m*(d+e*x**r)*(a+b*ln(c*x**n))**p,x)
```

output
```
Integral((f*x)**m*(a + b*log(c*x**n))**p*(d + e*x**r), x)
```

Maxima [F(-2)]

Exception generated.

$$\int (fx)^m (d+ex^r) (a+b\log(cx^n))^p \, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n))^p,x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

Giac [F]

$$\int (fx)^m (d+ex^r) (a+b\log(cx^n))^p \, dx = \int (ex^r+d)(fx)^m (b\log(cx^n)+a)^p \, dx$$

input
```
integrate((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n))^p,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)*(f*x)^m*(b*log(c*x^n) + a)^p, x)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^m (d+ex^r) (a+b\log(cx^n))^p \, dx = \int (f\,x)^m \left(d+e\,x^r\right) \left(a+b\,\ln(c\,x^n)\right)^p \, dx$$

input
```
int((f*x)^m*(d + e*x^r)*(a + b*log(c*x^n))^p,x)
```

output
```
int((f*x)^m*(d + e*x^r)*(a + b*log(c*x^n))^p, x)
```

Reduce [F]

$$\int (fx)^m (d+ex^r) (a+b\log(cx^n))^p \, dx = \text{too large to display}$$

input
```
int((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n))^p,x)
```

output
```
(f**m*(x**(m + r)*(log(x**n*c)*b + a)**p*a**2*e*m*x + x**(m + r)*(log(x**n
*c)*b + a)**p*a**2*e*x + x**(m + r)*(log(x**n*c)*b + a)**p*a*b*e*n*p*x + x
**m*(log(x**n*c)*b + a)**p*a**2*d*m*x + x**m*(log(x**n*c)*b + a)**p*a**2*d
*r*x + x**m*(log(x**n*c)*b + a)**p*a**2*d*x + x**m*(log(x**n*c)*b + a)**p*
a*b*d*n*p*x + int((x**(m + r)*(log(x**n*c)*b + a)**p*log(x**n*c))/(log(x**
n*c)*a**2*b*m**2 + log(x**n*c)*a**2*b*m*r + 2*log(x**n*c)*a**2*b*m + log(x
**n*c)*a**2*b*r + log(x**n*c)*a**2*b + 2*log(x**n*c)*a*b**2*m*n*p + log(x*
*n*c)*a*b**2*n*p*r + 2*log(x**n*c)*a*b**2*n*p + log(x**n*c)*b**3*n**2*p**2
 + a**3*m**2 + a**3*m*r + 2*a**3*m + a**3*r + a**3 + 2*a**2*b*m*n*p + a**2
*b*n*p*r + 2*a**2*b*n*p + a*b**2*n**2*p**2),x)*a**3*b**2*e*m**3*n*p + int(
(x**(m + r)*(log(x**n*c)*b + a)**p*log(x**n*c))/(log(x**n*c)*a**2*b*m**2 +
 log(x**n*c)*a**2*b*m*r + 2*log(x**n*c)*a**2*b*m + log(x**n*c)*a**2*b*r +
log(x**n*c)*a**2*b + 2*log(x**n*c)*a*b**2*m*n*p + log(x**n*c)*a*b**2*n*p*r
 + 2*log(x**n*c)*a*b**2*n*p + log(x**n*c)*b**3*n**2*p**2 + a**3*m**2 + a**
3*m*r + 2*a**3*m + a**3*r + a**3 + 2*a**2*b*m*n*p + a**2*b*n*p*r + 2*a**2*
b*n*p + a*b**2*n**2*p**2),x)*a**3*b**2*e*m**2*n*p*r + 3*int((x**(m + r)*(l
og(x**n*c)*b + a)**p*log(x**n*c))/(log(x**n*c)*a**2*b*m**2 + log(x**n*c)*a
**2*b*m*r + 2*log(x**n*c)*a**2*b*m + log(x**n*c)*a**2*b*r + log(x**n*c)*a*
*2*b + 2*log(x**n*c)*a*b**2*m*n*p + log(x**n*c)*a*b**2*n*p*r + 2*log(x**n*
c)*a*b**2*n*p + log(x**n*c)*b**3*n**2*p**2 + a**3*m**2 + a**3*m*r + 2*a...
```

3.449 $\int (fx)^m (a+b\log(cx^n))^p\,dx$

Optimal result 3292
Mathematica [A] (verified) 3292
Rubi [A] (verified) 3293
Maple [F] 3294
Fricas [F] 3294
Sympy [F] 3295
Maxima [F(-2)] 3295
Giac [F] 3295
Mupad [F(-1)] 3296
Reduce [F] 3296

Optimal result

Integrand size = 18, antiderivative size = 106

$$\int (fx)^m (a+b\log(cx^n))^p\,dx = \frac{e^{-\frac{a(1+m)}{bn}}(fx)^{1+m}(cx^n)^{-\frac{1+m}{n}}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{f(1+m)}$$

output
```
(f*x)^(1+m)*GAMMA(p+1,-(1+m)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/exp(a*
(1+m)/b/n)/f/(1+m)/((c*x^n)^((1+m)/n))/((-(1+m)*(a+b*ln(c*x^n))/b/n)^p)
```

Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 107, normalized size of antiderivative = 1.01

$$\int (fx)^m (a+b\log(cx^n))^p\,dx = \frac{e^{-\frac{(1+m)(a+b(-n\log(x)+\log(cx^n)))}{bn}}x^{-m}(fx)^m\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)}{1+m}$$

input
```
Integrate[(f*x)^m*(a + b*Log[c*x^n])^p,x]
```

output
```
((f*x)^m*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*
x^n])^p)/(E^(((1 + m)*(a + b*(-(n*Log[x]) + Log[c*x^n])))/(b*n))*(1 + m)*x
^m*(-(((1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p)
```

Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 106, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2747, 2612}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m (a+b\log(cx^n))^p\,dx$$

$$\Big\downarrow \text{2747}$$

$$\frac{(fx)^{m+1}(cx^n)^{-\frac{m+1}{n}}\int (cx^n)^{\frac{m+1}{n}}(a+b\log(cx^n))^p\,d\log(cx^n)}{fn}$$

$$\Big\downarrow \text{2612}$$

$$\frac{(fx)^{m+1}e^{-\frac{a(m+1)}{bn}}(cx^n)^{-\frac{m+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)^{-p}\Gamma\left(p+1,-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)}{f(m+1)}$$

input
```
Int[(f*x)^m*(a + b*Log[c*x^n])^p,x]
```

output
```
((f*x)^(1 + m)*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*
Log[c*x^n])^p)/(E^((a*(1 + m))/(b*n))*f*(1 + m)*(c*x^n)^((1 + m)/n)*(-(((1
 + m)*(a + b*Log[c*x^n]))/(b*n)))^p)
```

Defintions of rubi rules used

rule 2612
```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

rule 2747
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n))   Subst[Int[E^(((m + 1)/n
)*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Maple [F]

$$\int (fx)^m (a+b\ln (c\,x^n))^p dx$$

input
```
int((f*x)^m*(a+b*ln(c*x^n))^p,x)
```

output
```
int((f*x)^m*(a+b*ln(c*x^n))^p,x)
```

Fricas [F]

$$\int (fx)^m (a+b\log (cx^n))^p \, dx = \int (fx)^m (b\log (cx^n)+a)^p \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))^p,x, algorithm="fricas")
```

output
```
integral((f*x)^m*(b*log(c*x^n) + a)^p, x)
```

Sympy [F]

$$\int (fx)^m (a + b\log(cx^n))^p \, dx = \int (fx)^m (a + b\log(cx^n))^p \, dx$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n))**p,x)
```

output
```
Integral((f*x)**m*(a + b*log(c*x**n))**p, x)
```

Maxima [F(-2)]

Exception generated.

$$\int (fx)^m (a + b\log(cx^n))^p \, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))^p,x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

Giac [F]

$$\int (fx)^m (a + b\log(cx^n))^p \, dx = \int (fx)^m (b\log(cx^n) + a)^p \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))^p,x, algorithm="giac")
```

output
```
integrate((f*x)^m*(b*log(c*x^n) + a)^p, x)
```

Mupad [F(-1)]

Timed out.

$$\int (fx)^m (a+b\log(cx^n))^p \, dx = \int (f\,x)^m \,(a+b\,\ln(c\,x^n))^p \,dx$$

input
```
int((f*x)^m*(a + b*log(c*x^n))^p,x)
```

output
```
int((f*x)^m*(a + b*log(c*x^n))^p, x)
```

Reduce [F]

$$\int (fx)^m (a+b\log(cx^n))^p \, dx$$
$$= \frac{f^m\left(x^m(\log(x^n c)\,b+a)^p ax + \left(\int \frac{x^m(\log(x^n c)b+a)^p\log(x^n c)}{\log(x^n c)abm+\log(x^n c)ab+\log(x^n c)b^2np+a^2m+a^2+abnp}dx\right) a\,b^2mnp + \left(\int \frac{}{\log(x^n c)abr}\right.\right.}{bnp+}$$

input
```
int((f*x)^m*(a+b*log(c*x^n))^p,x)
```

output
```
(f**m*(x**m*(log(x**n*c)*b + a)**p*a*x + int((x**m*(log(x**n*c)*b + a)**p*
log(x**n*c))/(log(x**n*c)*a*b*m + log(x**n*c)*a*b + log(x**n*c)*b**2*n*p +
 a**2*m + a**2 + a*b*n*p),x)*a*b**2*m*n*p + int((x**m*(log(x**n*c)*b + a)*
*p*log(x**n*c))/(log(x**n*c)*a*b*m + log(x**n*c)*a*b + log(x**n*c)*b**2*n*
p + a**2*m + a**2 + a*b*n*p),x)*a*b**2*n*p + int((x**m*(log(x**n*c)*b + a)
**p*log(x**n*c))/(log(x**n*c)*a*b*m + log(x**n*c)*a*b + log(x**n*c)*b**2*n
*p + a**2*m + a**2 + a*b*n*p),x)*b**3*n**2*p**2))/(a*m + a + b*n*p)
```

3.450 $\int \frac{(fx)^m(a+b\log(cx^n))^p}{d+ex^r}\,dx$

Optimal result 3297
Mathematica [N/A] 3297
Rubi [N/A] 3298
Maple [N/A] 3298
Fricas [N/A] 3299
Sympy [N/A] 3299
Maxima [F(-2)] 3300
Giac [N/A] 3300
Mupad [N/A] 3300
Reduce [N/A] 3301

Optimal result

Integrand size = 27, antiderivative size = 27

$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{d+ex^r}\,dx = \text{Int}\left(\frac{(fx)^m (a+b\log(cx^n))^p}{d+ex^r},x\right)$$

output
```
Defer(Int)((f*x)^m*(a+b*ln(c*x^n))^p/(d+e*x^r),x)
```

Mathematica [N/A]

Not integrable

Time = 1.93 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{d+ex^r}\,dx = \int \frac{(fx)^m (a+b\log(cx^n))^p}{d+ex^r}\,dx$$

input
```
Integrate[((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r),x]
```

output
```
Integrate[((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r), x]
```

Rubi [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{d+ex^r} \, dx$$

$$\Big\downarrow \ 2796$$

$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{d+ex^r} dx$$

input
```
Int[((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r),x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^m (a+b\ln(c\,x^n))^p}{d+e\,x^r}dx$$

input
```
int((f*x)^m*(a+b*ln(c*x^n))^p/(d+e*x^r),x)
```

output
```
int((f*x)^m*(a+b*ln(c*x^n))^p/(d+e*x^r),x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{d+ex^r} \, dx = \int \frac{(fx)^m (b\log(cx^n)+a)^p}{ex^r+d} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r),x, algorithm="fricas")
```

output
```
integral((f*x)^m*(b*log(c*x^n) + a)^p/(e*x^r + d), x)
```

Sympy [N/A]

Not integrable

Time = 96.70 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{d+ex^r} \, dx = \int \frac{(fx)^m (a+b\log(cx^n))^p}{d+ex^r} \, dx$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n))**p/(d+e*x**r),x)
```

output
```
Integral((f*x)**m*(a + b*log(c*x**n))**p/(d + e*x**r), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(fx)^m (a + b \log (cx^n))^p}{d + ex^r} \, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

Giac [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{(fx)^m (a + b \log (cx^n))^p}{d + ex^r} \, dx = \int \frac{(fx)^m (b \log (cx^n) + a)^p}{ex^r + d} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((f*x)^m*(b*log(c*x^n) + a)^p/(e*x^r + d), x)
```

Mupad [N/A]

Not integrable

Time = 25.35 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{(fx)^m (a + b \log (cx^n))^p}{d + ex^r} \, dx = \int \frac{(f\,x)^m\,(a + b\,\ln (c\,x^n))^p}{d + e\,x^r} \, dx$$

input
```
int(((f*x)^m*(a + b*log(c*x^n))^p)/(d + e*x^r),x)
```

output
```
int(((f*x)^m*(a + b*log(c*x^n))^p)/(d + e*x^r), x)
```

Reduce [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

$$\int \frac{(fx)^m (a + b\log (cx^n))^p}{d + ex^r} dx = f^m \left(\int \frac{x^m (\log(x^n c) \, b + a)^p}{x^r e + d} dx \right)$$

input
```
int((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r),x)
```

output
```
f**m*int((x**m*(log(x**n*c)*b + a)**p)/(x**r*e + d),x)
```

3.451 $\int \frac{(fx)^m(a+b\log(cx^n))^p}{(d+ex^r)^2} dx$

Optimal result 3302
Mathematica [N/A] 3302
Rubi [N/A] 3303
Maple [N/A] 3303
Fricas [N/A] 3304
Sympy [F(-1)] 3304
Maxima [F(-2)] 3304
Giac [N/A] 3305
Mupad [N/A] 3305
Reduce [N/A] 3306

Optimal result

Integrand size = 27, antiderivative size = 27

$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{(d+ex^r)^2} dx = \text{Int}\left(\frac{(fx)^m (a+b\log(cx^n))^p}{(d+ex^r)^2}, x\right)$$

output
```
Defer(Int)((f*x)^m*(a+b*ln(c*x^n))^p/(d+e*x^r)^2,x)
```

Mathematica [N/A]

Not integrable

Time = 2.35 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{(d+ex^r)^2} dx = \int \frac{(fx)^m (a+b\log(cx^n))^p}{(d+ex^r)^2} dx$$

input
```
Integrate[((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r)^2,x]
```

output
```
Integrate[((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r)^2, x]
```

Rubi [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{(d+ex^r)^2} \, dx$$

$$\Big\downarrow \text{2796}$$

$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{(d+ex^r)^2} dx$$

input
```
Int[((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r)^2,x]
```

output
```
$Aborted
```

Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

Maple [N/A]

Not integrable

Time = 0.46 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^m (a+b\ln(c\,x^n))^p}{(d+e\,x^r)^2}dx$$

input
```
int((f*x)^m*(a+b*ln(c*x^n))^p/(d+e*x^r)^2,x)
```

output
```
int((f*x)^m*(a+b*ln(c*x^n))^p/(d+e*x^r)^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.56

$$\int \frac{(fx)^m (a + b \log (cx^n))^p}{(d + ex^r)^2}\, dx = \int \frac{(fx)^m (b \log (cx^n) + a)^p}{(ex^r + d)^2}\, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
integral((f*x)^m*(b*log(c*x^n) + a)^p/(e^2*x^(2*r) + 2*d*e*x^r + d^2), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{(fx)^m (a + b \log (cx^n))^p}{(d + ex^r)^2}\, dx = \text{Timed out}$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n))**p/(d+e*x**r)**2,x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(fx)^m (a + b \log (cx^n))^p}{(d + ex^r)^2}\, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

Giac [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{(d+ex^r)^2}\,dx = \int \frac{(fx)^m (b\log(cx^n)+a)^p}{(ex^r+d)^2}\,dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((f*x)^m*(b*log(c*x^n) + a)^p/(e*x^r + d)^2, x)
```

Mupad [N/A]

Not integrable

Time = 25.50 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{(d+ex^r)^2}\,dx = \int \frac{(f\,x)^m\,(a+b\,\ln(c\,x^n))^p}{(d+e\,x^r)^2}\,dx$$

input
```
int(((f*x)^m*(a + b*log(c*x^n))^p)/(d + e*x^r)^2,x)
```

output
```
int(((f*x)^m*(a + b*log(c*x^n))^p)/(d + e*x^r)^2, x)
```

Reduce [N/A]

Not integrable

Time = 0.19 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.63

$$\int \frac{(fx)^m (a+b\log (cx^n))^p}{(d+ex^r)^2}\,dx = f^m\left(\int \frac{x^m(\log(x^n c)\,b+a)^p}{x^{2r}e^2+2x^r de+d^2}dx\right)$$

input
```
int((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r)^2,x)
```

output
```
f**m*int((x**m*(log(x**n*c)*b + a)**p)/(x**(2*r)*e**2 + 2*x**r*d*e + d**2)
,x)
```

3.452 $\int \frac{(f+gx)(a+b\log(cx^n))}{(d+ex)^3}\,dx$

Optimal result 3307
Mathematica [A] (verified) 3307
Rubi [A] (verified) 3308
Maple [B] (verified) 3309
Fricas [B] (verification not implemented) 3310
Sympy [B] (verification not implemented) 3310
Maxima [B] (verification not implemented) 3311
Giac [A] (verification not implemented) 3312
Mupad [B] (verification not implemented) 3312
Reduce [B] (verification not implemented) 3313

Optimal result

Integrand size = 23, antiderivative size = 115

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)}{(d+ex)^3}\,dx = \frac{b(ef-dg)n}{2de^2(d+ex)}+\frac{bf^2n\log(x)}{2d^2(ef-dg)} - \frac{(f+gx)^2\left(a+b\log\left(cx^n\right)\right)}{2(ef-dg)(d+ex)^2} - \frac{b(ef+dg)n\log(d+ex)}{2d^2e^2}$$

output
```
1/2*b*(-d*g+e*f)*n/d/e^2/(e*x+d)+1/2*b*f^2*n*ln(x)/d^2/(-d*g+e*f)-1/2*(g*x
+f)^2*(a+b*ln(c*x^n))/(-d*g+e*f)/(e*x+d)^2-1/2*b*(d*g+e*f)*n*ln(e*x+d)/d^2
/e^2
```

Mathematica [A] (verified)

Time = 0.21 (sec) , antiderivative size = 108, normalized size of antiderivative = 0.94

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)}{(d+ex)^3}\,dx = \frac{-\frac{(ef-dg)(a+b\log(cx^n))}{(d+ex)^2}-\frac{2g(a+b\log(cx^n))}{d+ex}+\frac{2bgn(\log(x)-\log(d+ex))}{d}+\frac{b(ef-dg)n\left(\frac{d}{d+ex}+\log(x)-\log(d+ex)\right)}{d^2}}{2e^2}$$

input
```
Integrate[((f + g*x)*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

output
```
(-(((e*f - d*g)*(a + b*Log[c*x^n]))/(d + e*x)^2) - (2*g*(a + b*Log[c*x^n])
)/(d + e*x) + (2*b*g*n*(Log[x] - Log[d + e*x]))/d + (b*(e*f - d*g)*n*(d/(d
 + e*x) + Log[x] - Log[d + e*x]))/d^2)/(2*e^2)
```

Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.98, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.130$, Rules used = {2798, 99, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(f+gx)(a+b\log(cx^n))}{(d+ex)^3}dx$$

$$\Big\downarrow \text{2798}$$

$$\frac{bn\int \frac{(f+gx)^2}{x(d+ex)^2}dx}{2(ef-dg)}-\frac{(f+gx)^2(a+b\log(cx^n))}{2(d+ex)^2(ef-dg)}$$

$$\Big\downarrow \text{99}$$

$$\frac{bn\int \left(\frac{f^2}{d^2x}+\frac{d^2g^2-e^2f^2}{d^2e(d+ex)}-\frac{(dg-ef)^2}{de(d+ex)^2}\right)dx}{2(ef-dg)}-\frac{(f+gx)^2(a+b\log(cx^n))}{2(d+ex)^2(ef-dg)}$$

$$\Big\downarrow \text{2009}$$

$$\frac{bn\left(-\left(\frac{f^2}{d^2}-\frac{g^2}{e^2}\right)\log(d+ex)+\frac{f^2\log(x)}{d^2}+\frac{(ef-dg)^2}{de^2(d+ex)}\right)}{2(ef-dg)}-\frac{(f+gx)^2(a+b\log(cx^n))}{2(d+ex)^2(ef-dg)}$$

input
```
Int[((f + g*x)*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

output
```
-1/2*((f + g*x)^2*(a + b*Log[c*x^n]))/((e*f - d*g)*(d + e*x)^2) + (b*n*((e
*f - d*g)^2/(d*e^2*(d + e*x)) + (f^2*Log[x])/d^2 - (f^2/d^2 - g^2/e^2)*Log
[d + e*x]))/(2*(e*f - d*g))
```

Defintions of rubi rules used

rule 99
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_)*((e_.) + (f_.)*(x_)
)^(p_), x_] :> Int[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n*(e + f*x)^p, x],
 x] /; FreeQ[{a, b, c, d, e, f, p}, x] && IntegersQ[m, n] && (IntegerQ[p] |
| (GtQ[m, 0] && GeQ[n, -1]))
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2798
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_)*((
f_) + (g_.)*(x_))^(m_.), x_Symbol] :> Simp[(f + g*x)^(m + 1)*(d + e*x)^(q +
 1)*((a + b*Log[c*x^n])^p/((q + 1)*(e*f - d*g))), x] - Simp[b*n*(p/((q + 1)
*(e*f - d*g)))   Int[(f + g*x)^(m + 1)*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n, q}, x] && NeQ[e*f
 - d*g, 0] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 283 vs. $2(107) = 214$.

Time = 1.03 (sec) , antiderivative size = 284, normalized size of antiderivative = 2.47

method	result
parallelrisch	$-2\ln(ex+d)b\,d^3gn-b\,d^3gn-2a\,d^2ef+b\,d^2efn-2\ln(c\,x^n)b\,d^3g-2\ln(ex+d)b\,d^2efn-2\ln(ex+d)b\,e^3fn\,x^2+2x^2ad\,e^2g-2\ln(c$
risch	$-\frac{b(2gxe+dg+ef)\ln(x^n)}{2(ex+d)^2e^2}+ i\pi b\,d^2ef\,\mathrm{csgn}(ic\,x^n)^3-2\ln(c)b\,d^3g-2\ln(ex+d)b\,d^3gn+2\ln(-x)b\,d^3gn-2\ln(c)b\,d^2ef-2b\,d^3g$

input
```
int((g*x+f)*(a+b*ln(c*x^n))/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
1/4*(-2*ln(e*x+d)*b*d^3*g*n-b*d^3*g*n-2*a*d^2*e*f+b*d^2*e*f*n-2*ln(c*x^n)*
b*d^3*g-2*ln(e*x+d)*b*d^2*e*f*n-2*ln(e*x+d)*b*e^3*f*n*x^2+2*x^2*a*d*e^2*g-
2*ln(c*x^n)*b*d^2*e*f+2*ln(x)*b*d^3*g*n-2*ln(e*x+d)*b*d*e^2*g*n*x^2-4*ln(e
*x+d)*b*d^2*e*g*n*x-4*ln(e*x+d)*b*d*e^2*f*n*x-b*e^3*f*n*x^2-4*x*ln(c*x^n)*
b*d^2*e*g+2*ln(x)*x^2*b*e^3*f*n+b*d*e^2*g*n*x^2+2*ln(x)*b*d^2*e*f*n+2*ln(x
)*x^2*b*d*e^2*g*n+4*ln(x)*x*b*d^2*e*g*n+4*ln(x)*x*b*d*e^2*f*n)/d^2/e^2/(e*
x+d)^2
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 215 vs. $2(107) = 214$.

Time = 0.09 (sec) , antiderivative size = 215, normalized size of antiderivative = 1.87

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)}{(d+ex)^3}\,dx = -\frac{ad^2ef + ad^3g - (bd^2ef - bd^3g)n + (2\,ad^2eg - (bde^2f - bd^2eg)n)x + ((be^3f + bde^2g)nx^2 + 2\,(bde^2f -}{2\,(}$$

input
```
integrate((g*x+f)*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="fricas")
```

output
```
-1/2*(a*d^2*e*f + a*d^3*g - (b*d^2*e*f - b*d^3*g)*n + (2*a*d^2*e*g - (b*d*
e^2*f - b*d^2*e*g)*n)*x + ((b*e^3*f + b*d*e^2*g)*n*x^2 + 2*(b*d*e^2*f + b*
d^2*e*g)*n*x + (b*d^2*e*f + b*d^3*g)*n)*log(e*x + d) + (2*b*d^2*e*g*x + b*
d^2*e*f + b*d^3*g)*log(c) - (2*b*d*e^2*f*n*x + (b*e^3*f + b*d*e^2*g)*n*x^2
)*log(x))/(d^2*e^4*x^2 + 2*d^3*e^3*x + d^4*e^2)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 908 vs. $2(100) = 200$.

Time = 2.44 (sec) , antiderivative size = 908, normalized size of antiderivative = 7.90

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)}{(d+ex)^3}\,dx = \text{Too large to display}$$

input
```
integrate((g*x+f)*(a+b*ln(c*x**n))/(e*x+d)**3,x)
```

output
```
Piecewise((zoo*(-a*f/(2*x**2) - a*g/x - b*f*n/(4*x**2) - b*f*log(c*x**n)/(
2*x**2) - b*g*n/x - b*g*log(c*x**n)/x), Eq(d, 0) & Eq(e, 0)), ((a*f*x + a*
g*x**2/2 - b*f*n*x + b*f*x*log(c*x**n) - b*g*n*x**2/4 + b*g*x**2*log(c*x**
n)/2)/d**3, Eq(e, 0)), ((-a*f/(2*x**2) - a*g/x - b*f*n/(4*x**2) - b*f*log(
c*x**n)/(2*x**2) - b*g*n/x - b*g*log(c*x**n)/x)/e**3, Eq(d, 0)), (-a*d**3*
g/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d**2*e**4*x**2) - a*d**2*e*f/(2*d**4*e*
*2 + 4*d**3*e**3*x + 2*d**2*e**4*x**2) - 2*a*d**2*e*g*x/(2*d**4*e**2 + 4*d
**3*e**3*x + 2*d**2*e**4*x**2) - b*d**3*g*n*log(d/e + x)/(2*d**4*e**2 + 4*
d**3*e**3*x + 2*d**2*e**4*x**2) - b*d**3*g*n/(2*d**4*e**2 + 4*d**3*e**3*x
+ 2*d**2*e**4*x**2) - b*d**2*e*f*n*log(d/e + x)/(2*d**4*e**2 + 4*d**3*e**3
*x + 2*d**2*e**4*x**2) + b*d**2*e*f*n/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d**
2*e**4*x**2) - 2*b*d**2*e*g*n*x*log(d/e + x)/(2*d**4*e**2 + 4*d**3*e**3*x
+ 2*d**2*e**4*x**2) - b*d**2*e*g*n*x/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d**2
*e**4*x**2) - 2*b*d*e**2*f*n*x*log(d/e + x)/(2*d**4*e**2 + 4*d**3*e**3*x +
 2*d**2*e**4*x**2) + b*d*e**2*f*n*x/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d**2*
e**4*x**2) + 2*b*d*e**2*f*x*log(c*x**n)/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d
**2*e**4*x**2) - b*d*e**2*g*n*x**2*log(d/e + x)/(2*d**4*e**2 + 4*d**3*e**3
*x + 2*d**2*e**4*x**2) + b*d*e**2*g*x**2*log(c*x**n)/(2*d**4*e**2 + 4*d**3
*e**3*x + 2*d**2*e**4*x**2) - b*e**3*f*n*x**2*log(d/e + x)/(2*d**4*e**2 +
4*d**3*e**3*x + 2*d**2*e**4*x**2) + b*e**3*f*x**2*log(c*x**n)/(2*d**4*e...
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 218 vs. $2(107) = 214$.

Time = 0.04 (sec) , antiderivative size = 218, normalized size of antiderivative = 1.90

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)}{(d+ex)^3}\,dx = \frac{1}{2}\,bfn\left(\frac{1}{de^2x+d^2e}-\frac{\log\left(ex+d\right)}{d^2e}+\frac{\log\left(x\right)}{d^2e}\right) - \frac{1}{2}\,bgn\left(\frac{1}{e^3x+de^2}+\frac{\log\left(ex+d\right)}{de^2}-\frac{\log\left(x\right)}{de^2}\right) - \frac{(2\,ex+d)bg\log\left(cx^n\right)}{2\left(e^4x^2+2\,de^3x+d^2e^2\right)} - \frac{(2\,ex+d)ag}{2\left(e^4x^2+2\,de^3x+d^2e^2\right)} - \frac{bf\log\left(cx^n\right)}{2\left(e^3x^2+2\,de^2x+d^2e\right)} - \frac{af}{2\left(e^3x^2+2\,de^2x+d^2e\right)}$$

input
```
integrate((g*x+f)*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="maxima")
```

output
```
1/2*b*f*n*(1/(d*e^2*x + d^2*e) - log(e*x + d)/(d^2*e) + log(x)/(d^2*e)) -
1/2*b*g*n*(1/(e^3*x + d*e^2) + log(e*x + d)/(d*e^2) - log(x)/(d*e^2)) - 1/
2*(2*e*x + d)*b*g*log(c*x^n)/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) - 1/2*(2*e*x
+ d)*a*g/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) - 1/2*b*f*log(c*x^n)/(e^3*x^2 + 2
*d*e^2*x + d^2*e) - 1/2*a*f/(e^3*x^2 + 2*d*e^2*x + d^2*e)
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 199, normalized size of antiderivative = 1.73

$$\int \frac{(f+gx)(a+b\log(cx^n))}{(d+ex)^3}\,dx = -\frac{(2\,begnx+befn+bdgn)\log(x)}{2\,(e^4x^2+2\,de^3x+d^2e^2)} + \frac{be^2fnx-bdegnx-2\,bdegx\log(c)+bdefn-bd^2gn-2\,adegx-bdef\log(c)-bd^2g\log(c)-adef-}{2\,(de^4x^2+2\,d^2e^3x+d^3e^2)} - \frac{(befn+bdgn)\log(ex+d)}{2\,d^2e^2} + \frac{(befn+bdgn)\log(x)}{2\,d^2e^2}$$

input
```
integrate((g*x+f)*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="giac")
```

output
```
-1/2*(2*b*e*g*n*x + b*e*f*n + b*d*g*n)*log(x)/(e^4*x^2 + 2*d*e^3*x + d^2*e
^2) + 1/2*(b*e^2*f*n*x - b*d*e*g*n*x - 2*b*d*e*g*x*log(c) + b*d*e*f*n - b*
d^2*g*n - 2*a*d*e*g*x - b*d*e*f*log(c) - b*d^2*g*log(c) - a*d*e*f - a*d^2*
g)/(d*e^4*x^2 + 2*d^2*e^3*x + d^3*e^2) - 1/2*(b*e*f*n + b*d*g*n)*log(e*x +
 d)/(d^2*e^2) + 1/2*(b*e*f*n + b*d*g*n)*log(x)/(d^2*e^2)
```

Mupad [B] (verification not implemented)

Time = 25.76 (sec) , antiderivative size = 174, normalized size of antiderivative = 1.51

$$\int \frac{(f+gx)(a+b\log(cx^n))}{(d+ex)^3}\,dx = -\frac{a\,d\,g+a\,e\,f+\frac{x\,(2\,a\,d\,e\,g-b\,e^2\,f\,n+b\,d\,e\,g\,n)}{d}+b\,d\,g\,n-b\,e\,f\,n}{2\,d^2\,e^2+4\,d\,e^3\,x+2\,e^4\,x^2} - \frac{\ln(c\,x^n)\,\left(\frac{b\,f}{2\,e}+\frac{b\,d\,g}{2\,e^2}+\frac{b\,g\,x}{e}\right)}{d^2+2\,d\,e\,x+e^2\,x^2} - \frac{b\,n\,\mathrm{atanh}\left(\frac{b\,n\,(d\,g+e\,f)\,(d+2\,e\,x)}{d\,(b\,d\,g\,n+b\,e\,f\,n)}\right)\,(d\,g+e\,f)}{d^2\,e^2}$$

input
```
int(((f + g*x)*(a + b*log(c*x^n)))/(d + e*x)^3,x)
```

output
```
- (a*d*g + a*e*f + (x*(2*a*d*e*g - b*e^2*f*n + b*d*e*g*n))/d + b*d*g*n - b
*e*f*n)/(2*d^2*e^2 + 2*e^4*x^2 + 4*d*e^3*x) - (log(c*x^n)*((b*f)/(2*e) + (
b*d*g)/(2*e^2) + (b*g*x)/e))/(d^2 + e^2*x^2 + 2*d*e*x) - (b*n*atanh((b*n*(
d*g + e*f)*(d + 2*e*x))/(d*(b*d*g*n + b*e*f*n)))*(d*g + e*f))/(d^2*e^2)
```

Reduce [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 247, normalized size of antiderivative = 2.15

$$\int \frac{(f+gx)\,(a+b\log(cx^n))}{(d+ex)^3}\,dx$$
$$= \frac{-2\log(ex+d)\,b\,d^3gn-2\log(ex+d)\,b\,d^2efn-4\log(ex+d)\,b\,d^2egnx-4\log(ex+d)\,bd\,e^2fnx-2\log(}{}$$

input
```
int((g*x+f)*(a+b*log(c*x^n))/(e*x+d)^3,x)
```

output
```
( - 2*log(d + e*x)*b*d**3*g*n - 2*log(d + e*x)*b*d**2*e*f*n - 4*log(d + e*
x)*b*d**2*e*g*n*x - 4*log(d + e*x)*b*d*e**2*f*n*x - 2*log(d + e*x)*b*d*e**
2*g*n*x**2 - 2*log(d + e*x)*b*e**3*f*n*x**2 - 2*log(x**n*c)*b*d**2*e*f + 2
*log(x**n*c)*b*d*e**2*g*x**2 + 2*log(x)*b*d**2*e*f*n + 4*log(x)*b*d*e**2*f
*n*x + 2*log(x)*b*e**3*f*n*x**2 - 2*a*d**2*e*f + 2*a*d*e**2*g*x**2 - b*d**
3*g*n + b*d**2*e*f*n + b*d*e**2*g*n*x**2 - b*e**3*f*n*x**2)/(4*d**2*e**2*(
d**2 + 2*d*e*x + e**2*x**2))
```

3.453 $\int \frac{(f+gx)(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$

Optimal result . . . 3314
Mathematica [A] (verified) . . . 3315
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Maxima [F] . . . 3318
Giac [F] . . . 3319
Mupad [F(-1)] . . . 3319
Reduce [F] . . . 3319

Optimal result

Integrand size = 25, antiderivative size = 202

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)^2}{(d+ex)^3}\,dx = -\frac{b(ef-dg)nx(a+b\log\left(cx^n\right))}{d^2e(d+ex)} + \frac{f^2\left(a+b\log\left(cx^n\right)\right)^2}{2d^2(ef-dg)} - \frac{(f+gx)^2\left(a+b\log\left(cx^n\right)\right)^2}{2(ef-dg)(d+ex)^2} + \frac{b^2(ef-dg)n^2\log(d+ex)}{d^2e^2} - \frac{b(ef+dg)n(a+b\log\left(cx^n\right))\log\left(1+\frac{ex}{d}\right)}{d^2e^2} - \frac{b^2(ef+dg)n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^2e^2}$$

output
```
-b*(-d*g+e*f)*n*x*(a+b*ln(c*x^n))/d^2/e/(e*x+d)+1/2*f^2*(a+b*ln(c*x^n))^2/
d^2/(-d*g+e*f)-1/2*(g*x+f)^2*(a+b*ln(c*x^n))^2/(-d*g+e*f)/(e*x+d)^2+b^2*(-
d*g+e*f)*n^2*ln(e*x+d)/d^2/e^2-b*(d*g+e*f)*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d
^2/e^2-b^2*(d*g+e*f)*n^2*polylog(2,-e*x/d)/d^2/e^2
```

Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 244, normalized size of antiderivative = 1.21

$$\int \frac{(f+gx)(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$
$$= \frac{-\frac{(ef-dg)(a+b\log(cx^n))^2}{(d+ex)^2}-\frac{2g(a+b\log(cx^n))^2}{d+ex}+\frac{2g\left((a+b\log(cx^n))\left(a+b\log(cx^n)-2bn\log\left(1+\frac{ex}{d}\right)\right)-2b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)\right)}{d}+\frac{(ef-d}{}$$

input
```
Integrate[((f + g*x)*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

output
```
(-(((e*f - d*g)*(a + b*Log[c*x^n])^2)/(d + e*x)^2) - (2*g*(a + b*Log[c*x^n
])^2)/(d + e*x) + (2*g*((a + b*Log[c*x^n])*(a + b*Log[c*x^n] - 2*b*n*Log[1
 + (e*x)/d]) - 2*b^2*n^2*PolyLog[2, -((e*x)/d)]))/d + ((e*f - d*g)*(2*b*d*
n*(a + b*Log[c*x^n]) + (d + e*x)*(a + b*Log[c*x^n])^2 - 2*b^2*n^2*(d + e*x
)*(Log[x] - Log[d + e*x]) - 2*b*n*(d + e*x)*(a + b*Log[c*x^n])*Log[1 + (e*
x)/d] - 2*b^2*n^2*(d + e*x)*PolyLog[2, -((e*x)/d)]))/(d^2*(d + e*x)))/(2*e
^2)
```

Rubi [A] (verified)

Time = 0.59 (sec) , antiderivative size = 210, normalized size of antiderivative = 1.04, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.120$, Rules used = {2798, 2804, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(f+gx)(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$
$$\Big\downarrow \text{2798}$$
$$\frac{bn\int \frac{(f+gx)^2(a+b\log(cx^n))}{x(d+ex)^2}dx}{ef-dg}-\frac{(f+gx)^2(a+b\log(cx^n))^2}{2(d+ex)^2(ef-dg)}$$
$$\Big\downarrow \text{2804}$$

$$\frac{bn\int\left(\frac{(a+b\log(cx^n))f^2}{d^2x}+\frac{(d^2g^2-e^2f^2)(a+b\log(cx^n))}{d^2e(d+ex)}-\frac{(dg-ef)^2(a+b\log(cx^n))}{de(d+ex)^2}\right)dx}{ef-dg}-\frac{(f+gx)^2\left(a+b\log\left(cx^n\right)\right)^2}{2(d+ex)^2(ef-dg)}$$

$$\Big\downarrow \text{2009}$$

$$\frac{bn\left(-\left(\frac{f^2}{d^2}-\frac{g^2}{e^2}\right)\log\left(\frac{ex}{d}+1\right)\left(a+b\log\left(cx^n\right)\right)-\frac{x(ef-dg)^2(a+b\log(cx^n))}{d^2e(d+ex)}+\frac{f^2(a+b\log(cx^n))^2}{2bd^2n}-bn\left(\frac{f^2}{d^2}-\frac{g^2}{e^2}\right)\text{PolyLog}\right.}{ef-dg}$$
$$\frac{(f+gx)^2\left(a+b\log\left(cx^n\right)\right)^2}{2(d+ex)^2(ef-dg)}$$

input
```
Int[((f + g*x)*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

output
```
-1/2*((f + g*x)^2*(a + b*Log[c*x^n])^2)/((e*f - d*g)*(d + e*x)^2) + (b*n*(
-(((e*f - d*g)^2*x*(a + b*Log[c*x^n]))/(d^2*e*(d + e*x))) + (f^2*(a + b*Lo
g[c*x^n])^2)/(2*b*d^2*n) + (b*(e*f - d*g)^2*n*Log[d + e*x])/(d^2*e^2) - (f
^2/d^2 - g^2/e^2)*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - b*(f^2/d^2 - g^2/e
^2)*n*PolyLog[2, -((e*x)/d)]))/(e*f - d*g)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2798
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_)*((
f_) + (g_.)*(x_))^(m_.), x_Symbol] :> Simp[(f + g*x)^(m + 1)*(d + e*x)^(q +
 1)*((a + b*Log[c*x^n])^p/((q + 1)*(e*f - d*g))), x] - Simp[b*n*(p/((q + 1)
*(e*f - d*g)))   Int[(f + g*x)^(m + 1)*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n, q}, x] && NeQ[e*f
 - d*g, 0] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

rule 2804
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(RFx_), x_Symbol] :> With[{
u = ExpandIntegrand[(a + b*Log[c*x^n])^p, RFx, x]}, Int[u, x] /; SumQ[u]] /
; FreeQ[{a, b, c, n}, x] && RationalFunctionQ[RFx, x] && IGtQ[p, 0]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.27 (sec) , antiderivative size = 740, normalized size of antiderivative = 3.66

method	result
risch	$-\frac{b^2 \ln(x^n)^2 g}{e^2(ex+d)} + \frac{b^2 \ln(x^n)^2 dg}{2e^2(ex+d)^2} - \frac{b^2 \ln(x^n)^2 f}{2e(ex+d)^2} - \frac{b^2 n \ln(x^n) g}{e^2(ex+d)} + \frac{b^2 n \ln(x^n) f}{ed(ex+d)} - \frac{b^2 n \ln(x^n) \ln(ex+d) g}{e^2 d} - \frac{b^2 n \ln(x^n) \ln(ex+}{e\, d^2}$

input
```
int((g*x+f)*(a+b*ln(c*x^n))^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-b^2*ln(x^n)^2*g/e^2/(e*x+d)+1/2*b^2*ln(x^n)^2/e^2/(e*x+d)^2*d*g-1/2*b^2*l
n(x^n)^2/e/(e*x+d)^2*f-b^2*n*ln(x^n)/e^2/(e*x+d)*g+b^2*n*ln(x^n)/e/d/(e*x+
d)*f-b^2*n*ln(x^n)/e^2/d*ln(e*x+d)*g-b^2*n*ln(x^n)/e/d^2*ln(e*x+d)*f+b^2*n
*ln(x^n)/e^2/d*ln(x)*g+b^2*n*ln(x^n)/e/d^2*ln(x)*f-1/2*b^2*n^2/e^2/d*ln(x)
^2*g-1/2*b^2*n^2/e/d^2*ln(x)^2*f+b^2*n^2/e^2/d*ln(e*x+d)*ln(-e*x/d)*g+b^2*
n^2/e/d^2*ln(e*x+d)*ln(-e*x/d)*f+b^2*n^2/e^2/d*dilog(-e*x/d)*g+b^2*n^2/e/d
^2*dilog(-e*x/d)*f-b^2*n^2/e^2/d*ln(e*x+d)*g+b^2*n^2/e/d^2*ln(e*x+d)*f+b^2
*n^2/e^2/d*ln(x)*g-b^2*n^2/e/d^2*ln(x)*f+(I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)
^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(I*c*x^n)^3+I*Pi*
b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)*b*(-ln(x^n)/e^2/(e*x+d)*g+1/2*l
n(x^n)/e^2/(e*x+d)^2*d*g-1/2*ln(x^n)/e/(e*x+d)^2*f-1/2*n/e^2*(1/d^2*(d*g+e
*f)*ln(e*x+d)+(d*g-e*f)/d/(e*x+d)+(-d*g-e*f)/d^2*ln(x)))+1/4*(I*Pi*b*csgn(
I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*c
sgn(I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^2*(-g/e^2/(
e*x+d)-1/2*(-d*g+e*f)/e^2/(e*x+d)^2)
```

Fricas [F]

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)^2}{(d+ex)^3}\,dx = \int \frac{(gx+f)(b\log\left(cx^n\right)+a)^2}{\left(ex+d\right)^3}\,dx$$

input
```
integrate((g*x+f)*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((a^2*g*x + a^2*f + (b^2*g*x + b^2*f)*log(c*x^n)^2 + 2*(a*b*g*x +
a*b*f)*log(c*x^n))/(e^3*x^3 + 3*d*e^2*x^2 + 3*d^2*e*x + d^3), x)
```

Sympy [F]

$$\int \frac{(f + gx)\,(a + b\log{(cx^n)})^2}{(d + ex)^3}\,dx = \int \frac{(a + b\log{(cx^n)})^2\,(f + gx)}{(d + ex)^3}\,dx$$

input
```
integrate((g*x+f)*(a+b*ln(c*x**n))**2/(e*x+d)**3,x)
```

output
```
Integral((a + b*log(c*x**n))**2*(f + g*x)/(d + e*x)**3, x)
```

Maxima [F]

$$\int \frac{(f + gx)\,(a + b\log{(cx^n)})^2}{(d + ex)^3}\,dx = \int \frac{(gx + f)(b\log{(cx^n)} + a)^2}{(ex + d)^3}\,dx$$

input
```
integrate((g*x+f)*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="maxima")
```

output
```
a*b*f*n*(1/(d*e^2*x + d^2*e) - log(e*x + d)/(d^2*e) + log(x)/(d^2*e)) - a*
b*g*n*(1/(e^3*x + d*e^2) + log(e*x + d)/(d*e^2) - log(x)/(d*e^2)) - (2*e*x
 + d)*a*b*g*log(c*x^n)/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) - 1/2*(2*e*x + d)*a
^2*g/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) - a*b*f*log(c*x^n)/(e^3*x^2 + 2*d*e^2
*x + d^2*e) - 1/2*a^2*f/(e^3*x^2 + 2*d*e^2*x + d^2*e) - 1/2*(2*b^2*e*g*x +
 (e*f + d*g)*b^2)*log(x^n)^2/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) + integrate((
b^2*e^2*g*x^2*log(c)^2 + b^2*e^2*f*x*log(c)^2 + (2*(e^2*g*n + e^2*g*log(c)
)*b^2*x^2 + (e^2*f*n + 3*d*e*g*n + 2*e^2*f*log(c))*b^2*x + (d*e*f*n + d^2*
g*n)*b^2)*log(x^n))/(e^5*x^4 + 3*d*e^4*x^3 + 3*d^2*e^3*x^2 + d^3*e^2*x), x
)
```

Giac [F]

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)^2}{(d+ex)^3}\,dx=\int \frac{(gx+f)(b\log\left(cx^n\right)+a)^2}{\left(ex+d\right)^3}\,dx$$

input
```
integrate((g*x+f)*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((g*x + f)*(b*log(c*x^n) + a)^2/(e*x + d)^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)^2}{(d+ex)^3}\,dx=\int \frac{\left(f+g\,x\right)\,\left(a+b\,\ln\left(c\,x^n\right)\right)^2}{\left(d+e\,x\right)^3}\,dx$$

input
```
int(((f + g*x)*(a + b*log(c*x^n))^2)/(d + e*x)^3,x)
```

output
```
int(((f + g*x)*(a + b*log(c*x^n))^2)/(d + e*x)^3, x)
```

Reduce [F]

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)^2}{(d+ex)^3}\,dx=\text{Too large to display}$$

input
```
int((g*x+f)*(a+b*log(c*x^n))^2/(e*x+d)^3,x)
```

output
```
(4*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)
*b**2*d**6*g*n + 4*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3
 + e**3*x**4),x)*b**2*d**5*e*f*n + 8*int(log(x**n*c)/(d**3*x + 3*d**2*e*x*
*2 + 3*d*e**2*x**3 + e**3*x**4),x)*b**2*d**5*e*g*n*x + 8*int(log(x**n*c)/(
d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*b**2*d**4*e**2*f*n*
x + 4*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4)
,x)*b**2*d**4*e**2*g*n*x**2 + 4*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 +
3*d*e**2*x**3 + e**3*x**4),x)*b**2*d**3*e**3*f*n*x**2 - 4*log(d + e*x)*a*b
*d**3*g*n - 4*log(d + e*x)*a*b*d**2*e*f*n - 8*log(d + e*x)*a*b*d**2*e*g*n*
x - 8*log(d + e*x)*a*b*d*e**2*f*n*x - 4*log(d + e*x)*a*b*d*e**2*g*n*x**2 -
 4*log(d + e*x)*a*b*e**3*f*n*x**2 - 10*log(d + e*x)*b**2*d**3*g*n**2 - 2*l
og(d + e*x)*b**2*d**2*e*f*n**2 - 20*log(d + e*x)*b**2*d**2*e*g*n**2*x - 4*
log(d + e*x)*b**2*d*e**2*f*n**2*x - 10*log(d + e*x)*b**2*d*e**2*g*n**2*x**
2 - 2*log(d + e*x)*b**2*e**3*f*n**2*x**2 - 2*log(x**n*c)**2*b**2*d**3*g -
2*log(x**n*c)**2*b**2*d**2*e*f - 4*log(x**n*c)**2*b**2*d**2*e*g*x - 4*log(
x**n*c)*a*b*d**2*e*f + 4*log(x**n*c)*a*b*d*e**2*g*x**2 - 6*log(x**n*c)*b**
2*d**3*g*n - 2*log(x**n*c)*b**2*d**2*e*f*n + 4*log(x**n*c)*b**2*d*e**2*g*n
*x**2 + 4*log(x)*a*b*d**2*e*f*n + 8*log(x)*a*b*d*e**2*f*n*x + 4*log(x)*a*b
*e**3*f*n*x**2 + 6*log(x)*b**2*d**3*g*n**2 + 2*log(x)*b**2*d**2*e*f*n**2 +
 12*log(x)*b**2*d**2*e*g*n**2*x + 4*log(x)*b**2*d*e**2*f*n**2*x + 6*log...
```

3.454 $\int \frac{(f+gx)(a+b\log(cx^n))^3}{(d+ex)^3}\,dx$

Optimal result 3321
Mathematica [A] (verified) 3322
Rubi [A] (verified) 3323
Maple [C] (warning: unable to verify) 3324
Fricas [F] 3325
Sympy [F] 3326
Maxima [F] 3326
Giac [F] 3327
Mupad [F(-1)] 3327
Reduce [F] 3327

Optimal result

Integrand size = 25, antiderivative size = 295

$$\begin{aligned}\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)^3}{(d+ex)^3}\,dx = &-\frac{3b(ef-dg)nx(a+b\log\left(cx^n\right))^2}{2d^2e(d+ex)} \\ &+\frac{f^2(a+b\log\left(cx^n\right))^3}{2d^2(ef-dg)}-\frac{(f+gx)^2\left(a+b\log\left(cx^n\right)\right)^3}{2(ef-dg)(d+ex)^2} \\ &+\frac{3b^2(ef-dg)n^2(a+b\log\left(cx^n\right))\log\left(1+\frac{ex}{d}\right)}{d^2e^2} \\ &-\frac{3b(ef+dg)n(a+b\log\left(cx^n\right))^2\log\left(1+\frac{ex}{d}\right)}{2d^2e^2} \\ &+\frac{3b^3(ef-dg)n^3\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^2e^2} \\ &-\frac{3b^2(ef+dg)n^2(a+b\log\left(cx^n\right))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^2e^2} \\ &+\frac{3b^3(ef+dg)n^3\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^2e^2}\end{aligned}$$

output
```
-3/2*b*(-d*g+e*f)*n*x*(a+b*ln(c*x^n))^2/d^2/e/(e*x+d)+1/2*f^2*(a+b*ln(c*x^
n))^3/d^2/(-d*g+e*f)-1/2*(g*x+f)^2*(a+b*ln(c*x^n))^3/(-d*g+e*f)/(e*x+d)^2+
3*b^2*(-d*g+e*f)*n^2*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^2/e^2-3/2*b*(d*g+e*f)*n
*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/d^2/e^2+3*b^3*(-d*g+e*f)*n^3*polylog(2,-e*x
/d)/d^2/e^2-3*b^2*(d*g+e*f)*n^2*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/d^2/e^2+
3*b^3*(d*g+e*f)*n^3*polylog(3,-e*x/d)/d^2/e^2
```

Mathematica [A] (verified)

Time = 0.44 (sec) , antiderivative size = 339, normalized size of antiderivative = 1.15

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)^3}{(d+ex)^3}\,dx$$
$$= \frac{-\frac{(ef-dg)(a+b\log(cx^n))^3}{(d+ex)^2} - \frac{2g(a+b\log(cx^n))^3}{d+ex} + \frac{2g\left((a+b\log(cx^n))^2\left(a+b\log(cx^n)-3bn\log\left(1+\frac{ex}{d}\right)\right)-6b^2n^2(a+b\log(cx^n))\,\mathrm{PolyLog}(2,-}{d}}{}$$

input
```
Integrate[((f + g*x)*(a + b*Log[c*x^n])^3)/(d + e*x)^3,x]
```

output
```
(-(((e*f - d*g)*(a + b*Log[c*x^n])^3)/(d + e*x)^2) - (2*g*(a + b*Log[c*x^n
])^3)/(d + e*x) + (2*g*((a + b*Log[c*x^n])^2*(a + b*Log[c*x^n] - 3*b*n*Log
[1 + (e*x)/d]) - 6*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + 6*b
^3*n^3*PolyLog[3, -((e*x)/d)]))/d + ((e*f - d*g)*(3*b*d*n*(a + b*Log[c*x^n
])^2 + (d + e*x)*(a + b*Log[c*x^n])^3 - 3*b*n*(d + e*x)*(a + b*Log[c*x^n])
^2*Log[1 + (e*x)/d] - 3*b*n*(d + e*x)*((a + b*Log[c*x^n])*(a + b*Log[c*x^n
] - 2*b*n*Log[1 + (e*x)/d]) - 2*b^2*n^2*PolyLog[2, -((e*x)/d)]) - 6*b^2*n^
2*(d + e*x)*((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -(
(e*x)/d)])))/(d^2*(d + e*x)))/(2*e^2)
```

Rubi [A] (verified)

Time = 0.81 (sec) , antiderivative size = 312, normalized size of antiderivative = 1.06, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.120, Rules used = {2798, 2804, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(f+gx)(a+b\log(cx^n))^3}{(d+ex)^3}dx$$

$$\Big\downarrow \text{2798}$$

$$\frac{3bn\int \frac{(f+gx)^2(a+b\log(cx^n))^2}{x(d+ex)^2}dx}{2(ef-dg)}-\frac{(f+gx)^2(a+b\log(cx^n))^3}{2(d+ex)^2(ef-dg)}$$

$$\Big\downarrow \text{2804}$$

$$\frac{3bn\int \left(\frac{f^2(a+b\log(cx^n))^2}{d^2x}+\frac{(d^2g^2-e^2f^2)(a+b\log(cx^n))^2}{d^2e(d+ex)}-\frac{(dg-ef)^2(a+b\log(cx^n))^2}{de(d+ex)^2}\right)dx}{2(ef-dg)}-\frac{(f+gx)^2(a+b\log(cx^n))^3}{2(d+ex)^2(ef-dg)}$$

$$\Big\downarrow \text{2009}$$

$$\frac{3bn\left(-2bn\left(\frac{f^2}{d^2}-\frac{g^2}{e^2}\right)\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))-\left(\frac{f^2}{d^2}-\frac{g^2}{e^2}\right)\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2+\frac{2bn(ef-dg)^2}{\ldots}\right.}{\ldots}$$

$$\frac{(f+gx)^2(a+b\log(cx^n))^3}{2(d+ex)^2(ef-dg)}$$

input
```
Int[((f + g*x)*(a + b*Log[c*x^n])^3)/(d + e*x)^3,x]
```

output
```
-1/2*((f + g*x)^2*(a + b*Log[c*x^n])^3)/((e*f - d*g)*(d + e*x)^2) + (3*b*n
*(-(((e*f - d*g)^2*x*(a + b*Log[c*x^n])^2)/(d^2*e*(d + e*x))) + (f^2*(a +
b*Log[c*x^n])^3)/(3*b*d^2*n) + (2*b*(e*f - d*g)^2*n*(a + b*Log[c*x^n])*Log
[1 + (e*x)/d])/(d^2*e^2) - (f^2/d^2 - g^2/e^2)*(a + b*Log[c*x^n])^2*Log[1
+ (e*x)/d] + (2*b^2*(e*f - d*g)^2*n^2*PolyLog[2, -((e*x)/d)])/(d^2*e^2) -
2*b*(f^2/d^2 - g^2/e^2)*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + (2*b
^2*(e*f - d*g)*(e*f + d*g)*n^2*PolyLog[3, -((e*x)/d)])/(d^2*e^2)))/(2*(e*f
 - d*g))
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2798
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_)*((
f_) + (g_.)*(x_))^(m_.), x_Symbol] :> Simp[(f + g*x)^(m + 1)*(d + e*x)^(q +
 1)*((a + b*Log[c*x^n])^p/((q + 1)*(e*f - d*g))), x] - Simp[b*n*(p/((q + 1)
*(e*f - d*g)))   Int[(f + g*x)^(m + 1)*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n, q}, x] && NeQ[e*f
 - d*g, 0] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

rule 2804
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(RFx_), x_Symbol] :> With[{
u = ExpandIntegrand[(a + b*Log[c*x^n])^p, RFx, x]}, Int[u, x] /; SumQ[u]] /
; FreeQ[{a, b, c, n}, x] && RationalFunctionQ[RFx, x] && IGtQ[p, 0]
```

Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 2.44 (sec) , antiderivative size = 1652, normalized size of antiderivative = 5.60

method	result	size
risch	Expression too large to display	1652

input
```
int((g*x+f)*(a+b*ln(c*x^n))^3/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output

```
-3*b^3*n^3/e/d^2*ln(e*x+d)*ln(-e*x/d)*f-3*b^3*n^3/e/d^2*dilog(-e*x/d)*ln(x
)*f-3*b^3*n^3/e/d^2*ln(e*x+d)*ln(-e*x/d)*ln(x)*f+3*b^3*n^2/e^2/d*ln(e*x+d)
*ln(-e*x/d)*ln(x^n)*g-3*b^3*n^3/e^2/d*ln(e*x+d)*ln(-e*x/d)*ln(x)*g+3*b^3*n
^2/e/d^2*ln(e*x+d)*ln(-e*x/d)*ln(x^n)*f+3/2*b^3*n^3/e/d^2*ln(e*x+d)*ln(x)^
2*f-3/2*b^3*n^3/e/d^2*ln(1+e*x/d)*ln(x)^2*f+3/2*b^3*n*ln(x^n)^2/e^2/d*ln(x
)*g+3/2*b^3*n*ln(x^n)^2/e/d^2*ln(x)*f-3/2*b^3*n^2/e^2/d*ln(x)^2*ln(x^n)*g-
3*b^3*n^2/e^2/d*ln(x^n)*ln(e*x+d)*g+3/2*b^3*n*ln(x^n)^2/e/d/(e*x+d)*f-3/2*
b^3*n*ln(x^n)^2/e^2/d*ln(e*x+d)*g-3/2*b^3*n*ln(x^n)^2/e/d^2*ln(e*x+d)*f+3*
b^3*n^2/e^2/d*ln(x^n)*ln(x)*g-b^3*ln(x^n)^3*g/e^2/(e*x+d)-1/2*b^3*ln(x^n)^
3/e/(e*x+d)^2*f-3*b^3*n^3/e^2/d*polylog(2,-e*x/d)*ln(x)*g-3/2*b^3*n^2/e/d^
2*ln(x)^2*ln(x^n)*f+3*b^3*n^2/e/d^2*ln(x^n)*ln(e*x+d)*f-3*b^3*n^2/e/d^2*ln
(x^n)*ln(x)*f+3*b^3*n^3/e^2/d*ln(e*x+d)*ln(-e*x/d)*g-3*b^3*n^3/e/d^2*polyl
og(2,-e*x/d)*ln(x)*f+3/2*b^3*n^3/e/d^2*ln(x)^2*f-3*b^3*n^3/e/d^2*dilog(-e*
x/d)*f+1/2*b^3*ln(x^n)^3/e^2/(e*x+d)^2*d*g-3/2*b^3*n*ln(x^n)^2*g/e^2/(e*x+
d)+1/2*b^3*n^3/e^2/d*ln(x)^3*g-3/2*b^3*n^3/e^2/d*ln(x)^2*g+3*b^3*n^3/e^2/d
*dilog(-e*x/d)*g+3*b^3*n^3/e^2/d*polylog(3,-e*x/d)*g+1/8*(I*Pi*b*csgn(I*x^
n)*csgn(I*c*x^n)^2-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)*csgn(I*c)-I*Pi*b*csgn(
I*c*x^n)^3+I*Pi*b*csgn(I*c*x^n)^2*csgn(I*c)+2*b*ln(c)+2*a)^3*(-g/e^2/(e*x+
d)-1/2*(-d*g+e*f)/e^2/(e*x+d)^2)+3*b^3*n^2/e^2/d*dilog(-e*x/d)*ln(x^n)*g-3
*b^3*n^3/e^2/d*dilog(-e*x/d)*ln(x)*g+3*b^3*n^2/e/d^2*dilog(-e*x/d)*ln(x...
```

Fricas [F]

$$\int \frac{(f+gx)\,(a+b\log{(cx^n)})^3}{(d+ex)^3}\,dx=\int \frac{(gx+f)(b\log{(cx^n)}+a)^3}{(ex+d)^3}\,dx$$

input

```
integrate((g*x+f)*(a+b*log(c*x^n))^3/(e*x+d)^3,x, algorithm="fricas")
```

output

```
integral((a^3*g*x + a^3*f + (b^3*g*x + b^3*f)*log(c*x^n)^3 + 3*(a*b^2*g*x
+ a*b^2*f)*log(c*x^n)^2 + 3*(a^2*b*g*x + a^2*b*f)*log(c*x^n))/(e^3*x^3 + 3
*d*e^2*x^2 + 3*d^2*e*x + d^3), x)
```

Sympy [F]

$$\int \frac{(f+gx)\,(a+b\log{(cx^n)})^3}{(d+ex)^3}\,dx = \int \frac{(a+b\log{(cx^n)})^3\,(f+gx)}{(d+ex)^3}\,dx$$

input
```
integrate((g*x+f)*(a+b*ln(c*x**n))**3/(e*x+d)**3,x)
```

output
```
Integral((a + b*log(c*x**n))**3*(f + g*x)/(d + e*x)**3, x)
```

Maxima [F]

$$\int \frac{(f+gx)\,(a+b\log{(cx^n)})^3}{(d+ex)^3}\,dx = \int \frac{(gx+f)(b\log{(cx^n)}+a)^3}{(ex+d)^3}\,dx$$

input
```
integrate((g*x+f)*(a+b*log(c*x^n))^3/(e*x+d)^3,x, algorithm="maxima")
```

output
```
3/2*a^2*b*f*n*(1/(d*e^2*x + d^2*e) - log(e*x + d)/(d^2*e) + log(x)/(d^2*e)
) - 3/2*a^2*b*g*n*(1/(e^3*x + d*e^2) + log(e*x + d)/(d*e^2) - log(x)/(d*e^
2)) - 3/2*(2*e*x + d)*a^2*b*g*log(c*x^n)/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) -
 1/2*(2*e*x + d)*a^3*g/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) - 3/2*a^2*b*f*log(c
*x^n)/(e^3*x^2 + 2*d*e^2*x + d^2*e) - 1/2*a^3*f/(e^3*x^2 + 2*d*e^2*x + d^2
*e) - 1/2*(2*b^3*e*g*x + (e*f + d*g)*b^3)*log(x^n)^3/(e^4*x^2 + 2*d*e^3*x
+ d^2*e^2) + integrate(1/2*(2*(b^3*e^2*g*log(c)^3 + 3*a*b^2*e^2*g*log(c)^2
)*x^2 + 3*((d*e*f*n + d^2*g*n)*b^3 + 2*(a*b^2*e^2*g + (e^2*g*n + e^2*g*log
(c))*b^3)*x^2 + (2*a*b^2*e^2*f + (e^2*f*n + 3*d*e*g*n + 2*e^2*f*log(c))*b^
3)*x)*log(x^n)^2 + 2*(b^3*e^2*f*log(c)^3 + 3*a*b^2*e^2*f*log(c)^2)*x + 6*(
(b^3*e^2*g*log(c)^2 + 2*a*b^2*e^2*g*log(c))*x^2 + (b^3*e^2*f*log(c)^2 + 2*
a*b^2*e^2*f*log(c))*x)*log(x^n))/(e^5*x^4 + 3*d*e^4*x^3 + 3*d^2*e^3*x^2 +
d^3*e^2*x), x)
```

Giac [F]

$$\int \frac{(f+gx)\,(a+b\log{(cx^n)})^3}{(d+ex)^3}\,dx = \int \frac{(gx+f)(b\log{(cx^n)}+a)^3}{(ex+d)^3}\,dx$$

input
```
integrate((g*x+f)*(a+b*log(c*x^n))^3/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((g*x + f)*(b*log(c*x^n) + a)^3/(e*x + d)^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(f+gx)\,(a+b\log{(cx^n)})^3}{(d+ex)^3}\,dx = \int \frac{(f+g\,x)\,\left(a+b\,\ln{(c\,x^n)}\right)^3}{(d+e\,x)^3}\,dx$$

input
```
int(((f + g*x)*(a + b*log(c*x^n))^3)/(d + e*x)^3,x)
```

output
```
int(((f + g*x)*(a + b*log(c*x^n))^3)/(d + e*x)^3, x)
```

Reduce [F]

$$\int \frac{(f+gx)\,(a+b\log{(cx^n)})^3}{(d+ex)^3}\,dx = \text{too large to display}$$

input
```
int((g*x+f)*(a+b*log(c*x^n))^3/(e*x+d)^3,x)
```

output
```
(12*int(log(x**n*c)**2/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4
),x)*b**3*d**6*g*n + 12*int(log(x**n*c)**2/(d**3*x + 3*d**2*e*x**2 + 3*d*e
**2*x**3 + e**3*x**4),x)*b**3*d**5*e*f*n + 24*int(log(x**n*c)**2/(d**3*x +
 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*b**3*d**5*e*g*n*x + 24*int(
log(x**n*c)**2/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*b**
3*d**4*e**2*f*n*x + 12*int(log(x**n*c)**2/(d**3*x + 3*d**2*e*x**2 + 3*d*e*
*2*x**3 + e**3*x**4),x)*b**3*d**4*e**2*g*n*x**2 + 12*int(log(x**n*c)**2/(d
**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*b**3*d**3*e**3*f*n*x
**2 + 24*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x*
*4),x)*a*b**2*d**6*g*n + 24*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*
e**2*x**3 + e**3*x**4),x)*a*b**2*d**5*e*f*n + 48*int(log(x**n*c)/(d**3*x +
 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*a*b**2*d**5*e*g*n*x + 48*in
t(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*a*b*
*2*d**4*e**2*f*n*x + 24*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2
*x**3 + e**3*x**4),x)*a*b**2*d**4*e**2*g*n*x**2 + 24*int(log(x**n*c)/(d**3
*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*a*b**2*d**3*e**3*f*n*x*
*2 + 60*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**
4),x)*b**3*d**6*g*n**2 + 12*int(log(x**n*c)/(d**3*x + 3*d**2*e*x**2 + 3*d*
e**2*x**3 + e**3*x**4),x)*b**3*d**5*e*f*n**2 + 120*int(log(x**n*c)/(d**3*x
 + 3*d**2*e*x**2 + 3*d*e**2*x**3 + e**3*x**4),x)*b**3*d**5*e*g*n**2*x +...
```

CHAPTER 4

Appendix

4.1 Listing of Grading functions 3329
4.2 Links to plain text integration problems used in this report for each CAS . 3347

4.1 Listing of Grading functions

The following are the current version of the grading functions used for grading the quality of the antiderivative with reference to the optimal antiderivative included in the test suite.

There is a version for Maple and for Mathematica/Rubi. There is a version for grading Sympy and version for use with Sagemath.

The following are links to the current source code.

The following are the listings of source code of the grading functions.

Mathematica and Rubi grading function

```
(* Original version thanks to Albert Rich emailed on 03/21/2017 *)
(* ::Package:: *)

(* Nasser: April 7,2022. add second output which gives reason for the grade *)
(*                       Small rewrite of logic in main function to make it*)
(*                       match Maple's logic. No change in functionality otherwise*)

(* ::Subsection:: *)
(*GradeAntiderivative[result,optimal]*)
```

```
(* ::Text:: *)
(*If result and optimal are mathematical expressions, *)
(*          GradeAntiderivative[result,optimal] returns*)
(*  "F" if the result fails to integrate an expression that*)
(*      is integrable*)
(*  "C" if result involves higher level functions than necessary*)
(*  "B" if result is more than twice the size of the optimal*)
(*      antiderivative*)
(*  "A" if result can be considered optimal*)


GradeAntiderivative[result_,optimal_] := Module[{expnResult,expnOptimal,leafCountResult,leaf
    expnResult  = ExpnType[result];
    expnOptimal = ExpnType[optimal];
    leafCountResult = LeafCount[result];
    leafCountOptimal = LeafCount[optimal];

    (*Print["expnResult=",expnResult," expnOptimal=",expnOptimal];*)
    If[expnResult<=expnOptimal,
        If[Not[FreeQ[result,Complex]], (*result contains complex*)
            If[Not[FreeQ[optimal,Complex]], (*optimal contains complex*)
                If[leafCountResult<=2*leafCountOptimal,
                    finalresult={"A",""}
                    ,(*ELSE*)
                    finalresult={"B","Both result and optimal contain complex but leaf count
                  ]
            ,(*ELSE*)
                finalresult={"C","Result contains complex when optimal does not."}
            ]
        ,(*ELSE*)(*result does not contains complex*)
            If[leafCountResult<=2*leafCountOptimal,
               finalresult={"A",""}
            ,(*ELSE*)
               finalresult={"B","Leaf count is larger than twice the leaf count of optimal.
              ]
        ]
    ,(*ELSE*) (*expnResult>expnOptimal*)
        If[FreeQ[result,Integrate] && FreeQ[result,Int],
            finalresult={"C","Result contains higher order function than in optimal. Order "
            ,
```

```
            finalresult={"F","Contains unresolved integral."}
        ]
    ];

    finalresult
]

(* ::Text:: *)
(*The following summarizes the type number assigned an *)
(*expression based on the functions it involves*)
(*1 = rational function*)
(*2 = algebraic function*)
(*3 = elementary function*)
(*4 = special function*)
(*5 = hyperpergeometric function*)
(*6 = appell function*)
(*7 = rootsum function*)
(*8 = integrate function*)
(*9 = unknown function*)


ExpnType[expn_] :=
  If[AtomQ[expn],
    1,
  If[ListQ[expn],
    Max[Map[ExpnType,expn]],
  If[Head[expn]===Power,
    If[IntegerQ[expn[[2]]],
      ExpnType[expn[[1]]],
    If[Head[expn[[2]]]===Rational,
      If[IntegerQ[expn[[1]]] || Head[expn[[1]]]===Rational,
        1,
      Max[ExpnType[expn[[1]]],2]],
    Max[ExpnType[expn[[1]]],ExpnType[expn[[2]]],3]]],
  If[Head[expn]===Plus || Head[expn]===Times,
    Max[ExpnType[First[expn]],ExpnType[Rest[expn]]],
  If[ElementaryFunctionQ[Head[expn]],
    Max[3,ExpnType[expn[[1]]]]],
  If[SpecialFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],4]],
  If[HypergeometricFunctionQ[Head[expn]],
```

```
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],5]],
  If[AppellFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],6]],
  If[Head[expn]===RootSum,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
  If[Head[expn]===Integrate || Head[expn]===Int,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],8]],
  9]]]]]]]]]]


ElementaryFunctionQ[func_] :=
  MemberQ[{
  Exp,Log,
  Sin,Cos,Tan,Cot,Sec,Csc,
  ArcSin,ArcCos,ArcTan,ArcCot,ArcSec,ArcCsc,
  Sinh,Cosh,Tanh,Coth,Sech,Csch,
  ArcSinh,ArcCosh,ArcTanh,ArcCoth,ArcSech,ArcCsch
},func]


SpecialFunctionQ[func_] :=
  MemberQ[{
  Erf, Erfc, Erfi,
  FresnelS, FresnelC,
  ExpIntegralE, ExpIntegralEi, LogIntegral,
  SinIntegral, CosIntegral, SinhIntegral, CoshIntegral,
  Gamma, LogGamma, PolyGamma,
  Zeta, PolyLog, ProductLog,
  EllipticF, EllipticE, EllipticPi
},func]


HypergeometricFunctionQ[func_] :=
  MemberQ[{Hypergeometric1F1,Hypergeometric2F1,HypergeometricPFQ},func]


AppellFunctionQ[func_] :=
  MemberQ[{AppellF1},func]
```

Maple grading function

```
# File: GradeAntiderivative.mpl
# Original version thanks to Albert Rich emailed on 03/21/2017

#Nasser 03/22/2017  Use Maple leaf count instead since buildin
#Nasser 03/23/2017  missing 'ln' for ElementaryFunctionQ added
#Nasser 03/24/2017  corrected the check for complex result
#Nasser 10/27/2017  check for leafsize and do not call ExpnType()
#                   if leaf size is "too large". Set at 500,000
#Nasser 12/22/2019  Added debug flag, added 'dilog' to special functions
#                   see problem 156, file Apostol_Problems
#Nasser 4/07/2022   add second output which gives reason for the grade

GradeAntiderivative := proc(result,optimal)
local leaf_count_result,
        leaf_count_optimal,
        ExpnType_result,
        ExpnType_optimal,
        debug:=false;

        leaf_count_result:=leafcount(result);
        #do NOT call ExpnType() if leaf size is too large. Recursion problem
        if leaf_count_result > 500000 then
            return "B","result has leaf size over 500,000. Avoiding possible recursion issue
        fi;

        leaf_count_optimal := leafcount(optimal);
        ExpnType_result  := ExpnType(result);
        ExpnType_optimal := ExpnType(optimal);

        if debug then
            print("ExpnType_result",ExpnType_result," ExpnType_optimal=",ExpnType_optimal);
        fi;

# If result and optimal are mathematical expressions,
#  GradeAntiderivative[result,optimal] returns
#   "F" if the result fails to integrate an expression that
#       is integrable
#   "C" if result involves higher level functions than necessary
#   "B" if result is more than twice the size of the optimal
```

```
#       antiderivative
#   "A" if result can be considered optimal

    #This check below actually is not needed, since I only
    #call this grading only for passed integrals. i.e. I check
    #for "F" before calling this. But no harm of keeping it here.
    #just in case.


    if not type(result,freeof('int')) then
        return "F","Result contains unresolved integral";
    fi;


    if ExpnType_result<=ExpnType_optimal then
        if debug then
             print("ExpnType_result<=ExpnType_optimal");
        fi;
        if is_contains_complex(result) then
            if is_contains_complex(optimal) then
                if debug then
                        print("both result and optimal complex");
                fi;
                if leaf_count_result<=2*leaf_count_optimal then
                    return "A"," ";
                else
                   return "B",cat("Both result and optimal contain complex but leaf count of
                                convert(leaf_count_result,string)," vs. $2 (",
                                convert(leaf_count_optimal,string)," ) = ",convert(2*leaf
                end if
            else #result contains complex but optimal is not
                if debug then
                        print("result contains complex but optimal is not");
                fi;
                return "C","Result contains complex when optimal does not.";
            fi;
        else # result do not contain complex
             # this assumes optimal do not as well. No check is needed here.
            if debug then
                   print("result do not contain complex, this assumes optimal do not as well
            fi;
```

```
            if leaf_count_result<=2*leaf_count_optimal then
                if debug then
                    print("leaf_count_result<=2*leaf_count_optimal");
                fi;
                return "A"," ";
            else
                if debug then
                    print("leaf_count_result>2*leaf_count_optimal");
                fi;
                return "B",cat("Leaf count of result is larger than twice the leaf count of
                                  convert(leaf_count_result,string),"$ vs. $2(",
                                  convert(leaf_count_optimal,string),")=",convert(2*leaf_co
            fi;
        fi;
    else #ExpnType(result) > ExpnType(optimal)
        if debug then
            print("ExpnType(result) > ExpnType(optimal)");
        fi;
        return "C",cat("Result contains higher order function than in optimal. Order ",
                       convert(ExpnType_result,string)," vs. order ",
                       convert(ExpnType_optimal,string),".");
    fi;

end proc:

#
# is_contains_complex(result)
# takes expressions and returns true if it contains "I" else false
#
#Nasser 032417
is_contains_complex:= proc(expression)
  return (has(expression,I));
end proc:

# The following summarizes the type number assigned an expression
# based on the functions it involves
# 1 = rational function
# 2 = algebraic function
# 3 = elementary function
# 4 = special function
# 5 = hyperpergeometric function
```

```
# 6 = appell function
# 7 = rootsum function
# 8 = integrate function
# 9 = unknown function

ExpnType := proc(expn)
  if type(expn,'atomic') then
    1
  elif type(expn,'list') then
    apply(max,map(ExpnType,expn))
  elif type(expn,'sqrt') then
    if type(op(1,expn),'rational') then
       1
    else
       max(2,ExpnType(op(1,expn)))
    end if
  elif type(expn,'`^`') then
    if type(op(2,expn),'integer') then
      ExpnType(op(1,expn))
    elif type(op(2,expn),'rational') then
      if type(op(1,expn),'rational') then
         1
      else
         max(2,ExpnType(op(1,expn)))
      end if
    else
         max(3,ExpnType(op(1,expn)),ExpnType(op(2,expn)))
    end if
  elif type(expn,'`+`') or type(expn,'`*`') then
    max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
  elif ElementaryFunctionQ(op(0,expn)) then
    max(3,ExpnType(op(1,expn)))
  elif SpecialFunctionQ(op(0,expn)) then
    max(4,apply(max,map(ExpnType,[op(expn)])))
  elif HypergeometricFunctionQ(op(0,expn)) then
    max(5,apply(max,map(ExpnType,[op(expn)])))
  elif AppellFunctionQ(op(0,expn)) then
    max(6,apply(max,map(ExpnType,[op(expn)])))
  elif op(0,expn)='int' then
    max(8,apply(max,map(ExpnType,[op(expn)]))) else
  9
```

```
  end if
end proc:


ElementaryFunctionQ := proc(func)
  member(func,[
        exp,log,ln,
        sin,cos,tan,cot,sec,csc,
        arcsin,arccos,arctan,arccot,arcsec,arccsc,
        sinh,cosh,tanh,coth,sech,csch,
        arcsinh,arccosh,arctanh,arccoth,arcsech,arccsch])
end proc:

SpecialFunctionQ := proc(func)
  member(func,[
        erf,erfc,erfi,
        FresnelS,FresnelC,
        Ei,Ei,Li,Si,Ci,Shi,Chi,
        GAMMA,lnGAMMA,Psi,Zeta,polylog,dilog,LambertW,
        EllipticF,EllipticE,EllipticPi])
end proc:

HypergeometricFunctionQ := proc(func)
  member(func,[Hypergeometric1F1,hypergeom,HypergeometricPFQ])
end proc:

AppellFunctionQ := proc(func)
  member(func,[AppellF1])
end proc:

# u is a sum or product.  rest(u) returns all but the
# first term or factor of u.
rest := proc(u) local v;
  if nops(u)=2 then
     op(2,u)
  else
     apply(op(0,u),op(2..nops(u),u))
  end if
end proc:

#leafcount(u) returns the number of nodes in u.
```

```
#Nasser 3/23/17  Replaced by build-in leafCount from package in Maple
leafcount := proc(u)
   MmaTranslator[Mma][LeafCount](u);
end proc:
```

Sympy grading function

```
#Dec 24, 2019. Nasser M. Abbasi:
#             Port of original Maple grading function by
#             Albert Rich to use with Sympy/Python
#Dec 27, 2019  Nasser. Added `RootSum`. See problem 177, Timofeev file
#             added 'exp_polar'
from sympy import *

def leaf_count(expr):
   #sympy do not have leaf count function. This is approximation
   return round(1.7*count_ops(expr))

def is_sqrt(expr):
   if isinstance(expr,Pow):
      if expr.args[1] == Rational(1,2):
         return True
      else:
         return False
   else:
      return False

def is_elementary_function(func):
   return func in [exp,log,ln,sin,cos,tan,cot,sec,csc,
         asin,acos,atan,acot,asec,acsc,sinh,cosh,tanh,coth,sech,csch,
         asinh,acosh,atanh,acoth,asech,acsch
      ]

def is_special_function(func):
   return func in [ erf,erfc,erfi,
          fresnels,fresnelc,Ei,Ei,Li,Si,Ci,Shi,Chi,
          gamma,loggamma,digamma,zeta,polylog,LambertW,
          elliptic_f,elliptic_e,elliptic_pi,exp_polar
       ]
```

```python
def is_hypergeometric_function(func):
   return func in [hyper]

def is_appell_function(func):
   return func in [appellf1]

def is_atom(expn):
   try:
      if expn.isAtom or isinstance(expn,int) or isinstance(expn,float):
         return True
      else:
         return False

   except AttributeError as error:
      return False

def expnType(expn):
   debug=False
   if debug:
      print("expn=",expn,"type(expn)=",type(expn))

   if is_atom(expn):
     return 1
   elif isinstance(expn,list):
      return max(map(expnType, expn))   #apply(max,map(ExpnType,expn))
   elif  is_sqrt(expn):
      if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
         return 1
      else:
         return max(2,expnType(expn.args[0]))  #max(2,ExpnType(op(1,expn)))
   elif isinstance(expn,Pow):   #type(expn,'`^`')
      if isinstance(expn.args[1],Integer):  #type(op(2,expn),'integer')
         return expnType(expn.args[0])   #ExpnType(op(1,expn))
      elif isinstance(expn.args[1],Rational):  #type(op(2,expn),'rational')
         if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
            return 1
         else:
            return max(2,expnType(expn.args[0]))  #max(2,ExpnType(op(1,expn)))
      else:
         return max(3,expnType(expn.args[0]),expnType(expn.args[1])) #max(3,ExpnType(op(1,expn)),Expr
   elif isinstance(expn,Add) or isinstance(expn,Mul): #type(expn,'`+`') or type(expn,'`*`')
```

```
        m1 = expnType(expn.args[0])
        m2 = expnType(list(expn.args[1:]))
        return max(m1,m2)  #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
    elif is_elementary_function(expn.func):  #ElementaryFunctionQ(op(0,expn))
        return max(3,expnType(expn.args[0]))  #max(3,ExpnType(op(1,expn)))
    elif is_special_function(expn.func): #SpecialFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(4,m1)  #max(4,apply(max,map(ExpnType,[op(expn)])))
    elif is_hypergeometric_function(expn.func): #HypergeometricFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(5,m1)  #max(5,apply(max,map(ExpnType,[op(expn)])))
    elif is_appell_function(expn.func):
        m1 = max(map(expnType, list(expn.args)))
        return max(6,m1)  #max(5,apply(max,map(ExpnType,[op(expn)])))
    elif isinstance(expn,RootSum):
        m1 = max(map(expnType, list(expn.args))) #Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
        return max(7,m1)
    elif str(expn).find("Integral") != -1:
        m1 = max(map(expnType, list(expn.args)))
        return max(8,m1)  #max(5,apply(max,map(ExpnType,[op(expn)])))
    else:
        return 9

#main function
def grade_antiderivative(result,optimal):

    #print ("Enter grade_antiderivative for sagemath")
    #print("Enter grade_antiderivative, result=",result," optimal=",optimal)

    leaf_count_result  = leaf_count(result)
    leaf_count_optimal = leaf_count(optimal)

    #print("leaf_count_result=",leaf_count_result)
    #print("leaf_count_optimal=",leaf_count_optimal)

    expnType_result  = expnType(result)
    expnType_optimal = expnType(optimal)

    if str(result).find("Integral") != -1:
        grade = "F"
        grade_annotation =""
```

```
else:
   if expnType_result <= expnType_optimal:
      if result.has(I):
         if optimal.has(I): #both result and optimal complex
            if leaf_count_result <= 2*leaf_count_optimal:
               grade = "A"
               grade_annotation =""
            else:
               grade = "B"
               grade_annotation ="Both result and optimal contain complex but leaf count of result is lar
         else: #result contains complex but optimal is not
            grade = "C"
            grade_annotation ="Result contains complex when optimal does not."
      else: # result do not contain complex, this assumes optimal do not as well
         if leaf_count_result <= 2*leaf_count_optimal:
            grade = "A"
            grade_annotation =""
         else:
            grade = "B"
            grade_annotation ="Leaf count of result is larger than twice the leaf count of optimal. "+str(
   else:
      grade = "C"
      grade_annotation ="Result contains higher order function than in optimal. Order "+str(ExpnType


#print("Before returning. grade=",grade, " grade_annotation=",grade_annotation)

return grade, grade_annotation
```

SageMath grading function

```
#Dec 24, 2019. Nasser: Ported original Maple grading function by
#              Albert Rich to use with Sagemath. This is used to
#              grade Fricas, Giac and Maxima results.
#Dec 24, 2019. Nasser: Added 'exp_integral_e' and 'sng', 'sin_integral'
#              'arctan2','floor','abs','log_integral'
#June 4, 2022  Made default grade_annotation "none" instead of "" due
#              issue later when reading the file.
#July 14, 2022. Added ellipticF. This is until they fix sagemath, then remove it.
```

```
from sage.all import *
from sage.symbolic.operators import add_vararg, mul_vararg

debug=False;

def tree_size(expr):
   r"""
   Return the tree size of this expression.
   """
   #print("Enter tree_size, expr is ",expr)

   if expr not in SR:
      # deal with lists, tuples, vectors
      return 1 + sum(tree_size(a) for a in expr)
   expr = SR(expr)
   x, aa = expr.operator(), expr.operands()
   if x is None:
      return 1
   else:
      return 1 + sum(tree_size(a) for a in aa)

def is_sqrt(expr):
   if expr.operator() == operator.pow:   #isinstance(expr,Pow):
      if expr.operands()[1]==1/2: #expr.args[1] == Rational(1,2):
         if debug: print ("expr is sqrt")
         return True
      else:
         return False
   else:
      return False

def is_elementary_function(func):
   #debug=False
   m = func.name() in ['exp','log','ln',
         'sin','cos','tan','cot','sec','csc',
         'arcsin','arccos','arctan','arccot','arcsec','arccsc',
         'sinh','cosh','tanh','coth','sech','csch',
         'arcsinh','arccosh','arctanh','arccoth','arcsech','arccsch','sgn',
      'arctan2','floor','abs'
      ]
   if debug:
```

```
        if m:
            print ("func ", func , " is elementary_function")
        else:
            print ("func ", func , " is NOT elementary_function")


    return m

def is_special_function(func):
    #debug=False
    if debug:
        print ("type(func)=", type(func))

    m= func.name() in ['erf','erfc','erfi','fresnel_sin','fresnel_cos','Ei',
          'Ei','Li','Si','sin_integral','Ci','cos_integral','Shi','sinh_integral'
          'Chi','cosh_integral','gamma','log_gamma','psi','zeta',
          'polylog','lambert_w','elliptic_f','elliptic_e','ellipticF',
          'elliptic_pi','exp_integral_e','log_integral',
          'weierstrassPInverse','weierstrass','weierstrassP','weierstrassZeta',
          'weierstrassPPrime','weierstrassSigma']

    if debug:
        print ("m=",m)
        if m:
            print ("func ", func ," is special_function")
        else:
            print ("func ", func ," is NOT special_function")


    return m


def is_hypergeometric_function(func):
    return func.name() in ['hypergeometric','hypergeometric_M','hypergeometric_U']

def is_appell_function(func):
    return func.name() in ['hypergeometric']   #[appellf1] can't find this in sagemath

def is_atom(expn):

    #debug=False
```

```
    if debug:
         print ("Enter is_atom, expn=",expn)

    if not hasattr(expn, 'parent'):
        return False


    #thanks to answer at https://ask.sagemath.org/question/49179/what-is-sagemath-equivalent-to-atomic
    try:
        if expn.parent() is SR:
            return expn.operator() is None
        if expn.parent() in (ZZ, QQ, AA, QQbar):
            return expn in expn.parent() # Should always return True
        if hasattr(expn.parent(),"base_ring") and hasattr(expn.parent(),"gens"):
            return expn in expn.parent().base_ring() or expn in expn.parent().gens()

        return False

    except AttributeError as error:
        print("Exception,AttributeError in  is_atom")
        print ("cought exception" , type(error).__name__ )
        return False


def expnType(expn):

    if debug:
        print (">>>>>Enter expnType, expn=", expn)
        print (">>>>>is_atom(expn)=", is_atom(expn))

    if is_atom(expn):
        return 1
    elif type(expn)==list:    #isinstance(expn,list):
        return max(map(expnType, expn))    #apply(max,map(ExpnType,expn))
    elif  is_sqrt(expn):
        if  type(expn.operands()[0])==Rational: #type(isinstance(expn.args[0],Rational):
            return 1
        else:
            return max(2,expnType(expn.operands()[0]))   #max(2,expnType(expn.args[0]))
    elif expn.operator() == operator.pow:    #isinstance(expn,Pow)
        if type(expn.operands()[1])==Integer:   #isinstance(expn.args[1],Integer)
```

```
            return expnType(expn.operands()[0])    #expnType(expn.args[0])
        elif type(expn.operands()[1])==Rational:  #isinstance(expn.args[1],Rational)
            if type(expn.operands()[0])==Rational: #isinstance(expn.args[0],Rational)
                return 1
            else:
                return max(2,expnType(expn.operands()[0]))   #max(2,expnType(expn.args[0]))
        else:
            return max(3,expnType(expn.operands()[0]),expnType(expn.operands()[1])) #max(3,expnType(expr
    elif expn.operator() == add_vararg or expn.operator() == mul_vararg: #isinstance(expn,Add) or isins
        m1 = expnType(expn.operands()[0]) #expnType(expn.args[0])
        m2 = expnType(expn.operands()[1:]) #expnType(list(expn.args[1:]))
        return max(m1,m2)  #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
    elif is_elementary_function(expn.operator()):  #is_elementary_function(expn.func)
        return max(3,expnType(expn.operands()[0]))
    elif is_special_function(expn.operator()): #is_special_function(expn.func)
        m1 = max(map(expnType, expn.operands()))       #max(map(expnType, list(expn.args)))
        return max(4,m1)   #max(4,m1)
    elif is_hypergeometric_function(expn.operator()): #is_hypergeometric_function(expn.func)
        m1 = max(map(expnType, expn.operands()))        #max(map(expnType, list(expn.args)))
        return max(5,m1)   #max(5,m1)
    elif is_appell_function(expn.operator()):
        m1 = max(map(expnType, expn.operands()))        #max(map(expnType, list(expn.args)))
        return max(6,m1)   #max(6,m1)
    elif str(expn).find("Integral") != -1: #this will never happen, since it
                #is checked before calling the grading function that is passed.
                #but kept it here.
        m1 = max(map(expnType, expn.operands()))        #max(map(expnType, list(expn.args)))
        return max(8,m1)   #max(5,apply(max,map(ExpnType,[op(expn)])))
    else:
        return 9

#main function
def grade_antiderivative(result,optimal):


    if debug:
        print ("Enter grade_antiderivative for sagemath")
        print("Enter grade_antiderivative, result=",result)
        print("Enter grade_antiderivative, optimal=",optimal)
        print("type(anti)=",type(result))
        print("type(optimal)=",type(optimal))
```

```
leaf_count_result  = tree_size(result) #leaf_count(result)
leaf_count_optimal = tree_size(optimal) #leaf_count(optimal)

#if debug: print ("leaf_count_result=", leaf_count_result, "leaf_count_optimal=",leaf_count_optimal)


expnType_result  = expnType(result)
expnType_optimal = expnType(optimal)

if debug: print ("expnType_result=", expnType_result, "expnType_optimal=",expnType_optimal)

if expnType_result <= expnType_optimal:
    if result.has(I):
        if optimal.has(I): #both result and optimal complex
            if leaf_count_result <= 2*leaf_count_optimal:
                grade = "A"
                grade_annotation ="none"
            else:
                grade = "B"
                grade_annotation ="Both result and optimal contain complex but leaf count of result is larger
        else: #result contains complex but optimal is not
            grade = "C"
            grade_annotation ="Result contains complex when optimal does not."
    else: # result do not contain complex, this assumes optimal do not as well
        if leaf_count_result <= 2*leaf_count_optimal:
            grade = "A"
            grade_annotation ="none"
        else:
            grade = "B"
            grade_annotation ="Leaf count of result is larger than twice the leaf count of optimal. "+str(lea
else:
    grade = "C"
    grade_annotation ="Result contains higher order function than in optimal. Order "+str(expnType_re


print("Before returning. grade=",grade, " grade_annotation=",grade_annotation)

return grade, grade_annotation
```

4.2 Links to plain text integration problems used in this report for each CAS

1. Mathematica integration problems as .m file
2. Maple integration problems as .txt file
3. Sagemath integration problems as .sage file
4. Reduce integration problems as .txt file
5. Mupad integration problems as .txt file
6. Sympy integration problems as .py file