CAS integration tests. Progress report
Maple 2022.1 vs. Maple 2021.1

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Contents

1 Table summary of progress report

Table 1: Table summary of progress report

#	test file #	integral #	Maple 2022.1	Maple 2021.1
1	2	34	1 (pass)	0 (not solved)
2	3	13	1 (pass)	0 (not solved)
3	11	38	1 (pass)	0 (not solved)
4	11	110	1 (pass)	-1 (time out)
5	13	501	1 (pass)	0 (not solved)
6	13	531	1 (pass)	0 (not solved)
7	13	532	1 (pass)	0 (not solved)
8	13	555	1 (pass)	0 (not solved)
9	13	556	1 (pass)	0 (not solved)
10	19	884	1 (pass)	0 (not solved)
11	19	885	1 (pass)	0 (not solved)
12	19	886	1 (pass)	0 (not solved)
13	19	888	1 (pass)	0 (not solved)
14	19	889	1 (pass)	0 (not solved)
15	19	890	1 (pass)	0 (not solved)
16	19	912	1 (pass)	0 (not solved)
17	19	913	1 (pass)	0 (not solved)
18	19	914	1 (pass)	0 (not solved)
19	19	916	1 (pass)	0 (not solved)
20	19	917	1 (pass)	0 (not solved)
21	19	918	1 (pass)	0 (not solved)
22	20	297	1 (pass)	0 (not solved)
23	20	298	1 (pass)	0 (not solved)
24	20	299	1 (pass)	0 (not solved)
25	20	300	1 (pass)	0 (not solved)
26	22	55	1 (pass)	0 (not solved)
27	22	56	1 (pass)	0 (not solved)

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#	test file #	integral #	Maple 2022.1	Maple 2021.1
28	26	13	1 (pass)	-1 (time out)
29	52	393	1 (pass)	0 (not solved)
30	55	174	1 (pass)	0 (not solved)
31	55	175	1 (pass)	0 (not solved)
32	55	176	1 (pass)	0 (not solved)
33	55	177	1 (pass)	0 (not solved)
34	55	178	1 (pass)	0 (not solved)
35	55	180	1 (pass)	0 (not solved)
36	55	181	1 (pass)	0 (not solved)
37	55	182	1 (pass)	0 (not solved)
38	55	591	1 (pass)	-1 (time out)
39	55	606	1 (pass)	-1 (time out)
40	55	764	1 (pass)	0 (not solved)
41	55	765	1 (pass)	0 (not solved)
42	55	766	1 (pass)	0 (not solved)
43	56	65	1 (pass)	0 (not solved)
44	56	66	1 (pass)	0 (not solved)
45	56	67	1 (pass)	0 (not solved)
46	56	70	1 (pass)	0 (not solved)
47	56	71	1 (pass)	0 (not solved)
48	56	72	1 (pass)	0 (not solved)
49	56	73	1 (pass)	0 (not solved)
50	56	74	1 (pass)	0 (not solved)
51	56	75	1 (pass)	0 (not solved)
52	56	78	1 (pass)	0 (not solved)
53	56	79	1 (pass)	0 (not solved)
54	56	80	1 (pass)	0 (not solved)
55	56	81	1 (pass)	0 (not solved)
56	56	82	1 (pass)	0 (not solved)

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#	test file #	integral #	Maple 2022.1	Maple 2021.1
57	56	83	1 (pass)	0 (not solved)
58	56	86	1 (pass)	0 (not solved)
59	56	87	1 (pass)	0 (not solved)
60	56	88	1 (pass)	0 (not solved)
61	56	107	1 (pass)	0 (not solved)
62	56	108	1 (pass)	0 (not solved)
63	56	109	1 (pass)	0 (not solved)
64	56	111	1 (pass)	0 (not solved)
65	56	112	1 (pass)	0 (not solved)
66	57	92	1 (pass)	0 (not solved)
67	57	93	1 (pass)	0 (not solved)
68	57	94	1 (pass)	0 (not solved)
69	57	97	1 (pass)	0 (not solved)
70	57	98	1 (pass)	0 (not solved)
71	57	99	1 (pass)	0 (not solved)
72	57	100	1 (pass)	0 (not solved)
73	57	101	1 (pass)	0 (not solved)
74	57	102	1 (pass)	0 (not solved)
75	57	104	1 (pass)	0 (not solved)
76	57	105	1 (pass)	0 (not solved)
77	57	106	1 (pass)	0 (not solved)
78	57	107	1 (pass)	0 (not solved)
79	57	108	1 (pass)	0 (not solved)
80	57	111	1 (pass)	0 (not solved)
81	57	112	1 (pass)	0 (not solved)
82	57	113	1 (pass)	0 (not solved)
83	57	114	1 (pass)	0 (not solved)
84	57	118	1 (pass)	0 (not solved)
85	57	119	1 (pass)	0 (not solved)

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#	test file #	integral #	Maple 2022.1	Maple 2021.1
86	57	122	1 (pass)	0 (not solved)
87	57	123	1 (pass)	0 (not solved)
88	57	456	1 (pass)	0 (not solved)
89	58	6	1 (pass)	0 (not solved)
90	58	14	1 (pass)	0 (not solved)
91	58	15	1 (pass)	0 (not solved)
92	58	16	1 (pass)	0 (not solved)
93	58	21	1 (pass)	0 (not solved)
94	58	22	1 (pass)	0 (not solved)
95	58	23	1 (pass)	0 (not solved)
96	58	26	1 (pass)	0 (not solved)
97	58	28	1 (pass)	0 (not solved)
98	58	29	1 (pass)	0 (not solved)
99	58	30	1 (pass)	0 (not solved)
100	58	31	1 (pass)	0 (not solved)
101	58	34	1 (pass)	0 (not solved)
102	58	35	1 (pass)	0 (not solved)
103	58	42	1 (pass)	0 (not solved)
104	58	43	1 (pass)	0 (not solved)
105	58	78	1 (pass)	0 (not solved)
106	58	79	1 (pass)	0 (not solved)
107	58	80	1 (pass)	0 (not solved)
108	58	83	1 (pass)	0 (not solved)
109	58	84	1 (pass)	0 (not solved)
110	58	85	1 (pass)	0 (not solved)
111	58	86	1 (pass)	0 (not solved)
112	58	89	1 (pass)	0 (not solved)
113	58	92	1 (pass)	0 (not solved)
114	58	100	1 (pass)	0 (not solved)

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#	test file #	integral #	Maple 2022.1	Maple 2021.1
115	58	101	1 (pass)	0 (not solved)
116	58	102	1 (pass)	0 (not solved)
117	58	103	1 (pass)	0 (not solved)
118	58	108	1 (pass)	0 (not solved)
119	58	109	1 (pass)	0 (not solved)
120	58	110	1 (pass)	0 (not solved)
121	58	170	1 (pass)	0 (not solved)
122	58	171	1 (pass)	0 (not solved)
123	58	174	1 (pass)	0 (not solved)
124	58	175	1 (pass)	0 (not solved)
125	58	188	1 (pass)	-1 (time out)
126	58	189	1 (pass)	-1 (time out)
127	58	190	1 (pass)	-2 (exception) `int((e*x^2+d)*arcsinh(a*x)*ln(c*x^n),x)`
128	58	191	1 (pass)	-2 (exception) `int((e*x^2+d)*arccosh(a*x)*ln(c*x^n),x)`
129	58	192	1 (pass)	-1 (time out)
130	58	193	1 (pass)	-1 (time out)
131	59	112	1 (pass)	0 (not solved)
132	59	113	1 (pass)	0 (not solved)
133	59	117	1 (pass)	0 (not solved)
134	59	118	1 (pass)	0 (not solved)
135	59	195	1 (pass)	0 (not solved)
136	59	200	1 (pass)	0 (not solved)
137	61	91	1 (pass)	0 (not solved)
138	61	103	1 (pass)	0 (not solved)

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#	test file #	integral #	Maple 2022.1	Maple 2021.1
139	61	105	1 (pass)	0 (not solved)
140	62	5	1 (pass)	-1 (time out)
141	62	88	1 (pass)	0 (not solved)
142	62	89	1 (pass)	0 (not solved)
143	62	90	1 (pass)	0 (not solved)
144	62	94	1 (pass)	0 (not solved)
145	62	95	1 (pass)	0 (not solved)
146	62	96	1 (pass)	0 (not solved)
147	62	100	1 (pass)	0 (not solved)
148	62	101	1 (pass)	0 (not solved)
149	62	191	1 (pass)	0 (not solved)
150	62	192	1 (pass)	0 (not solved)
151	62	193	1 (pass)	0 (not solved)
152	62	194	1 (pass)	0 (not solved)
153	63	102	1 (pass)	0 (not solved)
154	63	109	1 (pass)	0 (not solved)
155	63	116	1 (pass)	0 (not solved)
156	63	123	1 (pass)	0 (not solved)
157	63	125	1 (pass)	0 (not solved)
158	63	127	1 (pass)	0 (not solved)
159	63	138	1 (pass)	0 (not solved)
160	63	139	1 (pass)	0 (not solved)
161	63	148	1 (pass)	0 (not solved)
162	63	149	1 (pass)	0 (not solved)
163	64	169	1 (pass)	-1 (time out)
164	64	172	1 (pass)	-1 (time out)
165	64	293	1 (pass)	0 (not solved)
166	64	305	1 (pass)	0 (not solved)
167	64	306	1 (pass)	0 (not solved)

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#	test file #	integral #	Maple 2022.1	Maple 2021.1
168	64	310	1 (pass)	0 (not solved)
169	64	311	1 (pass)	0 (not solved)
170	65	341	1 (pass)	0 (not solved)
171	73	265	1 (pass)	-2 (exception) `int(1/(a+a*sin(f*x+e))/(c-c*sin(f*x+e)),x)`
172	73	275	1 (pass)	-2 (exception) `int(1/(a+a*sin(f*x+e))^2/(c-c*sin(f*x+e))^2,x)`
173	73	286	1 (pass)	-2 (exception) `int(1/(a+a*sin(f*x+e))^3/(c-c*sin(f*x+e))^3,x)`
174	73	782	1 (pass)	-1 (time out)
175	73	795	1 (pass)	-1 (time out)
176	98	52	1 (pass)	-1 (time out)
177	98	363	1 (pass)	0 (not solved)
178	98	364	1 (pass)	0 (not solved)
179	103	1268	1 (pass)	-1 (time out)
180	103	1272	1 (pass)	-1 (time out)
181	106	29	1 (pass)	-1 (time out)
182	106	167	1 (pass)	-1 (time out)
183	106	168	1 (pass)	-1 (time out)
184	106	477	1 (pass)	0 (not solved)
185	106	478	1 (pass)	0 (not solved)
186	106	479	1 (pass)	-1 (time out)
187	107	25	1 (pass)	-1 (time out)
188	107	26	1 (pass)	-1 (time out)
189	114	16	1 (pass)	-1 (time out)

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#	test file #	integral #	Maple 2022.1	Maple 2021.1
190	115	288	1 (pass)	0 (not solved)
191	121	27	1 (pass)	-2 (exception) `int(1/(a+a*sec(f*x+e))^2/(c-c*sec(f*x+e))^2,x)`
192	121	38	1 (pass)	-2 (exception) `int(1/(a+a*sec(f*x+e))^3/(c-c*sec(f*x+e))^3,x)`
193	122	38	1 (pass)	-2 (exception) `int(sec(f*x+e)/(a+a*sec(f*x+e))/(c-c*sec(f*x+e)),x)`
194	122	48	1 (pass)	-2 (exception) `int(sec(f*x+e)/(a+a*sec(f*x+e))^2/(c-c*sec(f*x+e))^2,x)`
195	122	60	1 (pass)	-2 (exception) `int(sec(f*x+e)/(a+a*sec(f*x+e))^3/(c-c*sec(f*x+e))^3,x)`
196	135	81	1 (pass)	-1 (time out)
197	135	88	1 (pass)	-1 (time out)
198	135	104	1 (pass)	-1 (time out)
199	148	75	1 (pass)	-2 (exception) `int(x^5*(a+b*arctan(c*x^2))^2,x)`
200	150	643	1 (pass)	0 (not solved)
201	150	1262	1 (pass)	0 (not solved)
202	150	1266	1 (pass)	0 (not solved)
203	153	146	1 (pass)	0 (not solved)

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#	test file #	integral #	Maple 2022.1	Maple 2021.1
204	163	332	1 (pass)	-2 (exception) `int(exp(c*(b*x+a))/(sinh(b*c*x+a*c)^2)^(1/2),x)`
205	163	333	1 (pass)	-2 (exception) `int(exp(c*(b*x+a))/(sinh(b*c*x+a*c)^2)^(3/2),x)`
206	163	334	1 (pass)	-2 (exception) `int(exp(c*(b*x+a))/(sinh(b*c*x+a*c)^2)^(5/2),x)`
207	163	335	1 (pass)	-2 (exception) `int(exp(c*(b*x+a))/(sinh(b*c*x+a*c)^2)^(7/2),x)`
208	169	292	1 (pass)	-2 (exception) `int(exp(c*(b*x+a))*(cosh(b*c*x+a*c)^2)^(5/2),x)`
209	169	293	1 (pass)	-2 (exception) `int(exp(c*(b*x+a))*(cosh(b*c*x+a*c)^2)^(3/2),x)`
210	169	294	1 (pass)	-2 (exception) `int(exp(c*(b*x+a))*(cosh(b*c*x+a*c)^2)^(1/2),x)`
211	169	295	1 (pass)	-2 (exception) `int(exp(c*(b*x+a))/(cosh(b*c*x+a*c)^2)^(1/2),x)`

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#	test file #	integral #	Maple 2022.1	Maple 2021.1
212	169	296	1 (pass)	-2 (exception) `int(exp(c*(b*x+a))/(cosh(b*c*x+a*c)^2)^(3/2),x)`
213	169	297	1 (pass)	-2 (exception) `int(exp(c*(b*x+a))/(cosh(b*c*x+a*c)^2)^(5/2),x)`
214	169	298	1 (pass)	-2 (exception) `int(exp(c*(b*x+a))/(cosh(b*c*x+a*c)^2)^(7/2),x)`
215	189	73	1 (pass)	-2 (exception) `int(x^3*arccosh(a*x)^(1/2),x)`
216	189	79	1 (pass)	-2 (exception) `int(x^3*arccosh(a*x)^(3/2),x)`
217	189	85	1 (pass)	-2 (exception) `int(x^3*arccosh(a*x)^(5/2),x)`
218	189	91	1 (pass)	-2 (exception) `int(x^3/arccosh(a*x)^(1/2),x)`
219	189	98	1 (pass)	-2 (exception) `int(x^3/arccosh(a*x)^(3/2),x)`
220	189	104	1 (pass)	-2 (exception) `int(x^3/arccosh(a*x)^(5/2),x)`

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#	test file #	integral #	Maple 2022.1	Maple 2021.1
221	189	110	1 (pass)	-2 (exception) int(x^3/arccosh(a*x)^(7/2),x)
222	189	128	1 (pass)	-2 (exception) int(x^3*arccosh(a*x)^n,x)
223	192	64	1 (pass)	-2 (exception) int(x^7*(a+b*arctanh(c*x^2))^2,x)
224	192	65	1 (pass)	-2 (exception) int(x^5*(a+b*arctanh(c*x^2))^2,x)
225	192	116	1 (pass)	-2 (exception) int(x^11*(a+b*arctanh(c*x^3))^2,x)
226	192	172	1 (pass)	-2 (exception) int(x*(a+b*arctanh(c/x^2))^2,x)
227	194	534	1 (pass)	0 (not solved)
228	198	173	1 (pass)	-1 (time out)
229	198	181	1 (pass)	-1 (time out)
230	198	279	1 (pass)	0 (not solved)
231	208	145	1 (pass)	0 (not solved)
232	208	146	1 (pass)	0 (not solved)
233	208	147	1 (pass)	0 (not solved)
234	208	148	1 (pass)	0 (not solved)
235	209	1041	1 (pass)	0 (not solved)
236	209	1147	1 (pass)	0 (not solved)
237	209	1153	1 (pass)	0 (not solved)
238	209	1668	1 (pass)	0 (not solved)

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Table 1 – continued from previous page

#	test file #	integral #	Maple 2022.1	Maple 2021.1
239	209	1670	1 (pass)	0 (not solved)
240	209	1671	1 (pass)	0 (not solved)
241	209	1919	1 (pass)	0 (not solved)
242	209	1951	1 (pass)	0 (not solved)
243	209	3025	1 (pass)	0 (not solved)
244	210	9	1 (pass)	0 (not solved)
245	210	378	1 (pass)	0 (not solved)
246	210	457	1 (pass)	0 (not solved)
247	210	617	1 (pass)	0 (not solved)
248	210	1142	1 (pass)	-1 (time out)
249	210	2368	1 (pass)	0 (not solved)
250	210	2704	1 (pass)	0 (not solved)
251	210	3170	1 (pass)	-1 (time out)
252	210	3299	1 (pass)	0 (not solved)
253	210	3440	1 (pass)	-1 (time out)
254	210	3539	1 (pass)	-1 (time out)
255	210	3551	1 (pass)	-1 (time out)
256	210	4154	1 (pass)	0 (not solved)
257	210	4308	1 (pass)	0 (not solved)
258	210	5108	1 (pass)	0 (not solved)
259	210	5756	1 (pass)	0 (not solved)
260	210	6758	1 (pass)	0 (not solved)
261	210	6840	1 (pass)	0 (not solved)
262	210	6876	1 (pass)	0 (not solved)
263	210	7628	1 (pass)	0 (not solved)
264	210	7955	1 (pass)	0 (not solved)
265	210	8010	1 (pass)	0 (not solved)
266	210	8333	1 (pass)	0 (not solved)
267	210	8714	1 (pass)	0 (not solved)

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Table 1 – continued from previous page

#	test file #	integral #	Maple 2022.1	Maple 2021.1
268	210	9197	1 (pass)	0 (not solved)
269	210	10116	1 (pass)	-1 (time out)
270	210	10131	1 (pass)	0 (not solved)
271	210	10190	1 (pass)	-1 (time out)

2 Test file number 2

Test folder name:

`test_cases/0_Independent_test_suites/2_Bondarenko_Problems`

2.1 Problem number 34

$$\int \frac{\tan^{-1}(x)\log(x)}{x}\,dx$$

Optimal antiderivative

$$\frac{i\ln(x)\,\mathrm{polylog}(2,-ix)}{2}-\frac{i\ln(x)\,\mathrm{polylog}(2,ix)}{2}-\frac{i\,\mathrm{polylog}(3,-ix)}{2}+\frac{i\,\mathrm{polylog}(3,ix)}{2}$$

command

```
int(arctan(x)*ln(x)/x,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$\frac{i\ln(x)^2\ln(-i(x+i))}{4}-\frac{i\ln(x)^2\ln(-ix+1)}{4}-\frac{i\ln(x)\,\mathrm{polylog}(2,ix)}{2}+\frac{i\,\mathrm{polylog}(3,ix)}{2}+\frac{i\ln(x)\,\mathrm{polylog}(2,-ix)}{2}-\frac{i\,\mathrm{polylog}(3,-ix)}{2}$

Maple 2021.1 output

$$\int \frac{\arctan(x)\ln(x)}{x}\,dx$$

3 Test file number 3

Test folder name:

`test_cases/0_Independent_test_suites/3_Bronstein_Problems`

3.1 Problem number 13

$$\int \frac{-x^2-\log(x)+2\log^2(x)}{-x^2\log(x)+\log^3(x)}\,dx$$

Optimal antiderivative

$$\mathrm{logarithmicIntegral}(x)-\frac{\ln(x-\ln(x))}{2}+\frac{\ln(x+\ln(x))}{2}$$

command

`int((-x^2-ln(x)+2*ln(x)^2)/(-x^2*ln(x)+ln(x)^3),x,method=_RETURNVERBOSE)`

Maple 2022.1 output

method	result	size
default	$-\operatorname{expIntegral}(1,-\ln(x))-\frac{\ln(x-\ln(x))}{2}+\frac{\ln(x+\ln(x))}{2}$	26
risch	$-\operatorname{expIntegral}(1,-\ln(x))-\frac{\ln(x-\ln(x))}{2}+\frac{\ln(x+\ln(x))}{2}$	26

Maple 2021.1 output

$$\int \frac{-x^2+2\ln(x)^2-\ln(x)}{-x^2\ln(x)+\ln(x)^3}\,dx$$

4 Test file number 11

Test folder name:

`test_cases/0_Independent_test_suites/11_Welz_Problems`

4.1 Problem number 38

$$\int \frac{x}{(1+x)\sqrt[3]{1-x^3}}\,dx$$

Optimal antiderivative

$$\frac{\ln\left((1-x)(1+x)^2\right)2^{\frac{2}{3}}}{8}+\frac{\ln\left(x+\left(-x^3+1\right)^{\frac{1}{3}}\right)}{2}-\frac{3\ln\left(-1+x+2^{\frac{2}{3}}\left(-x^3+1\right)^{\frac{1}{3}}\right)2^{\frac{2}{3}}}{8}-\frac{\arctan\left(\frac{\left(1-\frac{2x}{\left(-x^3+1\right)^{\frac{1}{3}}}\right)\sqrt{3}}{3}\right)\sqrt{3}}{3}+\frac{\arctan\left(\frac{\left(1+\frac{2^{\frac{1}{3}}(1-x)}{\left(-x^3+1\right)^{\frac{1}{3}}}\right)\sqrt{3}}{3}\right)\sqrt{3}\,2^{\frac{2}{3}}}{4}$$

command

`int(x/(1+x)/(-x^3+1)^(1/3),x,method=_RETURNVERBOSE)`

Maple 2022.1 output

method	result	size
trager	Expression too large to display	1790

Maple 2021.1 output

$$\int \frac{x}{(x+1)\left(-x^3+1\right)^{\frac{1}{3}}}\,dx$$

4.2 Problem number 110

$$\int \frac{(1-2x)\left(1-x^3\right)^{2/3}}{\left(1-x+x^2\right)^2}\,dx$$

Optimal antiderivative

$$\frac{\left(-x^3+1\right)^{\frac{2}{3}}}{x^2-x+1}+\frac{\ln\left(2^{\frac{1}{3}}-\left(-x^3+1\right)^{\frac{1}{3}}\right)2^{\frac{2}{3}}}{2}-\frac{\ln\left(-2^{\frac{1}{3}}x-\left(-x^3+1\right)^{\frac{1}{3}}\right)2^{\frac{2}{3}}}{2}$$
$$+\ln\left(x+\left(-x^3+1\right)^{\frac{1}{3}}\right)-\frac{2\arctan\left(\frac{\left(1-\frac{2x}{\left(-x^3+1\right)^{\frac{1}{3}}}\right)\sqrt{3}}{3}\right)\sqrt{3}}{3}$$
$$+\frac{\arctan\left(\frac{\left(1-\frac{2\,2^{\frac{1}{3}}x}{\left(-x^3+1\right)^{\frac{1}{3}}}\right)\sqrt{3}}{3}\right)2^{\frac{2}{3}}\sqrt{3}}{3}+\frac{\arctan\left(\frac{\left(1+2^{\frac{2}{3}}\left(-x^3+1\right)^{\frac{1}{3}}\right)\sqrt{3}}{3}\right)2^{\frac{2}{3}}\sqrt{3}}{3}$$

command

```
int((1-2*x)*(-x^3+1)^(2/3)/(x^2-x+1)^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
trager	$\frac{\left(-x^3+1\right)^{\frac{2}{3}}}{x^2-x+1}+\frac{\ln\left(-\frac{\mathrm{RootOf}\left(\_Z^6+432\right)^4x^2+\mathrm{RootOf}\left(\_Z^6+432\right)^4x-\mathrm{RootOf}\left(\_Z^6+432\right)^4+12\,\mathrm{RootOf}\left(\_Z^6+432\right)^2\left(-x^3+1\right)^{\frac{1}{3}}x+72\left(-\right.\right.}{x^2-x+1}\right.}{72}$
risch	Expression too large to display

Maple 2021.1 output

$$\int \frac{(-2x+1)\left(-x^3+1\right)^{\frac{2}{3}}}{\left(x^2-x+1\right)^2}\,dx$$

5 Test file number 13

Test folder name:

`test_cases/1_Algebraic_functions/1.1_Binomial_products/1.1.1_Linear/13_1.1.1.2-a+b_x-^m-c+d_x-^n`

5.1 Problem number 501

$$\int \frac{\sqrt{a-bx}}{x^{3/2}}\,dx$$

Optimal antiderivative

$$-2\arctan\left(\frac{\sqrt{b}\ \sqrt{x}}{\sqrt{-bx+a}}\right)\sqrt{b}\ -\frac{2\sqrt{-bx+a}}{\sqrt{x}}$$

command

```
int((-b*x+a)^(1/2)/x^(3/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	$-\frac{2\sqrt{-bx+a}}{\sqrt{x}}-\frac{\sqrt{b}\ \arctan\left(\frac{\sqrt{b}\ \left(x-\frac{a}{2b}\right)}{\sqrt{-x^2b+ax}}\right)\sqrt{x\left(-bx+a\right)}}{\sqrt{x}\ \sqrt{-bx+a}}$	66

Maple 2021.1 output

$$\int \frac{\sqrt{-bx+a}}{x^{\frac{3}{2}}}\,dx$$

5.2 Problem number 531

$$\int \frac{(a-bx)^{3/2}}{x^{3/2}}\,dx$$

Optimal antiderivative

$$-3a\arctan\left(\frac{\sqrt{b}\ \sqrt{x}}{\sqrt{-bx+a}}\right)\sqrt{b}\ -\frac{2(-bx+a)^{\frac{3}{2}}}{\sqrt{x}}-3b\sqrt{x}\ \sqrt{-bx+a}$$

command

`int((-b*x+a)^(3/2)/x^(3/2),x,method=_RETURNVERBOSE)`

Maple 2022.1 output

method	result	size
risch	$-\frac{\sqrt{-bx+a}\ (bx+2a)}{\sqrt{x}}-\frac{3a\sqrt{b}\ \arctan\left(\frac{\sqrt{b}\ \left(x-\frac{a}{2b}\right)}{\sqrt{-x^2b+ax}}\right)\sqrt{x\left(-bx+a\right)}}{2\sqrt{x}\ \sqrt{-bx+a}}$	74

Maple 2021.1 output

$$\int \frac{(-bx+a)^{\frac{3}{2}}}{x^{\frac{3}{2}}}\,dx$$

5.3 Problem number 532

$$\int \frac{(a-bx)^{3/2}}{x^{5/2}}\,dx$$

Optimal antiderivative

$$-\frac{2(-bx+a)^{\frac{3}{2}}}{3x^{\frac{3}{2}}}+2b^{\frac{3}{2}}\arctan\left(\frac{\sqrt{b}\ \sqrt{x}}{\sqrt{-bx+a}}\right)+\frac{2b\sqrt{-bx+a}}{\sqrt{x}}$$

command

`int((-b*x+a)^(3/2)/x^(5/2),x,method=_RETURNVERBOSE)`

Maple 2022.1 output

method	result	size
risch	$-\frac{2\sqrt{-bx+a}\ (-4bx+a)}{3x^{\frac{3}{2}}}+\frac{b^{\frac{3}{2}}\arctan\left(\frac{\sqrt{b}\ \left(x-\frac{a}{2b}\right)}{\sqrt{-x^2b+ax}}\right)\sqrt{x\left(-bx+a\right)}}{\sqrt{x}\ \sqrt{-bx+a}}$	71

Maple 2021.1 output

$$\int \frac{(-bx+a)^{\frac{3}{2}}}{x^{\frac{5}{2}}}\,dx$$

5.4 Problem number 555

$$\int \frac{(a-bx)^{5/2}}{x^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{15a^2\arctan\left(\frac{\sqrt{b}\,\sqrt{x}}{\sqrt{-bx+a}}\right)\sqrt{b}}{4}-\frac{2(-bx+a)^{\frac{5}{2}}}{\sqrt{x}}-\frac{5b(-bx+a)^{\frac{3}{2}}\sqrt{x}}{2}-\frac{15ab\sqrt{x}\,\sqrt{-bx+a}}{4}$$

command

```
int((-b*x+a)^(5/2)/x^(3/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	$-\frac{\sqrt{-bx+a}\ (-2x^2b^2+9abx+8a^2)}{4\sqrt{x}}-\frac{15a^2\sqrt{b}\ \arctan\left(\frac{\sqrt{b}\ \left(x-\frac{a}{2b}\right)}{\sqrt{-x^2b+ax}}\right)\sqrt{x\,(-bx+a)}}{8\sqrt{x}\ \sqrt{-bx+a}}$	88

Maple 2021.1 output

$$\int \frac{(-bx+a)^{\frac{5}{2}}}{x^{\frac{3}{2}}}\,dx$$

5.5 Problem number 556

$$\int \frac{(a-bx)^{5/2}}{x^{5/2}}\,dx$$

Optimal antiderivative

$$-\frac{2(-bx+a)^{\frac{5}{2}}}{3x^{\frac{3}{2}}}+5a\,b^{\frac{3}{2}}\arctan\left(\frac{\sqrt{b}\,\sqrt{x}}{\sqrt{-bx+a}}\right)+\frac{10b(-bx+a)^{\frac{3}{2}}}{3\sqrt{x}}+5b^2\sqrt{x}\,\sqrt{-bx+a}$$

command

```
int((-b*x+a)^(5/2)/x^(5/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size

risch	$-\frac{\sqrt{-bx+a}\ \left(-3x^2b^2-14abx+2a^2\right)}{3x^{\frac{3}{2}}}+\frac{5ab^{\frac{3}{2}}\arctan\left(\frac{\sqrt{b}\ \left(x-\frac{a}{2b}\right)}{\sqrt{-x^2b+ax}}\right)\sqrt{x\left(-bx+a\right)}}{2\sqrt{x}\ \sqrt{-bx+a}}$	86

Maple 2021.1 output

$$\int \frac{(-bx+a)^{\frac{5}{2}}}{x^{\frac{5}{2}}}\,dx$$

6 Test file number 19

Test folder name:

`test_cases/1_Algebraic_functions/1.1_Binomial_products/1.1.2_Quadratic/19_1.1.2.2-c_x-^m-a+b_x^2-^p`

6.1 Problem number 884

$$\int \frac{x^6}{(2-3x^2)^{3/4}}\,dx$$

Optimal antiderivative

$$-\frac{160x\left(-3x^2+2\right)^{\frac{1}{4}}}{2079}-\frac{40x^3\left(-3x^2+2\right)^{\frac{1}{4}}}{693}-\frac{2x^5\left(-3x^2+2\right)^{\frac{1}{4}}}{33}+\frac{320\,2^{\frac{3}{4}}\sqrt{\frac{\sqrt{-6x^2+4}}{4}+\frac{1}{2}}\ \text{EllipticF}\left(\sin\left(\frac{\arcsin\left(\frac{x\sqrt{6}}{2}\right)}{2}\right),\sqrt{2}\right)\sqrt{3}}{6237\cos\left(\frac{\arcsin\left(\frac{x\sqrt{6}}{2}\right)}{2}\right)}$$

command

```
int(x^6/(-3*x^2+2)^(3/4),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
meijerg	$\frac{2^{\frac{1}{4}}x^7\,\text{hypergeom}\left(\left[\frac{3}{4},\frac{7}{2}\right],\left[\frac{9}{2}\right],\frac{3x^2}{2}\right)}{14}$	20

Maple 2021.1 output

$$\int \frac{x^6}{(-3x^2+2)^{\frac{3}{4}}}\,dx$$

6.2 Problem number 885

$$\int \frac{x^4}{(2-3x^2)^{3/4}}\,dx$$

Optimal antiderivative

$$-\frac{8x\left(-3x^2+2\right)^{\frac{1}{4}}}{63}-\frac{2x^3\left(-3x^2+2\right)^{\frac{1}{4}}}{21}+\frac{16\,2^{\frac{3}{4}}\sqrt{\frac{\sqrt{-6x^2+4}}{4}+\frac{1}{2}}\ \text{EllipticF}\left(\sin\left(\frac{\arcsin\left(\frac{x\sqrt{6}}{2}\right)}{2}\right),\sqrt{2}\right)\sqrt{3}}{189\cos\left(\frac{\arcsin\left(\frac{x\sqrt{6}}{2}\right)}{2}\right)}$$

command

```
int(x^4/(-3*x^2+2)^(3/4),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
meijerg	$\frac{2^{\frac{1}{4}}x^5\ \text{hypergeom}\left(\left[\frac{3}{4},\frac{5}{2}\right],\left[\frac{7}{2}\right],\frac{3x^2}{2}\right)}{10}$	20

Maple 2021.1 output

$$\int \frac{x^4}{(-3x^2+2)^{\frac{3}{4}}}\,dx$$

6.3 Problem number 886

$$\int \frac{x^2}{(2-3x^2)^{3/4}}\,dx$$

Optimal antiderivative

$$-\frac{2x\left(-3x^2+2\right)^{\frac{1}{4}}}{9}+\frac{4\,2^{\frac{3}{4}}\sqrt{\frac{\sqrt{-6x^2+4}}{4}+\frac{1}{2}}\ \text{EllipticF}\left(\sin\left(\frac{\arcsin\left(\frac{x\sqrt{6}}{2}\right)}{2}\right),\sqrt{2}\right)\sqrt{3}}{27\cos\left(\frac{\arcsin\left(\frac{x\sqrt{6}}{2}\right)}{2}\right)}$$

command

```
int(x^2/(-3*x^2+2)^(3/4),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
meijerg	$\frac{2^{\frac{1}{4}} x^3 \operatorname{hypergeom}\left(\left[\frac{3}{4},\frac{3}{2}\right],\left[\frac{5}{2}\right],\frac{3x^2}{2}\right)}{6}$	20

Maple 2021.1 output

$$\int \frac{x^2}{\left(-3x^2+2\right)^{\frac{3}{4}}}\,dx$$

6.4 Problem number 888

$$\int \frac{1}{x^2\left(2-3x^2\right)^{3/4}}\,dx$$

Optimal antiderivative

$$-\frac{\left(-3x^2+2\right)^{\frac{1}{4}}}{2x}+\frac{2^{\frac{3}{4}}\sqrt{\frac{\sqrt{-6x^2+4}}{4}+\frac{1}{2}}\ \operatorname{EllipticF}\left(\sin\left(\frac{\arcsin\left(\frac{x\sqrt{6}}{2}\right)}{2}\right),\sqrt{2}\right)\sqrt{3}}{4\cos\left(\frac{\arcsin\left(\frac{x\sqrt{6}}{2}\right)}{2}\right)}$$

command

```
int(1/x^2/(-3*x^2+2)^(3/4),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
meijerg	$-\frac{2^{\frac{1}{4}} \operatorname{hypergeom}\left(\left[-\frac{1}{2},\frac{3}{4}\right],\left[\frac{1}{2}\right],\frac{3x^2}{2}\right)}{2x}$	20

Maple 2021.1 output

$$\int \frac{1}{\left(-3x^2+2\right)^{\frac{3}{4}} x^2}\,dx$$

6.5 Problem number 889

$$\int \frac{1}{x^4 \left(2-3x^2\right)^{3/4}} \, dx$$

Optimal antiderivative

$$-\frac{\left(-3x^2+2\right)^{\frac{1}{4}}}{6x^3}-\frac{5\left(-3x^2+2\right)^{\frac{1}{4}}}{8x} + \frac{5\,2^{\frac{3}{4}}\sqrt{\frac{\sqrt{-6x^2+4}}{4}+\frac{1}{2}}\ \text{EllipticF}\left(\sin\left(\frac{\arcsin\left(\frac{x\sqrt{6}}{2}\right)}{2}\right),\sqrt{2}\right)\sqrt{3}}{16\cos\left(\frac{\arcsin\left(\frac{x\sqrt{6}}{2}\right)}{2}\right)}$$

command

```
int(1/x^4/(-3*x^2+2)^(3/4),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
meijerg	$-\frac{2^{\frac{1}{4}}\ \text{hypergeom}\left(\left[-\frac{3}{2},\frac{3}{4}\right],\left[-\frac{1}{2}\right],\frac{3x^2}{2}\right)}{6x^3}$	20

Maple 2021.1 output

$$\int \frac{1}{\left(-3x^2+2\right)^{\frac{3}{4}} x^4} \, dx$$

6.6 Problem number 890

$$\int \frac{1}{x^6 \left(2-3x^2\right)^{3/4}} \, dx$$

Optimal antiderivative

$$-\frac{\left(-3x^2+2\right)^{\frac{1}{4}}}{10x^5}-\frac{9\left(-3x^2+2\right)^{\frac{1}{4}}}{40x^3}-\frac{27\left(-3x^2+2\right)^{\frac{1}{4}}}{32x} + \frac{27\,2^{\frac{3}{4}}\sqrt{\frac{\sqrt{-6x^2+4}}{4}+\frac{1}{2}}\ \text{EllipticF}\left(\sin\left(\frac{\arcsin\left(\frac{x\sqrt{6}}{2}\right)}{2}\right),\sqrt{2}\right)\sqrt{3}}{64\cos\left(\frac{\arcsin\left(\frac{x\sqrt{6}}{2}\right)}{2}\right)}$$

command

```
int(1/x^6/(-3*x^2+2)^(3/4),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
meijerg	$-\frac{2^{\frac{1}{4}}\,\mathrm{hypergeom}\left(\left[-\frac{5}{2},\frac{3}{4}\right],\left[-\frac{3}{2}\right],\frac{3x^2}{2}\right)}{10x^5}$	20

Maple 2021.1 output

$$\int \frac{1}{\left(-3x^2+2\right)^{\frac{3}{4}}\,x^6}\,dx$$

6.7 Problem number 912

$$\int \frac{x^6}{\left(-2-3x^2\right)^{3/4}}\,dx$$

Optimal antiderivative

$$-\frac{160x\left(-3x^2-2\right)^{\frac{1}{4}}}{2079}+\frac{40x^3\left(-3x^2-2\right)^{\frac{1}{4}}}{693}-\frac{2x^5\left(-3x^2-2\right)^{\frac{1}{4}}}{33}$$
$$+\frac{160\,2^{\frac{3}{4}}\sqrt{\frac{\cos\left(4\arctan\left(\frac{\left(-24x^2-16\right)^{\frac{1}{4}}}{2}\right)\right)}{2}+\frac{1}{2}}\ \mathrm{EllipticF}\left(\sin\left(2\arctan\left(\frac{\left(-3x^2-2\right)^{\frac{1}{4}}2^{\frac{3}{4}}}{2}\right)\right),\frac{\sqrt{2}}{2}\right)\left(\sqrt{2}+\sqrt{-3x^2}\right.$$
$$6237\cos\left(2\arctan\left(\frac{\left(-3x^2-2\right)^{\frac{1}{4}}2^{\frac{3}{4}}}{2}\right)\right)x$$

command

```
int(x^6/(-3*x^2-2)^(3/4),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
meijerg	$-\frac{(-1)^{\frac{1}{4}}2^{\frac{1}{4}}x^7\,\mathrm{hypergeom}\left(\left[\frac{3}{4},\frac{7}{2}\right],\left[\frac{9}{2}\right],-\frac{3x^2}{2}\right)}{14}$	23

Maple 2021.1 output

$$\int \frac{x^6}{\left(-3x^2-2\right)^{\frac{3}{4}}}\,dx$$

6.8 Problem number 913

$$\int \frac{x^4}{(-2-3x^2)^{3/4}}\,dx$$

Optimal antiderivative

$$\frac{8x\left(-3x^2-2\right)^{\frac{1}{4}}}{63}-\frac{2x^3\left(-3x^2-2\right)^{\frac{1}{4}}}{21}$$
$$-\frac{8\,2^{\frac{3}{4}}\sqrt{\frac{\cos\left(4\arctan\left(\frac{(-24x^2-16)^{\frac{1}{4}}}{2}\right)\right)}{2}+\frac{1}{2}}\ \text{EllipticF}\left(\sin\left(2\arctan\left(\frac{(-3x^2-2)^{\frac{1}{4}}2^{\frac{3}{4}}}{2}\right)\right),\frac{\sqrt{2}}{2}\right)\left(\sqrt{2}+\sqrt{-3x^2-}\right.}{189\cos\left(2\arctan\left(\frac{(-3x^2-2)^{\frac{1}{4}}2^{\frac{3}{4}}}{2}\right)\right)x}$$

command

```
int(x^4/(-3*x^2-2)^(3/4),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
meijerg	$-\frac{(-1)^{\frac{1}{4}}2^{\frac{1}{4}}x^5\,\text{hypergeom}\left(\left[\frac{3}{4},\frac{5}{2}\right],\left[\frac{7}{2}\right],-\frac{3x^2}{2}\right)}{10}$	23

Maple 2021.1 output

$$\int \frac{x^4}{(-3x^2-2)^{\frac{3}{4}}}\,dx$$

6.9 Problem number 914

$$\int \frac{x^2}{(-2-3x^2)^{3/4}}\,dx$$

Optimal antiderivative

$$-\frac{2x\left(-3x^2-2\right)^{\frac{1}{4}}}{9}$$
$$+\frac{2\,2^{\frac{3}{4}}\sqrt{\frac{\cos\left(4\arctan\left(\frac{(-24x^2-16)^{\frac{1}{4}}}{2}\right)\right)}{2}+\frac{1}{2}}\ \text{EllipticF}\left(\sin\left(2\arctan\left(\frac{(-3x^2-2)^{\frac{1}{4}}2^{\frac{3}{4}}}{2}\right)\right),\frac{\sqrt{2}}{2}\right)\left(\sqrt{2}+\sqrt{-3x^2-}\right.}{27\cos\left(2\arctan\left(\frac{(-3x^2-2)^{\frac{1}{4}}2^{\frac{3}{4}}}{2}\right)\right)x}$$

command

```
int(x^2/(-3*x^2-2)^(3/4),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
meijerg	$-\frac{(-1)^{\frac{1}{4}} 2^{\frac{1}{4}} x^3 \operatorname{hypergeom}\left(\left[\frac{3}{4},\frac{3}{2}\right],\left[\frac{5}{2}\right],-\frac{3x^2}{2}\right)}{6}$	23

Maple 2021.1 output

$$\int \frac{x^2}{\left(-3x^2-2\right)^{\frac{3}{4}}}\,dx$$

6.10 Problem number 916

$$\int \frac{1}{x^2\left(-2-3x^2\right)^{3/4}}\,dx$$

Optimal antiderivative

$$\frac{\left(-3x^2-2\right)^{\frac{1}{4}}}{2x} + \frac{2^{\frac{3}{4}}\sqrt{\frac{\cos\left(4\arctan\left(\frac{(-24x^2-16)^{\frac{1}{4}}}{2}\right)\right)}{2}+\frac{1}{2}}\ \text{EllipticF}\left(\sin\left(2\arctan\left(\frac{(-3x^2-2)^{\frac{1}{4}}2^{\frac{3}{4}}}{2}\right)\right),\frac{\sqrt{2}}{2}\right)\left(\sqrt{2}+\sqrt{-3x^2-2}\right.}{8\cos\left(2\arctan\left(\frac{(-3x^2-2)^{\frac{1}{4}}2^{\frac{3}{4}}}{2}\right)\right)x}$$

command

```
int(1/x^2/(-3*x^2-2)^(3/4),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
meijerg	$\frac{(-1)^{\frac{1}{4}} 2^{\frac{1}{4}} \operatorname{hypergeom}\left(\left[-\frac{1}{2},\frac{3}{4}\right],\left[\frac{1}{2}\right],-\frac{3x^2}{2}\right)}{2x}$	23

Maple 2021.1 output

$$\int \frac{1}{\left(-3x^2-2\right)^{\frac{3}{4}}x^2}\,dx$$

6.11 Problem number 917

$$\int \frac{1}{x^4 \left(-2-3x^2\right)^{3/4}}\,dx$$

Optimal antiderivative

$$\frac{\left(-3x^2-2\right)^{\frac{1}{4}}}{6x^3}-\frac{5\left(-3x^2-2\right)^{\frac{1}{4}}}{8x}$$
$$-\frac{5\,2^{\frac{3}{4}}\sqrt{\frac{\cos\left(4\arctan\left(\frac{\left(-24x^2-16\right)^{\frac{1}{4}}}{2}\right)\right)}{2}+\frac{1}{2}}\ \text{EllipticF}\left(\sin\left(2\arctan\left(\frac{\left(-3x^2-2\right)^{\frac{1}{4}}2^{\frac{3}{4}}}{2}\right)\right),\frac{\sqrt{2}}{2}\right)\left(\sqrt{2}+\sqrt{-3x^2-}\right.}{32\cos\left(2\arctan\left(\frac{\left(-3x^2-2\right)^{\frac{1}{4}}2^{\frac{3}{4}}}{2}\right)\right)x}$$

command

```
int(1/x^4/(-3*x^2-2)^(3/4),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
meijerg	$\frac{(-1)^{\frac{1}{4}}2^{\frac{1}{4}}\ \text{hypergeom}\left(\left[-\frac{3}{2},\frac{3}{4}\right],\left[-\frac{1}{2}\right],-\frac{3x^2}{2}\right)}{6x^3}$	23

Maple 2021.1 output

$$\int \frac{1}{\left(-3x^2-2\right)^{\frac{3}{4}}x^4}\,dx$$

6.12 Problem number 918

$$\int \frac{1}{x^6 \left(-2-3x^2\right)^{3/4}}\,dx$$

Optimal antiderivative

$$\frac{\left(-3x^2-2\right)^{\frac{1}{4}}}{10x^5}-\frac{9\left(-3x^2-2\right)^{\frac{1}{4}}}{40x^3}+\frac{27\left(-3x^2-2\right)^{\frac{1}{4}}}{32x}$$
$$+\frac{27\,2^{\frac{3}{4}}\sqrt{\frac{\cos\left(4\arctan\left(\frac{\left(-24x^2-16\right)^{\frac{1}{4}}}{2}\right)\right)}{2}+\frac{1}{2}}\ \text{EllipticF}\left(\sin\left(2\arctan\left(\frac{\left(-3x^2-2\right)^{\frac{1}{4}}2^{\frac{3}{4}}}{2}\right)\right),\frac{\sqrt{2}}{2}\right)\left(\sqrt{2}+\sqrt{-3x^2-}\right.}{128\cos\left(2\arctan\left(\frac{\left(-3x^2-2\right)^{\frac{1}{4}}2^{\frac{3}{4}}}{2}\right)\right)x}$$

command

```
int(1/x^6/(-3*x^2-2)^(3/4),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
meijerg	$\frac{(-1)^{\frac{1}{4}} 2^{\frac{1}{4}} \operatorname{hypergeom}\left(\left[-\frac{5}{2}, \frac{3}{4}\right], \left[-\frac{3}{2}\right], -\frac{3x^2}{2}\right)}{10x^5}$	23

Maple 2021.1 output

$$\int \frac{1}{(-3x^2-2)^{\frac{3}{4}} x^6} \, dx$$

7 Test file number 20

Test folder name:

```
test_cases/1_Algebraic_functions/1.1_Binomial_products/1.1.2_Quadratic/20_1.1.2.3-
a+b_x^2-^p-c+d_x^2-^q
```

7.1 Problem number 297

$$\int \frac{\sqrt{1+\frac{2cx^2}{b-\sqrt{b^2-4ac}}}}{\sqrt{1-\frac{2cx^2}{b+\sqrt{b^2-4ac}}}} \, dx$$

Optimal antiderivative

$$\frac{\text{EllipticE}\left(\frac{x\sqrt{2}\,\sqrt{c}}{\sqrt{b+\sqrt{-4ac+b^2}}}, \sqrt{\frac{-b-\sqrt{-4ac+b^2}}{b-\sqrt{-4ac+b^2}}}\right) \sqrt{b+\sqrt{-4ac+b^2}}\,\sqrt{2}}{2\sqrt{c}}$$

command

```
int((1+2*c*x^2/(b-(-4*a*c+b^2)^(1/2)))^(1/2)/(1-2*c*x^2/(b+(-4*a*c+b^2)^(1/2)))^(1/2),x,metho
```

Maple 2022.1 output

method	result

elliptic	$\sqrt{\frac{-2cx^2+\sqrt{-4ac+b^2}-b}{-b+\sqrt{-4ac+b^2}}}\left(-b+\sqrt{-4ac+b^2}\right)\sqrt{-\frac{\left(-2cx^2+\sqrt{-4ac+b^2}-b\right)\left(-2cx^2+\sqrt{-4ac+b^2}+b\right)}{ac}}$

Maple 2021.1 output

$$\int \frac{\sqrt{\frac{2cx^2}{b-\sqrt{-4ac+b^2}}+1}}{\sqrt{-\frac{2cx^2}{b+\sqrt{-4ac+b^2}}+1}}\,dx$$

7.2 Problem number 298

$$\int \frac{\sqrt{1-\frac{2cx^2}{b-\sqrt{b^2-4ac}}}}{\sqrt{1-\frac{2cx^2}{b+\sqrt{b^2-4ac}}}}\,dx$$

Optimal antiderivative

$$\frac{\text{EllipticE}\left(\frac{x\sqrt{2}\,\sqrt{c}}{\sqrt{b+\sqrt{-4ac+b^2}}},\sqrt{\frac{b+\sqrt{-4ac+b^2}}{b-\sqrt{-4ac+b^2}}}\right)\sqrt{b+\sqrt{-4ac+b^2}}\,\sqrt{2}}{2\sqrt{c}}$$

command

```
int((1-2*c*x^2/(b-(-4*a*c+b^2)^(1/2)))^(1/2)/(1-2*c*x^2/(b+(-4*a*c+b^2)^(1/2)))^(1/2),x,metho
```

Maple 2022.1 output

method	result	size
elliptic	Expression too large to display	1388

Maple 2021.1 output

$$\int \frac{\sqrt{-\frac{2c\,x^2}{b-\sqrt{-4ac+b^2}}+1}}{\sqrt{-\frac{2c\,x^2}{b+\sqrt{-4ac+b^2}}+1}}\,dx$$

7.3 Problem number 299

$$\int \frac{\sqrt{1+\frac{2cx^2}{b-\sqrt{b^2-4ac}}}}{\sqrt{1+\frac{2cx^2}{b+\sqrt{b^2-4ac}}}}\,dx$$

Optimal antiderivative

$$\frac{x\sqrt{1+\frac{2c\,x^2}{b-\sqrt{-4ac+b^2}}}}{\sqrt{1+\frac{2c\,x^2}{b+\sqrt{-4ac+b^2}}}}$$

$$-\frac{\sqrt{\frac{1}{1+\frac{2c\,x^2}{b+\sqrt{-4ac+b^2}}}}\ \text{EllipticE}\left(\frac{x\sqrt{2}\ \sqrt{c}}{\sqrt{b+\sqrt{-4ac+b^2}}\ \sqrt{1+\frac{2c\,x^2}{b+\sqrt{-4ac+b^2}}}},\sqrt{-\frac{2\sqrt{-4ac+b^2}}{b-\sqrt{-4ac+b^2}}}\right)\sqrt{}}{2\sqrt{c}\ \sqrt{\frac{1+\frac{2c\,x^2}{b-\sqrt{-4ac+b^2}}}{1+\frac{2c\,x^2}{b+\sqrt{-4ac+b^2}}}}}$$

$$+\frac{\sqrt{\frac{1}{1+\frac{2c\,x^2}{b+\sqrt{-4ac+b^2}}}}\ \text{EllipticF}\left(\frac{x\sqrt{2}\ \sqrt{c}}{\sqrt{b+\sqrt{-4ac+b^2}}\ \sqrt{1+\frac{2c\,x^2}{b+\sqrt{-4ac+b^2}}}},\sqrt{-\frac{2\sqrt{-4ac+b^2}}{b-\sqrt{-4ac+b^2}}}\right)\sqrt{1}}{2\sqrt{c}\ \sqrt{\frac{1+\frac{2c\,x^2}{b-\sqrt{-4ac+b^2}}}{1+\frac{2c\,x^2}{b+\sqrt{-4ac+b^2}}}}}$$

command

```
int((1+2*c*x^2/(b-(-4*a*c+b^2)^(1/2)))^(1/2)/(1+2*c*x^2/(b+(-4*a*c+b^2)^(1/2)))^(1/2),x,metho
```

Maple 2022.1 output

method	result	size
elliptic	Expression too large to display	1388

Maple 2021.1 output

$$\int \frac{\sqrt{\dfrac{2c\,x^2}{b-\sqrt{-4ac+b^2}}+1}}{\sqrt{\dfrac{2c\,x^2}{b+\sqrt{-4ac+b^2}}+1}}\,dx$$

7.4 Problem number 300

$$\int \frac{\sqrt{1-\dfrac{2cx^2}{b-\sqrt{b^2-4ac}}}}{\sqrt{1+\dfrac{2cx^2}{b+\sqrt{b^2-4ac}}}}\,dx$$

Optimal antiderivative

$$\frac{b\,\text{EllipticF}\left(\dfrac{x\sqrt{2}\,\sqrt{c}}{\sqrt{b-\sqrt{-4ac+b^2}}},\sqrt{\dfrac{-b+\sqrt{-4ac+b^2}}{b+\sqrt{-4ac+b^2}}}\right)\sqrt{2}}{\sqrt{c}\,\sqrt{b-\sqrt{-4ac+b^2}}}$$
$$-\frac{\text{EllipticE}\left(\dfrac{x\sqrt{2}\,\sqrt{c}}{\sqrt{b-\sqrt{-4ac+b^2}}},\sqrt{\dfrac{-b+\sqrt{-4ac+b^2}}{b+\sqrt{-4ac+b^2}}}\right)\left(b+\sqrt{-4ac+b^2}\right)\sqrt{2}}{2\sqrt{c}\,\sqrt{b-\sqrt{-4ac+b^2}}}$$

command

```
int((1-2*c*x^2/(b-(-4*a*c+b^2)^(1/2)))^(1/2)/(1+2*c*x^2/(b+(-4*a*c+b^2)^(1/2)))^(1/2),x,metho
```

Maple 2022.1 output

method	result

elliptic	$\sqrt{\frac{2cx^2+\sqrt{-4ac+b^2}-b}{-b+\sqrt{-4ac+b^2}}}\left(-b+\sqrt{-4ac+b^2}\right)\sqrt{-\frac{\left(2cx^2+\sqrt{-4ac+b^2}-b\right)\left(2cx^2+\sqrt{-4ac+b^2}+b\right)}{ac}}\left(\sqrt{1-}\right.$

Maple 2021.1 output

$$\int \frac{\sqrt{-\frac{2cx^2}{b-\sqrt{-4ac+b^2}}+1}}{\sqrt{\frac{2cx^2}{b+\sqrt{-4ac+b^2}}+1}}\,dx$$

8 Test file number 22

Test folder name:

`test_cases/1_Algebraic_functions/1.1_Binomial_products/1.1.2_Quadratic/22_1.1.2.5-a+b_x^2-^p-c+d_x^2-^q-e+f_x^2-^r`

8.1 Problem number 55

$$\int \frac{-b-\sqrt{b^2-4ac}+2cx^2}{\sqrt{1+\frac{2cx^2}{-b-\sqrt{b^2-4ac}}}\sqrt{1+\frac{2cx^2}{-b+\sqrt{b^2-4ac}}}}\,dx$$

Optimal antiderivative

$$-\frac{\text{EllipticE}\left(\frac{x\sqrt{2}\sqrt{c}}{\sqrt{b-\sqrt{-4ac+b^2}}},\sqrt{\frac{b-\sqrt{-4ac+b^2}}{b+\sqrt{-4ac+b^2}}}\right)\left(b+\sqrt{-4ac+b^2}\right)\sqrt{b-\sqrt{-4ac+b^2}}\sqrt{2}}{2\sqrt{c}}$$

command

```
int((2*c*x^2-(-4*a*c+b^2)^(1/2)-b)/(1+2*c*x^2/(-b-(-4*a*c+b^2)^(1/2)))^(1/2)/(1+2*c/(-b+(-4*a*c+b^2)^(1/2))*x^2)^(1/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
elliptic	Expression too large to display	2538

Maple 2021.1 output

$$\int \frac{2cx^2-b-\sqrt{-4ac+b^2}}{\sqrt{\frac{2cx^2}{-b-\sqrt{-4ac+b^2}}+1}\sqrt{\frac{2cx^2}{-b+\sqrt{-4ac+b^2}}+1}}\,dx$$

8.2 Problem number 56

$$\int \frac{b-\sqrt{b^2-4ac}+2cx^2}{\sqrt{1+\frac{2cx^2}{b-\sqrt{b^2-4ac}}}\sqrt{1+\frac{2cx^2}{b+\sqrt{b^2-4ac}}}}\,dx$$

Optimal antiderivative

$$\frac{x\left(b-\sqrt{-4ac+b^2}\right)\sqrt{1+\frac{2cx^2}{b-\sqrt{-4ac+b^2}}}}{\sqrt{1+\frac{2cx^2}{b+\sqrt{-4ac+b^2}}}}$$

$$-\frac{\sqrt{\frac{1}{1+\frac{2cx^2}{b+\sqrt{-4ac+b^2}}}}\ \text{EllipticE}\left(\frac{x\sqrt{2}\ \sqrt{c}}{\sqrt{b+\sqrt{-4ac+b^2}}\sqrt{1+\frac{2cx^2}{b+\sqrt{-4ac+b^2}}}},\sqrt{-\frac{2\sqrt{-4ac+b^2}}{b-\sqrt{-4ac+b^2}}}\right)\left(b\right.}{2\sqrt{c}\ \sqrt{\frac{1+\frac{2cx^2}{b-\sqrt{-4ac+b^2}}}{1+\frac{2cx^2}{b+\sqrt{-4ac+b^2}}}}}$$

$$+\frac{\sqrt{\frac{1}{1+\frac{2cx^2}{b+\sqrt{-4ac+b^2}}}}\ \text{EllipticF}\left(\frac{x\sqrt{2}\ \sqrt{c}}{\sqrt{b+\sqrt{-4ac+b^2}}\sqrt{1+\frac{2cx^2}{b+\sqrt{-4ac+b^2}}}},\sqrt{-\frac{2\sqrt{-4ac+b^2}}{b-\sqrt{-4ac+b^2}}}\right)\left(b\right.}{2\sqrt{c}\ \sqrt{\frac{1+\frac{2cx^2}{b-\sqrt{-4ac+b^2}}}{1+\frac{2cx^2}{b+\sqrt{-4ac+b^2}}}}}$$

command

```
int((2*c*x^2-(-4*a*c+b^2)^(1/2)+b)/(1+2*c*x^2/(b-(-4*a*c+b^2)^(1/2)))^(1/2)/(1+2*c*x^2/(b+(-4*a*c+b^2)^(1/2)))^(1/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
elliptic	Expression too large to display	2477

Maple 2021.1 output

$$\int \frac{2c\,x^2+b-\sqrt{-4ac+b^2}}{\sqrt{\frac{2c\,x^2}{b-\sqrt{-4ac+b^2}}+1}\,\sqrt{\frac{2c\,x^2}{b+\sqrt{-4ac+b^2}}+1}}\,dx$$

9 Test file number 26

Test folder name:

```
test_cases/1_Algebraic_functions/1.1_Binomial_products/1.1.3_General/26_1.1.3.3-a+b_x^n-^p-c+d_x^n-^q
```

9.1 Problem number 13

$$\int \frac{\left(a+bx^3\right)^2}{\left(c+dx^3\right)^3}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{(-ad+bc)\,x\left(b\,x^3+a\right)}{6cd\left(d\,x^3+c\right)^2}-\frac{(-ad+bc)\,(5ad+4bc)\,x}{18c^2d^2\left(d\,x^3+c\right)}\\
&+\frac{\left(5a^2d^2+2abcd+2b^2c^2\right)\ln\left(c^{\frac{1}{3}}+d^{\frac{1}{3}}x\right)}{27c^{\frac{8}{3}}d^{\frac{7}{3}}}\\
&-\frac{\left(5a^2d^2+2abcd+2b^2c^2\right)\ln\left(c^{\frac{2}{3}}-c^{\frac{1}{3}}d^{\frac{1}{3}}x+d^{\frac{2}{3}}x^2\right)}{54c^{\frac{8}{3}}d^{\frac{7}{3}}}\\
&-\frac{\left(5a^2d^2+2abcd+2b^2c^2\right)\arctan\left(\frac{\left(c^{\frac{1}{3}}-2d^{\frac{1}{3}}x\right)\sqrt{3}}{3c^{\frac{1}{3}}}\right)\sqrt{3}}{27c^{\frac{8}{3}}d^{\frac{7}{3}}}
\end{aligned}$$

command

```
int((b*x^3+a)^2/(d*x^3+c)^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$\frac{\left(5a^2d^2+2abcd-7b^2c^2\right)x^4}{18c^2d}+\frac{2\left(2a^2d^2-abcd-b^2c^2\right)x}{9d^2c}+\frac{\sum_{\_R=\mathrm{RootOf}\left(d\_Z^3+c\right)}\frac{\left(5a^2d^2+2abcd+2b^2c^2\right)\ln\left(x-\_R\right)}{\_R^2}}{27c^2d^3}$
default	$\frac{\left(5a^2d^2+2abcd-7b^2c^2\right)x^4}{18c^2d}+\frac{2\left(2a^2d^2-abcd-b^2c^2\right)x}{9d^2c}+\frac{\left(5a^2d^2+2abcd+2b^2c^2\right)\left(\frac{\ln\left(x+\left(\frac{c}{d}\right)^{\frac{1}{3}}\right)}{3d\left(\frac{c}{d}\right)^{\frac{2}{3}}}-\frac{\ln\left(x^2-\left(\frac{c}{d}\right)^{\frac{1}{3}}x+\left(\frac{c}{d}\right)^{\frac{2}{3}}\right)}{6d\left(\frac{c}{d}\right)^{\frac{2}{3}}}+\frac{\sqrt{3}\ \arctan$

Maple 2021.1 output

hanged

10 Test file number 52

Test folder name:

`test_cases/1_Algebraic_functions/1.3_Miscellaneous/52_1.3.2_Algebraic_functions`

10.1 Problem number 393

$$\int \frac{\sqrt{ax^{2n}}}{\sqrt{1+x^n}}\,dx$$

Optimal antiderivative

$$\frac{x\,\mathrm{hypergeom}\left(\left[\frac{1}{2},1+\frac{1}{n}\right],\left[2+\frac{1}{n}\right],-x^n\right)\sqrt{a\,x^{2n}}}{1+n}$$

command

```
int((a*x^(2*n))^(1/2)/(1+x^n)^(1/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
meijerg	$\frac{x\,\mathrm{hypergeom}\left(\left[\frac{1}{2},1+\frac{1}{n}\right],\left[2+\frac{1}{n}\right],-x^n\right)\sqrt{a\,x^{2n}}}{1+n}$	36

Maple 2021.1 output

$$\int \frac{\sqrt{a\,x^{2n}}}{\sqrt{x^n+1}}\,dx$$

11 Test file number 55

Test folder name:

`test_cases/2_Exponentials/55_2.3_Exponential_functions`

11.1 Problem number 174

$$\int f^{a+bx^n} x^m \, dx$$

Optimal antiderivative

$$-\frac{f^a x^{1+m} \Gamma\left(\frac{1+m}{n}, -b\, x^n \ln(f)\right) \left(-b\, x^n \ln(f)\right)^{-\frac{1+m}{n}}}{n}$$

command

```
int(f^(a+b*x^n)*x^m,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
meijerg	$\frac{f^a (-b)^{-\frac{m}{n}-\frac{1}{n}} \ln(f)^{-\frac{m}{n}-\frac{1}{n}} \left(\frac{n\, x^{1+m} (-b)^{\frac{m}{n}+\frac{1}{n}} \ln(f)^{\frac{m}{n}+\frac{1}{n}} (\ln(f) x^n bn+m+n+1) L_{-\frac{1+m}{n}}^{\left(\frac{1+m+n}{n}\right)} (b\, x^n \ln(f)) \Gamma\left(-\frac{1+m}{n}+1\right) \Gamma\left(\frac{1+m+n}{n}+1\right)}{(1+m)(1+m+n)\Gamma\left(-\frac{1+m}{n}+\frac{1+m+n}{n}+1\right)} - \frac{n^2}{n}$

Maple 2021.1 output

$$\int f^{b\, x^n + a} x^m \, dx$$

11.2 Problem number 175

$$\int f^{a+bx^n} x^3 \, dx$$

Optimal antiderivative

$$-\frac{f^a x^4 \Gamma\left(\frac{4}{n}, -b\, x^n \ln(f)\right) \left(-b\, x^n \ln(f)\right)^{-\frac{4}{n}}}{n}$$

command

```
int(f^(a+b*x^n)*x^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
meijerg	$\frac{f^a(-b)^{-\frac{4}{n}}\ln(f)^{-\frac{4}{n}}\left(\frac{n x^4(-b)^{\frac{4}{n}}\ln(f)^{\frac{4}{n}}(\ln(f)x^n bn+n+4)\Gamma\left(1-\frac{4}{n}\right)\Gamma\left(\frac{n+4}{n}+1\right)L_{-\frac{4}{n}}^{\left(\frac{n+4}{n}\right)}(b x^n\ln(f))}{4(n+4)\Gamma\left(-\frac{4}{n}+\frac{n+4}{n}+1\right)}-\frac{n^2x^{n+4}(-b)^{\frac{4}{n}}\ln(f)^{1+\frac{4}{n}}bL_{-\frac{4}{n}}^{\left(\frac{n+4}{n}+1\right)}(}{4(n+4)\Gamma\left(-\frac{4}{n}+\frac{n}{}\right.}\right.}{n}$

Maple 2021.1 output

$$\int x^3 f^{b x^n+a}\,dx$$

11.3 Problem number 176

$$\int f^{a+bx^n}x^2\,dx$$

Optimal antiderivative

$$-\frac{f^a x^3\Gamma\left(\frac{3}{n},-b x^n\ln(f)\right)(-b x^n\ln(f))^{-\frac{3}{n}}}{n}$$

command

```
int(f^(a+b*x^n)*x^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
meijerg	$\frac{f^a(-b)^{-\frac{3}{n}}\ln(f)^{-\frac{3}{n}}\left(\frac{n x^3(-b)^{\frac{3}{n}}\ln(f)^{\frac{3}{n}}(\ln(f)x^n bn+n+3)\Gamma\left(1-\frac{3}{n}\right)\Gamma\left(\frac{3+n}{n}+1\right)L_{-\frac{3}{n}}^{\left(\frac{3+n}{n}\right)}(b x^n\ln(f))}{3(3+n)\Gamma\left(-\frac{3}{n}+\frac{3+n}{n}+1\right)}-\frac{n^2x^{3+n}(-b)^{\frac{3}{n}}\ln(f)^{1+\frac{3}{n}}bL_{-\frac{3}{n}}^{\left(\frac{3+n}{n}+1\right)}(}{3(3+n)\Gamma\left(-\frac{3}{n}+\frac{3}{}\right.}\right.}{n}$

Maple 2021.1 output

$$\int x^2 f^{b x^n+a}\,dx$$

11.4 Problem number 177

$$\int f^{a+bx^n}\, x\, dx$$

Optimal antiderivative

$$-\frac{f^a x^2 \Gamma\left(\frac{2}{n}, -b\, x^n \ln(f)\right) \left(-b\, x^n \ln(f)\right)^{-\frac{2}{n}}}{n}$$

command

```
int(f^(a+b*x^n)*x,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
meijerg	$\frac{f^a (-b)^{-\frac{2}{n}} \ln(f)^{-\frac{2}{n}} \left(\frac{n x^2 (-b)^{\frac{2}{n}} \ln(f)^{\frac{2}{n}} (\ln(f) x^n b n + n + 2) \Gamma\left(1-\frac{2}{n}\right) \Gamma\left(\frac{2+n}{n}+1\right) L_{-\frac{2}{n}}^{\left(\frac{2+n}{n}\right)}(b\, x^n \ln(f))}{2(2+n)\Gamma\left(-\frac{2}{n}+\frac{2+n}{n}+1\right)} - \frac{n^2 x^{2+n} (-b)^{\frac{2}{n}} \ln(f)^{1+\frac{2}{n}} b L_{-\frac{2}{n}}^{\left(\frac{2+n}{n}+1\right)}(}{2(2+n)\Gamma\left(-\frac{2}{n}+\frac{2}{}\right.} \right)}{n}$

Maple 2021.1 output

$$\int x\, f^{b\, x^n + a}\, dx$$

11.5 Problem number 178

$$\int f^{a+bx^n}\, dx$$

Optimal antiderivative

$$-\frac{f^a x \Gamma\left(\frac{1}{n}, -b\, x^n \ln(f)\right) \left(-b\, x^n \ln(f)\right)^{-\frac{1}{n}}}{n}$$

command

```
int(f^(a+b*x^n),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result

meijerg	$\frac{f^a(-b)^{-\frac{1}{n}}\ln(f)^{-\frac{1}{n}}\left(\frac{nx(-b)^{\frac{1}{n}}\ln(f)^{\frac{1}{n}}(\ln(f)x^n bn+n+1)\Gamma\left(1-\frac{1}{n}\right)\Gamma\left(\frac{1+n}{n}+1\right)L_{-\frac{1}{n}}^{\left(\frac{1+n}{n}\right)}(b\,x^n\ln(f))}{(1+n)\Gamma\left(-\frac{1}{n}+\frac{1+n}{n}+1\right)}-\frac{n^2x^{1+n}(-b)^{\frac{1}{n}}\ln(f)^{1+\frac{1}{n}}bL_{-\frac{1}{n}}^{\left(\frac{1+n}{n}+1\right)}(b\,x^n\ln(f))}{(1+n)\Gamma\left(-\frac{1}{n}+\frac{1+n}{n}+1\right)}\right.}{n}$

Maple 2021.1 output

$$\int f^{b\,x^n+a}\,dx$$

11.6 Problem number 180

$$\int \frac{f^{a+bx^n}}{x^2}\,dx$$

Optimal antiderivative

$$-\frac{f^a\Gamma\left(-\frac{1}{n},-b\,x^n\ln(f)\right)(-b\,x^n\ln(f))^{\frac{1}{n}}}{nx}$$

command

```
int(f^(a+b*x^n)/x^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
meijerg	$\frac{f^a(-b)^{\frac{1}{n}}\ln(f)^{\frac{1}{n}}\left(-\frac{n(-b)^{-\frac{1}{n}}\ln(f)^{-\frac{1}{n}}(\ln(f)x^n bn+n-1)\Gamma\left(1+\frac{1}{n}\right)\Gamma\left(\frac{-1+n}{n}+1\right)L_{\frac{1}{n}}^{\left(\frac{-1+n}{n}\right)}(b\,x^n\ln(f))}{x(-1+n)\Gamma\left(\frac{1}{n}+\frac{-1+n}{n}+1\right)}+\frac{n^2x^{-1+n}(-b)^{-\frac{1}{n}}\ln(f)^{1-\frac{1}{n}}bL_{\frac{1}{n}}^{\left(\frac{-1+n}{n}\right.}}{(-1+n)\Gamma\left(\right.}$

Maple 2021.1 output

$$\int \frac{f^{b\,x^n+a}}{x^2}\,dx$$

11.7 Problem number 181

$$\int \frac{f^{a+bx^n}}{x^3}\,dx$$

Optimal antiderivative

$$-\frac{f^a\Gamma\left(-\frac{2}{n},-b\,x^n\ln(f)\right)(-b\,x^n\ln(f))^{\frac{2}{n}}}{n\,x^2}$$

command

```
int(f^(a+b*x^n)/x^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
meijerg	$\frac{f^a(-b)^{\frac{2}{n}}\ln(f)^{\frac{2}{n}}\left(-\frac{n(-b)^{-\frac{2}{n}}\ln(f)^{-\frac{2}{n}}(\ln(f)x^n bn+n-2)\Gamma\left(1+\frac{2}{n}\right)\Gamma\left(\frac{-2+n}{n}+1\right)L_{\frac{2}{n}}^{\left(\frac{-2+n}{n}\right)}(b\,x^n\ln(f))}{2x^2(-2+n)\Gamma\left(\frac{2}{n}+\frac{-2+n}{n}+1\right)}+\frac{n^2x^{-2+n}(-b)^{-\frac{2}{n}}\ln(f)^{1-\frac{2}{n}}bL_{\frac{2}{n}}^{\left(\frac{-2+}{n}\right.}}{2(-2+n)\Gamma\left(\right.}\right.}{n}$

Maple 2021.1 output

$$\int \frac{f^{b\,x^n+a}}{x^3}\,dx$$

11.8 Problem number 182

$$\int \frac{f^{a+bx^n}}{x^4}\,dx$$

Optimal antiderivative

$$-\frac{f^a\Gamma\left(-\frac{3}{n},-b\,x^n\ln(f)\right)(-b\,x^n\ln(f))^{\frac{3}{n}}}{n\,x^3}$$

command

```
int(f^(a+b*x^n)/x^4,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
meijerg	$\frac{f^a(-b)^{\frac{3}{n}}\ln(f)^{\frac{3}{n}}\left(-\frac{n(-b)^{-\frac{3}{n}}\ln(f)^{-\frac{3}{n}}(\ln(f)x^n bn+n-3)\Gamma\left(1+\frac{3}{n}\right)\Gamma\left(\frac{n-3}{n}+1\right)L_{\frac{3}{n}}^{\left(\frac{n-3}{n}\right)}(b\,x^n\ln(f))}{3x^3(n-3)\Gamma\left(\frac{3}{n}+\frac{n-3}{n}+1\right)}+\frac{n^2x^{n-3}(-b)^{-\frac{3}{n}}\ln(f)^{1-\frac{3}{n}}bL_{\frac{3}{n}}^{\left(\frac{n-3}{n}+1\right)}}{3(n-3)\Gamma\left(\frac{3}{n}+\frac{n}{}\right.}\right.}{n}$

Maple 2021.1 output

$$\int \frac{f^{b\,x^n+a}}{x^4}\,dx$$

11.9 Problem number 591

$$\int \frac{F^{f\left(a+b\log^2(c(d+ex)^n)\right)}}{dg+egx}\,dx$$

Optimal antiderivative

$$\frac{F^{af}\,\operatorname{erfi}\left(\ln\left(c(ex+d)^n\right)\sqrt{b}\ \sqrt{f}\ \sqrt{\ln\left(F\right)}\right)\sqrt{\pi}}{2egn\sqrt{b}\ \sqrt{f}\ \sqrt{\ln\left(F\right)}}$$

command

```
int(F^(f*(a+b*ln(c*(e*x+d)^n)^2))/(e*g*x+d*g),x)
```

Maple 2022.1 output

$$\frac{\sqrt{\pi}\ F^{f\left(-ib\ln(c)\pi\,\operatorname{csgn}(ic)\operatorname{csgn}(ic(ex+d)^n)\operatorname{csgn}(i(ex+d)^n)+b\pi^2\operatorname{csgn}(ic)\operatorname{csgn}(ic(ex+d)^n)-b\pi^2\operatorname{csgn}(ic)\operatorname{csgn}(i(ex+d)^n)+b\pi^2\operatorname{csgn}(ic(ex+d)^n)\operatorname{cs}\right.}}{}$$

Maple 2021.1 output

$$\int \frac{F^{\left(b\ln(c(ex+d)^n)^2+a\right)f}}{egx+dg}\,dx$$

11.10 Problem number 606

$$\int \frac{F^{f\left(a+b\log(c(d+ex)^n)\right)^2}}{dg+egx}\,dx$$

Optimal antiderivative

$$\frac{\operatorname{erfi}\left(a\sqrt{f}\ \sqrt{\ln\left(F\right)}+b\ln\left(c(ex+d)^n\right)\sqrt{f}\ \sqrt{\ln\left(F\right)}\right)\sqrt{\pi}}{2begn\sqrt{f}\ \sqrt{\ln\left(F\right)}}$$

command

```
int(F^(f*(a+b*ln(c*(e*x+d)^n))^2)/(e*g*x+d*g),x)
```

Maple 2022.1 output

$$-\frac{\sqrt{\pi}\ \operatorname{erf}\left(-b\sqrt{-f\ln\left(F\right)}\ \ln\left((ex+d)^n\right)+\frac{f\left(a+b\left(\ln(c)-\frac{i\pi\,\operatorname{csgn}(ic(ex+d)^n)\left(-\operatorname{csgn}(ic(ex+d)^n)+\operatorname{csgn}(ic)\right)\left(-\operatorname{csgn}(ic(ex+d)^n)+\operatorname{csgn}(i(ex+\right.\right.\right.}{\sqrt{-f\ln\left(F\right)}}}{2genb\sqrt{-f\ln\left(F\right)}}$$

Maple 2021.1 output

$$\int \frac{F^{\left(b\ln(c(ex+d)^n)+a\right)^2 f}}{egx+dg}\,dx$$

11.11 Problem number 764

$$\int f^{a+bx^n} g^{c+dx^n}\,dx$$

Optimal antiderivative

$$-\frac{f^a g^c x \Gamma\left(\frac{1}{n}, -x^n(b\ln(f)+d\ln(g))\right)\left(-x^n(b\ln(f)+d\ln(g))\right)^{-\frac{1}{n}}}{n}$$

command

```
int(f^(a+b*x^n)*g^(c+d*x^n),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
meijerg	$\frac{f^a g^c (-d)^{-\frac{1}{n}} \ln(g)^{-\frac{1}{n}} \left(1+\frac{b\ln(f)}{d\ln(g)}\right)^{-\frac{1}{n}} \left(\frac{nx(-d)^{\frac{1}{n}} \ln(g)^{\frac{1}{n}} \left(1+\frac{b\ln(f)}{d\ln(g)}\right)^{\frac{1}{n}} \left(x^n d\ln(g)\left(1+\frac{b\ln(f)}{d\ln(g)}\right)n+n+1\right)\Gamma\left(1-\frac{1}{n}\right)\Gamma\left(\frac{1+n}{n}+1\right) L_{-\frac{1}{n}}^{\left(\frac{1+n}{n}\right)}\left(x^n d$ $\frac{}{(1+n)\Gamma\left(-\frac{1}{n}+\frac{1+n}{n}+1\right)}$ n

Maple 2021.1 output

$$\int f^{b\,x^n+a} g^{d\,x^n+c}\,dx$$

11.12 Problem number 765

$$\int e^{x^n} x^m\,dx$$

Optimal antiderivative

$$-\frac{x^{1+m}\Gamma\left(\frac{1+m}{n}, -x^n\right)\left(-x^n\right)^{-\frac{1+m}{n}}}{n}$$

command

```
int(exp(x^n)*x^m,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result

meijerg	$\frac{(-1)^{-\frac{m}{n}-\frac{1}{n}}\left(\frac{n\,x^{1+m}(-1)^{\frac{m}{n}+\frac{1}{n}}\left(x^n n+m+n+1\right)L_{-\frac{1+m}{n}}^{\left(\frac{1+m+n}{n}\right)}\left(x^n\right)\Gamma\left(-\frac{1+m}{n}+1\right)\Gamma\left(\frac{1+m+n}{n}+1\right)}{(1+m)(1+m+n)\Gamma\left(-\frac{1+m}{n}+\frac{1+m+n}{n}+1\right)}-\frac{(-1)^{\frac{m}{n}+\frac{1}{n}}n^2x^{1+m+n}L_{-\frac{1+m}{n}}^{\left(\frac{1+m+n}{n}+1\right)}\left(x^n\right)}{(1+m)(1+m+n)\Gamma\left(-\frac{1+m}{n}+\right.}\right.}{n}$

Maple 2021.1 output

$$\int x^m \mathrm{e}^{x^n}\,dx$$

11.13 Problem number 766

$$\int f^{x^n} x^m\,dx$$

Optimal antiderivative

$$-\frac{x^{1+m}\Gamma\left(\frac{1+m}{n},-x^n\ln(f)\right)\left(-x^n\ln(f)\right)^{-\frac{1+m}{n}}}{n}$$

command

```
int(f^(x^n)*x^m,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
meijerg	$\frac{(-1)^{-\frac{m}{n}-\frac{1}{n}}\ln(f)^{-\frac{m}{n}-\frac{1}{n}}\left(\frac{n\,x^{1+m}(-1)^{\frac{m}{n}+\frac{1}{n}}\ln(f)^{\frac{m}{n}+\frac{1}{n}}\left(x^n\ln(f)n+m+n+1\right)L_{-\frac{1+m}{n}}^{\left(\frac{1+m+n}{n}\right)}\left(x^n\ln(f)\right)\Gamma\left(-\frac{1+m}{n}+1\right)\Gamma\left(\frac{1+m+n}{n}+1\right)}{(1+m)(1+m+n)\Gamma\left(-\frac{1+m}{n}+\frac{1+m+n}{n}+1\right)}-\frac{(-1)^{\frac{m}{n}}}{n}\right.}$

Maple 2021.1 output

$$\int f^{x^n} x^m\,dx$$

12 Test file number 56

Test folder name:

```
test_cases/3_Logarithms/56_3.1.2-d_x-^m-a+b_log-c_x^n-^p
```

12.1 Problem number 65

$$\int \frac{x^3}{a + b \log\left(cx^n\right)}\, dx$$

Optimal antiderivative

$$\frac{x^4 \operatorname{expIntegral}\left(\frac{4a+4b\ln(c\,x^n)}{bn}\right) \mathrm{e}^{-\frac{4a}{bn}} \left(c\,x^n\right)^{-\frac{4}{n}}}{bn}$$

command

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

Maple 2022.1 output

method	result
risch	$-\frac{x^4 c^{-\frac{4}{n}} \left(x^n\right)^{-\frac{4}{n}} \mathrm{e}^{-\frac{2\left(-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x^n)^3+2a\right)}{bn}} \operatorname{expInteg}$

Maple 2021.1 output

$$\int \frac{x^3}{b \ln\left(c\,x^n\right) + a}\, dx$$

12.2 Problem number 66

$$\int \frac{x^2}{a + b \log\left(cx^n\right)}\, dx$$

Optimal antiderivative

$$\frac{x^3 \operatorname{expIntegral}\left(\frac{3a+3b\ln(c\,x^n)}{bn}\right) \mathrm{e}^{-\frac{3a}{bn}} \left(c\,x^n\right)^{-\frac{3}{n}}}{bn}$$

command

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

Maple 2022.1 output

method	result

risch	$-\frac{x^3 c^{-\frac{3}{n}} (x^n)^{-\frac{3}{n}} \mathrm{e}^{-\frac{3\left(-ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)+ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2+ib\pi \operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2-ib\pi \operatorname{csgn}(ic\,x^n)^3+2a\right)}{2bn}} \text{expInteg}}{}$

Maple 2021.1 output

$$\int \frac{x^2}{b \ln (c\,x^n) + a}\,dx$$

12.3 Problem number 67

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

Optimal antiderivative

$$\frac{x^2 \operatorname{expIntegral}\left(\frac{2a+2b \ln(c\,x^n)}{bn}\right) \mathrm{e}^{-\frac{2a}{bn}} (c\,x^n)^{-\frac{2}{n}}}{bn}$$

command

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

Maple 2022.1 output

method	result
risch	$-\frac{x^2 c^{-\frac{2}{n}} (x^n)^{-\frac{2}{n}} \mathrm{e}^{-\frac{-ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)+ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2+ib\pi \operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2-ib\pi \operatorname{csgn}(ic\,x^n)^3+2a}{bn}} \text{expIntegral}}{}$

Maple 2021.1 output

$$\int \frac{x}{b \ln (c\,x^n) + a}\,dx$$

12.4 Problem number 70

$$\int \frac{1}{x^2 \left(a + b \log (cx^n)\right)}\,dx$$

Optimal antiderivative

$$\frac{\mathrm{e}^{\frac{a}{bn}} (c\,x^n)^{\frac{1}{n}} \operatorname{expIntegral}\left(\frac{-a-b \ln(c\,x^n)}{bn}\right)}{bnx}$$

command

```
int(1/x^2/(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$-\frac{c^{\frac{1}{n}} (x^n)^{\frac{1}{n}} \mathrm{e}^{\frac{-ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)+ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2+ib\pi \operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2-ib\pi \operatorname{csgn}(ic\,x^n)^3+2a}{2bn}} \operatorname{expIntegral}\left(1,\ln(x\right.}{bn}$

Maple 2021.1 output

$$\int \frac{1}{(b \ln (c\,x^n) + a)\, x^2}\, dx$$

12.5 Problem number 71

$$\int \frac{1}{x^3 \left(a + b \log \left(c x^n\right)\right)}\, dx$$

Optimal antiderivative

$$\frac{\mathrm{e}^{\frac{2a}{bn}} (c\,x^n)^{\frac{2}{n}} \operatorname{expIntegral}\left(-\frac{2(a+b\ln(c\,x^n))}{bn}\right)}{bn\,x^2}$$

command

```
int(1/x^3/(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$-\frac{c^{\frac{2}{n}} (x^n)^{\frac{2}{n}} \mathrm{e}^{\frac{-ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)+ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2+ib\pi \operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2-ib\pi \operatorname{csgn}(ic\,x^n)^3+2a}{bn}} \operatorname{expIntegral}\left(1,2\ln\right.}{bn}$

Maple 2021.1 output

$$\int \frac{1}{(b \ln (c\,x^n) + a)\, x^3}\, dx$$

12.6 Problem number 72

$$\int \frac{1}{x^4 \left(a + b \log \left(c x^n\right)\right)} \, dx$$

Optimal antiderivative

$$\frac{\mathrm{e}^{\frac{3a}{bn}} \left(c x^n\right)^{\frac{3}{n}} \operatorname{expIntegral}\left(-\frac{3(a+b \ln(c x^n))}{bn}\right)}{bn x^3}$$

command

```
int(1/x^4/(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$-\frac{c^{\frac{3}{n}} (x^n)^{\frac{3}{n}} \mathrm{e}^{-\frac{\frac{3ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic x^n)}{2} + \frac{3ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ic x^n)^2}{2} + \frac{3ib\pi \operatorname{csgn}(ix^n)\operatorname{csgn}(ic x^n)^2}{2} - \frac{3ib\pi \operatorname{csgn}(ic x^n)^3}{2} + 3a}{bn}} \operatorname{expIntegral}$

Maple 2021.1 output

$$\int \frac{1}{\left(b \ln \left(c x^n\right) + a\right) x^4} \, dx$$

12.7 Problem number 73

$$\int \frac{x^3}{\left(a + b \log \left(c x^n\right)\right)^2} \, dx$$

Optimal antiderivative

$$\frac{4x^4 \operatorname{expIntegral}\left(\frac{4a+4b \ln(c x^n)}{bn}\right) \mathrm{e}^{-\frac{4a}{bn}} \left(c x^n\right)^{-\frac{4}{n}}}{b^2 n^2} - \frac{x^4}{bn \left(a + b \ln \left(c x^n\right)\right)}$$

command

```
int(x^3/(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result

risch	$-\frac{2x^4}{\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x^n)^3\right.$

Maple 2021.1 output

$$\int \frac{x^3}{\left(b\ln\left(c\,x^n\right)+a\right)^2}\,dx$$

12.8 Problem number 74

$$\int \frac{x^2}{\left(a+b\log\left(cx^n\right)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{3x^3\,\mathrm{expIntegral}\left(\frac{3a+3b\ln(c\,x^n)}{bn}\right)\mathrm{e}^{-\frac{3a}{bn}}\left(c\,x^n\right)^{-\frac{3}{n}}}{b^2n^2}-\frac{x^3}{bn\left(a+b\ln\left(c\,x^n\right)\right)}$$

command

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

Maple 2022.1 output

method	result
risch	$-\frac{2x^3}{\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x^n)^3\right.$

Maple 2021.1 output

$$\int \frac{x^2}{\left(b\ln\left(c\,x^n\right)+a\right)^2}\,dx$$

12.9 Problem number 75

$$\int \frac{x}{\left(a+b\log\left(cx^n\right)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{2x^2\,\mathrm{expIntegral}\left(\frac{2a+2b\ln\left(cx^n\right)}{bn}\right)\mathrm{e}^{-\frac{2a}{bn}}\left(cx^n\right)^{-\frac{2}{n}}}{b^2n^2}-\frac{x^2}{bn\left(a+b\ln\left(cx^n\right)\right)}$$

command

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

Maple 2022.1 output

method	result
risch	$-\frac{2x^2}{\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(icx^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(icx^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(icx^n)^2-ib\pi\mathrm{csgn}(icx^n)^3\right.$

Maple 2021.1 output

$$\int \frac{x}{\left(b\ln\left(cx^n\right)+a\right)^2}\,dx$$

12.10 Problem number 78

$$\int \frac{1}{x^2\left(a+b\log\left(cx^n\right)\right)^2}\,dx$$

Optimal antiderivative

$$-\frac{\mathrm{e}^{\frac{a}{bn}}\left(cx^n\right)^{\frac{1}{n}}\,\mathrm{expIntegral}\left(\frac{-a-b\ln\left(cx^n\right)}{bn}\right)}{b^2n^2x}-\frac{1}{bnx\left(a+b\ln\left(cx^n\right)\right)}$$

command

```
int(1/x^2/(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result

risch	$-\frac{2i}{bnx\left(b\pi \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)-b\pi \operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2-b\pi \operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2+b\pi\operatorname{csgn}(ic\,x^n)^3+2ib\ln(c)+2ib\ln(x^n)+2$

Maple 2021.1 output

$$\int \frac{1}{\left(b\ln\left(c\,x^n\right)+a\right)^2 x^2}\,dx$$

12.11 Problem number 79

$$\int \frac{1}{x^3\left(a+b\log\left(cx^n\right)\right)^2}\,dx$$

Optimal antiderivative

$$-\frac{2\,\mathrm{e}^{\frac{2a}{bn}}\left(c\,x^n\right)^{\frac{2}{n}}\operatorname{expIntegral}\left(-\frac{2(a+b\ln(c\,x^n))}{bn}\right)}{b^2n^2x^2}-\frac{1}{bn\,x^2\left(a+b\ln\left(c\,x^n\right)\right)}$$

command

```
int(1/x^3/(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$-\frac{2}{x^2\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)+ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2+ib\pi \operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2-ib\pi\operatorname{csgn}(ic\,x^n$

Maple 2021.1 output

$$\int \frac{1}{\left(b\ln\left(c\,x^n\right)+a\right)^2 x^3}\,dx$$

12.12 Problem number 80

$$\int \frac{1}{x^4\left(a+b\log\left(cx^n\right)\right)^2}\,dx$$

Optimal antiderivative

$$-\frac{3\,\mathrm{e}^{\frac{3a}{bn}}\left(c\,x^n\right)^{\frac{3}{n}}\operatorname{expIntegral}\left(-\frac{3(a+b\ln(c\,x^n))}{bn}\right)}{b^2n^2x^3}-\frac{1}{bn\,x^3\left(a+b\ln\left(c\,x^n\right)\right)}$$

command

```
int(1/x^4/(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$-\frac{2}{x^3\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x^n$

Maple 2021.1 output

$$\int \frac{1}{\left(b\ln\left(c\,x^n\right)+a\right)^2 x^4}\,dx$$

12.13 Problem number 81

$$\int \frac{x^3}{\left(a+b\log\left(cx^n\right)\right)^3}\,dx$$

Optimal antiderivative

$$\frac{8x^4\,\mathrm{expIntegral}\left(\frac{4a+4b\ln(c\,x^n)}{bn}\right)\mathrm{e}^{-\frac{4a}{bn}}\left(c\,x^n\right)^{-\frac{4}{n}}}{b^3n^3}-\frac{x^4}{2bn\left(a+b\ln\left(c\,x^n\right)\right)^2}-\frac{2x^4}{b^2n^2\left(a+b\ln\left(c\,x^n\right)\right)}$$

command

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

Maple 2022.1 output

method	result
risch	$-\frac{2\left(bn\,x^4-2i\pi b\,x^4\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+2i\pi b\,x^4\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+2i\pi b\,x^4\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-2i\pi b\,x^4\mathrm{csgn}(ic\,x^n)^3+\right.}{\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\right.}$

Maple 2021.1 output

$$\int \frac{x^3}{\left(b\ln\left(c\,x^n\right)+a\right)^3}\,dx$$

12.14 Problem number 82

$$\int \frac{x^2}{(a+b\log(cx^n))^3}\,dx$$

Optimal antiderivative

$$\frac{9x^3\,\mathrm{expIntegral}\left(\frac{3a+3b\ln(c\,x^n)}{bn}\right)\mathrm{e}^{-\frac{3a}{bn}}(c\,x^n)^{-\frac{3}{n}}}{2b^3n^3}-\frac{x^3}{2bn\left(a+b\ln\left(c\,x^n\right)\right)^2}-\frac{3x^3}{2b^2n^2\left(a+b\ln\left(c\,x^n\right)\right)}$$

command

```
int(x^2/(a+b*ln(c*x^n))^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$-\frac{2bn\,x^3-3i\pi b\,x^3\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+3i\pi b\,x^3\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+3i\pi b\,x^3\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-3i\pi b\,x^3\mathrm{csgn}(ic\,x^n)^3+6}{\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{cs}\right.$

Maple 2021.1 output

$$\int \frac{x^2}{(b\ln(c\,x^n)+a)^3}\,dx$$

12.15 Problem number 83

$$\int \frac{x}{(a+b\log(cx^n))^3}\,dx$$

Optimal antiderivative

$$\frac{2x^2\,\mathrm{expIntegral}\left(\frac{2a+2b\ln(c\,x^n)}{bn}\right)\mathrm{e}^{-\frac{2a}{bn}}(c\,x^n)^{-\frac{2}{n}}}{b^3n^3}-\frac{x^2}{2bn\left(a+b\ln\left(c\,x^n\right)\right)^2}-\frac{x^2}{b^2n^2\left(a+b\ln\left(c\,x^n\right)\right)}$$

command

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

Maple 2022.1 output

method	result

risch	$-\frac{2\left(bn\,x^2-i\pi b\,x^2\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+i\pi b\,x^2\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+i\pi b\,x^2\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-i\pi b\,x^2\mathrm{csgn}(ic\,x^n)^3+2\ln($}{\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csg}\right.}$

Maple 2021.1 output

$$\int \frac{x}{\left(b\ln\left(c\,x^n\right)+a\right)^3}\,dx$$

12.16 Problem number 86

$$\int \frac{1}{x^2\left(a+b\log\left(cx^n\right)\right)^3}\,dx$$

Optimal antiderivative

$$\frac{\mathrm{e}^{\frac{a}{bn}}\left(c\,x^n\right)^{\frac{1}{n}}\,\mathrm{expIntegral}\left(\frac{-a-b\ln(c\,x^n)}{bn}\right)}{2b^3n^3x}-\frac{1}{2bnx\left(a+b\ln\left(c\,x^n\right)\right)^2}+\frac{1}{2b^2n^2x\left(a+b\ln\left(c\,x^n\right)\right)}$$

command

```
int(1/x^2/(a+b*ln(c*x^n))^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$\frac{-2bn+2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x^n)^3}{\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x^n)^3\right)^2}$

Maple 2021.1 output

$$\int \frac{1}{\left(b\ln\left(c\,x^n\right)+a\right)^3x^2}\,dx$$

12.17 Problem number 87

$$\int \frac{1}{x^3\left(a+b\log\left(cx^n\right)\right)^3}\,dx$$

Optimal antiderivative

$$\frac{2\,\mathrm{e}^{\frac{2a}{bn}}\left(c\,x^n\right)^{\frac{2}{n}}\,\mathrm{expIntegral}\left(-\frac{2(a+b\ln(c\,x^n))}{bn}\right)}{b^3n^3x^2}-\frac{1}{2bn\,x^2\left(a+b\ln\left(c\,x^n\right)\right)^2}+\frac{1}{b^2n^2x^2\left(a+b\ln\left(c\,x^n\right)\right)}$$

command

```
int(1/x^3/(a+b*ln(c*x^n))^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$\frac{-2bn+4a+4b\ln(c)+4\ln(x^n)b-2ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+2ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+2ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-2ib\pi\mathrm{csgn}}{\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x^n)^3\right)^2}$

Maple 2021.1 output

$$\int \frac{1}{\left(b\ln\left(c\,x^n\right)+a\right)^3 x^3}\,dx$$

12.18 Problem number 88

$$\int \frac{1}{x^4\left(a+b\log\left(cx^n\right)\right)^3}\,dx$$

Optimal antiderivative

$$\frac{9\,\mathrm{e}^{\frac{3a}{bn}}\left(c\,x^n\right)^{\frac{3}{n}}\,\mathrm{expIntegral}\left(-\frac{3(a+b\ln(c\,x^n))}{bn}\right)}{2b^3n^3x^3}-\frac{1}{2bn\,x^3\left(a+b\ln\left(c\,x^n\right)\right)^2}+\frac{3}{2b^2n^2x^3\left(a+b\ln\left(c\,x^n\right)\right)}$$

command

```
int(1/x^4/(a+b*ln(c*x^n))^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$\frac{6a+6b\ln(c)+6\ln(x^n)b-3ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+3ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+3ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-3ib\pi\mathrm{csgn}(ic\,x^n)}{b^2n^2\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x^n\right.}$

Maple 2021.1 output

$$\int \frac{1}{\left(b\ln\left(c\,x^n\right)+a\right)^3 x^4}\,dx$$

12.19 Problem number 107

$$\int \frac{(dx)^{5/2}}{(a+b\log(cx^n))^2}\,dx$$

Optimal antiderivative

$$\frac{7(dx)^{\frac{7}{2}}\,\text{expIntegral}\left(\frac{\frac{7a}{2}+\frac{7b\ln(c\,x^n)}{2}}{bn}\right)\mathrm{e}^{-\frac{7a}{2bn}}(c\,x^n)^{-\frac{7}{2n}}}{2b^2d\,n^2}-\frac{(dx)^{\frac{7}{2}}}{bdn\,(a+b\ln(c\,x^n))}$$

command

```
int((d*x)^(5/2)/(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$-\frac{2x^4d^3}{bn\sqrt{dx}\,\left(2a+2b\ln(c)+2b\ln\left(\mathrm{e}^{n\ln(x)}\right)-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}\left(ic\,\mathrm{e}^{n\ln(x)}\right)\mathrm{csgn}\left(ic\,\mathrm{e}^{n\ln(x)}\right)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}\left(ic\,\mathrm{e}^{n\ln(x)}\right)^2+ib\pi\,\mathrm{csgn}\left(ie^{n\ln}\right.\right.$

Maple 2021.1 output

$$\int \frac{(dx)^{\frac{5}{2}}}{(b\ln(c\,x^n)+a)^2}\,dx$$

12.20 Problem number 108

$$\int \frac{(dx)^{3/2}}{(a+b\log(cx^n))^2}\,dx$$

Optimal antiderivative

$$\frac{5(dx)^{\frac{5}{2}}\,\text{expIntegral}\left(\frac{\frac{5a}{2}+\frac{5b\ln(c\,x^n)}{2}}{bn}\right)\mathrm{e}^{-\frac{5a}{2bn}}(c\,x^n)^{-\frac{5}{2n}}}{2b^2d\,n^2}-\frac{(dx)^{\frac{5}{2}}}{bdn\,(a+b\ln(c\,x^n))}$$

command

```
int((d*x)^(3/2)/(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$-\frac{2x^3d^2}{bn\sqrt{dx}\left(2a+2b\ln(c)+2b\ln\left(\mathrm{e}^{n\ln(x)}\right)-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}\left(ie^{n\ln(x)}\right)\mathrm{csgn}\left(ic\,\mathrm{e}^{n\ln(x)}\right)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}\left(ic\,\mathrm{e}^{n\ln(x)}\right)^2+ib\pi\,\mathrm{csgn}\left(ie^{n\ln}\right.\right.}$

Maple 2021.1 output

$$\int \frac{(dx)^{\frac{3}{2}}}{\left(b\ln\left(c\,x^n\right)+a\right)^2}\,dx$$

12.21 Problem number 109

$$\int \frac{\sqrt{dx}}{\left(a+b\log\left(cx^n\right)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{3(dx)^{\frac{3}{2}}\,\mathrm{expIntegral}\left(\frac{\frac{3a}{2}+\frac{3b\ln\left(c\,x^n\right)}{2}}{bn}\right)\mathrm{e}^{-\frac{3a}{2bn}}\left(c\,x^n\right)^{-\frac{3}{2n}}}{2b^2d\,n^2}-\frac{(dx)^{\frac{3}{2}}}{bdn\left(a+b\ln\left(c\,x^n\right)\right)}$$

command

```
int((d*x)^(1/2)/(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$-\frac{2x^2d}{bn\sqrt{dx}\left(2a+2b\ln(c)+2b\ln\left(\mathrm{e}^{n\ln(x)}\right)-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}\left(ie^{n\ln(x)}\right)\mathrm{csgn}\left(ic\,\mathrm{e}^{n\ln(x)}\right)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}\left(ic\,\mathrm{e}^{n\ln(x)}\right)^2+ib\pi\,\mathrm{csgn}\left(ie^{n\ln}\right.\right.}$

Maple 2021.1 output

$$\int \frac{\sqrt{dx}}{\left(b\ln\left(c\,x^n\right)+a\right)^2}\,dx$$

12.22 Problem number 111

$$\int \frac{1}{(dx)^{3/2}\left(a+b\log\left(cx^n\right)\right)^2}\,dx$$

Optimal antiderivative

$$-\frac{\mathrm{e}^{\frac{a}{2bn}}\left(c\,x^n\right)^{\frac{1}{2n}}\operatorname{expIntegral}\left(\frac{-a-b\ln\left(c\,x^n\right)}{2bn}\right)}{2b^2d\,n^2\sqrt{dx}}-\frac{1}{bdn\left(a+b\ln\left(c\,x^n\right)\right)\sqrt{dx}}$$

command

```
int(1/(d*x)^(3/2)/(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$-\frac{2}{bn\sqrt{dx}\left(2a+2b\ln(c)+2b\ln\left(\mathrm{e}^{n\ln(x)}\right)-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}\left(ic\,\mathrm{e}^{n\ln(x)}\right)\mathrm{csgn}\left(ic\,\mathrm{e}^{n\ln(x)}\right)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}\left(ic\,\mathrm{e}^{n\ln(x)}\right)^2+ib\pi\,\mathrm{csgn}\left(ie^{n\ln}\right.\right.$

Maple 2021.1 output

$$\int \frac{1}{(dx)^{\frac{3}{2}}\left(b\ln\left(c\,x^n\right)+a\right)^2}\,dx$$

12.23 Problem number 112

$$\int \frac{1}{(dx)^{5/2}\left(a+b\log\left(cx^n\right)\right)^2}\,dx$$

Optimal antiderivative

$$-\frac{3\,\mathrm{e}^{\frac{3a}{2bn}}\left(c\,x^n\right)^{\frac{3}{2n}}\operatorname{expIntegral}\left(-\frac{3(a+b\ln\left(c\,x^n\right))}{2bn}\right)}{2b^2d\,n^2\left(dx\right)^{\frac{3}{2}}}-\frac{1}{bdn\left(dx\right)^{\frac{3}{2}}\left(a+b\ln\left(c\,x^n\right)\right)}$$

command

```
int(1/(d*x)^(5/2)/(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result

risch	$-\frac{2}{bnx\sqrt{dx}\left(2a+2b\ln(c)+2b\ln\left(\mathrm{e}^{n\ln(x)}\right)-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}\left(ie^{n\ln(x)}\right)\mathrm{csgn}\left(ic\,\mathrm{e}^{n\ln(x)}\right)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}\left(ic\,\mathrm{e}^{n\ln(x)}\right)^2+ib\pi\,\mathrm{csgn}\left(ie^{n\ln(x)}\right)^2\right.$

Maple 2021.1 output

$$\int \frac{1}{(dx)^{\frac{5}{2}}\left(b\ln\left(cx^n\right)+a\right)^2}\,dx$$

13 Test file number 57

Test folder name:

`test_cases/3_Logarithms/57_3.1.4-f_x-^m-d+e_x^r-^q-a+b_log-c_x^n-^p`

13.1 Problem number 92

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

Optimal antiderivative

$$\begin{aligned}
&-\frac{2ab\,d^2nx}{e^3}+\frac{2b^2d^2n^2x}{e^3}-\frac{b^2dn^2x^2}{4e^2}+\frac{2b^2n^2x^3}{27e}-\frac{2b^2d^2nx\ln\left(cx^n\right)}{e^3}\\
&+\frac{bdnx^2(a+b\ln\left(cx^n\right))}{2e^2}-\frac{2bnx^3(a+b\ln\left(cx^n\right))}{9e}+\frac{d^2x(a+b\ln\left(cx^n\right))^2}{e^3}\\
&-\frac{dx^2(a+b\ln\left(cx^n\right))^2}{2e^2}+\frac{x^3(a+b\ln\left(cx^n\right))^2}{3e}-\frac{d^3(a+b\ln\left(cx^n\right))^2\ln\left(1+\frac{ex}{d}\right)}{e^4}\\
&-\frac{2bd^3n(a+b\ln\left(cx^n\right))\,\mathrm{polylog}\left(2,-\frac{ex}{d}\right)}{e^4}+\frac{2b^2d^3n^2\,\mathrm{polylog}\left(3,-\frac{ex}{d}\right)}{e^4}
\end{aligned}$$

command

```
int(x^3*(a+b*ln(c*x^n))^2/(e*x+d),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	4508

Maple 2021.1 output

$$\int \frac{\left(b\ln\left(cx^n\right)+a\right)^2x^3}{ex+d}\,dx$$

13.2 Problem number 93

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

Optimal antiderivative

$$\frac{2abdnx}{e^2}-\frac{2b^2dn^2x}{e^2}+\frac{b^2n^2x^2}{4e}+\frac{2b^2dnx\ln(cx^n)}{e^2}-\frac{bnx^2(a+b\ln(cx^n))}{2e}$$
$$-\frac{dx(a+b\ln(cx^n))^2}{e^2}+\frac{x^2(a+b\ln(cx^n))^2}{2e}+\frac{d^2(a+b\ln(cx^n))^2\ln\left(1+\frac{ex}{d}\right)}{e^3}$$
$$+\frac{2bd^2n(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{e^3}-\frac{2b^2d^2n^2\operatorname{polylog}\left(3,-\frac{ex}{d}\right)}{e^3}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	3479

Maple 2021.1 output

$$\int \frac{(b\ln(cx^n)+a)^2x^2}{ex+d}\,dx$$

13.3 Problem number 94

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

Optimal antiderivative

$$-\frac{2abnx}{e}+\frac{2b^2n^2x}{e}-\frac{2b^2nx\ln(cx^n)}{e}+\frac{x(a+b\ln(cx^n))^2}{e}-\frac{d(a+b\ln(cx^n))^2\ln\left(1+\frac{ex}{d}\right)}{e^2}$$
$$-\frac{2bdn(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{e^2}+\frac{2b^2dn^2\operatorname{polylog}\left(3,-\frac{ex}{d}\right)}{e^2}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	2420

Maple 2021.1 output

$$\int \frac{(b \ln (c x^n) + a)^2 x}{ex + d} dx$$

13.4 Problem number 97

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

Optimal antiderivative

$$-\frac{2b^2n^2}{dx} - \frac{2bn(a + b \ln (c x^n))}{dx} - \frac{(a + b \ln (c x^n))^2}{dx} + \frac{e \ln \left(1 + \frac{d}{ex}\right) (a + b \ln (c x^n))^2}{d^2} - \frac{2ben(a + b \ln (c x^n)) \operatorname{polylog}\left(2, -\frac{d}{ex}\right)}{d^2} - \frac{2b^2 e n^2 \operatorname{polylog}\left(3, -\frac{d}{ex}\right)}{d^2}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	3292

Maple 2021.1 output

$$\int \frac{(b \ln (c x^n) + a)^2}{(ex + d) x^2} dx$$

13.5 Problem number 98

$$\int \frac{(a + b \log (cx^n))^2}{x^3(d + ex)} dx$$

Optimal antiderivative

$$-\frac{b^2n^2}{4d x^2} + \frac{2b^2 e n^2}{d^2 x} - \frac{bn(a + b \ln (c x^n))}{2d x^2} + \frac{2ben(a + b \ln (c x^n))}{d^2 x} - \frac{(a + b \ln (c x^n))^2}{2d x^2} + \frac{e(a + b \ln (c x^n))^2}{d^2 x} - \frac{e^2 \ln \left(1 + \frac{d}{ex}\right) (a + b \ln (c x^n))^2}{d^3} + \frac{2b e^2 n(a + b \ln (c x^n)) \operatorname{polylog}\left(2, -\frac{d}{ex}\right)}{d^3} + \frac{2b^2 e^2 n^2 \operatorname{polylog}\left(3, -\frac{d}{ex}\right)}{d^3}$$

command

```
int((a+b*ln(c*x^n))^2/x^3/(e*x+d),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	4413

Maple 2021.1 output

$$\int \frac{(b \ln (c x^n) + a)^2}{(ex + d) x^3} \, dx$$

13.6 Problem number 99

$$\int \frac{(a + b \log (cx^n))^2}{x^4(d + ex)} \, dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{2b^2n^2}{27d\,x^3} + \frac{b^2e\,n^2}{4d^2x^2} - \frac{2b^2e^2n^2}{d^3x} - \frac{2bn(a + b\ln(c\,x^n))}{9d\,x^3} + \frac{ben(a + b\ln(c\,x^n))}{2d^2x^2} \\
&- \frac{2b\,e^2n(a + b\ln(c\,x^n))}{d^3x} - \frac{(a + b\ln(c\,x^n))^2}{3d\,x^3} + \frac{e(a + b\ln(c\,x^n))^2}{2d^2x^2} \\
&- \frac{e^2(a + b\ln(c\,x^n))^2}{d^3x} + \frac{e^3\ln\left(1 + \frac{d}{ex}\right)(a + b\ln(c\,x^n))^2}{d^4} \\
&- \frac{2b\,e^3n(a + b\ln(c\,x^n))\,\mathrm{polylog}\left(2, -\frac{d}{ex}\right)}{d^4} - \frac{2b^2e^3n^2\,\mathrm{polylog}\left(3, -\frac{d}{ex}\right)}{d^4}
\end{aligned}$$

command

```
int((a+b*ln(c*x^n))^2/x^4/(e*x+d),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	5435

Maple 2021.1 output

$$\int \frac{(b \ln (c x^n) + a)^2}{(ex + d) x^4} \, dx$$

13.7 Problem number 100

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&\frac{4abdnx}{e^3}-\frac{4b^2dn^2x}{e^3}+\frac{b^2n^2x^2}{4e^2}+\frac{4b^2dnx\ln(cx^n)}{e^3}\\
&-\frac{bnx^2(a+b\ln(cx^n))}{2e^2}-\frac{2dx(a+b\ln(cx^n))^2}{e^3}+\frac{x^2(a+b\ln(cx^n))^2}{2e^2}\\
&-\frac{d^2x(a+b\ln(cx^n))^2}{e^3(ex+d)}+\frac{2bd^2n(a+b\ln(cx^n))\ln\left(1+\frac{ex}{d}\right)}{e^4}\\
&+\frac{3d^2(a+b\ln(cx^n))^2\ln\left(1+\frac{ex}{d}\right)}{e^4}+\frac{2b^2d^2n^2\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{e^4}\\
&+\frac{6bd^2n(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{e^4}-\frac{6b^2d^2n^2\operatorname{polylog}\left(3,-\frac{ex}{d}\right)}{e^4}
\end{aligned}$$

command

```
int(x^3*(a+b*ln(c*x^n))^2/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	4871

Maple 2021.1 output

$$\int \frac{(b\ln(cx^n)+a)^2x^3}{(ex+d)^2}\,dx$$

13.8 Problem number 101

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

Optimal antiderivative

$$\begin{aligned}
&-\frac{2abnx}{e^2}+\frac{2b^2n^2x}{e^2}-\frac{2b^2nx\ln(cx^n)}{e^2}+\frac{x(a+b\ln(cx^n))^2}{e^2}\\
&+\frac{dx(a+b\ln(cx^n))^2}{e^2(ex+d)}-\frac{2bdn(a+b\ln(cx^n))\ln\left(1+\frac{ex}{d}\right)}{e^3}\\
&-\frac{2d(a+b\ln(cx^n))^2\ln\left(1+\frac{ex}{d}\right)}{e^3}-\frac{2b^2dn^2\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{e^3}\\
&-\frac{4bdn(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{e^3}+\frac{4b^2dn^2\operatorname{polylog}\left(3,-\frac{ex}{d}\right)}{e^3}
\end{aligned}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	3778

Maple 2021.1 output

$$\int \frac{(b \ln (c x^n) + a)^2 x^2}{(ex + d)^2} dx$$

13.9 Problem number 102

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

Optimal antiderivative

$$-\frac{x(a + b \ln (c x^n))^2}{e (ex + d)} + \frac{2bn(a + b \ln (c x^n)) \ln \left(1 + \frac{ex}{d}\right)}{e^2} + \frac{(a + b \ln (c x^n))^2 \ln \left(1 + \frac{ex}{d}\right)}{e^2} + \frac{2b^2 n^2 \operatorname{polylog}\left(2, -\frac{ex}{d}\right)}{e^2} + \frac{2bn(a + b \ln (c x^n)) \operatorname{polylog}\left(2, -\frac{ex}{d}\right)}{e^2} - \frac{2b^2 n^2 \operatorname{polylog}\left(3, -\frac{ex}{d}\right)}{e^2}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	2674

Maple 2021.1 output

$$\int \frac{(b \ln (c x^n) + a)^2 x}{(ex + d)^2} dx$$

13.10 Problem number 104

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

Optimal antiderivative

$$-\frac{ex(a+b\ln(cx^n))^2}{d^2(ex+d)}-\frac{\ln\left(1+\frac{d}{ex}\right)(a+b\ln(cx^n))^2}{d^2}+\frac{2bn(a+b\ln(cx^n))\ln\left(1+\frac{ex}{d}\right)}{d^2}$$
$$+\frac{2bn(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{d}{ex}\right)}{d^2}+\frac{2b^2n^2\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{d^2}+\frac{2b^2n^2\operatorname{polylog}\left(3,-\frac{d}{ex}\right)}{d^2}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	3536

Maple 2021.1 output

$$\int \frac{(b\ln(cx^n)+a)^2}{(ex+d)^2x}\,dx$$

13.11 Problem number 105

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

Optimal antiderivative

$$-\frac{2b^2n^2}{d^2x}-\frac{2bn(a+b\ln(cx^n))}{d^2x}-\frac{(a+b\ln(cx^n))^2}{d^2x}$$
$$+\frac{e^2x(a+b\ln(cx^n))^2}{d^3(ex+d)}+\frac{2e\ln\left(1+\frac{d}{ex}\right)(a+b\ln(cx^n))^2}{d^3}$$
$$-\frac{2ben(a+b\ln(cx^n))\ln\left(1+\frac{ex}{d}\right)}{d^3}-\frac{4ben(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{d}{ex}\right)}{d^3}$$
$$-\frac{2b^2en^2\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{d^3}-\frac{4b^2en^2\operatorname{polylog}\left(3,-\frac{d}{ex}\right)}{d^3}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	4586

Maple 2021.1 output

$$\int \frac{\left(b \ln \left(c x^{n}\right)+a\right)^{2}}{\left(e x+d\right)^{2} x^{2}} dx$$

13.12 Problem number 106

$$\int \frac{\left(a+b \log \left(c x^{n}\right)\right)^{2}}{x^{3}(d+e x)^{2}} dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{b^{2} n^{2}}{4 d^{2} x^{2}}+\frac{4 b^{2} e \, n^{2}}{d^{3} x}-\frac{b n(a+b \ln \left(c x^{n}\right))}{2 d^{2} x^{2}}+\frac{4 b e n(a+b \ln \left(c x^{n}\right))}{d^{3} x}-\frac{\left(a+b \ln \left(c x^{n}\right)\right)^{2}}{2 d^{2} x^{2}} \\
&+\frac{2 e(a+b \ln \left(c x^{n}\right))^{2}}{d^{3} x}-\frac{e^{3} x(a+b \ln \left(c x^{n}\right))^{2}}{d^{4}\left(e x+d\right)}-\frac{3 e^{2} \ln \left(1+\frac{d}{e x}\right)\left(a+b \ln \left(c x^{n}\right)\right)^{2}}{d^{4}} \\
&+\frac{2 b \, e^{2} n(a+b \ln \left(c x^{n}\right)) \ln \left(1+\frac{e x}{d}\right)}{d^{4}}+\frac{6 b \, e^{2} n(a+b \ln \left(c x^{n}\right)) \operatorname{polylog}\left(2,-\frac{d}{e x}\right)}{d^{4}} \\
&+\frac{2 b^{2} e^{2} n^{2} \operatorname{polylog}\left(2,-\frac{e x}{d}\right)}{d^{4}}+\frac{6 b^{2} e^{2} n^{2} \operatorname{polylog}\left(3,-\frac{d}{e x}\right)}{d^{4}}
\end{aligned}$$

command

```
int((a+b*ln(c*x^n))^2/x^3/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	5791

Maple 2021.1 output

$$\int \frac{\left(b \ln \left(c x^{n}\right)+a\right)^{2}}{\left(e x+d\right)^{2} x^{3}} dx$$

13.13 Problem number 107

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{2abnx}{e^3}+\frac{2b^2n^2x}{e^3}-\frac{2b^2nx\ln(cx^n)}{e^3}+\frac{bdnx(a+b\ln(cx^n))}{e^3(ex+d)}\\
&-\frac{d(a+b\ln(cx^n))^2}{2e^4}+\frac{x(a+b\ln(cx^n))^2}{e^3}+\frac{d^3(a+b\ln(cx^n))^2}{2e^4(ex+d)^2}\\
&+\frac{3dx(a+b\ln(cx^n))^2}{e^3(ex+d)}-\frac{b^2dn^2\ln(ex+d)}{e^4}-\frac{5bdn(a+b\ln(cx^n))\ln\left(1+\frac{ex}{d}\right)}{e^4}\\
&-\frac{3d(a+b\ln(cx^n))^2\ln\left(1+\frac{ex}{d}\right)}{e^4}-\frac{5b^2dn^2\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{e^4}\\
&-\frac{6bdn(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{e^4}+\frac{6b^2dn^2\operatorname{polylog}\left(3,-\frac{ex}{d}\right)}{e^4}
\end{aligned}$$

command

```
int(x^3*(a+b*ln(c*x^n))^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	4952

Maple 2021.1 output

$$\int \frac{(b\ln(cx^n)+a)^2x^3}{(ex+d)^3}\,dx$$

13.14 Problem number 108

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{bnx(a+b\ln(cx^n))}{e^2(ex+d)}+\frac{(a+b\ln(cx^n))^2}{2e^3}-\frac{d^2(a+b\ln(cx^n))^2}{2e^3(ex+d)^2}-\frac{2x(a+b\ln(cx^n))^2}{e^2(ex+d)}\\
&+\frac{b^2n^2\ln(ex+d)}{e^3}+\frac{3bn(a+b\ln(cx^n))\ln\left(1+\frac{ex}{d}\right)}{e^3}+\frac{(a+b\ln(cx^n))^2\ln\left(1+\frac{ex}{d}\right)}{e^3}\\
&+\frac{3b^2n^2\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{e^3}+\frac{2bn(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{e^3}-\frac{2b^2n^2\operatorname{polylog}\left(3,-\frac{ex}{d}\right)}{e^3}
\end{aligned}$$

command

```
int(x^2*(a+b*ln(c*x^n))^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	3831

Maple 2021.1 output

$$\int \frac{\left(b \ln \left(c x^{n}\right)+a\right)^{2} x^{2}}{\left(e x+d\right)^{3}} dx$$

13.15 Problem number 111

$$\int \frac{\left(a+b \log \left(c x^{n}\right)\right)^{2}}{x(d+e x)^{3}} dx$$

Optimal antiderivative

$$\begin{aligned}
&\frac{benx(a+b \ln \left(c x^{n}\right))}{d^{3}\left(e x+d\right)}-\frac{\left(a+b \ln \left(c x^{n}\right)\right)^{2}}{2 d^{3}}+\frac{\left(a+b \ln \left(c x^{n}\right)\right)^{2}}{2 d\left(e x+d\right)^{2}}-\frac{ex(a+b \ln \left(c x^{n}\right))^{2}}{d^{3}\left(e x+d\right)} \\
&+\frac{\left(a+b \ln \left(c x^{n}\right)\right)^{3}}{3 b d^{3} n}-\frac{b^{2} n^{2} \ln \left(e x+d\right)}{d^{3}}+\frac{3bn(a+b \ln \left(c x^{n}\right)) \ln \left(1+\frac{e x}{d}\right)}{d^{3}} \\
&-\frac{\left(a+b \ln \left(c x^{n}\right)\right)^{2} \ln \left(1+\frac{e x}{d}\right)}{d^{3}}+\frac{3 b^{2} n^{2} \operatorname{polylog}\left(2,-\frac{e x}{d}\right)}{d^{3}} \\
&-\frac{2bn(a+b \ln \left(c x^{n}\right)) \operatorname{polylog}\left(2,-\frac{e x}{d}\right)}{d^{3}}+\frac{2 b^{2} n^{2} \operatorname{polylog}\left(3,-\frac{e x}{d}\right)}{d^{3}}
\end{aligned}$$

command

```
int((a+b*ln(c*x^n))^2/x/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	4606

Maple 2021.1 output

$$\int \frac{\left(b \ln \left(c x^{n}\right)+a\right)^{2}}{\left(e x+d\right)^{3} x} dx$$

13.16 Problem number 112

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{2b^2n^2}{d^3x}-\frac{2bn(a+b\ln(cx^n))}{d^3x}-\frac{be^2nx(a+b\ln(cx^n))}{d^4(ex+d)}+\frac{e(a+b\ln(cx^n))^2}{2d^4}\\
&-\frac{(a+b\ln(cx^n))^2}{d^3x}-\frac{e(a+b\ln(cx^n))^2}{2d^2(ex+d)^2}+\frac{2e^2x(a+b\ln(cx^n))^2}{d^4(ex+d)}\\
&-\frac{e(a+b\ln(cx^n))^3}{bd^4n}+\frac{b^2en^2\ln(ex+d)}{d^4}-\frac{5ben(a+b\ln(cx^n))\ln\left(1+\frac{ex}{d}\right)}{d^4}\\
&+\frac{3e(a+b\ln(cx^n))^2\ln\left(1+\frac{ex}{d}\right)}{d^4}-\frac{5b^2en^2\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{d^4}\\
&+\frac{6ben(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{d^4}-\frac{6b^2en^2\operatorname{polylog}\left(3,-\frac{ex}{d}\right)}{d^4}
\end{aligned}$$

command

```
int((a+b*ln(c*x^n))^2/x^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	5696

Maple 2021.1 output

$$\int \frac{(b\ln(cx^n)+a)^2}{(ex+d)^3x^2}\,dx$$

13.17 Problem number 113

$$\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$

Optimal antiderivative

$$-\frac{2abnx}{e^4}+\frac{2b^2n^2x}{e^4}-\frac{b^2d^2n^2}{3e^5\left(ex+d\right)}-\frac{b^2dn^2\ln\left(x\right)}{3e^5}-\frac{2b^2nx\ln\left(cx^n\right)}{e^4}$$
$$+\frac{bd^3n(a+b\ln\left(cx^n\right))}{3e^5\left(ex+d\right)^2}+\frac{10bdnx(a+b\ln\left(cx^n\right))}{3e^4\left(ex+d\right)}-\frac{5d(a+b\ln\left(cx^n\right))^2}{3e^5}$$
$$+\frac{x(a+b\ln\left(cx^n\right))^2}{e^4}-\frac{d^4(a+b\ln\left(cx^n\right))^2}{3e^5\left(ex+d\right)^3}+\frac{2d^3(a+b\ln\left(cx^n\right))^2}{e^5\left(ex+d\right)^2}$$
$$+\frac{6dx(a+b\ln\left(cx^n\right))^2}{e^4\left(ex+d\right)}-\frac{3b^2dn^2\ln\left(ex+d\right)}{e^5}-\frac{26bdn(a+b\ln\left(cx^n\right))\ln\left(1+\frac{ex}{d}\right)}{3e^5}$$
$$-\frac{4d(a+b\ln\left(cx^n\right))^2\ln\left(1+\frac{ex}{d}\right)}{e^5}-\frac{26b^2dn^2\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{3e^5}$$
$$-\frac{8bdn(a+b\ln\left(cx^n\right))\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{e^5}+\frac{8b^2dn^2\operatorname{polylog}\left(3,-\frac{ex}{d}\right)}{e^5}$$

command

```
int(x^4*(a+b*ln(c*x^n))^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	6114

Maple 2021.1 output

$$\int\frac{\left(b\ln\left(cx^n\right)+a\right)^2x^4}{\left(ex+d\right)^4}dx$$

13.18 Problem number 114

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

Optimal antiderivative

$$\frac{b^2dn^2}{3e^4\left(ex+d\right)}+\frac{b^2n^2\ln\left(x\right)}{3e^4}-\frac{bd^2n(a+b\ln\left(cx^n\right))}{3e^4\left(ex+d\right)^2}-\frac{7bnx(a+b\ln\left(cx^n\right))}{3e^3\left(ex+d\right)}$$
$$+\frac{7(a+b\ln\left(cx^n\right))^2}{6e^4}+\frac{d^3(a+b\ln\left(cx^n\right))^2}{3e^4\left(ex+d\right)^3}-\frac{3d^2(a+b\ln\left(cx^n\right))^2}{2e^4\left(ex+d\right)^2}-\frac{3x(a+b\ln\left(cx^n\right))^2}{e^3\left(ex+d\right)}$$
$$+\frac{2b^2n^2\ln\left(ex+d\right)}{e^4}+\frac{11bn(a+b\ln\left(cx^n\right))\ln\left(1+\frac{ex}{d}\right)}{3e^4}+\frac{(a+b\ln\left(cx^n\right))^2\ln\left(1+\frac{ex}{d}\right)}{e^4}$$
$$+\frac{11b^2n^2\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{3e^4}+\frac{2bn(a+b\ln\left(cx^n\right))\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{e^4}-\frac{2b^2n^2\operatorname{polylog}\left(3,-\frac{ex}{d}\right)}{e^4}$$

command

```
int(x^3*(a+b*ln(c*x^n))^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	5003

Maple 2021.1 output

$$\int \frac{(b \ln (c x^n) + a)^2 x^3}{(ex + d)^4} \, dx$$

13.19 Problem number 118

$$\int \frac{(a + b \log (cx^n))^2}{x(d + ex)^4} \, dx$$

Optimal antiderivative

$$\frac{b^2 n^2}{3d^3 (ex + d)} + \frac{b^2 n^2 \ln (x)}{3d^4} - \frac{bn(a + b \ln (c x^n))}{3d^2 (ex + d)^2} + \frac{5benx(a + b \ln (c x^n))}{3d^4 (ex + d)} - \frac{5(a + b \ln (c x^n))^2}{6d^4}$$
$$+ \frac{(a + b \ln (c x^n))^2}{3d (ex + d)^3} + \frac{(a + b \ln (c x^n))^2}{2d^2 (ex + d)^2} - \frac{ex(a + b \ln (c x^n))^2}{d^4 (ex + d)} + \frac{(a + b \ln (c x^n))^3}{3b d^4 n}$$
$$- \frac{2b^2 n^2 \ln (ex + d)}{d^4} + \frac{11bn(a + b \ln (c x^n)) \ln \left(1 + \frac{ex}{d}\right)}{3d^4} - \frac{(a + b \ln (c x^n))^2 \ln \left(1 + \frac{ex}{d}\right)}{d^4}$$
$$+ \frac{11b^2 n^2 \operatorname{polylog} \left(2, -\frac{ex}{d}\right)}{3d^4} - \frac{2bn(a + b \ln (c x^n)) \operatorname{polylog} \left(2, -\frac{ex}{d}\right)}{d^4} + \frac{2b^2 n^2 \operatorname{polylog} \left(3, -\frac{ex}{d}\right)}{d^4}$$

command

```
int((a+b*ln(c*x^n))^2/x/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	5668

Maple 2021.1 output

$$\int \frac{(b \ln (c x^n) + a)^2}{(ex + d)^4 x} \, dx$$

13.20 Problem number 119

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{2b^2n^2}{d^4x}-\frac{b^2en^2}{3d^4(ex+d)}-\frac{b^2en^2\ln(x)}{3d^5}-\frac{2bn(a+b\ln(cx^n))}{d^4x}+\frac{ben(a+b\ln(cx^n))}{3d^3(ex+d)^2}\\
&-\frac{8be^2nx(a+b\ln(cx^n))}{3d^5(ex+d)}+\frac{4e(a+b\ln(cx^n))^2}{3d^5}-\frac{(a+b\ln(cx^n))^2}{d^4x}\\
&-\frac{e(a+b\ln(cx^n))^2}{3d^2(ex+d)^3}-\frac{e(a+b\ln(cx^n))^2}{d^3(ex+d)^2}+\frac{3e^2x(a+b\ln(cx^n))^2}{d^5(ex+d)}\\
&-\frac{4e(a+b\ln(cx^n))^3}{3bd^5n}+\frac{3b^2en^2\ln(ex+d)}{d^5}-\frac{26ben(a+b\ln(cx^n))\ln\left(1+\frac{ex}{d}\right)}{3d^5}\\
&+\frac{4e(a+b\ln(cx^n))^2\ln\left(1+\frac{ex}{d}\right)}{d^5}-\frac{26b^2en^2\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{3d^5}\\
&+\frac{8ben(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{d^5}-\frac{8b^2en^2\operatorname{polylog}\left(3,-\frac{ex}{d}\right)}{d^5}
\end{aligned}$$

command

```
int((a+b*ln(c*x^n))^2/x^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	6791

Maple 2021.1 output

$$\int \frac{(b\ln(cx^n)+a)^2}{(ex+d)^4x^2}\,dx$$

13.21 Problem number 122

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{ex(a+b\ln(cx^n))^3}{d^2(ex+d)}-\frac{\ln\left(1+\frac{d}{ex}\right)(a+b\ln(cx^n))^3}{d^2}+\frac{3bn(a+b\ln(cx^n))^2\ln\left(1+\frac{ex}{d}\right)}{d^2}\\
&+\frac{3bn(a+b\ln(cx^n))^2\operatorname{polylog}\left(2,-\frac{d}{ex}\right)}{d^2}+\frac{6b^2n^2(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{d^2}\\
&+\frac{6b^2n^2(a+b\ln(cx^n))\operatorname{polylog}\left(3,-\frac{d}{ex}\right)}{d^2}-\frac{6b^3n^3\operatorname{polylog}\left(3,-\frac{ex}{d}\right)}{d^2}+\frac{6b^3n^3\operatorname{polylog}\left(4,-\frac{d}{ex}\right)}{d^2}
\end{aligned}$$

command

```
int((a+b*ln(c*x^n))^3/x/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	14905

Maple 2021.1 output

$$\int \frac{(b \ln (c x^n)+a)^3}{(e x+d)^2 x} dx$$

13.22 Problem number 123

$$\int \frac{(a+b \log (c x^n))^3}{x(d+e x)^3} dx$$

Optimal antiderivative

$$\begin{aligned}
&\frac{3benx(a+b \ln (c x^n))^2}{2d^3 (ex+d)}-\frac{(a+b \ln (c x^n))^3}{2d^3}+\frac{(a+b \ln (c x^n))^3}{2d (ex+d)^2} \\
&-\frac{ex(a+b \ln (c x^n))^3}{d^3 (ex+d)}+\frac{(a+b \ln (c x^n))^4}{4b d^3 n}-\frac{3b^2 n^2 (a+b \ln (c x^n)) \ln \left(1+\frac{ex}{d}\right)}{d^3} \\
&+\frac{9bn(a+b \ln (c x^n))^2 \ln \left(1+\frac{ex}{d}\right)}{2d^3}-\frac{(a+b \ln (c x^n))^3 \ln \left(1+\frac{ex}{d}\right)}{d^3} \\
&-\frac{3b^3 n^3 \operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{d^3}+\frac{9b^2 n^2 (a+b \ln (c x^n)) \operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{d^3} \\
&-\frac{3bn(a+b \ln (c x^n))^2 \operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{d^3}-\frac{9b^3 n^3 \operatorname{polylog}\left(3,-\frac{ex}{d}\right)}{d^3} \\
&+\frac{6b^2 n^2 (a+b \ln (c x^n)) \operatorname{polylog}\left(3,-\frac{ex}{d}\right)}{d^3}-\frac{6b^3 n^3 \operatorname{polylog}\left(4,-\frac{ex}{d}\right)}{d^3}
\end{aligned}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	19018

Maple 2021.1 output

$$\int \frac{(b \ln (c x^n)+a)^3}{(e x+d)^3 x} dx$$

13.23 Problem number 456

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)^3}{(d+ex)^3}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{3b(-dg+ef)\,nx(a+b\ln(cx^n))^2}{2d^2e\,(ex+d)}+\frac{f^2(a+b\ln(cx^n))^3}{2d^2\,(-dg+ef)}\\
&-\frac{(gx+f)^2\,(a+b\ln(cx^n))^3}{2\,(-dg+ef)\,(ex+d)^2}+\frac{3b^2(-dg+ef)\,n^2(a+b\ln(cx^n))\ln\left(1+\frac{ex}{d}\right)}{d^2e^2}\\
&-\frac{3b(dg+ef)\,n(a+b\ln(cx^n))^2\ln\left(1+\frac{ex}{d}\right)}{2d^2e^2}+\frac{3b^3(-dg+ef)\,n^3\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{d^2e^2}\\
&-\frac{3b^2(dg+ef)\,n^2(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{ex}{d}\right)}{d^2e^2}+\frac{3b^3(dg+ef)\,n^3\operatorname{polylog}\left(3,-\frac{ex}{d}\right)}{d^2e^2}
\end{aligned}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	11535

Maple 2021.1 output

$$\int \frac{(gx+f)\left(b\ln\left(cx^n\right)+a\right)^3}{(ex+d)^3}\,dx$$

14 Test file number 58

Test folder name:

```
test_cases/3_Logarithms/58_3.1.5_u-a+b_log-c_x^n-^p
```

14.1 Problem number 6

$$\int \frac{(a+b\log\left(cx^n\right))\log(1+ex)}{x}\,dx$$

Optimal antiderivative

$$-(a+b\ln\left(cx^n\right))\operatorname{polylog}\left(2,-ex\right)+bn\operatorname{polylog}\left(3,-ex\right)$$

command

```
int((a+b*ln(c*x^n))*ln(e*x+1)/x,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$-\ln(x)\,\text{polylog}(2,-ex)\,bn+\ln(x)\,\text{dilog}(ex+1)\,bn-\ln(x^n)\,\text{dilog}(ex+1)\,b+bn\,\text{polylog}(3,-ex)-($

Maple 2021.1 output

$$\int \frac{(b\ln(cx^n)+a)\ln(ex+1)}{x}\,dx$$

14.2 Problem number 14

$$\int \frac{(a+b\log(cx^n))^2\log(1+ex)}{x}\,dx$$

Optimal antiderivative

$$-(a+b\ln(cx^n))^2\,\text{polylog}(2,-ex)+2bn(a+b\ln(cx^n))\,\text{polylog}(3,-ex)-2b^2n^2\,\text{polylog}(4,-ex)$$

command

```
int((a+b*ln(c*x^n))^2*ln(e*x+1)/x,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	835

Maple 2021.1 output

$$\int \frac{(b\ln(cx^n)+a)^2\ln(ex+1)}{x}\,dx$$

14.3 Problem number 15

$$\int \frac{(a+b\log(cx^n))^2\log(1+ex)}{x^2}\,dx$$

Optimal antiderivative

$$2b^2e\,n^2\ln(x)-2ben\ln\left(1+\frac{1}{ex}\right)(a+b\ln(c\,x^n))-e\ln\left(1+\frac{1}{ex}\right)(a+b\ln(c\,x^n))^2$$
$$-2b^2e\,n^2\ln(ex+1)-\frac{2b^2n^2\ln(ex+1)}{x}-\frac{2bn(a+b\ln(c\,x^n))\ln(ex+1)}{x}$$
$$-\frac{(a+b\ln(c\,x^n))^2\ln(ex+1)}{x}+2b^2e\,n^2\operatorname{polylog}\left(2,-\frac{1}{ex}\right)$$
$$+2ben(a+b\ln(c\,x^n))\operatorname{polylog}\left(2,-\frac{1}{ex}\right)+2b^2e\,n^2\operatorname{polylog}\left(3,-\frac{1}{ex}\right)$$

command

```
int((a+b*ln(c*x^n))^2*ln(e*x+1)/x^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	3402

Maple 2021.1 output

$$\int\frac{(b\ln(c\,x^n)+a)^2\ln(ex+1)}{x^2}\,dx$$

14.4 Problem number 16

$$\int\frac{(a+b\log(cx^n))^2\log(1+ex)}{x^3}\,dx$$

Optimal antiderivative

$$-\frac{7b^2e\,n^2}{4x}-\frac{b^2e^2n^2\ln(x)}{4}-\frac{3ben(a+b\ln(c\,x^n))}{2x}+\frac{b\,e^2n\ln\left(1+\frac{1}{ex}\right)(a+b\ln(c\,x^n))}{2}$$
$$-\frac{e(a+b\ln(c\,x^n))^2}{2x}+\frac{e^2\ln\left(1+\frac{1}{ex}\right)(a+b\ln(c\,x^n))^2}{2}$$
$$+\frac{b^2e^2n^2\ln(ex+1)}{4}-\frac{b^2n^2\ln(ex+1)}{4x^2}-\frac{bn(a+b\ln(c\,x^n))\ln(ex+1)}{2x^2}$$
$$-\frac{(a+b\ln(c\,x^n))^2\ln(ex+1)}{2x^2}-\frac{b^2e^2n^2\operatorname{polylog}\left(2,-\frac{1}{ex}\right)}{2}$$
$$-b\,e^2n(a+b\ln(c\,x^n))\operatorname{polylog}\left(2,-\frac{1}{ex}\right)-b^2e^2n^2\operatorname{polylog}\left(3,-\frac{1}{ex}\right)$$

command

```
int((a+b*ln(c*x^n))^2*ln(e*x+1)/x^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	4445

Maple 2021.1 output

$$\int \frac{(b \ln (c x^n) + a)^2 \ln (ex + 1)}{x^3} \, dx$$

14.5 Problem number 21

$$\int \frac{(a + b \log (cx^n))^3 \log(1 + ex)}{x} \, dx$$

Optimal antiderivative

$$\begin{aligned} &-(a + b \ln (c x^n))^3 \operatorname{polylog}(2, -ex) + 3bn(a + b \ln (c x^n))^2 \operatorname{polylog}(3, -ex) \\ &- 6b^2n^2(a + b \ln (c x^n)) \operatorname{polylog}(4, -ex) + 6b^3n^3 \operatorname{polylog}(5, -ex) \end{aligned}$$

command

```
int((a+b*ln(c*x^n))^3*ln(e*x+1)/x,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	4058

Maple 2021.1 output

$$\int \frac{(b \ln (c x^n) + a)^3 \ln (ex + 1)}{x} \, dx$$

14.6 Problem number 22

$$\int \frac{(a + b \log (cx^n))^3 \log(1 + ex)}{x^2} \, dx$$

Optimal antiderivative

$$
\begin{aligned}
&6b^3en^3\ln(x)-6b^2en^2\ln\left(1+\frac{1}{ex}\right)(a+b\ln(cx^n))\\
&-3ben\ln\left(1+\frac{1}{ex}\right)(a+b\ln(cx^n))^2-e\ln\left(1+\frac{1}{ex}\right)(a+b\ln(cx^n))^3\\
&-6b^3en^3\ln(ex+1)-\frac{6b^3n^3\ln(ex+1)}{x}-\frac{6b^2n^2(a+b\ln(cx^n))\ln(ex+1)}{x}\\
&-\frac{3bn(a+b\ln(cx^n))^2\ln(ex+1)}{x}-\frac{(a+b\ln(cx^n))^3\ln(ex+1)}{x}\\
&+6b^3en^3\operatorname{polylog}\left(2,-\frac{1}{ex}\right)+6b^2en^2(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{1}{ex}\right)\\
&+3ben(a+b\ln(cx^n))^2\operatorname{polylog}\left(2,-\frac{1}{ex}\right)+6b^3en^3\operatorname{polylog}\left(3,-\frac{1}{ex}\right)\\
&+6b^2en^2(a+b\ln(cx^n))\operatorname{polylog}\left(3,-\frac{1}{ex}\right)+6b^3en^3\operatorname{polylog}\left(4,-\frac{1}{ex}\right)
\end{aligned}
$$

command

```
int((a+b*ln(c*x^n))^3*ln(e*x+1)/x^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	14041

Maple 2021.1 output

$$\int \frac{(b\ln(cx^n)+a)^3\ln(ex+1)}{x^2}\,dx$$

14.7 Problem number 23

$$\int \frac{(a+b\log(cx^n))^3\log(1+ex)}{x^3}\,dx$$

Optimal antiderivative

$$
\begin{aligned}
&-\frac{45b^3en^3}{8x}-\frac{3b^3e^2n^3\ln(x)}{8}-\frac{21b^2en^2(a+b\ln(cx^n))}{4x}\\
&+\frac{3b^2e^2n^2\ln\left(1+\frac{1}{ex}\right)(a+b\ln(cx^n))}{4}-\frac{9ben(a+b\ln(cx^n))^2}{4x}\\
&+\frac{3be^2n\ln\left(1+\frac{1}{ex}\right)(a+b\ln(cx^n))^2}{4}-\frac{e(a+b\ln(cx^n))^3}{2x}\\
&+\frac{e^2\ln\left(1+\frac{1}{ex}\right)(a+b\ln(cx^n))^3}{2}+\frac{3b^3e^2n^3\ln(ex+1)}{8}\\
&-\frac{3b^3n^3\ln(ex+1)}{8x^2}-\frac{3b^2n^2(a+b\ln(cx^n))\ln(ex+1)}{4x^2}\\
&-\frac{3bn(a+b\ln(cx^n))^2\ln(ex+1)}{4x^2}-\frac{(a+b\ln(cx^n))^3\ln(ex+1)}{2x^2}\\
&-\frac{3b^3e^2n^3\operatorname{polylog}\left(2,-\frac{1}{ex}\right)}{4}-\frac{3b^2e^2n^2(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{1}{ex}\right)}{2}\\
&-\frac{3be^2n(a+b\ln(cx^n))^2\operatorname{polylog}\left(2,-\frac{1}{ex}\right)}{2}-\frac{3b^3e^2n^3\operatorname{polylog}\left(3,-\frac{1}{ex}\right)}{2}\\
&-3b^2e^2n^2(a+b\ln(cx^n))\operatorname{polylog}\left(3,-\frac{1}{ex}\right)-3b^3e^2n^3\operatorname{polylog}\left(4,-\frac{1}{ex}\right)
\end{aligned}
$$

command

```
int((a+b*ln(c*x^n))^3*ln(e*x+1)/x^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	17975

Maple 2021.1 output

$$\int \frac{(b\ln(cx^n)+a)^3\ln(ex+1)}{x^3}\,dx$$

14.8 Problem number 26

$$\int \frac{(a+b\log(cx^n))\log\left(d\left(\frac{1}{d}+fx^2\right)\right)}{x}\,dx$$

Optimal antiderivative

$$-\frac{(a+b\ln(cx^n))\operatorname{polylog}\left(2,-df\,x^2\right)}{2}+\frac{bn\operatorname{polylog}\left(3,-df\,x^2\right)}{4}$$

command

`int((a+b*ln(c*x^n))*ln(d*(1/d+f*x^2))/x,x,method=_RETURNVERBOSE)`

Maple 2022.1 output

method	result	size
risch	Expression too large to display	1026

Maple 2021.1 output

$$\int \frac{(b \ln (c x^n) + a) \ln \left(\left(f x^2 + \frac{1}{d} \right) d \right)}{x} \, dx$$

14.9 Problem number 28

$$\int x^2 (a + b \log (c x^n)) \log \left(d \left(\frac{1}{d} + f x^2 \right) \right) \, dx$$

Optimal antiderivative

$$\begin{aligned} &-\frac{8bnx}{9df} + \frac{4bn\,x^3}{27} + \frac{2bn \arctan \left(x \sqrt{d} \, \sqrt{f} \right)}{9 d^{\frac{3}{2}} f^{\frac{3}{2}}} + \frac{2x(a + b \ln (c x^n))}{3df} \\ &- \frac{2x^3 (a + b \ln (c x^n))}{9} - \frac{2 \arctan \left(x \sqrt{d} \, \sqrt{f} \right) (a + b \ln (c x^n))}{3 d^{\frac{3}{2}} f^{\frac{3}{2}}} \\ &- \frac{bn\,x^3 \ln \left(df\,x^2 + 1 \right)}{9} + \frac{x^3 (a + b \ln (c x^n)) \ln \left(df\,x^2 + 1 \right)}{3} \\ &+ \frac{ibn \operatorname{polylog} \left(2, -ix \sqrt{d} \, \sqrt{f} \right)}{3 d^{\frac{3}{2}} f^{\frac{3}{2}}} - \frac{ibn \operatorname{polylog} \left(2, ix \sqrt{d} \, \sqrt{f} \right)}{3 d^{\frac{3}{2}} f^{\frac{3}{2}}} \end{aligned}$$

command

`int(x^2*(a+b*ln(c*x^n))*ln(d*(1/d+f*x^2)),x,method=_RETURNVERBOSE)`

Maple 2022.1 output

output too large to display

Maple 2021.1 output

$$\int (b \ln (c x^n) + a) x^2 \ln \left(\left(f x^2 + \frac{1}{d} \right) d \right) \, dx$$

14.10 Problem number 29

$$\int (a+b\log (cx^n))\log \left (d\left (\frac{1}{d}+fx^2\right)\right)\,dx$$

Optimal antiderivative

$$\begin{aligned}&4bnx-2x(a+b\ln (cx^n))-bnx\ln \left (dfx^2+1\right)+x(a+b\ln (cx^n))\ln \left (dfx^2+1\right)\\&-\frac{2bn\arctan \left (x\sqrt{d}\ \sqrt{f}\right)}{\sqrt{d}\ \sqrt{f}}+\frac{2\arctan \left (x\sqrt{d}\ \sqrt{f}\right)(a+b\ln (cx^n))}{\sqrt{d}\ \sqrt{f}}\\&-\frac{ibn\operatorname{polylog}\left (2,-ix\sqrt{d}\ \sqrt{f}\right)}{\sqrt{d}\ \sqrt{f}}+\frac{ibn\operatorname{polylog}\left (2,ix\sqrt{d}\ \sqrt{f}\right)}{\sqrt{d}\ \sqrt{f}}\end{aligned}$$

command

```
int((a+b*ln(c*x^n))*ln(d*(1/d+f*x^2)),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$x\ln \left (dfx^2+1\right)a-2\ln (c)bx+ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(icx^n)x+\frac{2a\arctan \left (\frac{xdf}{\sqrt{df}}\right)}{\sqrt{df}}+4bnx+\frac{ib\pi \operatorname{csgn}$

Maple 2021.1 output

$$\int (b\ln (cx^n)+a)\ln \left (\left (fx^2+\frac{1}{d}\right)d\right)\,dx$$

14.11 Problem number 30

$$\int \frac{(a+b\log (cx^n))\log \left (d\left (\frac{1}{d}+fx^2\right)\right)}{x^2}\,dx$$

Optimal antiderivative

$$\begin{aligned}&-\frac{bn\ln \left (dfx^2+1\right)}{x}-\frac{(a+b\ln (cx^n))\ln \left (dfx^2+1\right)}{x}\\&+2bn\arctan \left (x\sqrt{d}\ \sqrt{f}\right)\sqrt{d}\ \sqrt{f}+2\arctan \left (x\sqrt{d}\ \sqrt{f}\right)(a+b\ln (cx^n))\sqrt{d}\ \sqrt{f}\\&-ibn\operatorname{polylog}\left (2,-ix\sqrt{d}\ \sqrt{f}\right)\sqrt{d}\ \sqrt{f}+ibn\operatorname{polylog}\left (2,ix\sqrt{d}\ \sqrt{f}\right)\sqrt{d}\ \sqrt{f}\end{aligned}$$

command

```
int((a+b*ln(c*x^n))*ln(d*(1/d+f*x^2))/x^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$-\frac{b\ln(df\,x^2+1)\ln(x^n)}{x}-\frac{2bdf\arctan\left(\frac{xdf}{\sqrt{df}}\right)n\ln(x)}{\sqrt{df}}+\frac{2bdf\arctan\left(\frac{xdf}{\sqrt{df}}\right)\ln(x^n)}{\sqrt{df}}-\frac{bn\ln(df\,x^2+1)}{x}+\frac{2bndf\arctan\left(\frac{xd}{\sqrt{d}}\right.}{\sqrt{df}}$

Maple 2021.1 output

$$\int \frac{(b\ln(c\,x^n)+a)\ln\left(\left(f\,x^2+\frac{1}{d}\right)d\right)}{x^2}\,dx$$

14.12 Problem number 31

$$\int \frac{(a+b\log(cx^n))\log\left(d\left(\frac{1}{d}+fx^2\right)\right)}{x^4}\,dx$$

Optimal antiderivative

$$\begin{aligned}&-\frac{8bdfn}{9x}-\frac{2b\,d^{\frac{3}{2}}f^{\frac{3}{2}}n\arctan\left(x\sqrt{d}\ \sqrt{f}\right)}{9}-\frac{2df(a+b\ln(c\,x^n))}{3x}\\&-\frac{2d^{\frac{3}{2}}f^{\frac{3}{2}}\arctan\left(x\sqrt{d}\ \sqrt{f}\right)(a+b\ln(c\,x^n))}{3}\\&-\frac{bn\ln\left(df\,x^2+1\right)}{9x^3}-\frac{(a+b\ln(c\,x^n))\ln\left(df\,x^2+1\right)}{3x^3}\\&+\frac{ib\,d^{\frac{3}{2}}f^{\frac{3}{2}}n\,\mathrm{polylog}\left(2,-ix\sqrt{d}\ \sqrt{f}\right)}{3}-\frac{ib\,d^{\frac{3}{2}}f^{\frac{3}{2}}n\,\mathrm{polylog}\left(2,ix\sqrt{d}\ \sqrt{f}\right)}{3}\end{aligned}$$

command

```
int((a+b*ln(c*x^n))*ln(d*(1/d+f*x^2))/x^4,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$-\frac{\ln(df\,x^2+1)a}{3x^3}+\frac{bndf\sqrt{-df}\ \mathrm{dilog}\left(1+x\sqrt{-df}\right)}{3}-\frac{bndf\sqrt{-df}\ \mathrm{dilog}\left(1-x\sqrt{-df}\right)}{3}+\frac{ib\pi\mathrm{csgn}(ic\,x^n)^3df}{3x}+\frac{2b\,d^2f^2\,\mathrm{arc}}{}$

Maple 2021.1 output

$$\int \frac{(b\ln(c\,x^n)+a)\ln\left(\left(f\,x^2+\frac{1}{d}\right)d\right)}{x^4}\,dx$$

14.13 Problem number 34

$$\int \frac{(a+b\log(cx^n))^2 \log\left(d\left(\frac{1}{d}+fx^2\right)\right)}{x}\,dx$$

Optimal antiderivative

$$-\frac{(a+b\ln(cx^n))^2 \operatorname{polylog}(2,-dfx^2)}{2} + \frac{bn(a+b\ln(cx^n))\operatorname{polylog}(3,-dfx^2)}{2} - \frac{b^2n^2\operatorname{polylog}(4,-dfx^2)}{4}$$

command

```
int((a+b*ln(c*x^n))^2*ln(d*(1/d+f*x^2))/x,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	6180

Maple 2021.1 output

$$\int \frac{(b\ln(cx^n)+a)^2 \ln\left(\left(fx^2+\frac{1}{d}\right)d\right)}{x}\,dx$$

14.14 Problem number 35

$$\int \frac{(a+b\log(cx^n))^2 \log\left(d\left(\frac{1}{d}+fx^2\right)\right)}{x^3}\,dx$$

Optimal antiderivative

$$\frac{b^2df\,n^2\ln(x)}{2} - \frac{bdfn\ln\left(1+\frac{1}{dfx^2}\right)(a+b\ln(cx^n))}{2} - \frac{df\ln\left(1+\frac{1}{dfx^2}\right)(a+b\ln(cx^n))^2}{2} - \frac{b^2df\,n^2\ln(dfx^2+1)}{4} - \frac{b^2n^2\ln(dfx^2+1)}{4x^2} - \frac{bn(a+b\ln(cx^n))\ln(dfx^2+1)}{2x^2} - \frac{(a+b\ln(cx^n))^2\ln(dfx^2+1)}{2x^2} + \frac{b^2df\,n^2\operatorname{polylog}\left(2,-\frac{1}{dfx^2}\right)}{4} + \frac{bdfn(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{1}{dfx^2}\right)}{2} + \frac{b^2df\,n^2\operatorname{polylog}\left(3,-\frac{1}{dfx^2}\right)}{4}$$

command

```
int((a+b*ln(c*x^n))^2*ln(d*(1/d+f*x^2))/x^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	3493

Maple 2021.1 output

$$\int \frac{(b \ln (c x^n) + a)^2 \ln \left(\left(f x^2 + \frac{1}{d}\right) d\right)}{x^3} \, dx$$

14.15 Problem number 42

$$\int \frac{(a + b \log (cx^n))^3 \log \left(d\left(\frac{1}{d} + fx^2\right)\right)}{x} \, dx$$

Optimal antiderivative

$$-\frac{(a + b \ln (c x^n))^3 \operatorname{polylog}\left(2, -df\, x^2\right)}{2} + \frac{3bn(a + b \ln (c x^n))^2 \operatorname{polylog}\left(3, -df\, x^2\right)}{4} - \frac{3b^2n^2(a + b \ln (c x^n)) \operatorname{polylog}\left(4, -df\, x^2\right)}{4} + \frac{3b^3n^3 \operatorname{polylog}\left(5, -df\, x^2\right)}{8}$$

command

```
int((a+b*ln(c*x^n))^3*ln(d*(1/d+f*x^2))/x,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	23414

Maple 2021.1 output

$$\int \frac{(b \ln (c x^n) + a)^3 \ln \left(\left(f x^2 + \frac{1}{d}\right) d\right)}{x} \, dx$$

14.16 Problem number 43

$$\int \frac{(a + b \log (cx^n))^3 \log \left(d\left(\frac{1}{d} + fx^2\right)\right)}{x^3} \, dx$$

Optimal antiderivative

$$\frac{3b^3df\,n^3\ln(x)}{4}-\frac{3b^2df\,n^2\ln\left(1+\frac{1}{df\,x^2}\right)(a+b\ln(cx^n))}{4}$$
$$-\frac{3bdfn\ln\left(1+\frac{1}{df\,x^2}\right)(a+b\ln(cx^n))^2}{4}-\frac{df\ln\left(1+\frac{1}{df\,x^2}\right)(a+b\ln(cx^n))^3}{2}$$
$$-\frac{3b^3df\,n^3\ln\left(df\,x^2+1\right)}{8}-\frac{3b^3n^3\ln\left(df\,x^2+1\right)}{8x^2}-\frac{3b^2n^2(a+b\ln(cx^n))\ln\left(df\,x^2+1\right)}{4x^2}$$
$$-\frac{3bn(a+b\ln(cx^n))^2\ln\left(df\,x^2+1\right)}{4x^2}-\frac{(a+b\ln(cx^n))^3\ln\left(df\,x^2+1\right)}{2x^2}$$
$$+\frac{3b^3df\,n^3\operatorname{polylog}\left(2,-\frac{1}{df\,x^2}\right)}{8}+\frac{3b^2df\,n^2(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{1}{df\,x^2}\right)}{4}$$
$$+\frac{3bdfn(a+b\ln(cx^n))^2\operatorname{polylog}\left(2,-\frac{1}{df\,x^2}\right)}{4}+\frac{3b^3df\,n^3\operatorname{polylog}\left(3,-\frac{1}{df\,x^2}\right)}{8}$$
$$+\frac{3b^2df\,n^2(a+b\ln(cx^n))\operatorname{polylog}\left(3,-\frac{1}{df\,x^2}\right)}{4}+\frac{3b^3df\,n^3\operatorname{polylog}\left(4,-\frac{1}{df\,x^2}\right)}{8}$$

command

```
int((a+b*ln(c*x^n))^3*ln(d*(1/d+f*x^2))/x^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	13973

Maple 2021.1 output

$$\int\frac{(b\ln(cx^n)+a)^3\ln\left(\left(fx^2+\frac{1}{d}\right)d\right)}{x^3}\,dx$$

14.17 Problem number 78

$$\int x^2(a+b\log(cx^n))^2\log(d(e+fx)^m)\,dx$$

Optimal antiderivative

$$\frac{8ab\,e^2mnx}{9f^2}-\frac{26b^2e^2m\,n^2x}{27f^2}+\frac{19b^2em\,n^2x^2}{108f}-\frac{2b^2m\,n^2x^3}{27}+\frac{8b^2e^2mnx\ln\left(c\,x^n\right)}{9f^2}$$
$$-\frac{5bemn\,x^2(a+b\ln\left(c\,x^n\right))}{18f}+\frac{4bmn\,x^3(a+b\ln\left(c\,x^n\right))}{27}-\frac{e^2mx(a+b\ln\left(c\,x^n\right))^2}{3f^2}$$
$$+\frac{em\,x^2(a+b\ln\left(c\,x^n\right))^2}{6f}-\frac{m\,x^3(a+b\ln\left(c\,x^n\right))^2}{9}+\frac{2b^2e^3m\,n^2\ln\left(fx+e\right)}{27f^3}$$
$$+\frac{2b^2n^2x^3\ln\left(d(fx+e)^m\right)}{27}-\frac{2bn\,x^3(a+b\ln\left(c\,x^n\right))\ln\left(d(fx+e)^m\right)}{9}$$
$$+\frac{x^3(a+b\ln\left(c\,x^n\right))^2\ln\left(d(fx+e)^m\right)}{3}-\frac{2b\,e^3mn(a+b\ln\left(c\,x^n\right))\ln\left(1+\frac{fx}{e}\right)}{9f^3}$$
$$+\frac{e^3m(a+b\ln\left(c\,x^n\right))^2\ln\left(1+\frac{fx}{e}\right)}{3f^3}-\frac{2b^2e^3m\,n^2\operatorname{polylog}\left(2,-\frac{fx}{e}\right)}{9f^3}$$
$$+\frac{2b\,e^3mn(a+b\ln\left(c\,x^n\right))\operatorname{polylog}\left(2,-\frac{fx}{e}\right)}{3f^3}-\frac{2b^2e^3m\,n^2\operatorname{polylog}\left(3,-\frac{fx}{e}\right)}{3f^3}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	12902

Maple 2021.1 output

$$\int \left(b\ln\left(c\,x^n\right)+a\right)^2x^2\ln\left(d(fx+e)^m\right)\,dx$$

14.18 Problem number 79

$$\int x(a+b\log\left(cx^n\right))^2\log\left(d(e+fx)^m\right)\,dx$$

Optimal antiderivative

$$-\frac{3abemnx}{2f}+\frac{7b^2em\,n^2x}{4f}-\frac{3b^2m\,n^2x^2}{8}-\frac{3b^2emnx\ln\left(c\,x^n\right)}{2f}+\frac{bmn\,x^2(a+b\ln\left(c\,x^n\right))}{2}$$
$$+\frac{emx(a+b\ln\left(c\,x^n\right))^2}{2f}-\frac{m\,x^2(a+b\ln\left(c\,x^n\right))^2}{4}-\frac{b^2e^2m\,n^2\ln\left(fx+e\right)}{4f^2}$$
$$+\frac{b^2n^2x^2\ln\left(d(fx+e)^m\right)}{4}-\frac{bn\,x^2(a+b\ln\left(c\,x^n\right))\ln\left(d(fx+e)^m\right)}{2}$$
$$+\frac{x^2(a+b\ln\left(c\,x^n\right))^2\ln\left(d(fx+e)^m\right)}{2}+\frac{b\,e^2mn(a+b\ln\left(c\,x^n\right))\ln\left(1+\frac{fx}{e}\right)}{2f^2}$$
$$-\frac{e^2m(a+b\ln\left(c\,x^n\right))^2\ln\left(1+\frac{fx}{e}\right)}{2f^2}+\frac{b^2e^2m\,n^2\operatorname{polylog}\left(2,-\frac{fx}{e}\right)}{2f^2}$$
$$-\frac{b\,e^2mn(a+b\ln\left(c\,x^n\right))\operatorname{polylog}\left(2,-\frac{fx}{e}\right)}{f^2}+\frac{b^2e^2m\,n^2\operatorname{polylog}\left(3,-\frac{fx}{e}\right)}{f^2}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	11828

Maple 2021.1 output

$$\int \left(b\ln\left(c\,x^n\right)+a\right)^2 x\ln\left(d(fx+e)^m\right)\,dx$$

14.19 Problem number 80

$$\int \left(a+b\log\left(cx^n\right)\right)^2\log\left(d(e+fx)^m\right)\,dx$$

Optimal antiderivative

$$2abmnx-4b^2m\,n^2x+2bmn(-bn+a)\,x+4b^2mnx\ln\left(c\,x^n\right)$$
$$-mx(a+b\ln\left(c\,x^n\right))^2-\frac{2bemn(-bn+a)\ln\left(fx+e\right)}{f}-2abnx\ln\left(d(fx+e)^m\right)$$
$$+2b^2n^2x\ln\left(d(fx+e)^m\right)-2b^2nx\ln\left(c\,x^n\right)\ln\left(d(fx+e)^m\right)$$
$$+x(a+b\ln\left(c\,x^n\right))^2\ln\left(d(fx+e)^m\right)-\frac{2b^2emn\ln\left(c\,x^n\right)\ln\left(1+\frac{fx}{e}\right)}{f}$$
$$+\frac{em(a+b\ln\left(c\,x^n\right))^2\ln\left(1+\frac{fx}{e}\right)}{f}-\frac{2b^2em\,n^2\operatorname{polylog}\left(2,-\frac{fx}{e}\right)}{f}$$
$$+\frac{2bemn(a+b\ln\left(c\,x^n\right))\operatorname{polylog}\left(2,-\frac{fx}{e}\right)}{f}-\frac{2b^2em\,n^2\operatorname{polylog}\left(3,-\frac{fx}{e}\right)}{f}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	10356

Maple 2021.1 output

$$\int (b \ln (c x^n) + a)^2 \ln (d(fx+e)^m) \, dx$$

14.20 Problem number 83

$$\int \frac{(a + b \log (cx^n))^2 \log (d(e+fx)^m)}{x^3} \, dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{7b^2 fmn^2}{4ex} - \frac{b^2 f^2 m n^2 \ln (x)}{4e^2} - \frac{3bfmn(a + b \ln (c x^n))}{2ex} \\
&+ \frac{b f^2 mn \ln \left(1 + \frac{e}{fx}\right) (a + b \ln (c x^n))}{2e^2} - \frac{fm(a + b \ln (c x^n))^2}{2ex} \\
&+ \frac{f^2 m \ln \left(1 + \frac{e}{fx}\right) (a + b \ln (c x^n))^2}{2e^2} + \frac{b^2 f^2 m n^2 \ln (fx+e)}{4e^2} \\
&- \frac{b^2 n^2 \ln (d(fx+e)^m)}{4x^2} - \frac{bn(a + b \ln (c x^n)) \ln (d(fx+e)^m)}{2x^2} \\
&- \frac{(a + b \ln (c x^n))^2 \ln (d(fx+e)^m)}{2x^2} - \frac{b^2 f^2 m n^2 \operatorname{polylog}\left(2, -\frac{e}{fx}\right)}{2e^2} \\
&- \frac{b f^2 mn(a + b \ln (c x^n)) \operatorname{polylog}\left(2, -\frac{e}{fx}\right)}{e^2} - \frac{b^2 f^2 m n^2 \operatorname{polylog}\left(3, -\frac{e}{fx}\right)}{e^2}
\end{aligned}$$

command

```
int((a+b*ln(c*x^n))^2*ln(d*(f*x+e)^m)/x^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	12159

Maple 2021.1 output

$$\int \frac{(b \ln (c x^n) + a)^2 \ln (d(fx+e)^m)}{x^3} \, dx$$

14.21 Problem number 84

$$\int \frac{(a+b\log(cx^n))^2 \log(d(e+fx)^m)}{x^4}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{19b^2fmn^2}{108ex^2}+\frac{26b^2f^2mn^2}{27e^2x}+\frac{2b^2f^3mn^2\ln(x)}{27e^3}-\frac{5bfmn(a+b\ln(cx^n))}{18ex^2}\\
&+\frac{8bf^2mn(a+b\ln(cx^n))}{9e^2x}-\frac{2bf^3mn\ln\left(1+\frac{e}{fx}\right)(a+b\ln(cx^n))}{9e^3}\\
&-\frac{fm(a+b\ln(cx^n))^2}{6ex^2}+\frac{f^2m(a+b\ln(cx^n))^2}{3e^2x}-\frac{f^3m\ln\left(1+\frac{e}{fx}\right)(a+b\ln(cx^n))^2}{3e^3}\\
&-\frac{2b^2f^3mn^2\ln(fx+e)}{27e^3}-\frac{2b^2n^2\ln(d(fx+e)^m)}{27x^3}-\frac{2bn(a+b\ln(cx^n))\ln(d(fx+e)^m)}{9x^3}\\
&-\frac{(a+b\ln(cx^n))^2\ln(d(fx+e)^m)}{3x^3}+\frac{2b^2f^3mn^2\operatorname{polylog}\left(2,-\frac{e}{fx}\right)}{9e^3}\\
&+\frac{2bf^3mn(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{e}{fx}\right)}{3e^3}+\frac{2b^2f^3mn^2\operatorname{polylog}\left(3,-\frac{e}{fx}\right)}{3e^3}
\end{aligned}$$

command

```
int((a+b*ln(c*x^n))^2*ln(d*(f*x+e)^m)/x^4,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	13227

Maple 2021.1 output

$$\int \frac{(b\ln(cx^n)+a)^2\ln(d(fx+e)^m)}{x^4}\,dx$$

14.22 Problem number 85

$$\int x(a+b\log(cx^n))^3\log(d(e+fx)^m)\,dx$$

Optimal antiderivative

$$\frac{21a\,b^2emn^2x}{4f}-\frac{45b^3emn^3x}{8f}+\frac{3b^3mn^3x^2}{4}+\frac{21b^3emn^2x\ln\left(cx^n\right)}{4f}$$
$$-\frac{9b^2mn^2x^2(a+b\ln\left(cx^n\right))}{8}-\frac{9bemnx(a+b\ln\left(cx^n\right))^2}{4f}$$
$$+\frac{3bmnx^2(a+b\ln\left(cx^n\right))^2}{4}+\frac{emx(a+b\ln\left(cx^n\right))^3}{2f}$$
$$-\frac{mx^2(a+b\ln\left(cx^n\right))^3}{4}+\frac{3b^3e^2mn^3\ln\left(fx+e\right)}{8f^2}-\frac{3b^3n^3x^2\ln\left(d(fx+e)^m\right)}{8}$$
$$+\frac{3b^2n^2x^2(a+b\ln\left(cx^n\right))\ln\left(d(fx+e)^m\right)}{4}-\frac{3bnx^2(a+b\ln\left(cx^n\right))^2\ln\left(d(fx+e)^m\right)}{4}$$
$$+\frac{x^2(a+b\ln\left(cx^n\right))^3\ln\left(d(fx+e)^m\right)}{2}-\frac{3b^2e^2mn^2(a+b\ln\left(cx^n\right))\ln\left(1+\frac{fx}{e}\right)}{4f^2}$$
$$+\frac{3b\,e^2mn(a+b\ln\left(cx^n\right))^2\ln\left(1+\frac{fx}{e}\right)}{4f^2}-\frac{e^2m(a+b\ln\left(cx^n\right))^3\ln\left(1+\frac{fx}{e}\right)}{2f^2}$$
$$-\frac{3b^3e^2mn^3\operatorname{polylog}\left(2,-\frac{fx}{e}\right)}{4f^2}+\frac{3b^2e^2mn^2(a+b\ln\left(cx^n\right))\operatorname{polylog}\left(2,-\frac{fx}{e}\right)}{2f^2}$$
$$-\frac{3b\,e^2mn(a+b\ln\left(cx^n\right))^2\operatorname{polylog}\left(2,-\frac{fx}{e}\right)}{2f^2}-\frac{3b^3e^2mn^3\operatorname{polylog}\left(3,-\frac{fx}{e}\right)}{2f^2}$$
$$+\frac{3b^2e^2mn^2(a+b\ln\left(cx^n\right))\operatorname{polylog}\left(3,-\frac{fx}{e}\right)}{f^2}-\frac{3b^3e^2mn^3\operatorname{polylog}\left(4,-\frac{fx}{e}\right)}{f^2}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	44991

Maple 2021.1 output

$$\int \left(b\ln\left(cx^n\right)+a\right)^3 x\ln\left(d(fx+e)^m\right)\,dx$$

14.23 Problem number 86

$$\int (a+b\log(cx^n))^3 \log(d(e+fx)^m)\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-12ab^2mn^2x+18b^3mn^3x-6b^2mn^2(-bn+a)x-18b^3mn^2x\ln(cx^n)\\
&+6bmnx(a+b\ln(cx^n))^2-mx(a+b\ln(cx^n))^3+\frac{6b^2emn^2(-bn+a)\ln(fx+e)}{f}\\
&+6ab^2n^2x\ln(d(fx+e)^m)-6b^3n^3x\ln(d(fx+e)^m)\\
&+6b^3n^2x\ln(cx^n)\ln(d(fx+e)^m)-3bnx(a+b\ln(cx^n))^2\ln(d(fx+e)^m)\\
&+x(a+b\ln(cx^n))^3\ln(d(fx+e)^m)+\frac{6b^3emn^2\ln(cx^n)\ln\left(1+\frac{fx}{e}\right)}{f}\\
&-\frac{3bemn(a+b\ln(cx^n))^2\ln\left(1+\frac{fx}{e}\right)}{f}+\frac{em(a+b\ln(cx^n))^3\ln\left(1+\frac{fx}{e}\right)}{f}\\
&+\frac{6b^3emn^3\operatorname{polylog}\left(2,-\frac{fx}{e}\right)}{f}-\frac{6b^2emn^2(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{fx}{e}\right)}{f}\\
&+\frac{3bemn(a+b\ln(cx^n))^2\operatorname{polylog}\left(2,-\frac{fx}{e}\right)}{f}+\frac{6b^3emn^3\operatorname{polylog}\left(3,-\frac{fx}{e}\right)}{f}\\
&-\frac{6b^2emn^2(a+b\ln(cx^n))\operatorname{polylog}\left(3,-\frac{fx}{e}\right)}{f}+\frac{6b^3emn^3\operatorname{polylog}\left(4,-\frac{fx}{e}\right)}{f}
\end{aligned}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	39644

Maple 2021.1 output

$$\int (b\ln(cx^n)+a)^3 \ln(d(fx+e)^m)\,dx$$

14.24 Problem number 89

$$\int \frac{(a+b\log(cx^n))^3 \log(d(e+fx)^m)}{x^3}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{45b^3fmn^3}{8ex}-\frac{3b^3f^2mn^3\ln(x)}{8e^2}-\frac{21b^2fmn^2(a+b\ln(cx^n))}{4ex}\\
&+\frac{3b^2f^2mn^2\ln\left(1+\frac{e}{fx}\right)(a+b\ln(cx^n))}{4e^2}-\frac{9bfmn(a+b\ln(cx^n))^2}{4ex}\\
&+\frac{3bf^2mn\ln\left(1+\frac{e}{fx}\right)(a+b\ln(cx^n))^2}{4e^2}-\frac{fm(a+b\ln(cx^n))^3}{2ex}\\
&+\frac{f^2m\ln\left(1+\frac{e}{fx}\right)(a+b\ln(cx^n))^3}{2e^2}+\frac{3b^3f^2mn^3\ln(fx+e)}{8e^2}\\
&-\frac{3b^3n^3\ln(d(fx+e)^m)}{8x^2}-\frac{3b^2n^2(a+b\ln(cx^n))\ln(d(fx+e)^m)}{4x^2}\\
&-\frac{3bn(a+b\ln(cx^n))^2\ln(d(fx+e)^m)}{4x^2}-\frac{(a+b\ln(cx^n))^3\ln(d(fx+e)^m)}{2x^2}\\
&-\frac{3b^3f^2mn^3\operatorname{polylog}\left(2,-\frac{e}{fx}\right)}{4e^2}-\frac{3b^2f^2mn^2(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{e}{fx}\right)}{2e^2}\\
&-\frac{3bf^2mn(a+b\ln(cx^n))^2\operatorname{polylog}\left(2,-\frac{e}{fx}\right)}{2e^2}-\frac{3b^3f^2mn^3\operatorname{polylog}\left(3,-\frac{e}{fx}\right)}{2e^2}\\
&-\frac{3b^2f^2mn^2(a+b\ln(cx^n))\operatorname{polylog}\left(3,-\frac{e}{fx}\right)}{e^2}-\frac{3b^3f^2mn^3\operatorname{polylog}\left(4,-\frac{e}{fx}\right)}{e^2}
\end{aligned}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	46399

Maple 2021.1 output

$$\int \frac{(b\ln(cx^n)+a)^3 \ln(d(fx+e)^m)}{x^3}\,dx$$

14.25 Problem number 92

$$\int \frac{(a+b\log(cx^n))\log\left(d(e+fx^2)^m\right)}{x}\,dx$$

Optimal antiderivative

$$\frac{(a+b\ln(cx^n))^2\ln\left(d(fx^2+e)^m\right)}{2bn}-\frac{m(a+b\ln(cx^n))^2\ln\left(1+\frac{fx^2}{e}\right)}{2bn}$$
$$-\frac{m(a+b\ln(cx^n))\,\mathrm{polylog}\left(2,-\frac{fx^2}{e}\right)}{2}+\frac{bmn\,\mathrm{polylog}\left(3,-\frac{fx^2}{e}\right)}{4}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	2842

Maple 2021.1 output

$$\int \frac{(b\ln(cx^n)+a)\ln\left(d(fx^2+e)^m\right)}{x}\,dx$$

14.26 Problem number 100

$$\int x(a+b\log(cx^n))^2\log\left(d(e+fx^2)^m\right)\,dx$$

Optimal antiderivative

$$-\frac{3b^2mn^2x^2}{4}+bmnx^2(a+b\ln(cx^n))-\frac{mx^2(a+b\ln(cx^n))^2}{2}+\frac{b^2emn^2\ln(fx^2+e)}{4f}$$
$$+\frac{b^2n^2x^2\ln\left(d(fx^2+e)^m\right)}{4}-\frac{bnx^2(a+b\ln(cx^n))\ln\left(d(fx^2+e)^m\right)}{2}$$
$$+\frac{x^2(a+b\ln(cx^n))^2\ln\left(d(fx^2+e)^m\right)}{2}-\frac{bemn(a+b\ln(cx^n))\ln\left(1+\frac{fx^2}{e}\right)}{2f}$$
$$+\frac{em(a+b\ln(cx^n))^2\ln\left(1+\frac{fx^2}{e}\right)}{2f}-\frac{b^2emn^2\,\mathrm{polylog}\left(2,-\frac{fx^2}{e}\right)}{4f}$$
$$+\frac{bemn(a+b\ln(cx^n))\,\mathrm{polylog}\left(2,-\frac{fx^2}{e}\right)}{2f}-\frac{b^2emn^2\,\mathrm{polylog}\left(3,-\frac{fx^2}{e}\right)}{4f}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	12230

Maple 2021.1 output

$$\int (b \ln (c\,x^n) + a)^2\, x \ln \left(d \left(f\,x^2 + e\right)^m\right)\, dx$$

14.27 Problem number 101

$$\int \frac{(a + b \log (c x^n))^2 \log \left(d \left(e + f x^2\right)^m\right)}{x}\, dx$$

Optimal antiderivative

$$\frac{(a + b \ln (c\,x^n))^3 \ln \left(d \left(f\,x^2 + e\right)^m\right)}{3bn} - \frac{m(a + b \ln (c\,x^n))^3 \ln \left(1 + \frac{f\,x^2}{e}\right)}{3bn} - \frac{m(a + b \ln (c\,x^n))^2 \operatorname{polylog}\left(2, -\frac{f\,x^2}{e}\right)}{2} + \frac{bmn(a + b \ln (c\,x^n)) \operatorname{polylog}\left(3, -\frac{f\,x^2}{e}\right)}{2} - \frac{b^2 m\, n^2 \operatorname{polylog}\left(4, -\frac{f\,x^2}{e}\right)}{4}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	27214

Maple 2021.1 output

$$\int \frac{(b \ln (c\,x^n) + a)^2 \ln \left(d \left(f\,x^2 + e\right)^m\right)}{x}\, dx$$

14.28 Problem number 102

$$\int \frac{(a+b\log(cx^n))^2 \log\left(d(e+fx^2)^m\right)}{x^3}\,dx$$

Optimal antiderivative

$$\frac{b^2 fmn^2 \ln(x)}{2e} - \frac{bfmn \ln\left(1+\frac{e}{fx^2}\right)(a+b\ln(cx^n))}{2e} - \frac{fm \ln\left(1+\frac{e}{fx^2}\right)(a+b\ln(cx^n))^2}{2e} - \frac{b^2 fmn^2 \ln\left(fx^2+e\right)}{4e} - \frac{b^2 n^2 \ln\left(d(fx^2+e)^m\right)}{4x^2} - \frac{bn(a+b\ln(cx^n))\ln\left(d(fx^2+e)^m\right)}{2x^2} - \frac{(a+b\ln(cx^n))^2 \ln\left(d(fx^2+e)^m\right)}{2x^2} + \frac{b^2 fmn^2 \operatorname{polylog}\left(2,-\frac{e}{fx^2}\right)}{4e} + \frac{bfmn(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{e}{fx^2}\right)}{2e} + \frac{b^2 fmn^2 \operatorname{polylog}\left(3,-\frac{e}{fx^2}\right)}{4e}$$

command

```
int((a+b*ln(c*x^n))^2*ln(d*(f*x^2+e)^m)/x^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	12568

Maple 2021.1 output

$$\int \frac{(b\ln(cx^n)+a)^2 \ln\left(d(fx^2+e)^m\right)}{x^3}\,dx$$

14.29 Problem number 103

$$\int \frac{(a+b\log(cx^n))^2 \log\left(d(e+fx^2)^m\right)}{x^5}\,dx$$

Optimal antiderivative

$$
\begin{aligned}
&-\frac{7b^2fmn^2}{32ex^2}-\frac{b^2f^2mn^2\ln(x)}{16e^2}-\frac{3bfmn(a+b\ln(cx^n))}{8ex^2}\\
&+\frac{bf^2mn\ln\left(1+\frac{e}{fx^2}\right)(a+b\ln(cx^n))}{8e^2}-\frac{fm(a+b\ln(cx^n))^2}{4ex^2}\\
&+\frac{f^2m\ln\left(1+\frac{e}{fx^2}\right)(a+b\ln(cx^n))^2}{4e^2}+\frac{b^2f^2mn^2\ln\left(fx^2+e\right)}{32e^2}\\
&-\frac{b^2n^2\ln\left(d\left(fx^2+e\right)^m\right)}{32x^4}-\frac{bn(a+b\ln(cx^n))\ln\left(d\left(fx^2+e\right)^m\right)}{8x^4}\\
&-\frac{(a+b\ln(cx^n))^2\ln\left(d\left(fx^2+e\right)^m\right)}{4x^4}-\frac{b^2f^2mn^2\operatorname{polylog}\left(2,-\frac{e}{fx^2}\right)}{16e^2}\\
&-\frac{bf^2mn(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{e}{fx^2}\right)}{4e^2}-\frac{b^2f^2mn^2\operatorname{polylog}\left(3,-\frac{e}{fx^2}\right)}{8e^2}
\end{aligned}
$$

command

```
int((a+b*ln(c*x^n))^2*ln(d*(f*x^2+e)^m)/x^5,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	13825

Maple 2021.1 output

$$\int \frac{(b\ln(cx^n)+a)^2\ln\left(d\left(fx^2+e\right)^m\right)}{x^5}\,dx$$

14.30 Problem number 108

$$\int x(a+b\log(cx^n))^3\log\left(d\left(e+fx^2\right)^m\right)\,dx$$

Optimal antiderivative

$$\frac{3b^3mn^3x^2}{2}-\frac{9b^2mn^2x^2(a+b\ln(cx^n))}{4}+\frac{3bmnx^2(a+b\ln(cx^n))^2}{2}$$
$$-\frac{mx^2(a+b\ln(cx^n))^3}{2}-\frac{3b^3emn^3\ln\left(fx^2+e\right)}{8f}$$
$$-\frac{3b^3n^3x^2\ln\left(d\left(fx^2+e\right)^m\right)}{8}+\frac{3b^2n^2x^2(a+b\ln(cx^n))\ln\left(d\left(fx^2+e\right)^m\right)}{4}$$
$$-\frac{3bnx^2(a+b\ln(cx^n))^2\ln\left(d\left(fx^2+e\right)^m\right)}{4}+\frac{x^2(a+b\ln(cx^n))^3\ln\left(d\left(fx^2+e\right)^m\right)}{2}$$
$$+\frac{3b^2emn^2(a+b\ln(cx^n))\ln\left(1+\frac{fx^2}{e}\right)}{4f}-\frac{3bemn(a+b\ln(cx^n))^2\ln\left(1+\frac{fx^2}{e}\right)}{4f}$$
$$+\frac{em(a+b\ln(cx^n))^3\ln\left(1+\frac{fx^2}{e}\right)}{2f}+\frac{3b^3emn^3\operatorname{polylog}\left(2,-\frac{fx^2}{e}\right)}{8f}$$
$$-\frac{3b^2emn^2(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{fx^2}{e}\right)}{4f}$$
$$+\frac{3bemn(a+b\ln(cx^n))^2\operatorname{polylog}\left(2,-\frac{fx^2}{e}\right)}{4f}+\frac{3b^3emn^3\operatorname{polylog}\left(3,-\frac{fx^2}{e}\right)}{8f}$$
$$-\frac{3b^2emn^2(a+b\ln(cx^n))\operatorname{polylog}\left(3,-\frac{fx^2}{e}\right)}{4f}+\frac{3b^3emn^3\operatorname{polylog}\left(4,-\frac{fx^2}{e}\right)}{8f}$$

command

```
int(x*(a+b*ln(c*x^n))^3*ln(d*(f*x^2+e)^m),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	47964

Maple 2021.1 output

$$\int (b\ln(cx^n)+a)^3\,x\ln\left(d\left(fx^2+e\right)^m\right)\,dx$$

14.31 Problem number 109

$$\int \frac{(a+b\log(cx^n))^3 \log\left(d(e+fx^2)^m\right)}{x}\,dx$$

Optimal antiderivative

$$\frac{(a+b\ln(cx^n))^4 \ln\left(d(fx^2+e)^m\right)}{4bn} - \frac{m(a+b\ln(cx^n))^4 \ln\left(1+\frac{fx^2}{e}\right)}{4bn} - \frac{m(a+b\ln(cx^n))^3 \operatorname{polylog}\left(2,-\frac{fx^2}{e}\right)}{2} + \frac{3bmn(a+b\ln(cx^n))^2 \operatorname{polylog}\left(3,-\frac{fx^2}{e}\right)}{4} - \frac{3b^2mn^2(a+b\ln(cx^n)) \operatorname{polylog}\left(4,-\frac{fx^2}{e}\right)}{4} + \frac{3b^3mn^3 \operatorname{polylog}\left(5,-\frac{fx^2}{e}\right)}{8}$$

command

```
int((a+b*ln(c*x^n))^3*ln(d*(f*x^2+e)^m)/x,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	77072

Maple 2021.1 output

$$\int \frac{(b\ln(cx^n)+a)^3 \ln\left(d(fx^2+e)^m\right)}{x}\,dx$$

14.32 Problem number 110

$$\int \frac{(a+b\log(cx^n))^3 \log\left(d(e+fx^2)^m\right)}{x^3}\,dx$$

Optimal antiderivative

$$\frac{3b^3fmn^3\ln(x)}{4e}-\frac{3b^2fmn^2\ln\left(1+\frac{e}{fx^2}\right)(a+b\ln(cx^n))}{4e}$$
$$-\frac{3bfmn\ln\left(1+\frac{e}{fx^2}\right)(a+b\ln(cx^n))^2}{4e}-\frac{fm\ln\left(1+\frac{e}{fx^2}\right)(a+b\ln(cx^n))^3}{2e}$$
$$-\frac{3b^3fmn^3\ln\left(fx^2+e\right)}{8e}-\frac{3b^3n^3\ln\left(d\left(fx^2+e\right)^m\right)}{8x^2}$$
$$-\frac{3b^2n^2(a+b\ln(cx^n))\ln\left(d\left(fx^2+e\right)^m\right)}{4x^2}-\frac{3bn(a+b\ln(cx^n))^2\ln\left(d\left(fx^2+e\right)^m\right)}{4x^2}$$
$$-\frac{(a+b\ln(cx^n))^3\ln\left(d\left(fx^2+e\right)^m\right)}{2x^2}+\frac{3b^3fmn^3\operatorname{polylog}\left(2,-\frac{e}{fx^2}\right)}{8e}$$
$$+\frac{3b^2fmn^2(a+b\ln(cx^n))\operatorname{polylog}\left(2,-\frac{e}{fx^2}\right)}{4e}$$
$$+\frac{3bfmn(a+b\ln(cx^n))^2\operatorname{polylog}\left(2,-\frac{e}{fx^2}\right)}{4e}+\frac{3b^3fmn^3\operatorname{polylog}\left(3,-\frac{e}{fx^2}\right)}{8e}$$
$$+\frac{3b^2fmn^2(a+b\ln(cx^n))\operatorname{polylog}\left(3,-\frac{e}{fx^2}\right)}{4e}+\frac{3b^3fmn^3\operatorname{polylog}\left(4,-\frac{e}{fx^2}\right)}{8e}$$

command

```
int((a+b*ln(c*x^n))^3*ln(d*(f*x^2+e)^m)/x^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	49628

Maple 2021.1 output

$$\int\frac{(b\ln(cx^n)+a)^3\ln\left(d\left(fx^2+e\right)^m\right)}{x^3}dx$$

14.33 Problem number 170

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

Optimal antiderivative

$$\frac{bnx^3}{3em}-\frac{bnx^3\operatorname{expIntegral}\left(\frac{3d+3e\ln(fx^m)}{em}\right)(d+e\ln(fx^m))\,\mathrm{e}^{-\frac{3d}{em}}(fx^m)^{-\frac{3}{m}}}{e^2m^2}$$
$$+\frac{x^3\operatorname{expIntegral}\left(\frac{3d+3e\ln(fx^m)}{em}\right)(a+b\ln(cx^n))\,\mathrm{e}^{-\frac{3d}{em}}(fx^m)^{-\frac{3}{m}}}{em}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	2350

Maple 2021.1 output

$$\int \frac{(b \ln (c x^n) + a) x^2}{e \ln (f x^m) + d} dx$$

14.34 Problem number 171

$$\int \frac{x(a + b \log (cx^n))}{d + e \log (fx^m)} dx$$

Optimal antiderivative

$$\frac{bn x^2}{2em} - \frac{bn x^2 \operatorname{expIntegral}\left(\frac{2d+2e \ln(f x^m)}{em}\right) (d + e \ln (f x^m)) \mathrm{e}^{-\frac{2d}{em}} (f x^m)^{-\frac{2}{m}}}{e^2 m^2} + \frac{x^2 \operatorname{expIntegral}\left(\frac{2d+2e \ln(f x^m)}{em}\right) (a + b \ln (c x^n)) \mathrm{e}^{-\frac{2d}{em}} (f x^m)^{-\frac{2}{m}}}{em}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	2350

Maple 2021.1 output

$$\int \frac{(b \ln (c x^n) + a) x}{e \ln (f x^m) + d} dx$$

14.35 Problem number 174

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+e\log\left(fx^m\right)\right)}\,dx$$

Optimal antiderivative

$$-\frac{bn}{emx}-\frac{b\,\mathrm{e}^{\frac{d}{em}}n(f\,x^m)^{\frac{1}{m}}\,\mathrm{expIntegral}\left(\frac{-d-e\ln(f\,x^m)}{em}\right)\left(d+e\ln\left(f\,x^m\right)\right)}{e^2m^2x}+\frac{\mathrm{e}^{\frac{d}{em}}(f\,x^m)^{\frac{1}{m}}\,\mathrm{expIntegral}\left(\frac{-d-e\ln(f\,x^m)}{em}\right)\left(a+b\ln\left(c\,x^n\right)\right)}{emx}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	2296

Maple 2021.1 output

$$\int \frac{b\ln\left(c\,x^n\right)+a}{\left(e\ln\left(f\,x^m\right)+d\right)x^2}\,dx$$

14.36 Problem number 175

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+e\log\left(fx^m\right)\right)}\,dx$$

Optimal antiderivative

$$-\frac{bn}{2em\,x^2}-\frac{b\,\mathrm{e}^{\frac{2d}{em}}n(f\,x^m)^{\frac{2}{m}}\,\mathrm{expIntegral}\left(-\frac{2(d+e\ln(f\,x^m))}{em}\right)\left(d+e\ln\left(f\,x^m\right)\right)}{e^2m^2x^2}+\frac{\mathrm{e}^{\frac{2d}{em}}(f\,x^m)^{\frac{2}{m}}\,\mathrm{expIntegral}\left(-\frac{2(d+e\ln(f\,x^m))}{em}\right)\left(a+b\ln\left(c\,x^n\right)\right)}{em\,x^2}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	2341

Maple 2021.1 output

$$\int \frac{b \ln (c\,x^n) + a}{(e \ln (f\,x^m) + d)\,x^3}\,dx$$

14.37 Problem number 188

$$\int \left(d + e x^2\right) \tan^{-1}(ax) \log \left(c x^n\right)\,dx$$

Optimal antiderivative

$$\frac{5enx^2}{36a} - dnx \arctan (ax) - \frac{enx^3 \arctan (ax)}{9} - \frac{e\,x^2 \ln (c\,x^n)}{6a} + dx \arctan (ax) \ln (c\,x^n) + \frac{e\,x^3 \arctan (ax) \ln (c\,x^n)}{3} + \frac{dn \ln \left(a^2x^2+1\right)}{2a} - \frac{en \ln \left(a^2x^2+1\right)}{18a^3} - \frac{\left(3a^2d-e\right) \ln (c\,x^n) \ln \left(a^2x^2+1\right)}{6a^3} - \frac{\left(3a^2d-e\right) n \operatorname{polylog}\left(2, -a^2x^2\right)}{12a^3}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	2700
default	Expression too large to display	78943

Maple 2021.1 output

$$\int \left(e\,x^2 + d\right) \arctan (ax) \ln (c\,x^n)\,dx$$

14.38 Problem number 189

$$\int \left(d+ex^2\right)\cot^{-1}(ax)\log\left(cx^n\right)\,dx$$

Optimal antiderivative

$$-\frac{5en\,x^2}{36a}-dnx\,\mathrm{arccot}(ax)-\frac{en\,x^3\mathrm{arccot}(ax)}{9}+\frac{e\,x^2\ln\left(c\,x^n\right)}{6a}+dx\,\mathrm{arccot}(ax)\ln\left(c\,x^n\right)$$
$$+\frac{e\,x^3\mathrm{arccot}(ax)\ln\left(c\,x^n\right)}{3}-\frac{dn\ln\left(a^2x^2+1\right)}{2a}+\frac{en\ln\left(a^2x^2+1\right)}{18a^3}$$
$$+\frac{\left(3a^2d-e\right)\ln\left(c\,x^n\right)\ln\left(a^2x^2+1\right)}{6a^3}+\frac{\left(3a^2d-e\right)n\,\mathrm{polylog}\left(2,-a^2x^2\right)}{12a^3}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	3017
default	Expression too large to display	152337

Maple 2021.1 output

$$\int \left(e\,x^2+d\right)\mathrm{arccot}(ax)\ln\left(c\,x^n\right)\,dx$$

14.39 Problem number 190

$$\int \left(d+ex^2\right)\sinh^{-1}(ax)\log\left(cx^n\right)\,dx$$

Optimal antiderivative

$$\frac{2en\left(a^2x^2+1\right)^{\frac{3}{2}}}{27a^3}-dnx\,\mathrm{arcsinh}\left(ax\right)-\frac{en\,x^3\,\mathrm{arcsinh}\left(ax\right)}{9}$$
$$-\frac{\left(3a^2d-e\right)n\,\mathrm{arctanh}\left(\sqrt{a^2x^2+1}\right)}{3a^3}-\frac{en\,\mathrm{arctanh}\left(\sqrt{a^2x^2+1}\right)}{9a^3}$$
$$-\frac{e\left(a^2x^2+1\right)^{\frac{3}{2}}\ln\left(c\,x^n\right)}{9a^3}+dx\,\mathrm{arcsinh}\left(ax\right)\ln\left(c\,x^n\right)+\frac{e\,x^3\,\mathrm{arcsinh}\left(ax\right)\ln\left(c\,x^n\right)}{3}$$
$$+\frac{dn\sqrt{a^2x^2+1}}{a}+\frac{\left(3a^2d-e\right)n\sqrt{a^2x^2+1}}{3a^3}-\frac{\left(3a^2d-e\right)\ln\left(c\,x^n\right)\sqrt{a^2x^2+1}}{3a^3}$$

command

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

Maple 2022.1 output

method	result	size
default	Expression too large to display	4077

Maple 2021.1 output

$$\int \left(e\,x^2+d\right)\operatorname{arcsinh}\left(ax\right)\ln\left(c\,x^n\right)\,dx$$

14.40 Problem number 191

$$\int \left(d+ex^2\right)\cosh^{-1}(ax)\log\left(cx^n\right)\,dx$$

Optimal antiderivative

$$\begin{aligned}
&\frac{en(ax-1)^{\frac{3}{2}}\,(ax+1)^{\frac{3}{2}}}{27a^3}-dnx\operatorname{arccosh}(ax)-\frac{en\,x^3\operatorname{arccosh}(ax)}{9}\\
&-\frac{\left(9a^2d+2e\right)n\arctan\left(\sqrt{ax-1}\,\sqrt{ax+1}\right)}{9a^3}+dx\operatorname{arccosh}(ax)\ln\left(c\,x^n\right)\\
&+\frac{e\,x^3\operatorname{arccosh}(ax)\ln\left(c\,x^n\right)}{3}+\frac{dn\sqrt{ax-1}\,\sqrt{ax+1}}{a}+\frac{2en\sqrt{ax-1}\,\sqrt{ax+1}}{27a^3}\\
&+\frac{\left(9a^2d+2e\right)n\sqrt{ax-1}\,\sqrt{ax+1}}{9a^3}+\frac{en\,x^2\sqrt{ax-1}\,\sqrt{ax+1}}{27a}\\
&-\frac{\left(9a^2d+2e\right)\ln\left(c\,x^n\right)\sqrt{ax-1}\,\sqrt{ax+1}}{9a^3}-\frac{e\,x^2\ln\left(c\,x^n\right)\sqrt{ax-1}\,\sqrt{ax+1}}{9a}
\end{aligned}$$

command

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

Maple 2022.1 output

method	result	size
default	Expression too large to display	4732

Maple 2021.1 output

$$\int \left(e\,x^2+d\right)\operatorname{arccosh}(ax)\ln\left(c\,x^n\right)\,dx$$

14.41 Problem number 192

$$\int \left(d+ex^2\right) \tanh^{-1}(ax) \log\left(cx^n\right)\, dx$$

Optimal antiderivative

$$-\frac{5enx^2}{36a}-dnx\operatorname{arctanh}\left(ax\right)-\frac{enx^3\operatorname{arctanh}\left(ax\right)}{9}+\frac{ex^2\ln\left(cx^n\right)}{6a}+dx\operatorname{arctanh}\left(ax\right)\ln\left(cx^n\right)$$
$$+\frac{ex^3\operatorname{arctanh}\left(ax\right)\ln\left(cx^n\right)}{3}-\frac{dn\ln\left(-a^2x^2+1\right)}{2a}-\frac{en\ln\left(-a^2x^2+1\right)}{18a^3}$$
$$+\frac{\left(3a^2d+e\right)\ln\left(cx^n\right)\ln\left(-a^2x^2+1\right)}{6a^3}+\frac{\left(3a^2d+e\right)n\operatorname{polylog}\left(2,a^2x^2\right)}{12a^3}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	1939
default	Expression too large to display	90894

Maple 2021.1 output

$$\int \left(ex^2+d\right) \operatorname{arctanh}\left(ax\right) \ln\left(cx^n\right)\, dx$$

14.42 Problem number 193

$$\int \left(d+ex^2\right) \coth^{-1}(ax) \log\left(cx^n\right)\, dx$$

Optimal antiderivative

$$-\frac{5enx^2}{36a}-dnx\operatorname{arccoth}(ax)-\frac{enx^3\operatorname{arccoth}(ax)}{9}+\frac{ex^2\ln\left(cx^n\right)}{6a}+dx\operatorname{arccoth}(ax)\ln\left(cx^n\right)$$
$$+\frac{ex^3\operatorname{arccoth}(ax)\ln\left(cx^n\right)}{3}-\frac{dn\ln\left(-a^2x^2+1\right)}{2a}-\frac{en\ln\left(-a^2x^2+1\right)}{18a^3}$$
$$+\frac{\left(3a^2d+e\right)\ln\left(cx^n\right)\ln\left(-a^2x^2+1\right)}{6a^3}+\frac{\left(3a^2d+e\right)n\operatorname{polylog}\left(2,a^2x^2\right)}{12a^3}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	1911

Maple 2021.1 output

$$\int \left(e\,x^2+d\right)\operatorname{arccoth}(ax)\ln\left(c\,x^n\right)\,dx$$

15 Test file number 59

Test folder name:

`test_cases/3_Logarithms/59_3.2.1-f+g_x-^m-A+B_log-e-a+b_x-over-c+d_x-^n-^p`

15.1 Problem number 112

$$\int \frac{1}{(ag+bgx)^2\left(A+B\log\left(\frac{e(a+bx)}{c+dx}\right)\right)}\,dx$$

Optimal antiderivative

$$\frac{e\,\mathrm{e}^{\frac{A}{B}}\operatorname{expIntegral}\left(\frac{-A-B\ln\left(\frac{e(bx+a)}{dx+c}\right)}{B}\right)}{B\left(-ad+bc\right)g^2}$$

command

`int(1/(b*g*x+a*g)^2/(A+B*ln(e*(b*x+a)/(d*x+c))),x,method=_RETURNVERBOSE)`

Maple 2022.1 output

method	result	size
derivativedivides	$\frac{e\,\mathrm{e}^{\frac{A}{B}}\operatorname{expIntegral}\left(1,\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)+\frac{A}{B}\right)}{(ad-cb)g^2B}$	61
default	$\frac{e\,\mathrm{e}^{\frac{A}{B}}\operatorname{expIntegral}\left(1,\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)+\frac{A}{B}\right)}{(ad-cb)g^2B}$	61
risch	$\frac{e\,\mathrm{e}^{\frac{A}{B}}\operatorname{expIntegral}\left(1,\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)+\frac{A}{B}\right)}{(ad-cb)g^2B}$	61

Maple 2021.1 output

$$\int \frac{1}{(bgx+ag)^2\left(B\ln\left(\frac{(bx+a)e}{dx+c}\right)+A\right)}\,dx$$

15.2 Problem number 113

$$\int \frac{1}{(ag+bgx)^3 \left(A+B\log\left(\frac{e(a+bx)}{c+dx}\right)\right)}\,dx$$

Optimal antiderivative

$$\frac{b\,e^2 \mathrm{e}^{\frac{2A}{B}}\,\mathrm{expIntegral}\left(-\frac{2\left(A+B\ln\left(\frac{e(bx+a)}{dx+c}\right)\right)}{B}\right)}{B\left(-ad+bc\right)^2 g^3} - \frac{de\,\mathrm{e}^{\frac{A}{B}}\,\mathrm{expIntegral}\left(\frac{-A-B\ln\left(\frac{e(bx+a)}{dx+c}\right)}{B}\right)}{B\left(-ad+bc\right)^2 g^3}$$

command

```
int(1/(b*g*x+a*g)^3/(A+B*ln(e*(b*x+a)/(d*x+c))),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
derivativedivides	$\frac{e\left(\frac{d\,\mathrm{e}^{\frac{A}{B}}\,\mathrm{expIntegral}\left(1,\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)+\frac{A}{B}\right)}{B}-\frac{be\,\mathrm{e}^{\frac{2A}{B}}\,\mathrm{expIntegral}\left(1,2\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)+\frac{2A}{B}\right)}{B}\right)}{(ad-cb)^2 g^3}$	117
default	$\frac{e\left(\frac{d\,\mathrm{e}^{\frac{A}{B}}\,\mathrm{expIntegral}\left(1,\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)+\frac{A}{B}\right)}{B}-\frac{be\,\mathrm{e}^{\frac{2A}{B}}\,\mathrm{expIntegral}\left(1,2\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)+\frac{2A}{B}\right)}{B}\right)}{(ad-cb)^2 g^3}$	117
risch	$\frac{ed\,\mathrm{e}^{\frac{A}{B}}\,\mathrm{expIntegral}\left(1,\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)+\frac{A}{B}\right)}{g^3(ad-cb)^2 B}-\frac{e^2 b\,\mathrm{e}^{\frac{2A}{B}}\,\mathrm{expIntegral}\left(1,2\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)+\frac{2A}{B}\right)}{g^3(ad-cb)^2 B}$	131

Maple 2021.1 output

$$\int \frac{1}{(bgx+ag)^3 \left(B\ln\left(\frac{(bx+a)e}{dx+c}\right)+A\right)}\,dx$$

15.3 Problem number 117

$$\int \frac{1}{(ag+bgx)^2 \left(A+B\log\left(\frac{e(a+bx)}{c+dx}\right)\right)^2}\,dx$$

Optimal antiderivative

$$-\frac{e\,\mathrm{e}^{\frac{A}{B}}\,\mathrm{expIntegral}\left(\frac{-A-B\ln\left(\frac{e(bx+a)}{dx+c}\right)}{B}\right)}{B^2\left(-ad+bc\right)g^2} + \frac{-dx-c}{B\left(-ad+bc\right)g^2\left(bx+a\right)\left(A+B\ln\left(\frac{e(bx+a)}{dx+c}\right)\right)}$$

command

```
int(1/(b*g*x+a*g)^2/(A+B*ln(e*(b*x+a)/(d*x+c)))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	$\frac{dx+c}{(ad-cb)B(bx+a)g^2\left(A+B\ln\left(\frac{e(bx+a)}{dx+c}\right)\right)}-\frac{e\,\mathrm{e}^{\frac{A}{B}}\,\mathrm{expIntegral}\left(1,\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)+\frac{A}{B}\right)}{g^2B^2(ad-cb)}$	113
derivativedivides	$-\frac{e\left(-\frac{1}{\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)B\left(A+B\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)\right)}+\frac{\mathrm{e}^{\frac{A}{B}}\,\mathrm{expIntegral}\left(1,\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)+\frac{A}{B}\right)}{B^2}\right)}{(ad-cb)g^2}$	132
default	$-\frac{e\left(-\frac{1}{\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)B\left(A+B\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)\right)}+\frac{\mathrm{e}^{\frac{A}{B}}\,\mathrm{expIntegral}\left(1,\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)+\frac{A}{B}\right)}{B^2}\right)}{(ad-cb)g^2}$	132

Maple 2021.1 output

$$\int \frac{1}{(bgx+ag)^2\left(B\ln\left(\frac{(bx+a)e}{dx+c}\right)+A\right)^2}\,dx$$

15.4 Problem number 118

$$\int \frac{1}{(ag+bgx)^3\left(A+B\log\left(\frac{e(a+bx)}{c+dx}\right)\right)^2}\,dx$$

Optimal antiderivative

$$-\frac{2b\,e^2\mathrm{e}^{\frac{2A}{B}}\,\mathrm{expIntegral}\left(-\frac{2\left(A+B\ln\left(\frac{e(bx+a)}{dx+c}\right)\right)}{B}\right)}{B^2\left(-ad+bc\right)^2g^3}+\frac{de\,\mathrm{e}^{\frac{A}{B}}\,\mathrm{expIntegral}\left(\frac{-A-B\ln\left(\frac{e(bx+a)}{dx+c}\right)}{B}\right)}{B^2\left(-ad+bc\right)^2g^3}$$
$$+\frac{d(dx+c)}{B\left(-ad+bc\right)^2g^3(bx+a)\left(A+B\ln\left(\frac{e(bx+a)}{dx+c}\right)\right)}$$
$$-\frac{b(dx+c)^2}{B\left(-ad+bc\right)^2g^3(bx+a)^2\left(A+B\ln\left(\frac{e(bx+a)}{dx+c}\right)\right)}$$

command

```
int(1/(b*g*x+a*g)^3/(A+B*ln(e*(b*x+a)/(d*x+c)))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$\frac{dx+c}{(ad-cb)B(bx+a)^2g^3\left(A+B\ln\left(\frac{e(bx+a)}{dx+c}\right)\right)}-\frac{ed\,\mathrm{e}^{\frac{A}{B}}\,\mathrm{expIntegral}\left(1,\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)+\frac{A}{B}\right)}{g^3B^2(ad-cb)^2}+\frac{2e^2b\,\mathrm{e}^{\frac{2A}{B}}\,\mathrm{expIntegral}\left(1,\right.}{g^3B^2(}$
derivativedivides	$\frac{e\left(-d\left(-\frac{1}{\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)B\left(A+B\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)\right)}+\frac{\mathrm{e}^{\frac{A}{B}}\,\mathrm{expIntegral}\left(1,\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)+\frac{A}{B}\right)}{B^2}\right)+be\left(-\frac{}{\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right.}\right.}{(ad-cb)^2g^3}$
default	$\frac{e\left(-d\left(-\frac{1}{\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)B\left(A+B\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)\right)}+\frac{\mathrm{e}^{\frac{A}{B}}\,\mathrm{expIntegral}\left(1,\ln\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right)+\frac{A}{B}\right)}{B^2}\right)+be\left(-\frac{}{\left(\frac{be}{d}+\frac{(ad-cb)e}{d(dx+c)}\right.}\right.}{(ad-cb)^2g^3}$

Maple 2021.1 output

$$\int \frac{1}{(bgx+ag)^3\left(B\ln\left(\frac{(bx+a)e}{dx+c}\right)+A\right)^2}\,dx$$

15.5 Problem number 195

$$\int \frac{1}{(ag+bgx)^3\left(A+B\log\left(\frac{e(c+dx)}{a+bx}\right)\right)}\,dx$$

Optimal antiderivative

$$\frac{d\,\mathrm{expIntegral}\left(\frac{A+B\ln\left(\frac{e(dx+c)}{bx+a}\right)}{B}\right)\mathrm{e}^{-\frac{A}{B}}}{B\left(-ad+bc\right)^2e\,g^3}-\frac{b\,\mathrm{expIntegral}\left(\frac{2A+2B\ln\left(\frac{e(dx+c)}{bx+a}\right)}{B}\right)\mathrm{e}^{-\frac{2A}{B}}}{B\left(-ad+bc\right)^2e^2g^3}$$

command

```
int(1/(b*g*x+a*g)^3/(A+B*ln(e*(d*x+c)/(b*x+a))),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
derivativedivides	$-\frac{-\frac{b\,\mathrm{e}^{-\frac{2A}{B}}\,\mathrm{expIntegral}\left(1,-2\ln\left(\frac{de}{b}-\frac{e(ad-cb)}{b(bx+a)}\right)-\frac{2A}{B}\right)}{B}+\frac{ed\,\mathrm{e}^{-\frac{A}{B}}\,\mathrm{expIntegral}\left(1,-\ln\left(\frac{de}{b}-\frac{e(ad-cb)}{b(bx+a)}\right)-\frac{A}{B}\right)}{B}}{e^2(ad-cb)^2g^3}$	126
default	$-\frac{-\frac{b\,\mathrm{e}^{-\frac{2A}{B}}\,\mathrm{expIntegral}\left(1,-2\ln\left(\frac{de}{b}-\frac{e(ad-cb)}{b(bx+a)}\right)-\frac{2A}{B}\right)}{B}+\frac{ed\,\mathrm{e}^{-\frac{A}{B}}\,\mathrm{expIntegral}\left(1,-\ln\left(\frac{de}{b}-\frac{e(ad-cb)}{b(bx+a)}\right)-\frac{A}{B}\right)}{B}}{e^2(ad-cb)^2g^3}$	126
risch	$\frac{b\,\mathrm{e}^{-\frac{2A}{B}}\,\mathrm{expIntegral}\left(1,-2\ln\left(\frac{de}{b}-\frac{e(ad-cb)}{b(bx+a)}\right)-\frac{2A}{B}\right)}{g^3(ad-cb)^2e^2B}-\frac{d\,\mathrm{e}^{-\frac{A}{B}}\,\mathrm{expIntegral}\left(1,-\ln\left(\frac{de}{b}-\frac{e(ad-cb)}{b(bx+a)}\right)-\frac{A}{B}\right)}{g^3(ad-cb)^2eB}$	139

Maple 2021.1 output

$$\int \frac{1}{(bgx+ag)^3\left(B\ln\left(\frac{(dx+c)e}{bx+a}\right)+A\right)}\,dx$$

15.6 Problem number 200

$$\int \frac{1}{(ag+bgx)^3\left(A+B\log\left(\frac{e(c+dx)}{a+bx}\right)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{d\,\mathrm{expIntegral}\left(\frac{A+B\ln\left(\frac{e(dx+c)}{bx+a}\right)}{B}\right)\mathrm{e}^{-\frac{A}{B}}}{B^2\left(-ad+bc\right)^2 e\,g^3}-\frac{2b\,\mathrm{expIntegral}\left(\frac{2A+2B\ln\left(\frac{e(dx+c)}{bx+a}\right)}{B}\right)\mathrm{e}^{-\frac{2A}{B}}}{B^2\left(-ad+bc\right)^2 e^2 g^3}$$
$$+\frac{dx+c}{B\left(-ad+bc\right)g^3\left(bx+a\right)^2\left(A+B\ln\left(\frac{e(dx+c)}{bx+a}\right)\right)}$$

command

```
int(1/(b*g*x+a*g)^3/(A+B*ln(e*(d*x+c)/(b*x+a)))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
derivativedivides	$-\frac{b\left(-\frac{\left(\frac{de}{b}-\frac{e(ad-cb)}{b(bx+a)}\right)^2}{\ln\left(\frac{de}{b}-\frac{e(ad-cb)}{b(bx+a)}\right)+\frac{A}{B}}-2\,\mathrm{e}^{-\frac{2A}{B}}\,\mathrm{expIntegral}\left(1,-2\ln\left(\frac{de}{b}-\frac{e(ad-cb)}{b(bx+a)}\right)-\frac{2A}{B}\right)\right)}{B^2}-\frac{ed\left(-\frac{\frac{de}{b}-\frac{e(ad-cb)}{b(bx+a)}}{\ln\left(\frac{de}{b}-\frac{e(ad-cb)}{b(bx+a)}\right)+\frac{A}{B}}-\mathrm{e}^{-\frac{A}{B}}\,\mathrm{expI}\right.}{B^2}$
default	$-\frac{b\left(-\frac{\left(\frac{de}{b}-\frac{e(ad-cb)}{b(bx+a)}\right)^2}{\ln\left(\frac{de}{b}-\frac{e(ad-cb)}{b(bx+a)}\right)+\frac{A}{B}}-2\,\mathrm{e}^{-\frac{2A}{B}}\,\mathrm{expIntegral}\left(1,-2\ln\left(\frac{de}{b}-\frac{e(ad-cb)}{b(bx+a)}\right)-\frac{2A}{B}\right)\right)}{B^2}-\frac{ed\left(-\frac{\frac{de}{b}-\frac{e(ad-cb)}{b(bx+a)}}{\ln\left(\frac{de}{b}-\frac{e(ad-cb)}{b(bx+a)}\right)+\frac{A}{B}}-\mathrm{e}^{-\frac{A}{B}}\,\mathrm{expI}\right.}{B^2}$
risch	$-\frac{dx+c}{(ad-cb)B(bx+a)^2g^3\left(A+B\ln\left(\frac{e(dx+c)}{bx+a}\right)\right)}+\frac{bcd\,\mathrm{e}^{-\frac{A}{B}}\,\mathrm{expIntegral}\left(1,-\ln\left(\frac{de}{b}-\frac{e(ad-cb)}{b(bx+a)}\right)-\frac{A}{B}\right)}{e\,g^3B^2(ad-cb)^3}-\frac{2cb^2\mathrm{e}^{-\frac{2A}{B}}\,\mathrm{expInt}}{}$

Maple 2021.1 output

$$\int \frac{1}{(bgx+ag)^3\left(B\ln\left(\frac{(dx+c)e}{bx+a}\right)+A\right)^2}\,dx$$

16 Test file number 61

Test folder name:

`test_cases/3_Logarithms/61_3.2.3_u_log-e-f-a+b_x-^p-c+d_x-^q-^r-^s`

16.1 Problem number 91

$$\int \frac{\log\left(\frac{bc-ad}{b(c+dx)}\right)\log^2\left(\frac{e(a+bx)}{c+dx}\right)}{(c+dx)(ag+bgx)}\,dx$$

Optimal antiderivative

$$-\frac{\ln\left(\frac{e(bx+a)}{dx+c}\right)^2 \operatorname{polylog}\left(2, 1+\frac{ad-bc}{b(dx+c)}\right)}{(-ad+bc)\,g} + \frac{2\ln\left(\frac{e(bx+a)}{dx+c}\right)\operatorname{polylog}\left(3, 1+\frac{ad-bc}{b(dx+c)}\right)}{(-ad+bc)\,g} - \frac{2\operatorname{polylog}\left(4, 1+\frac{ad-bc}{b(dx+c)}\right)}{(-ad+bc)\,g}$$

command

```
int(ln((-a*d+b*c)/b/(d*x+c))*ln(e*(b*x+a)/(d*x+c))^2/(d*x+c)/(b*g*x+a*g),x,method=_RETURNVERB
```

Maple 2022.1 output

method	result
default	$\frac{-\frac{\ln\left(\frac{e(bx+a)}{dx+c}\right)^3\ln\left(-\frac{\frac{e(bx+a)d}{dx+c}-be}{be}\right)}{3(ad-cb)}+\frac{\ln\left(\frac{e(bx+a)}{dx+c}\right)^3\ln\left(1-\frac{d(bx+a)}{b(dx+c)}\right)}{3ad-3cb}+\frac{\ln\left(\frac{e(bx+a)}{dx+c}\right)^2\operatorname{polylog}\left(2,\frac{d(bx+a)}{b(dx+c)}\right)}{ad-cb}-\frac{2\ln\left(\frac{e(bx+a)}{dx+c}\right)\operatorname{polylog}\left(3,\frac{d(b}{b(d}\right.}{ad-cb}}{g}$

Maple 2021.1 output

$$\int \frac{\ln\left(\frac{(bx+a)e}{dx+c}\right)^2 \ln\left(\frac{-ad+bc}{(dx+c)b}\right)}{(dx+c)\,(bgx+ag)}\,dx$$

16.2 Problem number 103

$$\int \frac{\log\left(\frac{-bc+ad}{d(a+bx)}\right)\log\left(\frac{e(c+dx)}{a+bx}\right)}{(a+bx)(c+dx)}\,dx$$

Optimal antiderivative

$$\frac{\ln\left(\frac{e(dx+c)}{bx+a}\right)\operatorname{polylog}\left(2, 1+\frac{-ad+bc}{d(bx+a)}\right)}{-ad+bc} - \frac{\operatorname{polylog}\left(3, 1+\frac{-ad+bc}{d(bx+a)}\right)}{-ad+bc}$$

command

```
int(ln((a*d-b*c)/d/(b*x+a))*ln(e*(d*x+c)/(b*x+a))/(b*x+a)/(d*x+c),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
default	$\frac{\ln\left(\frac{e(dx+c)}{bx+a}\right)^2 \ln\left(-\frac{\frac{e(dx+c)b}{bx+a}-ed}{ed}\right)}{2ad-2cb} - \frac{\ln\left(\frac{e(dx+c)}{bx+a}\right)^2 \ln\left(1-\frac{b(dx+c)}{d(bx+a)}\right)}{2(ad-cb)} - \frac{\ln\left(\frac{e(dx+c)}{bx+a}\right) \operatorname{polylog}\left(2,\frac{b(dx+c)}{d(bx+a)}\right)}{ad-cb} + \frac{\operatorname{polylog}\left(3,\frac{b(dx+c)}{d(bx+a)}\right)}{ad-cb}$

Maple 2021.1 output

$$\int \frac{\ln\left(\frac{(dx+c)e}{bx+a}\right)\ln\left(\frac{ad-bc}{(bx+a)d}\right)}{(bx+a)\,(dx+c)}\,dx$$

16.3 Problem number 105

$$\int \frac{\log\left(\frac{e(c+dx)}{a+bx}\right)\log\left(\frac{(-bc+ad)(e+fx)}{(de-cf)(a+bx)}\right)}{(a+bx)(c+dx)}\,dx$$

Optimal antiderivative

$$\frac{\ln\left(\frac{e(dx+c)}{bx+a}\right)\operatorname{polylog}\left(2,1+\frac{(-ad+bc)(fx+e)}{(-cf+de)(bx+a)}\right)}{-ad+bc} - \frac{\operatorname{polylog}\left(3,1+\frac{(-ad+bc)(fx+e)}{(-cf+de)(bx+a)}\right)}{-ad+bc}$$

command

```
int(ln(e*(d*x+c)/(b*x+a))*ln((a*d-b*c)*(f*x+e)/(-c*f+d*e)/(b*x+a))/(b*x+a)/(d*x+c),x,method=_
```

Maple 2022.1 output

method	result
default	$\frac{\ln\left(\frac{e(dx+c)}{bx+a}\right)^2 \ln\left(-\frac{\frac{e(dx+c)af}{bx+a}-\frac{e^2(dx+c)b}{bx+a}-cef+d\,e^2}{e(cf-ed)}\right)}{2ad-2cb} - \frac{af\ln\left(\frac{e(dx+c)}{bx+a}\right)^2 \ln\left(1-\frac{(af-be)e(dx+c)}{(bx+a)\left(cef-d\,e^2\right)}\right)}{2(ad-cb)(af-be)} - \frac{af\ln\left(\frac{e(dx+c)}{bx+a}\right)\operatorname{polylog}\left($

Maple 2021.1 output

$$\int \frac{\ln\left(\frac{(dx+c)e}{bx+a}\right)\ln\left(\frac{(ad-bc)(fx+e)}{(-cf+de)(bx+a)}\right)}{(bx+a)\,(dx+c)}\,dx$$

17 Test file number 62

Test folder name:

`test_cases/3_Logarithms/62_3.3_u-a+b_log-c-d+e_x-^n-^p`

17.1 Problem number 5

$$\int \frac{1}{\log(c(d+ex))}\,dx$$

Optimal antiderivative

$$\frac{\text{logarithmicIntegral}\left(c(ex+d)\right)}{ce}$$

command

`int(1/ln(c*(e*x+d)),x,method=_RETURNVERBOSE)`

Maple 2022.1 output

method	result	size
derivativedivides	$-\frac{\text{expIntegral}(1,-\ln(cex+cd))}{ce}$	22
default	$-\frac{\text{expIntegral}(1,-\ln(cex+cd))}{ce}$	22
risch	$-\frac{\text{expIntegral}(1,-\ln(cex+cd))}{ce}$	22

Maple 2021.1 output

hanged

17.2 Problem number 88

$$\int \frac{(f+gx)^3}{a+b\log\left(c(d+ex)^n\right)}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&\frac{(-dg+ef)^3\,(ex+d)\,\text{expIntegral}\left(\frac{a+b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{a}{bn}}\left(c(ex+d)^n\right)^{-\frac{1}{n}}}{b\,e^4 n}\\
&+\frac{3g(-dg+ef)^2\,(ex+d)^2\,\text{expIntegral}\left(\frac{2a+2b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{2a}{bn}}\left(c(ex+d)^n\right)^{-\frac{2}{n}}}{b\,e^4 n}\\
&+\frac{3g^2(-dg+ef)\,(ex+d)^3\,\text{expIntegral}\left(\frac{3a+3b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{3a}{bn}}\left(c(ex+d)^n\right)^{-\frac{3}{n}}}{b\,e^4 n}\\
&+\frac{g^3(ex+d)^4\,\text{expIntegral}\left(\frac{4a+4b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{4a}{bn}}\left(c(ex+d)^n\right)^{-\frac{4}{n}}}{b\,e^4 n}
\end{aligned}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	3160

Maple 2021.1 output

$$\int \frac{(gx+f)^3}{b\ln\left(c\left(ex+d\right)^n\right)+a}\,dx$$

17.3 Problem number 89

$$\int \frac{(f+gx)^2}{a+b\log\left(c(d+ex)^n\right)}\,dx$$

Optimal antiderivative

$$\begin{aligned}&\frac{(-dg+ef)^2\,(ex+d)\,\mathrm{expIntegral}\left(\frac{a+b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{a}{bn}}\left(c(ex+d)^n\right)^{-\frac{1}{n}}}{b\,e^3n}\\&+\frac{2g(-dg+ef)\,(ex+d)^2\,\mathrm{expIntegral}\left(\frac{2a+2b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{2a}{bn}}\left(c(ex+d)^n\right)^{-\frac{2}{n}}}{b\,e^3n}\\&+\frac{g^2(ex+d)^3\,\mathrm{expIntegral}\left(\frac{3a+3b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{3a}{bn}}\left(c(ex+d)^n\right)^{-\frac{3}{n}}}{b\,e^3n}\end{aligned}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	1889

Maple 2021.1 output

$$\int \frac{(gx+f)^2}{b\ln\left(c\left(ex+d\right)^n\right)+a}\,dx$$

17.4 Problem number 90

$$\int \frac{f+gx}{a+b\log\left(c(d+ex)^n\right)}\,dx$$

Optimal antiderivative

$$\frac{(-dg+ef)\,(ex+d)\,\mathrm{expIntegral}\left(\frac{a+b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{a}{bn}}\left(c(ex+d)^n\right)^{-\frac{1}{n}}}{b\,e^2n} + \frac{g(ex+d)^2\,\mathrm{expIntegral}\left(\frac{2a+2b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{2a}{bn}}\left(c(ex+d)^n\right)^{-\frac{2}{n}}}{b\,e^2n}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	937

Maple 2021.1 output

$$\int \frac{gx+f}{b\ln\left(c\left(ex+d\right)^n\right)+a}\,dx$$

17.5 Problem number 94

$$\int \frac{(f+gx)^3}{\left(a+b\log\left(c(d+ex)^n\right)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{(-dg+ef)^3\,(ex+d)\,\mathrm{expIntegral}\left(\frac{a+b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{a}{bn}}\left(c(ex+d)^n\right)^{-\frac{1}{n}}}{b^2e^4n^2} + \frac{6g(-dg+ef)^2\,(ex+d)^2\,\mathrm{expIntegral}\left(\frac{2a+2b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{2a}{bn}}\left(c(ex+d)^n\right)^{-\frac{2}{n}}}{b^2e^4n^2} + \frac{9g^2(-dg+ef)\,(ex+d)^3\,\mathrm{expIntegral}\left(\frac{3a+3b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{3a}{bn}}\left(c(ex+d)^n\right)^{-\frac{3}{n}}}{b^2e^4n^2} + \frac{4g^3(ex+d)^4\,\mathrm{expIntegral}\left(\frac{4a+4b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{4a}{bn}}\left(c(ex+d)^n\right)^{-\frac{4}{n}}}{b^2e^4n^2} - \frac{(ex+d)\,(gx+f)^3}{ben\left(a+b\ln\left(c\left(ex+d\right)^n\right)\right)}$$

command

```
int((g*x+f)^3/(a+b*ln(c*(e*x+d)^n))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	9517

Maple 2021.1 output

$$\int \frac{(gx+f)^3}{(b\ln(c(ex+d)^n)+a)^2}\,dx$$

17.6 Problem number 95

$$\int \frac{(f+gx)^2}{(a+b\log(c(d+ex)^n))^2}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&\frac{(-dg+ef)^2(ex+d)\,\mathrm{expIntegral}\left(\frac{a+b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{a}{bn}}(c(ex+d)^n)^{-\frac{1}{n}}}{b^2e^3n^2}\\
&+\frac{4g(-dg+ef)(ex+d)^2\,\mathrm{expIntegral}\left(\frac{2a+2b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{2a}{bn}}(c(ex+d)^n)^{-\frac{2}{n}}}{b^2e^3n^2}\\
&+\frac{3g^2(ex+d)^3\,\mathrm{expIntegral}\left(\frac{3a+3b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{3a}{bn}}(c(ex+d)^n)^{-\frac{3}{n}}}{b^2e^3n^2}\\
&-\frac{(ex+d)(gx+f)^2}{ben(a+b\ln(c(ex+d)^n))}
\end{aligned}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	5123

Maple 2021.1 output

$$\int \frac{(gx+f)^2}{(b\ln(c(ex+d)^n)+a)^2}\,dx$$

17.7 Problem number 96

$$\int \frac{f+gx}{\left(a+b\log\left(c(d+ex)^n\right)\right)^2}\,dx$$

Optimal antiderivative

$$\frac{(-dg+ef)(ex+d)\,\mathrm{expIntegral}\left(\frac{a+b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{a}{bn}}\left(c(ex+d)^n\right)^{-\frac{1}{n}}}{b^2e^2n^2}$$
$$+\frac{2g(ex+d)^2\,\mathrm{expIntegral}\left(\frac{2a+2b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{2a}{bn}}\left(c(ex+d)^n\right)^{-\frac{2}{n}}}{b^2e^2n^2}-\frac{(ex+d)(gx+f)}{ben\left(a+b\ln\left(c\left(ex+d\right)^n\right)\right)}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	2300

Maple 2021.1 output

$$\int \frac{gx+f}{\left(b\ln\left(c\left(ex+d\right)^n\right)+a\right)^2}\,dx$$

17.8 Problem number 100

$$\int \frac{(f+gx)^2}{\left(a+b\log\left(c(d+ex)^n\right)\right)^3}\,dx$$

Optimal antiderivative

$$\frac{(-dg+ef)^2(ex+d)\,\mathrm{expIntegral}\left(\frac{a+b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{a}{bn}}\left(c(ex+d)^n\right)^{-\frac{1}{n}}}{2b^3e^3n^3}$$
$$+\frac{4g(-dg+ef)(ex+d)^2\,\mathrm{expIntegral}\left(\frac{2a+2b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{2a}{bn}}\left(c(ex+d)^n\right)^{-\frac{2}{n}}}{b^3e^3n^3}$$
$$+\frac{9g^2(ex+d)^3\,\mathrm{expIntegral}\left(\frac{3a+3b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{3a}{bn}}\left(c(ex+d)^n\right)^{-\frac{3}{n}}}{2b^3e^3n^3}$$
$$-\frac{(ex+d)(gx+f)^2}{2ben\left(a+b\ln\left(c\left(ex+d\right)^n\right)\right)^2}+\frac{(-dg+ef)(ex+d)(gx+f)}{b^2e^2n^2\left(a+b\ln\left(c\left(ex+d\right)^n\right)\right)}$$
$$-\frac{3(ex+d)(gx+f)^2}{2b^2e\,n^2\left(a+b\ln\left(c\left(ex+d\right)^n\right)\right)}$$

command

```
int((g*x+f)^2/(a+b*ln(c*(e*x+d)^n))^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	6545

Maple 2021.1 output

$$\int \frac{(gx+f)^2}{(b\ln(c(ex+d)^n)+a)^3}\,dx$$

17.9 Problem number 101

$$\int \frac{f+gx}{(a+b\log(c(d+ex)^n))^3}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&\frac{(-dg+ef)(ex+d)\,\mathrm{expIntegral}\left(\frac{a+b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{a}{bn}}\left(c(ex+d)^n\right)^{-\frac{1}{n}}}{2b^3e^2n^3}\\
&+\frac{2g(ex+d)^2\,\mathrm{expIntegral}\left(\frac{2a+2b\ln(c(ex+d)^n)}{bn}\right)\mathrm{e}^{-\frac{2a}{bn}}\left(c(ex+d)^n\right)^{-\frac{2}{n}}}{b^3e^2n^3}\\
&-\frac{(ex+d)(gx+f)}{2ben\left(a+b\ln\left(c(ex+d)^n\right)\right)^2}+\frac{(-dg+ef)(ex+d)}{2b^2e^2n^2\left(a+b\ln\left(c(ex+d)^n\right)\right)}\\
&-\frac{(ex+d)(gx+f)}{b^2e\,n^2\left(a+b\ln\left(c(ex+d)^n\right)\right)}
\end{aligned}$$

command

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

Maple 2022.1 output

method	result	size
risch	Expression too large to display	3114

Maple 2021.1 output

$$\int \frac{gx+f}{(b\ln(c(ex+d)^n)+a)^3}\,dx$$

17.10 Problem number 191

$$\int \frac{(h+ix)^4}{(de+dfx)(a+b\log(c(e+fx)))}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&\frac{4i(-ei+fh)^3\,\mathrm{expIntegral}\left(\frac{a+b\ln(c(fx+e))}{b}\right)\mathrm{e}^{-\frac{a}{b}}}{bcd\,f^5}\\
&+\frac{6i^2(-ei+fh)^2\,\mathrm{expIntegral}\left(\frac{2a+2b\ln(c(fx+e))}{b}\right)\mathrm{e}^{-\frac{2a}{b}}}{b\,c^2d\,f^5}\\
&+\frac{4i^3(-ei+fh)\,\mathrm{expIntegral}\left(\frac{3a+3b\ln(c(fx+e))}{b}\right)\mathrm{e}^{-\frac{3a}{b}}}{b\,c^3d\,f^5}\\
&+\frac{i^4\,\mathrm{expIntegral}\left(\frac{4a+4b\ln(c(fx+e))}{b}\right)\mathrm{e}^{-\frac{4a}{b}}}{b\,c^4d\,f^5}+\frac{(-ei+fh)^4\ln\left(a+b\ln\left(c(fx+e)\right)\right)}{bd\,f^5}
\end{aligned}$$

command

```
int((i*x+h)^4/(d*f*x+d*e)/(a+b*ln(c*(f*x+e))),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

output too large to display

Maple 2021.1 output

$$\int \frac{(ix+h)^4}{(dfx+de)\left(b\ln\left((fx+e)\,c\right)+a\right)}\,dx$$

17.11 Problem number 192

$$\int \frac{(h+ix)^3}{(de+dfx)(a+b\log(c(e+fx)))}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&\frac{3i(-ei+fh)^2\,\mathrm{expIntegral}\left(\frac{a+b\ln(c(fx+e))}{b}\right)\mathrm{e}^{-\frac{a}{b}}}{bcd\,f^4}\\
&+\frac{3i^2(-ei+fh)\,\mathrm{expIntegral}\left(\frac{2a+2b\ln(c(fx+e))}{b}\right)\mathrm{e}^{-\frac{2a}{b}}}{b\,c^2d\,f^4}\\
&+\frac{i^3\,\mathrm{expIntegral}\left(\frac{3a+3b\ln(c(fx+e))}{b}\right)\mathrm{e}^{-\frac{3a}{b}}}{b\,c^3d\,f^4}+\frac{(-ei+fh)^3\ln\left(a+b\ln\left(c(fx+e)\right)\right)}{bd\,f^4}
\end{aligned}$$

command

```
int((i*x+h)^3/(d*f*x+d*e)/(a+b*ln(c*(f*x+e))),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

output too large to display

Maple 2021.1 output

$$\int \frac{(ix+h)^3}{(dfx+de)\left(b\ln\left(\left(fx+e\right)c\right)+a\right)}\,dx$$

17.12 Problem number 193

$$\int \frac{(h+ix)^2}{(de+dfx)(a+b\log(c(e+fx)))}\,dx$$

Optimal antiderivative

$$\frac{2i(-ei+fh)\,\mathrm{expIntegral}\left(\frac{a+b\ln(c(fx+e))}{b}\right)\mathrm{e}^{-\frac{a}{b}}}{bcd\,f^3}$$
$$+\frac{i^2\,\mathrm{expIntegral}\left(\frac{2a+2b\ln(c(fx+e))}{b}\right)\mathrm{e}^{-\frac{2a}{b}}}{b\,c^2d\,f^3}+\frac{(-ei+fh)^2\ln\left(a+b\ln\left(c(fx+e)\right)\right)}{bd\,f^3}$$

command

```
int((i*x+h)^2/(d*f*x+d*e)/(a+b*ln(c*(f*x+e))),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
derivativedivides	$-\frac{\frac{i^2\mathrm{e}^{-\frac{2a}{b}}\,\mathrm{expIntegral}\left(1,-2\ln(cfx+ce)-\frac{2a}{b}\right)}{b}+\frac{c^2e^2i^2\ln(a+b\ln(cfx+ce))}{b}+\frac{c^2f^2h^2\ln(a+b\ln(cfx+ce))}{b}+\frac{2cei^2\mathrm{e}^{-\frac{a}{b}}\,\mathrm{expIntegral}\left(1,-}{b}}{c^2f^3d}$
default	$-\frac{\frac{i^2\mathrm{e}^{-\frac{2a}{b}}\,\mathrm{expIntegral}\left(1,-2\ln(cfx+ce)-\frac{2a}{b}\right)}{b}+\frac{c^2e^2i^2\ln(a+b\ln(cfx+ce))}{b}+\frac{c^2f^2h^2\ln(a+b\ln(cfx+ce))}{b}+\frac{2cei^2\mathrm{e}^{-\frac{a}{b}}\,\mathrm{expIntegral}\left(1,-}{b}}{c^2f^3d}$
risch	$-\frac{i^2\mathrm{e}^{-\frac{2a}{b}}\,\mathrm{expIntegral}\left(1,-2\ln(cfx+ce)-\frac{2a}{b}\right)}{d\,f^3c^2b}+\frac{e^2i^2\ln(a+b\ln(cfx+ce))}{d\,f^3b}+\frac{h^2\ln(a+b\ln(cfx+ce))}{dfb}+\frac{2ei^2\mathrm{e}^{-\frac{a}{b}}\,\mathrm{expIn}$

Maple 2021.1 output

$$\int \frac{(ix+h)^2}{(dfx+de)\left(b\ln\left(\left(fx+e\right)c\right)+a\right)}\,dx$$

17.13 Problem number 194

$$\int \frac{h+ix}{(de+dfx)(a+b\log(c(e+fx)))}\,dx$$

Optimal antiderivative

$$\frac{i\,\mathrm{expIntegral}\left(\frac{a+b\ln(c(fx+e))}{b}\right)\mathrm{e}^{-\frac{a}{b}}}{bcd\,f^2}+\frac{(-ei+fh)\ln\left(a+b\ln\left(c(fx+e)\right)\right)}{bd\,f^2}$$

command

```
int((i*x+h)/(d*f*x+d*e)/(a+b*ln(c*(f*x+e))),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
derivativedivides	$-\frac{\frac{i\,\mathrm{e}^{-\frac{a}{b}}\,\mathrm{expIntegral}\left(1,-\ln(cfx+ce)-\frac{a}{b}\right)}{b}-\frac{hcf\ln(a+b\ln(cfx+ce))}{b}+\frac{cei\ln(a+b\ln(cfx+ce))}{b}}{c\,f^2d}$	88
default	$-\frac{\frac{i\,\mathrm{e}^{-\frac{a}{b}}\,\mathrm{expIntegral}\left(1,-\ln(cfx+ce)-\frac{a}{b}\right)}{b}-\frac{hcf\ln(a+b\ln(cfx+ce))}{b}+\frac{cei\ln(a+b\ln(cfx+ce))}{b}}{c\,f^2d}$	88
risch	$-\frac{i\,\mathrm{e}^{-\frac{a}{b}}\,\mathrm{expIntegral}\left(1,-\ln(cfx+ce)-\frac{a}{b}\right)}{d\,f^2cb}+\frac{h\ln(a+b\ln(cfx+ce))}{dfb}-\frac{ei\ln(a+b\ln(cfx+ce))}{d\,f^2b}$	96

Maple 2021.1 output

$$\int \frac{ix+h}{(dfx+de)\left(b\ln\left((fx+e)\,c\right)+a\right)}\,dx$$

18 Test file number 63

Test folder name:

```
test_cases/3_Logarithms/63_3.4_u-a+b_log-c-d+e_x^m-^n-^p
```

18.1 Problem number 102

$$\int \frac{x^3}{\log\left(c\left(a+bx^2\right)^p\right)}\,dx$$

Optimal antiderivative

$$-\frac{a\left(b\,x^2+a\right)\mathrm{expIntegral}\left(\frac{\ln\left(c\left(b\,x^2+a\right)^p\right)}{p}\right)\left(c\left(b\,x^2+a\right)^p\right)^{-\frac{1}{p}}}{2b^2p}$$
$$+\frac{\left(b\,x^2+a\right)^2\mathrm{expIntegral}\left(\frac{2\ln\left(c\left(b\,x^2+a\right)^p\right)}{p}\right)\left(c\left(b\,x^2+a\right)^p\right)^{-\frac{2}{p}}}{2b^2p}$$

command

```
int(x^3/ln(c*(b*x^2+a)^p),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$-\frac{(bx^2+a)^2 c^{-\frac{2}{p}} \left((bx^2+a)^p\right)^{-\frac{2}{p}} \mathrm{e}^{\frac{i\pi \operatorname{csgn}\left(ic\left(bx^2+a\right)^p\right)\left(\operatorname{csgn}\left(i\left(bx^2+a\right)^p\right)-\operatorname{csgn}\left(ic\left(bx^2+a\right)^p\right)\right)\left(\operatorname{csgn}(ic)-\operatorname{csgn}\left(ic\left(bx^2+a\right)^p\right)\right)}{p}} \text{expIntegra}$

Maple 2021.1 output

$$\int \frac{x^3}{\ln\left(c\left(bx^2+a\right)^p\right)}\,dx$$

18.2 Problem number 109

$$\int \frac{x^3}{\log^2\left(c\left(a+bx^2\right)^p\right)}\,dx$$

Optimal antiderivative

$$-\frac{a\left(bx^2+a\right)\operatorname{expIntegral}\left(\frac{\ln\left(c\left(bx^2+a\right)^p\right)}{p}\right)\left(c\left(bx^2+a\right)^p\right)^{-\frac{1}{p}}}{2b^2p^2} + \frac{\left(bx^2+a\right)^2\operatorname{expIntegral}\left(\frac{2\ln\left(c\left(bx^2+a\right)^p\right)}{p}\right)\left(c\left(bx^2+a\right)^p\right)^{-\frac{2}{p}}}{b^2p^2} - \frac{x^2\left(bx^2+a\right)}{2bp\ln\left(c\left(bx^2+a\right)^p\right)}$$

command

```
int(x^3/ln(c*(b*x^2+a)^p)^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	1474

Maple 2021.1 output

$$\int \frac{x^3}{\ln\left(c\left(bx^2+a\right)^p\right)^2}\,dx$$

18.3 Problem number 116

$$\int \frac{x^3}{\log^3\left(c\left(a+bx^2\right)^p\right)}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{a\left(b\,x^2+a\right)\operatorname{expIntegral}\left(\frac{\ln\left(c\left(b\,x^2+a\right)^p\right)}{p}\right)\left(c\left(b\,x^2+a\right)^p\right)^{-\frac{1}{p}}}{4b^2p^3}\\
&+\frac{\left(b\,x^2+a\right)^2\operatorname{expIntegral}\left(\frac{2\ln\left(c\left(b\,x^2+a\right)^p\right)}{p}\right)\left(c\left(b\,x^2+a\right)^p\right)^{-\frac{2}{p}}}{b^2p^3}\\
&-\frac{x^2\left(b\,x^2+a\right)}{4bp\ln\left(c\left(b\,x^2+a\right)^p\right)^2}-\frac{a\left(b\,x^2+a\right)}{4b^2p^2\ln\left(c\left(b\,x^2+a\right)^p\right)}-\frac{x^2\left(b\,x^2+a\right)}{2b\,p^2\ln\left(c\left(b\,x^2+a\right)^p\right)}
\end{aligned}$$

command

```
int(x^3/ln(c*(b*x^2+a)^p)^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	1969

Maple 2021.1 output

$$\int \frac{x^3}{\ln\left(c\left(b\,x^2+a\right)^p\right)^3}\,dx$$

18.4 Problem number 123

$$\int \frac{x^3}{\log\left(c\left(a+bx^2\right)\right)}\,dx$$

Optimal antiderivative

$$\frac{\operatorname{expIntegral}\left(2\ln\left(c\left(b\,x^2+a\right)\right)\right)}{2b^2c^2}-\frac{a\operatorname{logarithmicIntegral}\left(c\left(b\,x^2+a\right)\right)}{2b^2c}$$

command

```
int(x^3/ln(c*(b*x^2+a)),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	$\frac{-\operatorname{expIntegral}\left(1,-2\ln\left(c\left(b\,x^2+a\right)\right)\right)+ca\operatorname{expIntegral}\left(1,-\ln\left(c\left(b\,x^2+a\right)\right)\right)}{2c^2b^2}$	43
risch	$\frac{a\operatorname{expIntegral}\left(1,-\ln\left(c\left(b\,x^2+a\right)\right)\right)}{2c\,b^2}-\frac{\operatorname{expIntegral}\left(1,-2\ln\left(c\left(b\,x^2+a\right)\right)\right)}{2c^2b^2}$	47

Maple 2021.1 output

$$\int \frac{x^3}{\ln\left(\left(b\,x^2+a\right)c\right)}\,dx$$

18.5 Problem number 125

$$\int \frac{x^3}{\log^2\left(c\left(a+bx^2\right)\right)}\,dx$$

Optimal antiderivative

$$\frac{\operatorname{expIntegral}\left(2\ln\left(c\left(b\,x^2+a\right)\right)\right)}{b^2c^2}-\frac{a\operatorname{logarithmicIntegral}\left(c\left(b\,x^2+a\right)\right)}{2b^2c}-\frac{x^2\left(b\,x^2+a\right)}{2b\ln\left(c\left(b\,x^2+a\right)\right)}$$

command

```
int(x^3/ln(c*(b*x^2+a))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	$-\frac{x^2\left(b\,x^2+a\right)}{2b\ln\left(c\left(b\,x^2+a\right)\right)}+\frac{a\operatorname{expIntegral}\left(1,-\ln\left(c\left(b\,x^2+a\right)\right)\right)}{2c\,b^2}-\frac{\operatorname{expIntegral}\left(1,-2\ln\left(c\left(b\,x^2+a\right)\right)\right)}{c^2b^2}$	74
default	$\frac{-\frac{c^2\left(b\,x^2+a\right)^2}{\ln\left(c\left(b\,x^2+a\right)\right)}-2\operatorname{expIntegral}\left(1,-2\ln\left(c\left(b\,x^2+a\right)\right)\right)-ca\left(-\frac{c\left(b\,x^2+a\right)}{\ln\left(c\left(b\,x^2+a\right)\right)}-\operatorname{expIntegral}\left(1,-\ln\left(c\left(b\,x^2+a\right)\right)\right)\right)}{2c^2b^2}$	95

Maple 2021.1 output

$$\int \frac{x^3}{\ln\left(\left(b\,x^2+a\right)c\right)^2}\,dx$$

18.6 Problem number 127

$$\int \frac{x^3}{\log^3\left(c\left(a+bx^2\right)\right)}\,dx$$

Optimal antiderivative

$$\frac{\operatorname{expIntegral}\left(2\ln\left(c\left(b\,x^2+a\right)\right)\right)}{b^2c^2}-\frac{a\operatorname{logarithmicIntegral}\left(c\left(b\,x^2+a\right)\right)}{4b^2c}$$
$$-\frac{x^2\left(b\,x^2+a\right)}{4b\ln\left(c\left(b\,x^2+a\right)\right)^2}-\frac{a\left(b\,x^2+a\right)}{4b^2\ln\left(c\left(b\,x^2+a\right)\right)}-\frac{x^2\left(b\,x^2+a\right)}{2b\ln\left(c\left(b\,x^2+a\right)\right)}$$

command

```
int(x^3/ln(c*(b*x^2+a))^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$-\frac{\left(b\,x^2+a\right)\left(2\ln\left(c\left(b\,x^2+a\right)\right)b\,x^2+b\,x^2+\ln\left(c\left(b\,x^2+a\right)\right)a\right)}{4b^2\ln\left(c\left(b\,x^2+a\right)\right)^2}+\frac{a\operatorname{expIntegral}\left(1,-\ln\left(c\left(b\,x^2+a\right)\right)\right)}{4cb^2}-\frac{\operatorname{expIntegral}\left(1,-2\ln\left(c\left(b\,x^2+a\right)\right)\right)}{c^2b^2}$
default	$\frac{-\frac{c^2\left(b\,x^2+a\right)^2}{2\ln\left(c\left(b\,x^2+a\right)\right)^2}-\frac{c^2\left(b\,x^2+a\right)^2}{\ln\left(c\left(b\,x^2+a\right)\right)}-2\operatorname{expIntegral}\left(1,-2\ln\left(c\left(b\,x^2+a\right)\right)\right)-ca\left(-\frac{c\left(b\,x^2+a\right)}{2\ln\left(c\left(b\,x^2+a\right)\right)^2}-\frac{c\left(b\,x^2+a\right)}{2\ln\left(c\left(b\,x^2+a\right)\right)}-\frac{\operatorname{expIntegral}\left(1,-\ln\left(\right.\right.\right.}{2}}{2c^2b^2}$

Maple 2021.1 output

$$\int \frac{x^3}{\ln\left(\left(b\,x^2+a\right)c\right)^3}\,dx$$

18.7 Problem number 138

$$\int \frac{x^8}{\log\left(c\left(d+ex^3\right)^p\right)}\,dx$$

Optimal antiderivative

$$\frac{d^2\left(e\,x^3+d\right)\operatorname{expIntegral}\left(\frac{\ln\left(c\left(e\,x^3+d\right)^p\right)}{p}\right)\left(c\left(e\,x^3+d\right)^p\right)^{-\frac{1}{p}}}{3e^3p}$$
$$-\frac{2d\left(e\,x^3+d\right)^2\operatorname{expIntegral}\left(\frac{2\ln\left(c\left(e\,x^3+d\right)^p\right)}{p}\right)\left(c\left(e\,x^3+d\right)^p\right)^{-\frac{2}{p}}}{3e^3p}$$
$$+\frac{\left(e\,x^3+d\right)^3\operatorname{expIntegral}\left(\frac{3\ln\left(c\left(e\,x^3+d\right)^p\right)}{p}\right)\left(c\left(e\,x^3+d\right)^p\right)^{-\frac{3}{p}}}{3e^3p}$$

command

```
int(x^8/ln(c*(e*x^3+d)^p),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

output too large to display

Maple 2021.1 output

$$\int \frac{x^8}{\ln\left(c\left(e\,x^3+d\right)^p\right)}\,dx$$

18.8 Problem number 139

$$\int \frac{x^5}{\log\left(c\left(d+ex^3\right)^p\right)}\,dx$$

Optimal antiderivative

$$-\frac{d\left(e\,x^3+d\right)\operatorname{expIntegral}\left(\frac{\ln\left(c\left(e\,x^3+d\right)^p\right)}{p}\right)\left(c\left(e\,x^3+d\right)^p\right)^{-\frac{1}{p}}}{3e^2p}$$
$$+\frac{\left(e\,x^3+d\right)^2\operatorname{expIntegral}\left(\frac{2\ln\left(c\left(e\,x^3+d\right)^p\right)}{p}\right)\left(c\left(e\,x^3+d\right)^p\right)^{-\frac{2}{p}}}{3e^2p}$$

command

```
int(x^5/ln(c*(e*x^3+d)^p),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$-\frac{\left(e\,x^3+d\right)^2 c^{-\frac{2}{p}}\left(\left(e\,x^3+d\right)^p\right)^{-\frac{2}{p}}\mathrm{e}^{\frac{i\pi\,\operatorname{csgn}\left(ic\left(e\,x^3+d\right)^p\right)\left(-\operatorname{csgn}\left(ic\left(e\,x^3+d\right)^p\right)+\operatorname{csgn}(ic)\right)\left(-\operatorname{csgn}\left(ic\left(e\,x^3+d\right)^p\right)+\operatorname{csgn}\left(i\left(e\,x^3+d\right)^p\right)\right)}{p}}\operatorname{expInte}$

Maple 2021.1 output

$$\int \frac{x^5}{\ln\left(c\left(e\,x^3+d\right)^p\right)}\,dx$$

18.9 Problem number 148

$$\int \frac{x^8}{\log^2\left(c\left(d+ex^3\right)^p\right)}\,dx$$

Optimal antiderivative

$$\frac{d^2\left(e\,x^3+d\right)\operatorname{expIntegral}\left(\frac{\ln\left(c\left(e\,x^3+d\right)^p\right)}{p}\right)\left(c\left(e\,x^3+d\right)^p\right)^{-\frac{1}{p}}}{3e^3p^2}$$
$$-\frac{4d\left(e\,x^3+d\right)^2\operatorname{expIntegral}\left(\frac{2\ln\left(c\left(e\,x^3+d\right)^p\right)}{p}\right)\left(c\left(e\,x^3+d\right)^p\right)^{-\frac{2}{p}}}{3e^3p^2}$$
$$+\frac{\left(e\,x^3+d\right)^3\operatorname{expIntegral}\left(\frac{3\ln\left(c\left(e\,x^3+d\right)^p\right)}{p}\right)\left(c\left(e\,x^3+d\right)^p\right)^{-\frac{3}{p}}}{e^3p^2}-\frac{x^6\left(e\,x^3+d\right)}{3ep\ln\left(c\left(e\,x^3+d\right)^p\right)}$$

command

```
int(x^8/ln(c*(e*x^3+d)^p)^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	2564

Maple 2021.1 output

$$\int \frac{x^8}{\ln\left(c\left(e\,x^3+d\right)^p\right)^2}\,dx$$

18.10 Problem number 149

$$\int \frac{x^5}{\log^2\left(c\left(d+ex^3\right)^p\right)}\,dx$$

Optimal antiderivative

$$-\frac{d\left(e\,x^3+d\right)\operatorname{expIntegral}\left(\frac{\ln\left(c\left(e\,x^3+d\right)^p\right)}{p}\right)\left(c\left(e\,x^3+d\right)^p\right)^{-\frac{1}{p}}}{3e^2p^2}$$
$$+\frac{2\left(e\,x^3+d\right)^2\operatorname{expIntegral}\left(\frac{2\ln\left(c\left(e\,x^3+d\right)^p\right)}{p}\right)\left(c\left(e\,x^3+d\right)^p\right)^{-\frac{2}{p}}}{3e^2p^2}-\frac{x^3\left(e\,x^3+d\right)}{3ep\ln\left(c\left(e\,x^3+d\right)^p\right)}$$

command

`int(x^5/ln(c*(e*x^3+d)^p)^2,x,method=_RETURNVERBOSE)`

Maple 2022.1 output

method	result	size
risch	Expression too large to display	1487

Maple 2021.1 output

$$\int \frac{x^5}{\ln\left(c\left(e\,x^3+d\right)^p\right)^2}\,dx$$

19 Test file number 64

Test folder name:

`test_cases/3_Logarithms/64_3.5_Logarithm_functions`

19.1 Problem number 169

$$\int \log\left(a\tan^n(x)\right)\,dx$$

Optimal antiderivative

$$2nx\,\operatorname{arctanh}\left(\mathrm{e}^{2ix}\right)+x\ln\left(a(\tan^n(x))\right)-\frac{in\,\operatorname{polylog}\left(2,-\mathrm{e}^{2ix}\right)}{2}+\frac{in\,\operatorname{polylog}\left(2,\mathrm{e}^{2ix}\right)}{2}$$

command

`int(ln(a*tan(x)^n),x,method=_RETURNVERBOSE)`

Maple 2022.1 output

method	result	size
risch	Expression too large to display	2356

Maple 2021.1 output

$$\int \ln\left(a(\tan^n(x))\right)\,dx$$

19.2 Problem number 172

$$\int \log\left(a \cot^{n}(x)\right)\, dx$$

Optimal antiderivative

$$-2nx \operatorname{arctanh}\left(\mathrm{e}^{2ix}\right) + x \ln\left(a(\cot^{n}\left(x\right))\right) + \frac{in \operatorname{polylog}\left(2, -\mathrm{e}^{2ix}\right)}{2} - \frac{in \operatorname{polylog}\left(2, \mathrm{e}^{2ix}\right)}{2}$$

command

```
int(ln(a*cot(x)^n),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	2357

Maple 2021.1 output

$$\int \ln\left(a(\cot^{n}\left(x\right))\right)\, dx$$

19.3 Problem number 293

$$\int \frac{1+x}{\log(x)(x+\log(x))}\, dx$$

Optimal antiderivative

$$\operatorname{logarithmicIntegral}\left(x\right) + \ln\left(\ln\left(x\right)\right) - \ln\left(x + \ln\left(x\right)\right)$$

command

```
int((1+x)/ln(x)/(x+ln(x)),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	$-\operatorname{expIntegral}\left(1, -\ln\left(x\right)\right) + \ln\left(\ln\left(x\right)\right) - \ln\left(x + \ln\left(x\right)\right)$	20
risch	$-\operatorname{expIntegral}\left(1, -\ln\left(x\right)\right) + \ln\left(\ln\left(x\right)\right) - \ln\left(x + \ln\left(x\right)\right)$	20

Maple 2021.1 output

$$\int \frac{x+1}{\left(x + \ln\left(x\right)\right) \ln\left(x\right)}\, dx$$

19.4 Problem number 305

$$\int x^2 \log(\log(x)\sin(x))\,dx$$

Optimal antiderivative

$$\frac{ix^4}{12} - \frac{\text{expIntegral}\left(3\ln\left(x\right)\right)}{3} - \frac{x^3\ln\left(1-\mathrm{e}^{2ix}\right)}{3} + \frac{x^3\ln\left(\ln\left(x\right)\sin\left(x\right)\right)}{3} + \frac{ix^2\,\text{polylog}\left(2,\mathrm{e}^{2ix}\right)}{2} - \frac{x\,\text{polylog}\left(3,\mathrm{e}^{2ix}\right)}{2} - \frac{i\,\text{polylog}\left(4,\mathrm{e}^{2ix}\right)}{4}$$

command

```
int(x^2*ln(ln(x)*sin(x)),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$ix^2\,\text{polylog}\left(2,-\mathrm{e}^{ix}\right)+ix^2\,\text{polylog}\left(2,\mathrm{e}^{ix}\right)-\frac{i\pi x^3}{6}+\frac{ix^4}{12}-2x\,\text{polylog}\left(3,-\mathrm{e}^{ix}\right)-2x\,\text{polylog}\left(3,\mathrm{e}^{ix}\right)-2$

Maple 2021.1 output

$$\int x^2 \ln\left(\ln\left(x\right)\sin\left(x\right)\right)\,dx$$

19.5 Problem number 306

$$\int x \log(\log(x)\sin(x))\,dx$$

Optimal antiderivative

$$\frac{ix^3}{6} - \frac{\text{expIntegral}\left(2\ln\left(x\right)\right)}{2} - \frac{x^2\ln\left(1-\mathrm{e}^{2ix}\right)}{2} + \frac{x^2\ln\left(\ln\left(x\right)\sin\left(x\right)\right)}{2} + \frac{ix\,\text{polylog}\left(2,\mathrm{e}^{2ix}\right)}{2} - \frac{\text{polylog}\left(3,\mathrm{e}^{2ix}\right)}{4}$$

command

```
int(x*ln(ln(x)*sin(x)),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result

risch	$\frac{\text{expIntegral}(1,-2\ln(x))}{2}-\frac{i\pi\text{csgn}\left(i\left(\mathrm{e}^{2ix}-1\right)\ln(x)\right)^3x^2}{4}-\frac{i\pi\text{csgn}(i\ln(x)\sin(x))^3x^2}{4}+\frac{i\pi\text{csgn}(i\ln(x)\sin(x))^2x^2}{4}+\frac{i\pi\text{csgn}(\ln(x)$

Maple 2021.1 output

$$\int x\ln\left(\ln\left(x\right)\sin\left(x\right)\right)\,dx$$

19.6 Problem number 310

$$\int x^2\log\left(e^x\log(x)\sin(x)\right)\,dx$$

Optimal antiderivative

$$\left(-\frac{1}{12}+\frac{i}{12}\right)x^4-\frac{\text{expIntegral}\left(3\ln\left(x\right)\right)}{3}-\frac{x^3\ln\left(1-\mathrm{e}^{2ix}\right)}{3}+\frac{x^3\ln\left(\mathrm{e}^x\ln\left(x\right)\sin\left(x\right)\right)}{3}$$
$$+\frac{ix^2\,\text{polylog}\left(2,\mathrm{e}^{2ix}\right)}{2}-\frac{x\,\text{polylog}\left(3,\mathrm{e}^{2ix}\right)}{2}-\frac{i\,\text{polylog}\left(4,\mathrm{e}^{2ix}\right)}{4}$$

command

```
int(x^2*ln(exp(x)*ln(x)*sin(x)),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	691

Maple 2021.1 output

$$\int x^2\ln\left(\mathrm{e}^x\ln\left(x\right)\sin\left(x\right)\right)\,dx$$

19.7 Problem number 311

$$\int x\log\left(e^x\log(x)\sin(x)\right)\,dx$$

Optimal antiderivative

$$\left(-\frac{1}{6}+\frac{i}{6}\right)x^3-\frac{\text{expIntegral}\left(2\ln\left(x\right)\right)}{2}-\frac{x^2\ln\left(1-\mathrm{e}^{2ix}\right)}{2}$$
$$+\frac{x^2\ln\left(\mathrm{e}^x\ln\left(x\right)\sin\left(x\right)\right)}{2}+\frac{ix\,\text{polylog}\left(2,\mathrm{e}^{2ix}\right)}{2}-\frac{\text{polylog}\left(3,\mathrm{e}^{2ix}\right)}{4}$$

command

```
int(x*ln(exp(x)*ln(x)*sin(x)),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	663

Maple 2021.1 output

$$\int x \ln \left(\mathrm{e}^{x} \ln \left(x\right) \sin \left(x\right)\right) \, dx$$

20 Test file number 65

Test folder name:

```
test_cases/4_Trig_functions/4.1_Sine/65_4.1.0-a_sin-^m-b_trg-^n
```

20.1 Problem number 341

$$\int \cos^3(a+bx)(c\sin(a+bx))^m \, dx$$

Optimal antiderivative

$$\frac{\left(c \sin \left(bx+a\right)\right)^{1+m}}{bc \left(1+m\right)} - \frac{\left(c \sin \left(bx+a\right)\right)^{3+m}}{b c^{3} \left(3+m\right)}$$

command

```
int(cos(b*x+a)^3*(c*sin(b*x+a))^m,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	1318

Maple 2021.1 output

$$\int \left(\cos^{3}\left(bx+a\right)\right) \left(c \sin \left(bx+a\right)\right)^{m} \, dx$$

21 Test file number 73

Test folder name:

`test_cases/4_Trig_functions/4.1_Sine/73_4.1.2.1-a+b_sin-^m-c+d_sin-^n`

21.1 Problem number 265

$$\int \frac{1}{(a+a\sin(e+fx))(c-c\sin(e+fx))}\,dx$$

Optimal antiderivative

$$\frac{\tan(fx+e)}{acf}$$

command

```
int(1/(a+a*sin(f*x+e))/(c-c*sin(f*x+e)),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	$\frac{\tan(fx+e)}{acf}$	17
risch	$\frac{2i}{\left(e^{i(fx+e)}-i\right)\left(e^{i(fx+e)}+i\right)acf}$	41
norman	$-\frac{2\tan\left(\frac{fx}{2}+\frac{e}{2}\right)}{acf\left(\tan\left(\frac{fx}{2}+\frac{e}{2}\right)+1\right)\left(\tan\left(\frac{fx}{2}+\frac{e}{2}\right)-1\right)}$	47
derivativedivides	`error in RationalFunction: argument is not a rational function\`	N/A

Maple 2021.1 output

$$\int \frac{1}{(a+a\sin(fx+e))(c-c\sin(fx+e))}\,dx$$

21.2 Problem number 275

$$\int \frac{1}{(a+a\sin(e+fx))^2(c-c\sin(e+fx))^2}\,dx$$

Optimal antiderivative

$$\frac{\tan(fx+e)}{a^2c^2f}+\frac{\tan^3(fx+e)}{3a^2c^2f}$$

command

```
int(1/(a+a*sin(f*x+e))^2/(c-c*sin(f*x+e))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	$-\frac{\left(-\frac{2}{3}-\frac{\left(\sec^2(fx+e)\right)}{3}\right)\tan(fx+e)}{a^2c^2f}$	30
risch	$\frac{4i\left(3\,\mathrm{e}^{2i(fx+e)}+1\right)}{3\left(\mathrm{e}^{i(fx+e)}-i\right)^3\left(\mathrm{e}^{i(fx+e)}+i\right)^3fa^2c^2}$	54
norman	$\frac{-\frac{2\tan\left(\frac{fx}{2}+\frac{e}{2}\right)}{acf}+\frac{4\left(\tan^3\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{3acf}-\frac{2\left(\tan^5\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{acf}}{a\left(\tan\left(\frac{fx}{2}+\frac{e}{2}\right)+1\right)^3c\left(\tan\left(\frac{fx}{2}+\frac{e}{2}\right)-1\right)^3}$	99
derivativedivides	`error in RationalFunction: argument is not a rational function\`	N/A

Maple 2021.1 output

$$\int \frac{1}{\left(a+a\sin\left(fx+e\right)\right)^2\left(c-c\sin\left(fx+e\right)\right)^2}\,dx$$

21.3 Problem number 286

$$\int \frac{1}{(a+a\sin(e+fx))^3(c-c\sin(e+fx))^3}\,dx$$

Optimal antiderivative

$$\frac{\tan\left(fx+e\right)}{a^3c^3f}+\frac{2\left(\tan^3\left(fx+e\right)\right)}{3a^3c^3f}+\frac{\tan^5\left(fx+e\right)}{5a^3c^3f}$$

command

```
int(1/(a+a*sin(f*x+e))^3/(c-c*sin(f*x+e))^3,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	$-\frac{\left(-\frac{8}{15}-\frac{\left(\sec^4(fx+e)\right)}{5}-\frac{4\left(\sec^2(fx+e)\right)}{15}\right)\tan(fx+e)}{a^3c^3f}$	40
risch	$\frac{16i\left(10\,\mathrm{e}^{4i(fx+e)}+5\,\mathrm{e}^{2i(fx+e)}+1\right)}{15\left(\mathrm{e}^{i(fx+e)}-i\right)^5\left(\mathrm{e}^{i(fx+e)}+i\right)^5fa^3c^3}$	65
norman	$\frac{-\frac{2\tan\left(\frac{fx}{2}+\frac{e}{2}\right)}{acf}+\frac{8\left(\tan^3\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{3acf}-\frac{116\left(\tan^5\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{15acf}+\frac{8\left(\tan^7\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{3acf}-\frac{2\left(\tan^9\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{acf}}{a^2\left(\tan\left(\frac{fx}{2}+\frac{e}{2}\right)+1\right)^5c^2\left(\tan\left(\frac{fx}{2}+\frac{e}{2}\right)-1\right)^5}$	143
derivativedivides	`error in RationalFunction: argument is not a rational function\`	N/A

Maple 2021.1 output

$$\int \frac{1}{\left(a+a\sin\left(fx+e\right)\right)^3\left(c-c\sin\left(fx+e\right)\right)^3}\,dx$$

21.4 Problem number 782

$$\int \frac{(a+b\sin(e+fx))^{5/2}}{(c+d\sin(e+fx))^{5/2}}\,dx$$

Optimal antiderivative

$$\frac{2(-ad+bc)^2\cos(fx+e)\sqrt{a+b\sin(fx+e)}}{3d\left(c^2-d^2\right)f\left(c+d\sin(fx+e)\right)^{\frac{3}{2}}}$$
$$+\frac{2(a-b)\left(4acd+3bc^2-7bd^2\right)\text{EllipticE}\left(\frac{\sqrt{c+d}\sqrt{a+b\sin(fx+e)}}{\sqrt{a+b}\sqrt{c+d\sin(fx+e)}},\sqrt{\frac{(a+b)(c-d)}{(a-b)(c+d)}}\right)\sec(fx+e)(c+d\sin(fx+e))\sqrt{a+b\sin(fx+e)}}{3(c-d)^2d^2(c+d)^{\frac{3}{2}}f}$$
$$-\frac{2\left(a^2d^2(3c+d)+abd\left(3c^2-4cd-7d^2\right)+b^2\left(3c^3-6c^2d-2cd^2+9d^3\right)\right)\text{EllipticF}\left(\frac{\sqrt{c+d}\sqrt{a+b\sin(fx+e)}}{\sqrt{a+b}\sqrt{c+d\sin(fx+e)}}\right.}{3(}$$
$$+\frac{2b^2\text{EllipticPi}\left(\frac{\sqrt{c+d}\sqrt{a+b\sin(fx+e)}}{\sqrt{a+b}\sqrt{c+d\sin(fx+e)}},\frac{(a+b)d}{b(c+d)},\sqrt{\frac{(a+b)(c-d)}{(a-b)(c+d)}}\right)\sec(fx+e)(c+d\sin(fx+e))\sqrt{a+b}}{d^3f\sqrt{c+d}}$$

command

```
int((a+b*sin(f*x+e))^(5/2)/(c+d*sin(f*x+e))^(5/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	Expression too large to display	4937517

Maple 2021.1 output

$$\int \frac{(a+b\sin(fx+e))^{\frac{5}{2}}}{(c+d\sin(fx+e))^{\frac{5}{2}}}\,dx$$

21.5 Problem number 795

$$\int \frac{(c+d\sin(e+fx))^{5/2}}{(a+b\sin(e+fx))^{5/2}}\,dx$$

Optimal antiderivative

$$\frac{2(c-d)\left(3a^2d+4abc-7b^2d\right)\text{EllipticE}\left(\frac{\sqrt{a+b}\ \sqrt{c+d\sin(fx+e)}}{\sqrt{c+d}\ \sqrt{a+b\sin(fx+e)}},\sqrt{\frac{(a-b)(c+d)}{(a+b)(c-d)}}\right)\sec(fx+e)(a+b\sin$$
$$3(a-b)^2b^2(a+b)^{\frac{3}{2}}f$$
$$+\frac{2d^2\,\text{EllipticPi}\left(\frac{\sqrt{a+b}\ \sqrt{c+d\sin(fx+e)}}{\sqrt{c+d}\ \sqrt{a+b\sin(fx+e)}},\frac{b(c+d)}{(a+b)d},\sqrt{\frac{(a-b)(c+d)}{(a+b)(c-d)}}\right)\sec(fx+e)(a+b\sin(fx+e))\sqrt{c+d}$$
$$b^3f\sqrt{a+b}$$
$$+\frac{2\left(3a^2b(c-2d)d+3a^3d^2+ab^2\left(3c^2-4cd-2d^2\right)+b^3\left(c^2-7cd+9d^2\right)\right)\text{EllipticF}\left(\frac{\sqrt{c+d}\ \sqrt{a+b\sin(fx+e)}}{\sqrt{a+b}\ \sqrt{c+d\sin(fx+e)}}\right.}{3(a-b)^2b}$$
$$+\frac{2(-ad+bc)^2\cos(fx+e)\sqrt{c+d\sin(fx+e)}}{3b(a^2-b^2)f(a+b\sin(fx+e))^{\frac{3}{2}}}$$

command

```
int((c+d*sin(f*x+e))^(5/2)/(a+b*sin(f*x+e))^(5/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	Expression too large to display	5973124

Maple 2021.1 output

$$\int\frac{(c+d\sin(fx+e))^{\frac{5}{2}}}{(a+b\sin(fx+e))^{\frac{5}{2}}}\,dx$$

22 Test file number 98

Test folder name:

```
test_cases/4_Trig_functions/4.3_Tangent/98_4.3.0-a_trg-^m-b_tan-^n
```

22.1 Problem number 52

$$\int(b\tan^p(c+dx))^{\frac{1}{p}}\,dx$$

Optimal antiderivative

$$-\frac{\cot(dx+c)\ln(\cos(dx+c))(b(\tan^p(dx+c)))^{\frac{1}{p}}}{d}$$

command

```
int((b*tan(d*x+c)^p)^(1/p),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	12884

Maple 2021.1 output

$$\int (b(\tan^p(dx+c)))^{\frac{1}{p}}\,dx$$

22.2 Problem number 363

$$\int \sec^6(a+bx)(d\tan(a+bx))^n\,dx$$

Optimal antiderivative

$$\frac{(d\tan(bx+a))^{1+n}}{bd(1+n)}+\frac{2(d\tan(bx+a))^{3+n}}{b\,d^3(3+n)}+\frac{(d\tan(bx+a))^{5+n}}{b\,d^5(5+n)}$$

command

```
int(sec(b*x+a)^6*(d*tan(b*x+a))^n,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	10923

Maple 2021.1 output

$$\int \left(\sec^6(bx+a)\right)(d\tan(bx+a))^n\,dx$$

22.3 Problem number 364

$$\int \sec^4(a+bx)(d\tan(a+bx))^n\,dx$$

Optimal antiderivative

$$\frac{(d\tan(bx+a))^{1+n}}{bd(1+n)}+\frac{(d\tan(bx+a))^{3+n}}{b\,d^3(3+n)}$$

command

```
int(sec(b*x+a)^4*(d*tan(b*x+a))^n,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	5438

Maple 2021.1 output

$$\int \left(\sec^4(bx+a)\right)\left(d\tan(bx+a)\right)^n\,dx$$

23 Test file number 103

Test folder name:

```
test_cases/4_Trig_functions/4.3_Tangent/103_4.3.2.1-a+b_tan-^m-c+d_tan-^n
```

23.1 Problem number 1268

$$\int \frac{\sqrt{c+d\tan(e+fx)}}{\sqrt{a+b\tan(e+fx)}}\,dx$$

Optimal antiderivative

$$-\frac{i\operatorname{arctanh}\left(\frac{\sqrt{-id+c}\ \sqrt{a+b\tan(fx+e)}}{\sqrt{-ib+a}\ \sqrt{c+d\tan(fx+e)}}\right)\sqrt{-id+c}}{f\sqrt{-ib+a}}$$
$$+\frac{i\operatorname{arctanh}\left(\frac{\sqrt{id+c}\ \sqrt{a+b\tan(fx+e)}}{\sqrt{ib+a}\ \sqrt{c+d\tan(fx+e)}}\right)\sqrt{id+c}}{f\sqrt{ib+a}}$$

command

```
int((c+d*tan(f*x+e))^(1/2)/(a+b*tan(f*x+e))^(1/2),x)
```

Maple 2022.1 output

output too large to display

Maple 2021.1 output

$$\int \frac{\sqrt{c+d\tan(fx+e)}}{\sqrt{a+b\tan(fx+e)}}\,dx$$

23.2 Problem number 1272

$$\int \sqrt{a+b\tan(e+fx)}\,(c+d\tan(e+fx))^{3/2}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{i(-id+c)^{\frac{3}{2}}\operatorname{arctanh}\left(\frac{\sqrt{-id+c}\,\sqrt{a+b\tan(fx+e)}}{\sqrt{-ib+a}\,\sqrt{c+d\tan(fx+e)}}\right)\sqrt{-ib+a}}{f}\\
&+\frac{i(id+c)^{\frac{3}{2}}\operatorname{arctanh}\left(\frac{\sqrt{id+c}\,\sqrt{a+b\tan(fx+e)}}{\sqrt{ib+a}\,\sqrt{c+d\tan(fx+e)}}\right)\sqrt{ib+a}}{f}\\
&+\frac{(ad+3bc)\operatorname{arctanh}\left(\frac{\sqrt{d}\,\sqrt{a+b\tan(fx+e)}}{\sqrt{b}\,\sqrt{c+d\tan(fx+e)}}\right)\sqrt{d}}{f\sqrt{b}}\\
&+\frac{d\sqrt{a+b\tan(fx+e)}\,\sqrt{c+d\tan(fx+e)}}{f}
\end{aligned}$$

command

```
int((a+b*tan(f*x+e))^(1/2)*(c+d*tan(f*x+e))^(3/2),x)
```

Maple 2022.1 output

output too large to display

Maple 2021.1 output

$$\int \sqrt{a+b\tan(fx+e)}\,(c+d\tan(fx+e))^{\frac{3}{2}}\,dx$$

24 Test file number 106

Test folder name:

```
test_cases/4_Trig_functions/4.3_Tangent/106_4.3.7-d_trig-^m-a+b-c_tan-^n-^p
```

24.1 Problem number 29

$$\int (b \tan^n(e+fx))^{\frac{1}{n}}\, dx$$

Optimal antiderivative

$$-\frac{\cot(fx+e)\ln(\cos(fx+e))\,(b(\tan^n(fx+e)))^{\frac{1}{n}}}{f}$$

command

```
int((b*tan(f*x+e)^n)^(1/n),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	12884

Maple 2021.1 output

$$\int (b(\tan^n(fx+e)))^{\frac{1}{n}}\, dx$$

24.2 Problem number 167

$$\int \csc^2(e+fx)\,(b(c\tan(e+fx))^n)^p\, dx$$

Optimal antiderivative

$$-\frac{\cot(fx+e)\,(b(c\tan(fx+e))^n)^p}{f\,(-np+1)}$$

command

```
int(csc(f*x+e)^2*(b*(c*tan(f*x+e))^n)^p,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	10285

Maple 2021.1 output

$$\int (\csc^2(fx+e))\,(b(c\tan(fx+e))^n)^p\, dx$$

24.3 Problem number 168

$$\int \csc^4(e+fx)\left(b(c\tan(e+fx))^n\right)^p\,dx$$

Optimal antiderivative

$$-\frac{\cot\left(fx+e\right)\left(b(c\tan\left(fx+e\right))^n\right)^p}{f\left(-np+1\right)}-\frac{\left(\cot^3\left(fx+e\right)\right)\left(b(c\tan\left(fx+e\right))^n\right)^p}{f\left(-np+3\right)}$$

command

```
int(csc(f*x+e)^4*(b*(c*tan(f*x+e))^n)^p,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	34276

Maple 2021.1 output

$$\int \left(\csc^4\left(fx+e\right)\right)\left(b(c\tan\left(fx+e\right))^n\right)^p\,dx$$

24.4 Problem number 477

$$\int \sec^6(e+fx)\left(b(c\tan(e+fx))^n\right)^p\,dx$$

Optimal antiderivative

$$\frac{\tan\left(fx+e\right)\left(b(c\tan\left(fx+e\right))^n\right)^p}{f\left(np+1\right)}+\frac{2\left(\tan^3\left(fx+e\right)\right)\left(b(c\tan\left(fx+e\right))^n\right)^p}{f\left(np+3\right)}+\frac{\left(\tan^5\left(fx+e\right)\right)\left(b(c\tan\left(fx+e\right))^n\right)^p}{f\left(np+5\right)}$$

command

```
int(sec(f*x+e)^6*(b*(c*tan(f*x+e))^n)^p,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	70270

Maple 2021.1 output

$$\int \left(\sec^6\left(fx+e\right)\right)\left(b(c\tan\left(fx+e\right))^n\right)^p\,dx$$

24.5 Problem number 478

$$\int \sec^4(e+fx)\left(b(c\tan(e+fx))^n\right)^p\,dx$$

Optimal antiderivative

$$\frac{\tan\left(fx+e\right)\left(b(c\tan\left(fx+e\right))^n\right)^p}{f\left(np+1\right)}+\frac{\left(\tan^3\left(fx+e\right)\right)\left(b(c\tan\left(fx+e\right))^n\right)^p}{f\left(np+3\right)}$$

command

```
int(sec(f*x+e)^4*(b*(c*tan(f*x+e))^n)^p,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	34277

Maple 2021.1 output

$$\int \left(\sec^4\left(fx+e\right)\right)\left(b(c\tan\left(fx+e\right))^n\right)^p\,dx$$

24.6 Problem number 479

$$\int \sec^2(e+fx)\left(b(c\tan(e+fx))^n\right)^p\,dx$$

Optimal antiderivative

$$\frac{\tan\left(fx+e\right)\left(b(c\tan\left(fx+e\right))^n\right)^p}{f\left(np+1\right)}$$

command

```
int(sec(f*x+e)^2*(b*(c*tan(f*x+e))^n)^p,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	10286

Maple 2021.1 output

$$\int \left(\sec^2\left(fx+e\right)\right)\left(b(c\tan\left(fx+e\right))^n\right)^p\,dx$$

25 Test file number 107

Test folder name:

`test_cases/4_Trig_functions/4.3_Tangent/107_4.3.9_trig^m-a+b_tan^n+c_tan^-2_n-^p`

25.1 Problem number 25

$$\int \frac{\cot^2(d+ex)}{\left(a+b\tan(d+ex)+c\tan^2(d+ex)\right)^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{3b\,\operatorname{arctanh}\left(\frac{2a+b\tan(ex+d)}{2\sqrt{a}\,\sqrt{a+b\tan(ex+d)+c\left(\tan^2(ex+d)\right)}}\right)}{2a^{\frac{5}{2}}e}$$
$$-\frac{\arctan\left(\frac{\left(b\left(2a-2c+\sqrt{a^2-2ac+b^2+c^2}\right)+\left(b^2-(a-c)\left(a-c-\sqrt{a^2-2ac+b^2+c^2}\right)\right)\right)\tan(ex+d)}{2\sqrt{2a-2c+\sqrt{a^2-2ac+b^2+c^2}}\,\sqrt{a^2-b^2-2ac+c^2-(a-c)\sqrt{a^2-2ac+b^2+c^2}}\,\sqrt{a+b\tan(}\right.}{2\,(a^2-}$$
$$+\frac{\arctan\left(\frac{\left(b\left(2a-2c-\sqrt{a^2-2ac+b^2+c^2}\right)+\left(b^2-(a-c)\left(a-c+\sqrt{a^2-2ac+b^2+c^2}\right)\right)\right)\tan(ex+d)}{2\sqrt{2a-2c-\sqrt{a^2-2ac+b^2+c^2}}\,\sqrt{a^2-b^2-2ac+c^2+(a-c)\sqrt{a^2-2ac+b^2+c^2}}\,\sqrt{a+b\tan(e}\right.}{2\,(a^2-}$$
$$-\frac{\left(-8ac+3b^2\right)\cot(ex+d)\sqrt{a+b\tan(ex+d)+c\left(\tan^2(ex+d)\right)}}{a^2\left(-4ac+b^2\right)e}$$
$$+\frac{2\cot(ex+d)\left(b^2-2ac+bc\tan(ex+d)\right)}{a\left(-4ac+b^2\right)e\sqrt{a+b\tan(ex+d)+c\left(\tan^2(ex+d)\right)}}$$
$$+\frac{2b\left(b^2-(3a-c)c\right)+2c\left(b^2-2(a-c)c\right)\tan(ex+d)}{\left(b^2+(a-c)^2\right)\left(-4ac+b^2\right)e\sqrt{a+b\tan(ex+d)+c\left(\tan^2(ex+d)\right)}}$$

command

```
int(cot(e*x+d)^2/(a+b*tan(e*x+d)+c*tan(e*x+d)^2)^(3/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	Expression too large to display	14934566

Maple 2021.1 output

$$\int \frac{\cot^2(ex+d)}{\left(a+b\tan(ex+d)+c\left(\tan^2(ex+d)\right)\right)^{\frac{3}{2}}}\,dx$$

25.2 Problem number 26

$$\int \frac{\cot^3(d+ex)}{\left(a+b\tan(d+ex)+c\tan^2(d+ex)\right)^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{\operatorname{arctanh}\left(\frac{2a+b\tan(ex+d)}{2\sqrt{a}\ \sqrt{a+b\tan(ex+d)+c\left(\tan^2(ex+d)\right)}}\right)}{a^{\frac{3}{2}}e}$$
$$-\frac{3\left(-4ac+5b^2\right)\operatorname{arctanh}\left(\frac{2a+b\tan(ex+d)}{2\sqrt{a}\ \sqrt{a+b\tan(ex+d)+c\left(\tan^2(ex+d)\right)}}\right)}{8a^{\frac{7}{2}}e}$$
$$-\frac{\operatorname{arctanh}\left(\frac{\left(b^2-(a-c)\left(a-c-\sqrt{a^2-2ac+b^2+c^2}\right)\right)-b\left(2a-2c+\sqrt{a^2-2ac+b^2+c^2}\right)\tan(ex+d)}{2\sqrt{2a-2c+\sqrt{a^2-2ac+b^2+c^2}}\ \sqrt{a^2-b^2-2ac+c^2-(a-c)\sqrt{a^2-2ac+b^2+c^2}}\ \sqrt{a+b\tan}\right.}}{2\left(a^2-\right.}$$
$$+\frac{\operatorname{arctanh}\left(\frac{\left(b^2-(a-c)\left(a-c+\sqrt{a^2-2ac+b^2+c^2}\right)\right)-b\left(2a-2c-\sqrt{a^2-2ac+b^2+c^2}\right)\tan(ex+d)}{2\sqrt{2a-2c-\sqrt{a^2-2ac+b^2+c^2}}\ \sqrt{a^2-b^2-2ac+c^2+(a-c)\sqrt{a^2-2ac+b^2+c^2}}\ \sqrt{a+b\tan}\right.}}{2\left(a^2-\right.}$$
$$+\frac{b\left(-52ac+15b^2\right)\cot(ex+d)\sqrt{a+b\tan(ex+d)+c\left(\tan^2(ex+d)\right)}}{4a^3\left(-4ac+b^2\right)e}$$
$$-\frac{\left(-12ac+5b^2\right)\left(\cot^2(ex+d)\right)\sqrt{a+b\tan(ex+d)+c\left(\tan^2(ex+d)\right)}}{2a^2\left(-4ac+b^2\right)e}$$
$$-\frac{2\left(b^2-2ac+bc\tan(ex+d)\right)}{a\left(-4ac+b^2\right)e\sqrt{a+b\tan(ex+d)+c\left(\tan^2(ex+d)\right)}}$$
$$+\frac{2\left(\cot^2(ex+d)\right)\left(b^2-2ac+bc\tan(ex+d)\right)}{a\left(-4ac+b^2\right)e\sqrt{a+b\tan(ex+d)+c\left(\tan^2(ex+d)\right)}}$$
$$+\frac{2a\left(b^2-2(a-c)c\right)+2bc(a+c)\tan(ex+d)}{\left(b^2+(a-c)^2\right)\left(-4ac+b^2\right)e\sqrt{a+b\tan(ex+d)+c\left(\tan^2(ex+d)\right)}}$$

command

```
int(cot(e*x+d)^3/(a+b*tan(e*x+d)+c*tan(e*x+d)^2)^(3/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	Expression too large to display	37670490

Maple 2021.1 output

$$\int \frac{\cot^3(ex+d)}{\left(a+b\tan(ex+d)+c\left(\tan^2(ex+d)\right)\right)^{\frac{3}{2}}}\,dx$$

26 Test file number 114

Test folder name:

`test_cases/4_Trig_functions/4.4_Cotangent/114_4.4.9_trig^m-a+b_cot^n+c_cot^-2_n-^p`

26.1 Problem number 16

$$\int \frac{\tan^3(d+ex)}{\left(a+b\cot(d+ex)+c\cot^2(d+ex)\right)^{3/2}}\,dx$$

Optimal antiderivative

$$
\begin{aligned}
&-\frac{\operatorname{arctanh}\left(\frac{2a+b\cot(ex+d)}{2\sqrt{a}\,\sqrt{a+b\cot(ex+d)+c\left(\cot^2(ex+d)\right)}}\right)}{a^{\frac{3}{2}}e}\\
&+\frac{3\left(-4ac+5b^2\right)\operatorname{arctanh}\left(\frac{2a+b\cot(ex+d)}{2\sqrt{a}\,\sqrt{a+b\cot(ex+d)+c\left(\cot^2(ex+d)\right)}}\right)}{8a^{\frac{7}{2}}e}\\
&+\frac{2b^2-4ac+2bc\cot(ex+d)}{a\left(-4ac+b^2\right)e\sqrt{a+b\cot(ex+d)+c\left(\cot^2(ex+d)\right)}}\\
&-\frac{2\left(a\left(b^2-2(a-c)c\right)+bc(a+c)\cot(ex+d)\right)}{\left(b^2+(a-c)^2\right)\left(-4ac+b^2\right)e\sqrt{a+b\cot(ex+d)+c\left(\cot^2(ex+d)\right)}}\\
&+\frac{\operatorname{arctanh}\left(\frac{\left(b^2-(a-c)\left(a-c-\sqrt{a^2-2ac+b^2+c^2}\right)\right)-b\cot(ex+d)\left(2a-2c+\sqrt{a^2-2ac+b^2+c^2}\right)}{2\sqrt{a+b\cot(ex+d)+c\left(\cot^2(ex+d)\right)}\,\sqrt{2a-2c+\sqrt{a^2-2ac+b^2+c^2}}\,\sqrt{a^2-b^2-2ac+c^2-(a}\right)}{2\left(a^2-\right.}\\
&-\frac{\operatorname{arctanh}\left(\frac{\left(b^2-b\cot(ex+d)\left(2a-2c-\sqrt{a^2-2ac+b^2+c^2}\right)\right)-(a-c)\left(a-c+\sqrt{a^2-2ac+b^2+c^2}\right)}{2\sqrt{a+b\cot(ex+d)+c\left(\cot^2(ex+d)\right)}\,\sqrt{2a-2c-\sqrt{a^2-2ac+b^2+c^2}}\,\sqrt{a^2-b^2-2ac+c^2+(}\right)}{2\left(a^2-\right.}\\
&-\frac{b\left(-52ac+15b^2\right)\sqrt{a+b\cot(ex+d)+c\left(\cot^2(ex+d)\right)}\,\tan(ex+d)}{4a^3\left(-4ac+b^2\right)e}\\
&-\frac{2\left(b^2-2ac+bc\cot(ex+d)\right)\left(\tan^2(ex+d)\right)}{a\left(-4ac+b^2\right)e\sqrt{a+b\cot(ex+d)+c\left(\cot^2(ex+d)\right)}}\\
&+\frac{\left(-12ac+5b^2\right)\sqrt{a+b\cot(ex+d)+c\left(\cot^2(ex+d)\right)}\,\left(\tan^2(ex+d)\right)}{2a^2\left(-4ac+b^2\right)e}
\end{aligned}
$$

command

```
int(tan(e*x+d)^3/(a+b*cot(e*x+d)+c*cot(e*x+d)^2)^(3/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	Expression too large to display	29682798

Maple 2021.1 output

$$\int \frac{\tan^3(ex+d)}{\left(a+b\cot(ex+d)+c\left(\cot^2(ex+d)\right)\right)^{\frac{3}{2}}}\,dx$$

27 Test file number 115

Test folder name:

`test_cases/4_Trig_functions/4.5_Secant/115_4.5.0-a_sec-^m-b_trg-^n`

27.1 Problem number 288

$$\int \cos^3(e+fx)(b\csc(e+fx))^n\,dx$$

Optimal antiderivative

$$-\frac{b^3(b\csc(fx+e))^{-3+n}}{f(3-n)}+\frac{b(b\csc(fx+e))^{-1+n}}{f(1-n)}$$

command

```
int(cos(f*x+e)^3*(b*csc(f*x+e))^n,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	2446

Maple 2021.1 output

$$\int \left(\cos^3(fx+e)\right)(b\csc(fx+e))^n\,dx$$

28 Test file number 121

Test folder name:

`test_cases/4_Trig_functions/4.5_Secant/121_4.5.2.1-a+b_sec-^m-c+d_sec-^n`

28.1 Problem number 27

$$\int \frac{1}{(a+a\sec(e+fx))^2(c-c\sec(e+fx))^2}\,dx$$

Optimal antiderivative

$$\frac{x}{a^2c^2}+\frac{\cot(fx+e)}{a^2c^2f}-\frac{\cot^3(fx+e)}{3a^2c^2f}$$

command

`int(1/(a+a*sec(f*x+e))^2/(c-c*sec(f*x+e))^2,x,method=_RETURNVERBOSE)`

Maple 2022.1 output

method	result	size
default	$\frac{-\frac{\left(\cot^3(fx+e)\right)}{3}+\cot(fx+e)+fx+e}{a^2c^2f}$	32
risch	$\frac{x}{a^2c^2}+\frac{4i\left(3\,\mathrm{e}^{4i(fx+e)}-3\,\mathrm{e}^{2i(fx+e)}+2\right)}{3f\,a^2c^2\left(\mathrm{e}^{i(fx+e)}+1\right)^3\left(\mathrm{e}^{i(fx+e)}-1\right)^3}$	72
norman	$\frac{\frac{x\left(\tan^3\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{ca}-\frac{1}{24acf}+\frac{5\left(\tan^2\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{8acf}-\frac{5\left(\tan^4\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{8acf}+\frac{\tan^6\left(\frac{fx}{2}+\frac{e}{2}\right)}{24acf}}{ca\tan\left(\frac{fx}{2}+\frac{e}{2}\right)^3}$	116
derivativedivides	`error in RationalFunction: argument is not a rational function\`	N/A

Maple 2021.1 output

$$\int \frac{1}{(a+a\sec(fx+e))^2(c-c\sec(fx+e))^2}\,dx$$

28.2 Problem number 38

$$\int \frac{1}{(a+a\sec(e+fx))^3(c-c\sec(e+fx))^3}\,dx$$

Optimal antiderivative

$$\frac{x}{a^3c^3}+\frac{\cot(fx+e)}{a^3c^3f}-\frac{\cot^3(fx+e)}{3a^3c^3f}+\frac{\cot^5(fx+e)}{5a^3c^3f}$$

command

`int(1/(a+a*sec(f*x+e))^3/(c-c*sec(f*x+e))^3,x,method=_RETURNVERBOSE)`

Maple 2022.1 output

method	result
default	$-\frac{-\frac{\left(\cot^5(fx+e)\right)}{5}+\frac{\left(\cot^3(fx+e)\right)}{3}-\cot(fx+e)-fx-e}{c^3a^3f}$
risch	$\frac{x}{a^3c^3}+\frac{2i\left(45\,\mathrm{e}^{8i(fx+e)}-90\,\mathrm{e}^{6i(fx+e)}+140\,\mathrm{e}^{4i(fx+e)}-70\,\mathrm{e}^{2i(fx+e)}+23\right)}{15f\,c^3a^3\left(\mathrm{e}^{i(fx+e)}+1\right)^5\left(\mathrm{e}^{i(fx+e)}-1\right)^5}$
norman	$\frac{\frac{x\left(\tan^5\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{ca}+\frac{1}{160acf}-\frac{7\left(\tan^2\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{96acf}+\frac{11\left(\tan^4\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{16acf}-\frac{11\left(\tan^6\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{16acf}+\frac{7\left(\tan^8\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{96acf}-\frac{\tan^{10}\left(\frac{fx}{2}+\frac{e}{2}\right)}{160acf}}{a^2c^2\tan\left(\frac{fx}{2}+\frac{e}{2}\right)^5}$
derivativedivides	`error in RationalFunction: argument is not a rational function\`

Maple 2021.1 output

$$\int \frac{1}{(a+a\sec(fx+e))^3(c-c\sec(fx+e))^3}\,dx$$

29 Test file number 122

Test folder name:

`test_cases/4_Trig_functions/4.5_Secant/122_4.5.2.3-g_sec-^p-a+b_sec-^m-c+d_sec-^n`

29.1 Problem number 38

$$\int \frac{\sec(e+fx)}{(a+a\sec(e+fx))(c-c\sec(e+fx))}\,dx$$

Optimal antiderivative

$$\frac{\csc(fx+e)}{acf}$$

command

```
int(sec(f*x+e)/(a+a*sec(f*x+e))/(c-c*sec(f*x+e)),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	$\frac{1}{caf\sin(fx+e)}$	19
norman	$\frac{\frac{1}{2acf}+\frac{\tan^2\left(\frac{fx}{2}+\frac{e}{2}\right)}{2acf}}{\tan\left(\frac{fx}{2}+\frac{e}{2}\right)}$	47
risch	$\frac{2i\mathrm{e}^{i(fx+e)}}{fca\left(\mathrm{e}^{i(fx+e)}-1\right)\left(\mathrm{e}^{i(fx+e)}+1\right)}$	48
derivativedivides	`error in RationalFunction: argument is not a rational function\`	N/A

Maple 2021.1 output

$$\int \frac{\sec(fx+e)}{(a+a\sec(fx+e))(c-c\sec(fx+e))}\,dx$$

29.2 Problem number 48

$$\int \frac{\sec(e+fx)}{(a+a\sec(e+fx))^2(c-c\sec(e+fx))^2}\,dx$$

Optimal antiderivative

$$\frac{\csc(fx+e)}{a^2c^2f}-\frac{\csc^3(fx+e)}{3a^2c^2f}$$

command

`int(sec(f*x+e)/(a+a*sec(f*x+e))^2/(c-c*sec(f*x+e))^2,x,method=_RETURNVERBOSE)`

Maple 2022.1 output

method	result	size
default	$\frac{-\frac{\cos^4(fx+e)}{3\sin(fx+e)^3}+\frac{\cos^4(fx+e)}{3\sin(fx+e)}+\frac{\left(2+\cos^2(fx+e)\right)\sin(fx+e)}{3}}{a^2c^2f}$	66
risch	$\frac{2i\left(3\,\mathrm{e}^{5i(fx+e)}-2\,\mathrm{e}^{3i(fx+e)}+3\,\mathrm{e}^{i(fx+e)}\right)}{3fa^2c^2\left(\mathrm{e}^{i(fx+e)}+1\right)^3\left(\mathrm{e}^{i(fx+e)}-1\right)^3}$	73
norman	$\frac{-\frac{1}{24acf}+\frac{3\left(\tan^2\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{8acf}+\frac{3\left(\tan^4\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{8acf}-\frac{\tan^6\left(\frac{fx}{2}+\frac{e}{2}\right)}{24acf}}{ac\tan\left(\frac{fx}{2}+\frac{e}{2}\right)^3}$	97
derivativedivides	`error in RationalFunction: argument is not a rational function\`	N/A

Maple 2021.1 output

$$\int \frac{\sec(fx+e)}{(a+a\sec(fx+e))^2(c-c\sec(fx+e))^2}\,dx$$

29.3 Problem number 60

$$\int \frac{\sec(e+fx)}{(a+a\sec(e+fx))^3(c-c\sec(e+fx))^3}\,dx$$

Optimal antiderivative

$$\frac{\csc(fx+e)}{a^3c^3f}-\frac{2\left(\csc^3(fx+e)\right)}{3a^3c^3f}+\frac{\csc^5(fx+e)}{5a^3c^3f}$$

command

`int(sec(f*x+e)/(a+a*sec(f*x+e))^3/(c-c*sec(f*x+e))^3,x,method=_RETURNVERBOSE)`

Maple 2022.1 output

method	result	size
default	$-\frac{-\frac{\cos^6(fx+e)}{5\sin(fx+e)^5}+\frac{\cos^6(fx+e)}{15\sin(fx+e)^3}-\frac{\cos^6(fx+e)}{5\sin(fx+e)}-\frac{\left(\frac{8}{3}+\cos^4(fx+e)+\frac{4\left(\cos^2(fx+e)\right)}{3}\right)\sin(fx+e)}{5}}{c^3a^3f}$	95
risch	$\frac{2i\left(15\,\mathrm{e}^{9i(fx+e)}-20\,\mathrm{e}^{7i(fx+e)}+58\,\mathrm{e}^{5i(fx+e)}-20\,\mathrm{e}^{3i(fx+e)}+15\,\mathrm{e}^{i(fx+e)}\right)}{15fc^3a^3\left(\mathrm{e}^{i(fx+e)}+1\right)^5\left(\mathrm{e}^{i(fx+e)}-1\right)^5}$	95
norman	$\frac{\frac{1}{160acf}-\frac{5\left(\tan^2\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{96acf}+\frac{5\left(\tan^4\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{16acf}+\frac{5\left(\tan^6\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{16acf}-\frac{5\left(\tan^8\left(\frac{fx}{2}+\frac{e}{2}\right)\right)}{96acf}+\frac{\tan^{10}\left(\frac{fx}{2}+\frac{e}{2}\right)}{160acf}}{a^2c^2\tan\left(\frac{fx}{2}+\frac{e}{2}\right)^5}$	141
derivativedivides	`error in RationalFunction: argument is not a rational function\`	N/A

Maple 2021.1 output

$$\int \frac{\sec(fx+e)}{(a+a\sec(fx+e))^3(c-c\sec(fx+e))^3}\,dx$$

30 Test file number 135

Test folder name:

`test_cases/4_Trig_functions/4.7_Miscellaneous/135_4.7.1-c_trig-^m-d_trig-^n`

30.1 Problem number 81

$$\int \sin^2(a+bx)\sin^{\frac{7}{2}}(2a+2bx)\,dx$$

Optimal antiderivative

$$-\frac{5\sqrt{\frac{1}{2}+\frac{\sin(2bx+2a)}{2}}\ \text{EllipticF}\left(\cos\left(a+\frac{\pi}{4}+bx\right),\sqrt{2}\right)}{42\sin\left(a+\frac{\pi}{4}+bx\right)b}$$
$$-\frac{\cos(2bx+2a)\left(\sin^{\frac{5}{2}}(2bx+2a)\right)}{14b}-\frac{\sin^{\frac{9}{2}}(2bx+2a)}{18b}-\frac{5\cos(2bx+2a)\left(\sqrt{\sin}(2bx+2a)\right)}{42b}$$

command

```
int(sin(b*x+a)^2*sin(2*b*x+2*a)^(7/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	Expression too large to display	519395265

Maple 2021.1 output

$$\int \left(\sin^2(bx+a)\right)\left(\sin^{\frac{7}{2}}(2bx+2a)\right)\,dx$$

30.2 Problem number 88

$$\int \frac{\sin^2(a+bx)}{\sin^{\frac{7}{2}}(2a+2bx)}\,dx$$

Optimal antiderivative

$$\frac{3\sqrt{\frac{1}{2}+\frac{\sin(2bx+2a)}{2}}\ \text{EllipticE}\left(\cos\left(a+\frac{\pi}{4}+bx\right),\sqrt{2}\right)}{10\sin\left(a+\frac{\pi}{4}+bx\right)b}$$
$$+\frac{\sin^2(bx+a)}{5b\sin(2bx+2a)^{\frac{5}{2}}}-\frac{3\cos(2bx+2a)}{10b\sqrt{\sin(2bx+2a)}}$$

command

```
int(sin(b*x+a)^2/sin(2*b*x+2*a)^(7/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
default	$\frac{\sqrt{2}\left(\frac{8\sqrt{2}}{5\sin(2xb+2a)^{\frac{5}{2}}}+\frac{4\sqrt{2}\left(6\sqrt{\sin(2xb+2a)+1}\,\sqrt{-2\sin(2xb+2a)+2}\,\sqrt{-\sin(2xb+2a)}\,\left(\sin^2(2xb+2a)\right.\right.}{}$

Maple 2021.1 output

$$\int \frac{\sin^2(bx+a)}{\sin(2bx+2a)^{\frac{7}{2}}}\,dx$$

30.3 Problem number 104

$$\int \frac{\csc(a+bx)}{\sin^{\frac{7}{2}}(2a+2bx)}\,dx$$

Optimal antiderivative

$$-\frac{2\cos(bx+a)}{7b\sin(2bx+2a)^{\frac{7}{2}}}+\frac{12\sin(bx+a)}{35b\sin(2bx+2a)^{\frac{5}{2}}}-\frac{16\cos(bx+a)}{35b\sin(2bx+2a)^{\frac{3}{2}}}+\frac{32\sin(bx+a)}{35b\sqrt{\sin(2bx+2a)}}$$

command

```
int(csc(b*x+a)/sin(2*b*x+2*a)^(7/2),x)
```

Maple 2022.1 output

$$\frac{\sqrt{-\frac{\tan\left(\frac{a}{2}+\frac{xb}{2}\right)}{\tan^2\left(\frac{a}{2}+\frac{xb}{2}\right)-1}}\left(\tan^2\left(\frac{a}{2}+\frac{xb}{2}\right)-1\right)\left(3\left(\tan^8\left(\frac{a}{2}+\frac{xb}{2}\right)\right)+40\sqrt{\tan\left(\frac{a}{2}+\frac{xb}{2}\right)+1}\,\sqrt{-2\tan\left(\frac{a}{2}+\frac{xb}{2}\right)+2}\right.}{1344b\tan\left(\frac{a}{2}+\frac{xb}{2}\right)^3\sqrt{\tan\left(\frac{a}{2}+\frac{xb}{2}\right)}\left(\tan\right.}$$

Maple 2021.1 output

$$\int \frac{\csc(bx+a)}{\sin(2bx+2a)^{\frac{7}{2}}}\,dx$$

31 Test file number 148

Test folder name:

`test_cases/5_Inverse_trig_functions/5.3_Inverse_tangent/148_5.3.2-d_x-^m-a+b_arctan-c_x^n-^p`

31.1 Problem number 75

$$\int x^5 \left(a + b\text{ArcTan}\left(cx^2\right)\right)^2 \, dx$$

Optimal antiderivative

$$\frac{b^2 x^2}{6c^2} - \frac{b^2 \arctan\left(c\,x^2\right)}{6c^3} - \frac{b\,x^4\left(a + b\arctan\left(c\,x^2\right)\right)}{6c} - \frac{i\left(a + b\arctan\left(c\,x^2\right)\right)^2}{6c^3} + \frac{x^6\left(a + b\arctan\left(c\,x^2\right)\right)^2}{6} - \frac{b\left(a + b\arctan\left(c\,x^2\right)\right)\ln\left(\frac{2}{ic\,x^2+1}\right)}{3c^3} - \frac{ib^2\,\text{polylog}\left(2, 1 - \frac{2}{ic\,x^2+1}\right)}{6c^3}$$

command

```
int(x^5*(a+b*arctan(c*x^2))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$\frac{x^6 a^2}{6} + \frac{ba\ln\left(c^2x^4+1\right)}{6c^3} + \frac{ib^2\ln\left(-ic\,x^2+1\right)^2}{24c^3} + \frac{b^2\ln\left(ic\,x^2+1\right)\ln\left(-ic\,x^2+1\right)x^6}{12} - \frac{ab\,x^4}{6c} + \frac{ib^2\ln\left(\frac{1}{2}+\frac{ic\,x^2}{2}\right)\ln\left(-ic\,x^2+1\right)}{6c^3} - \frac{ib^2$

Maple 2021.1 output

$$\int x^5 \left(a + b\arctan\left(c\,x^2\right)\right)^2 \, dx$$

32 Test file number 150

Test folder name:

`test_cases/5_Inverse_trig_functions/5.3_Inverse_tangent/150_5.3.4_u-a+b_arctan-c_x-^p`

32.1 Problem number 643

$$\int \left(\frac{x^3}{(1+a^2x^2)\,\mathrm{ArcTan}(ax)^3} - \frac{3x^2}{2a\mathrm{ArcTan}(ax)^2} \right) dx$$

Optimal antiderivative

$$-\frac{x^3}{2a\arctan(ax)^2}$$

command

```
int(x^3/(a^2*x^2+1)/arctan(a*x)^3-3/2*x^2/a/arctan(a*x)^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	$\frac{2x^3}{a(\ln(-iax+1)-\ln(iax+1))^2}$	30

Maple 2021.1 output

$$\int \frac{x^3}{(a^2x^2+1)\arctan(ax)^3} - \frac{3x^2}{2a\arctan(ax)^2}\,dx$$

32.2 Problem number 1262

$$\int \frac{x^2(a+b\text{ArcTan}(cx))^2}{d+ex^2}\,dx$$

Optimal antiderivative

$$\frac{i(a+b\arctan(cx))^2}{ce}+\frac{x(a+b\arctan(cx))^2}{e}+\frac{2b(a+b\arctan(cx))\ln\left(\frac{2}{icx+1}\right)}{ce}$$
$$+\frac{ib^2\,\text{polylog}\left(2,1-\frac{2}{icx+1}\right)}{ce}+\frac{(a+b\arctan(cx))^2\ln\left(\frac{2c\left(\sqrt{-d}-x\sqrt{e}\right)}{(-icx+1)\left(c\sqrt{-d}-i\sqrt{e}\right)}\right)\sqrt{-d}}{2e^{\frac{3}{2}}}$$
$$-\frac{(a+b\arctan(cx))^2\ln\left(\frac{2c\left(\sqrt{-d}+x\sqrt{e}\right)}{(-icx+1)\left(c\sqrt{-d}+i\sqrt{e}\right)}\right)\sqrt{-d}}{2e^{\frac{3}{2}}}$$
$$-\frac{ib(a+b\arctan(cx))\,\text{polylog}\left(2,1-\frac{2c\left(\sqrt{-d}-x\sqrt{e}\right)}{(-icx+1)\left(c\sqrt{-d}-i\sqrt{e}\right)}\right)\sqrt{-d}}{2e^{\frac{3}{2}}}$$
$$+\frac{ib(a+b\arctan(cx))\,\text{polylog}\left(2,1-\frac{2c\left(\sqrt{-d}+x\sqrt{e}\right)}{(-icx+1)\left(c\sqrt{-d}+i\sqrt{e}\right)}\right)\sqrt{-d}}{2e^{\frac{3}{2}}}$$
$$+\frac{b^2\,\text{polylog}\left(3,1-\frac{2c\left(\sqrt{-d}-x\sqrt{e}\right)}{(-icx+1)\left(c\sqrt{-d}-i\sqrt{e}\right)}\right)\sqrt{-d}}{4e^{\frac{3}{2}}}$$
$$-\frac{b^2\,\text{polylog}\left(3,1-\frac{2c\left(\sqrt{-d}+x\sqrt{e}\right)}{(-icx+1)\left(c\sqrt{-d}+i\sqrt{e}\right)}\right)\sqrt{-d}}{4e^{\frac{3}{2}}}$$

command

```
int(x^2*(a+b*arctan(c*x))^2/(e*x^2+d),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
derivativedivides	Expression too large to display	94172
default	Expression too large to display	94172

Maple 2021.1 output

$$\int \frac{x^2(a+b\arctan(cx))^2}{e\,x^2+d}\,dx$$

32.3 Problem number 1266

$$\int \frac{(a+b\text{ArcTan}(cx))^2}{x^2\left(d+ex^2\right)}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{ic(a+b\arctan(cx))^2}{d}-\frac{(a+b\arctan(cx))^2}{dx}\\
&+\frac{2bc(a+b\arctan(cx))\ln\left(2-\frac{2}{-icx+1}\right)}{d}-\frac{ib^2c\,\text{polylog}\left(2,-1+\frac{2}{-icx+1}\right)}{d}\\
&+\frac{(a+b\arctan(cx))^2\ln\left(\frac{2c\left(\sqrt{-d}-x\sqrt{e}\right)}{(-icx+1)\left(c\sqrt{-d}-i\sqrt{e}\right)}\right)\sqrt{e}}{2(-d)^{\frac{3}{2}}}\\
&-\frac{(a+b\arctan(cx))^2\ln\left(\frac{2c\left(\sqrt{-d}+x\sqrt{e}\right)}{(-icx+1)\left(c\sqrt{-d}+i\sqrt{e}\right)}\right)\sqrt{e}}{2(-d)^{\frac{3}{2}}}\\
&-\frac{ib(a+b\arctan(cx))\,\text{polylog}\left(2,1-\frac{2c\left(\sqrt{-d}-x\sqrt{e}\right)}{(-icx+1)\left(c\sqrt{-d}-i\sqrt{e}\right)}\right)\sqrt{e}}{2(-d)^{\frac{3}{2}}}\\
&+\frac{ib(a+b\arctan(cx))\,\text{polylog}\left(2,1-\frac{2c\left(\sqrt{-d}+x\sqrt{e}\right)}{(-icx+1)\left(c\sqrt{-d}+i\sqrt{e}\right)}\right)\sqrt{e}}{2(-d)^{\frac{3}{2}}}\\
&+\frac{b^2\,\text{polylog}\left(3,1-\frac{2c\left(\sqrt{-d}-x\sqrt{e}\right)}{(-icx+1)\left(c\sqrt{-d}-i\sqrt{e}\right)}\right)\sqrt{e}}{4(-d)^{\frac{3}{2}}}\\
&-\frac{b^2\,\text{polylog}\left(3,1-\frac{2c\left(\sqrt{-d}+x\sqrt{e}\right)}{(-icx+1)\left(c\sqrt{-d}+i\sqrt{e}\right)}\right)\sqrt{e}}{4(-d)^{\frac{3}{2}}}
\end{aligned}$$

command

```
int((a+b*arctan(c*x))^2/x^2/(e*x^2+d),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size

derivativedivides	Expression too large to display	102882
default	Expression too large to display	102882

Maple 2021.1 output

$$\int \frac{(a + b \arctan(cx))^2}{x^2 (e x^2 + d)} \, dx$$

33 Test file number 153

Test folder name:

`test_cases/5_Inverse_trig_functions/5.3_Inverse_tangent/153_5.3.7_Inverse_tangent_functions`

33.1 Problem number 146

$$\int \frac{\text{ArcTan}(c(a + bx)) \log(d(a + bx))}{a + bx} \, dx$$

Optimal antiderivative

$$\frac{i \ln(d(bx + a)) \operatorname{polylog}(2, -ic(bx + a))}{2b} - \frac{i \ln(d(bx + a)) \operatorname{polylog}(2, ic(bx + a))}{2b} - \frac{i \operatorname{polylog}(3, -ic(bx + a))}{2b} + \frac{i \operatorname{polylog}(3, ic(bx + a))}{2b}$$

command

```
int(arctan(c*(b*x+a))*ln(d*(b*x+a))/(b*x+a),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	1087

Maple 2021.1 output

$$\int \frac{\arctan(c(bx + a)) \ln(d(bx + a))}{bx + a} \, dx$$

34 Test file number 163

Test folder name:

`test_cases/6_Hyperbolic_functions/6.1_Hyperbolic_sine/163_6.1.5_Hyperbolic_sine_functions`

34.1 Problem number 332

$$\int \frac{e^{c(a+bx)}}{\sqrt{\sinh^2(ac+bcx)}}\,dx$$

Optimal antiderivative

$$\frac{2\ln\left(1-\mathrm{e}^{2c(bx+a)}\right)\sinh\left(bcx+ac\right)}{bc\sqrt{-2+2\cosh\left(2bcx+2ac\right)}}$$

command

```
int(exp(c*(b*x+a))/(sinh(b*c*x+a*c)^2)^(1/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	$\frac{\ln\left(\mathrm{e}^{2bcx}-\mathrm{e}^{-2ac}\right)\left(\mathrm{e}^{2c(bx+a)}-1\right)\mathrm{e}^{-c(bx+a)}}{cb\sqrt{\left(\mathrm{e}^{2c(bx+a)}-1\right)^2\mathrm{e}^{-2c(bx+a)}}}$	68

Maple 2021.1 output

$$\int \frac{2\,\mathrm{e}^{c(bx+a)}}{\sqrt{-2+2\cosh\left(2bcx+2ac\right)}}\,dx$$

34.2 Problem number 333

$$\int \frac{e^{c(a+bx)}}{\sinh^2(ac+bcx)^{3/2}}\,dx$$

Optimal antiderivative

$$-\frac{4\,\mathrm{e}^{4c(bx+a)}\sinh\left(bcx+ac\right)}{bc\left(1-\mathrm{e}^{2c(bx+a)}\right)^2\sqrt{-2+2\cosh\left(2bcx+2ac\right)}}$$

command

```
int(exp(c*(b*x+a))/(sinh(b*c*x+a*c)^2)^(3/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	$-\frac{2\left(2\,\mathrm{e}^{2c(bx+a)}-1\right)\mathrm{e}^{-c(bx+a)}}{cb\sqrt{\left(\mathrm{e}^{2c(bx+a)}-1\right)^2\mathrm{e}^{-2c(bx+a)}}\,\left(\mathrm{e}^{2c(bx+a)}-1\right)}$	69

Maple 2021.1 output

$$\int \frac{8\,\mathrm{e}^{c(bx+a)}}{\left(-2+2\cosh\left(2bcx+2ac\right)\right)^{\frac{3}{2}}}\,dx$$

34.3 Problem number 334

$$\int \frac{e^{c(a+bx)}}{\sinh^2(ac+bcx)^{5/2}}\,dx$$

Optimal antiderivative

$$\begin{aligned}&-\frac{8\sinh\left(bcx+ac\right)}{bc\left(1-\mathrm{e}^{2c(bx+a)}\right)^4\sqrt{-2+2\cosh\left(2bcx+2ac\right)}}\\&+\frac{64\sinh\left(bcx+ac\right)}{3bc\left(1-\mathrm{e}^{2c(bx+a)}\right)^3\sqrt{-2+2\cosh\left(2bcx+2ac\right)}}\\&-\frac{16\sinh\left(bcx+ac\right)}{bc\left(1-\mathrm{e}^{2c(bx+a)}\right)^2\sqrt{-2+2\cosh\left(2bcx+2ac\right)}}\end{aligned}$$

command

```
int(exp(c*(b*x+a))/(sinh(b*c*x+a*c)^2)^(5/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	$-\frac{4\left(6\,\mathrm{e}^{4c(bx+a)}-4\,\mathrm{e}^{2c(bx+a)}+1\right)\mathrm{e}^{-c(bx+a)}}{3cb\sqrt{\left(\mathrm{e}^{2c(bx+a)}-1\right)^2\mathrm{e}^{-2c(bx+a)}}\,\left(\mathrm{e}^{2c(bx+a)}-1\right)^3}$	80

Maple 2021.1 output

$$\int \frac{32\,\mathrm{e}^{c(bx+a)}}{\left(-2+2\cosh\left(2bcx+2ac\right)\right)^{\frac{5}{2}}}\,dx$$

34.4 Problem number 335

$$\int \frac{e^{c(a+bx)}}{\sinh^2(ac+bcx)^{7/2}}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{64\sinh(bcx+ac)}{3bc\left(1-\mathrm{e}^{2c(bx+a)}\right)^6\sqrt{-2+2\cosh(2bcx+2ac)}} \\
&+\frac{384\sinh(bcx+ac)}{5bc\left(1-\mathrm{e}^{2c(bx+a)}\right)^5\sqrt{-2+2\cosh(2bcx+2ac)}} \\
&-\frac{96\sinh(bcx+ac)}{bc\left(1-\mathrm{e}^{2c(bx+a)}\right)^4\sqrt{-2+2\cosh(2bcx+2ac)}} \\
&+\frac{128\sinh(bcx+ac)}{3bc\left(1-\mathrm{e}^{2c(bx+a)}\right)^3\sqrt{-2+2\cosh(2bcx+2ac)}}
\end{aligned}$$

command

```
int(exp(c*(b*x+a))/(sinh(b*c*x+a*c)^2)^(7/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	$-\frac{16\left(20\,\mathrm{e}^{6c(bx+a)}-15\,\mathrm{e}^{4c(bx+a)}+6\,\mathrm{e}^{2c(bx+a)}-1\right)\mathrm{e}^{-c(bx+a)}}{15cb\sqrt{\left(\mathrm{e}^{2c(bx+a)}-1\right)^2\mathrm{e}^{-2c(bx+a)}}\left(\mathrm{e}^{2c(bx+a)}-1\right)^5}$	91

Maple 2021.1 output

$$\int \frac{128\,\mathrm{e}^{c(bx+a)}}{\left(-2+2\cosh(2bcx+2ac)\right)^{\frac{7}{2}}}\,dx$$

35 Test file number 169

Test folder name:

```
test_cases/6_Hyperbolic_functions/6.2_Hyperbolic_cosine/169_6.2.5_Hyperbolic_cosine_functions
```

35.1 Problem number 292

$$\int e^{c(a+bx)} \cosh^2(ac+bcx)^{5/2}\, dx$$

Optimal antiderivative

$$-\frac{\operatorname{sech}(bcx+ac)\sqrt{\frac{\cosh(2bcx+2ac)}{2}+\frac{1}{2}}\,\mathrm{e}^{-4c(bx+a)}}{128bc}$$
$$-\frac{5\operatorname{sech}(bcx+ac)\sqrt{\frac{\cosh(2bcx+2ac)}{2}+\frac{1}{2}}\,\mathrm{e}^{-2c(bx+a)}}{64bc}$$
$$+\frac{5\,\mathrm{e}^{2c(bx+a)}\operatorname{sech}(bcx+ac)\sqrt{\frac{\cosh(2bcx+2ac)}{2}+\frac{1}{2}}}{32bc}$$
$$+\frac{5\,\mathrm{e}^{4c(bx+a)}\operatorname{sech}(bcx+ac)\sqrt{\frac{\cosh(2bcx+2ac)}{2}+\frac{1}{2}}}{128bc}$$
$$+\frac{\mathrm{e}^{6c(bx+a)}\operatorname{sech}(bcx+ac)\sqrt{\frac{\cosh(2bcx+2ac)}{2}+\frac{1}{2}}}{192bc}$$
$$+\frac{5x\operatorname{sech}(bcx+ac)\sqrt{\frac{\cosh(2bcx+2ac)}{2}+\frac{1}{2}}}{16}$$

command

```
int(exp(c*(b*x+a))*(cosh(b*c*x+a*c)^2)^(5/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$\frac{5x\sqrt{\left(1+\mathrm{e}^{2c(bx+a)}\right)^2\mathrm{e}^{-2c(bx+a)}}\,\mathrm{e}^{c(bx+a)}}{16\left(1+\mathrm{e}^{2c(bx+a)}\right)}+\frac{\sqrt{\left(1+\mathrm{e}^{2c(bx+a)}\right)^2\mathrm{e}^{-2c(bx+a)}}\,\mathrm{e}^{7c(bx+a)}}{192cb\left(1+\mathrm{e}^{2c(bx+a)}\right)}+\frac{5\sqrt{\left(1+\mathrm{e}^{2c(bx+a)}\right)^2\mathrm{e}^{}}}{128cb\left(1+\mathrm{e}^{2c}\right.}$

Maple 2021.1 output

$$\int \mathrm{e}^{c(bx+a)}\left(\frac{\cosh(2bcx+2ac)}{2}+\frac{1}{2}\right)^{\frac{5}{2}}\, dx$$

35.2 Problem number 293

$$\int e^{c(a+bx)} \cosh^2(ac+bcx)^{3/2}\, dx$$

Optimal antiderivative

$$-\frac{\operatorname{sech}(bcx+ac)\sqrt{\frac{\cosh(2bcx+2ac)}{2}+\frac{1}{2}}\, e^{-2c(bx+a)}}{16bc} + \frac{3\, e^{2c(bx+a)}\operatorname{sech}(bcx+ac)\sqrt{\frac{\cosh(2bcx+2ac)}{2}+\frac{1}{2}}}{16bc} + \frac{e^{4c(bx+a)}\operatorname{sech}(bcx+ac)\sqrt{\frac{\cosh(2bcx+2ac)}{2}+\frac{1}{2}}}{32bc} + \frac{3x\operatorname{sech}(bcx+ac)\sqrt{\frac{\cosh(2bcx+2ac)}{2}+\frac{1}{2}}}{8}$$

command

```
int(exp(c*(b*x+a))*(cosh(b*c*x+a*c)^2)^(3/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$\frac{3x\sqrt{\left(1+e^{2c(bx+a)}\right)^2 e^{-2c(bx+a)}}\, e^{c(bx+a)}}{8\left(1+e^{2c(bx+a)}\right)} + \frac{\sqrt{\left(1+e^{2c(bx+a)}\right)^2 e^{-2c(bx+a)}}\, e^{5c(bx+a)}}{32cb\left(1+e^{2c(bx+a)}\right)} + \frac{3\sqrt{\left(1+e^{2c(bx+a)}\right)^2 e^{-}}}{16cb(1+e^{2c(}}$

Maple 2021.1 output

$$\int e^{c(bx+a)}\left(\frac{\cosh(2bcx+2ac)}{2}+\frac{1}{2}\right)^{\frac{3}{2}}\, dx$$

35.3 Problem number 294

$$\int e^{c(a+bx)}\sqrt{\cosh^2(ac+bcx)}\, dx$$

Optimal antiderivative

$$\frac{e^{2c(bx+a)}\operatorname{sech}(bcx+ac)\sqrt{\frac{\cosh(2bcx+2ac)}{2}+\frac{1}{2}}}{4bc} + \frac{x\operatorname{sech}(bcx+ac)\sqrt{\frac{\cosh(2bcx+2ac)}{2}+\frac{1}{2}}}{2}$$

command

```
int(exp(c*(b*x+a))*(cosh(b*c*x+a*c)^2)^(1/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	$\frac{x\sqrt{\left(1+\mathrm{e}^{2c(bx+a)}\right)^2\mathrm{e}^{-2c(bx+a)}}\,\mathrm{e}^{c(bx+a)}}{2+2\,\mathrm{e}^{2c(bx+a)}}+\frac{\sqrt{\left(1+\mathrm{e}^{2c(bx+a)}\right)^2\mathrm{e}^{-2c(bx+a)}}\,\mathrm{e}^{3c(bx+a)}}{4cb\left(1+\mathrm{e}^{2c(bx+a)}\right)}$	106

Maple 2021.1 output

$$\int \mathrm{e}^{c(bx+a)}\sqrt{\frac{\cosh\left(2bcx+2ac\right)}{2}+\frac{1}{2}}\,dx$$

35.4 Problem number 295

$$\int \frac{e^{c(a+bx)}}{\sqrt{\cosh^2(ac+bcx)}}\,dx$$

Optimal antiderivative

$$\frac{2\cosh\left(bcx+ac\right)\ln\left(1+\mathrm{e}^{2c(bx+a)}\right)}{bc\sqrt{2\cosh\left(2bcx+2ac\right)+2}}$$

command

```
int(exp(c*(b*x+a))/(cosh(b*c*x+a*c)^2)^(1/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	$\frac{\ln\left(\mathrm{e}^{2bcx}+\mathrm{e}^{-2ac}\right)\left(1+\mathrm{e}^{2c(bx+a)}\right)\mathrm{e}^{-c(bx+a)}}{cb\sqrt{\left(1+\mathrm{e}^{2c(bx+a)}\right)^2\mathrm{e}^{-2c(bx+a)}}}$	66

Maple 2021.1 output

$$\int \frac{2\,\mathrm{e}^{c(bx+a)}}{\sqrt{2\cosh\left(2bcx+2ac\right)+2}}\,dx$$

35.5 Problem number 296

$$\int \frac{e^{c(a+bx)}}{\cosh^2(ac+bcx)^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{4\,\mathrm{e}^{4c(bx+a)}\cosh\left(bcx+ac\right)}{bc\left(1+\mathrm{e}^{2c(bx+a)}\right)^2\sqrt{2\cosh\left(2bcx+2ac\right)+2}}$$

command

```
int(exp(c*(b*x+a))/(cosh(b*c*x+a*c)^2)^(3/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	$-\frac{2\left(2\,\mathrm{e}^{2c(bx+a)}+1\right)\mathrm{e}^{-c(bx+a)}}{cb\sqrt{\left(1+\mathrm{e}^{2c(bx+a)}\right)^2\mathrm{e}^{-2c(bx+a)}}\,\left(1+\mathrm{e}^{2c(bx+a)}\right)}$	69

Maple 2021.1 output

$$\int \frac{8\,\mathrm{e}^{c(bx+a)}}{\left(2\cosh\left(2bcx+2ac\right)+2\right)^{\frac{3}{2}}}\,dx$$

35.6 Problem number 297

$$\int \frac{e^{c(a+bx)}}{\cosh^2(ac+bcx)^{5/2}}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-\frac{8\cosh\left(bcx+ac\right)}{bc\left(1+\mathrm{e}^{2c(bx+a)}\right)^4\sqrt{2\cosh\left(2bcx+2ac\right)+2}} \\
&+\frac{64\cosh\left(bcx+ac\right)}{3bc\left(1+\mathrm{e}^{2c(bx+a)}\right)^3\sqrt{2\cosh\left(2bcx+2ac\right)+2}} \\
&-\frac{16\cosh\left(bcx+ac\right)}{bc\left(1+\mathrm{e}^{2c(bx+a)}\right)^2\sqrt{2\cosh\left(2bcx+2ac\right)+2}}
\end{aligned}$$

command

```
int(exp(c*(b*x+a))/(cosh(b*c*x+a*c)^2)^(5/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	$-\frac{4\left(6\,\mathrm{e}^{4c(bx+a)}+4\,\mathrm{e}^{2c(bx+a)}+1\right)\mathrm{e}^{-c(bx+a)}}{3cb\sqrt{\left(1+\mathrm{e}^{2c(bx+a)}\right)^2\mathrm{e}^{-2c(bx+a)}}\left(1+\mathrm{e}^{2c(bx+a)}\right)^3}$	80

Maple 2021.1 output

$$\int \frac{32\,\mathrm{e}^{c(bx+a)}}{\left(2\cosh\left(2bcx+2ac\right)+2\right)^{\frac{5}{2}}}\,dx$$

35.7 Problem number 298

$$\int \frac{e^{c(a+bx)}}{\cosh^2(ac+bcx)^{7/2}}\,dx$$

Optimal antiderivative

$$\begin{aligned}
&\frac{64\cosh\left(bcx+ac\right)}{3bc\left(1+\mathrm{e}^{2c(bx+a)}\right)^6\sqrt{2\cosh\left(2bcx+2ac\right)+2}} \\
&-\frac{384\cosh\left(bcx+ac\right)}{5bc\left(1+\mathrm{e}^{2c(bx+a)}\right)^5\sqrt{2\cosh\left(2bcx+2ac\right)+2}} \\
&+\frac{96\cosh\left(bcx+ac\right)}{bc\left(1+\mathrm{e}^{2c(bx+a)}\right)^4\sqrt{2\cosh\left(2bcx+2ac\right)+2}} \\
&-\frac{128\cosh\left(bcx+ac\right)}{3bc\left(1+\mathrm{e}^{2c(bx+a)}\right)^3\sqrt{2\cosh\left(2bcx+2ac\right)+2}}
\end{aligned}$$

command

```
int(exp(c*(b*x+a))/(cosh(b*c*x+a*c)^2)^(7/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	$-\frac{16\left(20\,\mathrm{e}^{6c(bx+a)}+15\,\mathrm{e}^{4c(bx+a)}+6\,\mathrm{e}^{2c(bx+a)}+1\right)\mathrm{e}^{-c(bx+a)}}{15cb\sqrt{\left(1+\mathrm{e}^{2c(bx+a)}\right)^2\mathrm{e}^{-2c(bx+a)}}\left(1+\mathrm{e}^{2c(bx+a)}\right)^5}$	91

Maple 2021.1 output

$$\int \frac{128\,\mathrm{e}^{c(bx+a)}}{\left(2\cosh\left(2bcx+2ac\right)+2\right)^{\frac{7}{2}}}\,dx$$

36 Test file number 189

Test folder name:

`test_cases/7_Inverse_hyperbolic_functions/7.2_Inverse_hyperbolic_cosine/189_7.2.2-d_x-^m-a+b_arccosh-c_x-^n`

36.1 Problem number 73

$$\int x^3 \sqrt{\cosh^{-1}(ax)}\, dx$$

Optimal antiderivative

$$-\frac{\operatorname{erf}\left(\sqrt{2}\ \sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{2}\ \sqrt{\pi}}{64a^4} - \frac{\operatorname{erfi}\left(\sqrt{2}\ \sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{2}\ \sqrt{\pi}}{64a^4}$$
$$-\frac{\operatorname{erf}\left(2\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{\pi}}{256a^4} - \frac{\operatorname{erfi}\left(2\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{\pi}}{256a^4}$$
$$-\frac{3\sqrt{\operatorname{arccosh}(ax)}}{32a^4} + \frac{x^4\sqrt{\operatorname{arccosh}(ax)}}{4}$$

command

```
int(x^3*arccosh(a*x)^(1/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
default	$-\frac{\sqrt{2}\left(-8\sqrt{2}\ \sqrt{\operatorname{arccosh}(ax)}\ \sqrt{\pi}\ a^2x^2+4\sqrt{2}\ \sqrt{\operatorname{arccosh}(ax)}\ \sqrt{\pi}+\pi\operatorname{erf}\left(\sqrt{2}\ \sqrt{\operatorname{arccosh}(ax)}\right)+\pi\operatorname{erfi}\left(\sqrt{2}\right.\right.}{64\sqrt{\pi}\ a^4}$

Maple 2021.1 output

$$\int x^3 \sqrt{\operatorname{arccosh}(ax)}\, dx$$

36.2 Problem number 79

$$\int x^3 \cosh^{-1}(ax)^{3/2}\, dx$$

Optimal antiderivative

$$-\frac{3\operatorname{arccosh}(ax)^{\frac{3}{2}}}{32a^4}+\frac{x^4\operatorname{arccosh}(ax)^{\frac{3}{2}}}{4}-\frac{3\operatorname{erf}\left(\sqrt{2}\ \sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{2}\ \sqrt{\pi}}{256a^4}$$
$$+\frac{3\operatorname{erfi}\left(\sqrt{2}\ \sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{2}\ \sqrt{\pi}}{256a^4}-\frac{3\operatorname{erf}\left(2\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{\pi}}{2048a^4}$$
$$+\frac{3\operatorname{erfi}\left(2\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{\pi}}{2048a^4}-\frac{9x\sqrt{ax-1}\ \sqrt{ax+1}\ \sqrt{\operatorname{arccosh}(ax)}}{64a^3}$$
$$-\frac{3x^3\sqrt{ax-1}\ \sqrt{ax+1}\ \sqrt{\operatorname{arccosh}(ax)}}{32a}$$

command

```
int(x^3*arccosh(a*x)^(3/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
default	$-\frac{\sqrt{2}\ \left(-32\operatorname{arccosh}(ax)^{\frac{3}{2}}\sqrt{2}\ \sqrt{\pi}\ a^2x^2+24\sqrt{2}\ \sqrt{\operatorname{arccosh}(ax)}\ \sqrt{\pi}\ \sqrt{ax+1}\ \sqrt{ax-1}\ ax+16\operatorname{arccosh}(ax)^{\frac{3}{2}}\sqrt{2}\right.}{256\sqrt{\pi}\ a^4}$

Maple 2021.1 output

$$\int x^3\operatorname{arccosh}(ax)^{\frac{3}{2}}\,dx$$

36.3 Problem number 85

$$\int x^3\cosh^{-1}(ax)^{5/2}\,dx$$

Optimal antiderivative

$$-\frac{3\operatorname{arccosh}(ax)^{\frac{5}{2}}}{32a^4}+\frac{x^4\operatorname{arccosh}(ax)^{\frac{5}{2}}}{4}-\frac{15\operatorname{erf}\left(\sqrt{2}\ \sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{2}\ \sqrt{\pi}}{1024a^4}$$
$$-\frac{15\operatorname{erfi}\left(\sqrt{2}\ \sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{2}\ \sqrt{\pi}}{1024a^4}-\frac{15\operatorname{erf}\left(2\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{\pi}}{16384a^4}$$
$$-\frac{15\operatorname{erfi}\left(2\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{\pi}}{16384a^4}-\frac{15x\operatorname{arccosh}(ax)^{\frac{3}{2}}\sqrt{ax-1}\ \sqrt{ax+1}}{64a^3}$$
$$-\frac{5x^3\operatorname{arccosh}(ax)^{\frac{3}{2}}\sqrt{ax-1}\ \sqrt{ax+1}}{32a}-\frac{225\sqrt{\operatorname{arccosh}(ax)}}{2048a^4}$$
$$+\frac{45x^2\sqrt{\operatorname{arccosh}(ax)}}{256a^2}+\frac{15x^4\sqrt{\operatorname{arccosh}(ax)}}{256}$$

command

```
int(x^3*arccosh(a*x)^(5/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
default	$-\frac{\sqrt{2}\left(-128\operatorname{arccosh}(ax)^{\frac{5}{2}}\sqrt{2}\sqrt{\pi}\,a^2x^2+160\operatorname{arccosh}(ax)^{\frac{3}{2}}\sqrt{2}\sqrt{\pi}\sqrt{ax+1}\sqrt{ax-1}\,ax-120\sqrt{2}\sqrt{\operatorname{arccosh}(ax}\right.$

Maple 2021.1 output

$$\int x^3\operatorname{arccosh}(ax)^{\frac{5}{2}}\,dx$$

36.4 Problem number 91

$$\int \frac{x^3}{\sqrt{\cosh^{-1}(ax)}}\,dx$$

Optimal antiderivative

$$-\frac{\operatorname{erf}\left(\sqrt{2}\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{2}\sqrt{\pi}}{16a^4}+\frac{\operatorname{erfi}\left(\sqrt{2}\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{2}\sqrt{\pi}}{16a^4}$$
$$-\frac{\operatorname{erf}\left(2\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{\pi}}{32a^4}+\frac{\operatorname{erfi}\left(2\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{\pi}}{32a^4}$$

command

```
int(x^3/arccosh(a*x)^(1/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
default	$-\frac{\sqrt{\pi}\sqrt{2}\left(\operatorname{erf}\left(\sqrt{2}\sqrt{\operatorname{arccosh}(ax)}\right)-\operatorname{erfi}\left(\sqrt{2}\sqrt{\operatorname{arccosh}(ax)}\right)\right)}{16a^4}-\frac{\sqrt{\pi}\left(\operatorname{erf}\left(2\sqrt{\operatorname{arccosh}(ax)}\right)-\operatorname{erfi}\left(2\right.\right.}{32a^4}$

Maple 2021.1 output

$$\int \frac{x^3}{\sqrt{\operatorname{arccosh}(ax)}}\,dx$$

36.5 Problem number 98

$$\int \frac{x^3}{\cosh^{-1}(ax)^{3/2}}\,dx$$

Optimal antiderivative

$$\frac{\operatorname{erf}\left(\sqrt{2}\ \sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{2}\ \sqrt{\pi}}{4a^4}+\frac{\operatorname{erfi}\left(\sqrt{2}\ \sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{2}\ \sqrt{\pi}}{4a^4}$$
$$+\frac{\operatorname{erf}\left(2\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{\pi}}{4a^4}+\frac{\operatorname{erfi}\left(2\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{\pi}}{4a^4}-\frac{2x^3\sqrt{ax-1}\ \sqrt{ax+1}}{a\sqrt{\operatorname{arccosh}(ax)}}$$

command

```
int(x^3/arccosh(a*x)^(3/2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
default	$-\frac{\sqrt{2}\ \left(2\sqrt{2}\ \sqrt{\operatorname{arccosh}(ax)}\ \sqrt{\pi}\ \sqrt{ax+1}\ \sqrt{ax-1}\ ax-\operatorname{arccosh}(ax)\pi\operatorname{erf}\left(\sqrt{2}\ \sqrt{\operatorname{arccosh}(ax)}\right)-\operatorname{arccosh}(ax)\right.$ $\left.4\sqrt{\pi}\ a^4\operatorname{arccosh}(ax)\right.$

Maple 2021.1 output

$$\int \frac{x^3}{\operatorname{arccosh}(ax)^{\frac{3}{2}}}\,dx$$

36.6 Problem number 104

$$\int \frac{x^3}{\cosh^{-1}(ax)^{5/2}}\,dx$$

Optimal antiderivative

$$-\frac{2\operatorname{erf}\left(2\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{\pi}}{3a^4}+\frac{2\operatorname{erfi}\left(2\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{\pi}}{3a^4}$$
$$-\frac{\operatorname{erf}\left(\sqrt{2}\ \sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{2}\ \sqrt{\pi}}{3a^4}+\frac{\operatorname{erfi}\left(\sqrt{2}\ \sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{2}\ \sqrt{\pi}}{3a^4}$$
$$-\frac{2x^3\sqrt{ax-1}\ \sqrt{ax+1}}{3a\operatorname{arccosh}(ax)^{\frac{3}{2}}}+\frac{4x^2}{a^2\sqrt{\operatorname{arccosh}(ax)}}-\frac{16x^4}{3\sqrt{\operatorname{arccosh}(ax)}}$$

command

`int(x^3/arccosh(a*x)^(5/2),x,method=_RETURNVERBOSE)`

Maple 2022.1 output

method	result
default	$-\frac{\sqrt{2}\left(4\operatorname{arccosh}(ax)^{\frac{3}{2}}\sqrt{2}\sqrt{\pi}\,a^2x^2+\sqrt{2}\sqrt{\operatorname{arccosh}(ax)}\sqrt{\pi}\sqrt{ax+1}\sqrt{ax-1}\,ax+2\operatorname{arccosh}(ax)^2\pi\operatorname{erf}\left(\sqrt{2}\right.\right.}{6\sqrt{\pi}\,a^4\operatorname{arccosh}(ax)^2}$

Maple 2021.1 output

$$\int \frac{x^3}{\operatorname{arccosh}(ax)^{\frac{5}{2}}}\,dx$$

36.7 Problem number 110

$$\int \frac{x^3}{\cosh^{-1}(ax)^{7/2}}\,dx$$

Optimal antiderivative

$$\frac{4x^2}{5a^2\operatorname{arccosh}(ax)^{\frac{3}{2}}}-\frac{16x^4}{15\operatorname{arccosh}(ax)^{\frac{3}{2}}}+\frac{16\operatorname{erf}\left(2\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{\pi}}{15a^4}$$
$$+\frac{16\operatorname{erfi}\left(2\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{\pi}}{15a^4}+\frac{4\operatorname{erf}\left(\sqrt{2}\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{2}\sqrt{\pi}}{15a^4}$$
$$+\frac{4\operatorname{erfi}\left(\sqrt{2}\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{2}\sqrt{\pi}}{15a^4}-\frac{2x^3\sqrt{ax-1}\sqrt{ax+1}}{5a\operatorname{arccosh}(ax)^{\frac{5}{2}}}$$
$$+\frac{16x\sqrt{ax-1}\sqrt{ax+1}}{5a^3\sqrt{\operatorname{arccosh}(ax)}}-\frac{128x^3\sqrt{ax-1}\sqrt{ax+1}}{15a\sqrt{\operatorname{arccosh}(ax)}}$$

command

`int(x^3/arccosh(a*x)^(7/2),x,method=_RETURNVERBOSE)`

Maple 2022.1 output

method	result
default	$\frac{\sqrt{2}\left(-16\operatorname{arccosh}(ax)^{\frac{5}{2}}\sqrt{2}\sqrt{\pi}\sqrt{ax+1}\sqrt{ax-1}\,ax-4\operatorname{arccosh}(ax)^{\frac{3}{2}}\sqrt{2}\sqrt{\pi}\,a^2x^2-3\sqrt{2}\sqrt{\operatorname{arccosh}(ax)}\sqrt{\pi}\right.}{}$

Maple 2021.1 output

$$\int \frac{x^3}{\operatorname{arccosh}(ax)^{\frac{7}{2}}}\,dx$$

36.8 Problem number 128

$$\int x^3 \cosh^{-1}(ax)^n \, dx$$

Optimal antiderivative

$$\frac{\operatorname{arccosh}(ax)^n \, \Gamma(1+n, -4\operatorname{arccosh}(ax)) \, 2^{-2n} (-\operatorname{arccosh}(ax))^{-n}}{64a^4} + \frac{2^{-4-n} \operatorname{arccosh}(ax)^n \, \Gamma(1+n, -2\operatorname{arccosh}(ax)) \, (-\operatorname{arccosh}(ax))^{-n}}{a^4} + \frac{2^{-4-n} \Gamma(1+n, 2\operatorname{arccosh}(ax))}{a^4} + \frac{\Gamma(1+n, 4\operatorname{arccosh}(ax)) \, 2^{-2n}}{64a^4}$$

command

```
int(x^3*arccosh(a*x)^n,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	s
default	$\frac{\operatorname{arccosh}(ax)^{n+2} \operatorname{hypergeom}\left(\left[1+\frac{n}{2}\right],\left[\frac{3}{2},2+\frac{n}{2}\right],\operatorname{arccosh}(ax)^2\right)}{2a^4(n+2)} + \frac{\operatorname{arccosh}(ax)^{n+2} \operatorname{hypergeom}\left(\left[1+\frac{n}{2}\right],\left[\frac{3}{2},2+\frac{n}{2}\right],4\operatorname{arccosh}(ax)^2\right)}{2a^4(n+2)}$	8

Maple 2021.1 output

$$\int x^3 \operatorname{arccosh}(ax)^n \, dx$$

37 Test file number 192

Test folder name:

```
test_cases/7_Inverse_hyperbolic_functions/7.3_Inverse_hyperbolic_tangent/192_7.3.2-d_x-^m-a+b_arctanh-c_x^n-^p
```

37.1 Problem number 64

$$\int x^7 \left(a + b \tanh^{-1}\left(cx^2\right)\right)^2 \, dx$$

Optimal antiderivative

$$\frac{ab\,x^2}{4c^3} + \frac{b^2x^4}{24c^2} + \frac{b^2x^2 \operatorname{arctanh}\left(c\,x^2\right)}{4c^3} + \frac{b\,x^6\left(a + b\operatorname{arctanh}\left(c\,x^2\right)\right)}{12c} - \frac{\left(a + b\operatorname{arctanh}\left(c\,x^2\right)\right)^2}{8c^4} + \frac{x^8\left(a + b\operatorname{arctanh}\left(c\,x^2\right)\right)^2}{8} + \frac{b^2 \ln\left(-c^2x^4 + 1\right)}{6c^4}$$

command

```
int(x^7*(a+b*arctanh(c*x^2))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$\frac{b^2(x^8c^4-1)\ln(cx^2+1)^2}{32c^4}+\frac{b(-3x^8b\ln(-cx^2+1)c^4+6ac^4x^8+2bc^3x^6+6bcx^2+3b\ln(-cx^2+1))\ln(cx^2+1)}{48c^4}+\frac{b^2x^8\ln(-cx^2+1)^2}{32}$

Maple 2021.1 output

$$\int x^7\left(a+b\operatorname{arctanh}\left(cx^2\right)\right)^2\,dx$$

37.2 Problem number 65

$$\int x^5\left(a+b\tanh^{-1}\left(cx^2\right)\right)^2\,dx$$

Optimal antiderivative

$$\frac{b^2x^2}{6c^2}-\frac{b^2\operatorname{arctanh}\left(cx^2\right)}{6c^3}+\frac{bx^4\left(a+b\operatorname{arctanh}\left(cx^2\right)\right)}{6c}+\frac{\left(a+b\operatorname{arctanh}\left(cx^2\right)\right)^2}{6c^3}$$
$$+\frac{x^6\left(a+b\operatorname{arctanh}\left(cx^2\right)\right)^2}{6}-\frac{b\left(a+b\operatorname{arctanh}\left(cx^2\right)\right)\ln\left(\frac{2}{-cx^2+1}\right)}{3c^3}-\frac{b^2\operatorname{polylog}\left(2,1-\frac{2}{-cx^2+1}\right)}{6c^3}$$

command

```
int(x^5*(a+b*arctanh(c*x^2))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$\frac{b^2x^2}{6c^2}+\frac{bax^6\ln(cx^2+1)}{6}+\frac{ba\ln(cx^2+1)}{6c^3}-\frac{b^2\ln(-cx^2+1)\ln(cx^2+1)x^6}{12}-\frac{b^2\ln(-cx^2+1)\ln(cx^2+1)}{12c^3}+\frac{b^2\ln\left(\frac{1}{2}-\frac{cx^2}{2}\right)\ln(c$

Maple 2021.1 output

$$\int x^5\left(a+b\operatorname{arctanh}\left(cx^2\right)\right)^2\,dx$$

37.3 Problem number 116

$$\int x^{11}\left(a+b\tanh^{-1}\left(cx^3\right)\right)^2\,dx$$

Optimal antiderivative

$$\frac{abx^3}{6c^3}+\frac{b^2x^6}{36c^2}+\frac{b^2x^3\operatorname{arctanh}\left(cx^3\right)}{6c^3}+\frac{bx^9\left(a+b\operatorname{arctanh}\left(cx^3\right)\right)}{18c}$$
$$-\frac{\left(a+b\operatorname{arctanh}\left(cx^3\right)\right)^2}{12c^4}+\frac{x^{12}\left(a+b\operatorname{arctanh}\left(cx^3\right)\right)^2}{12}+\frac{b^2\ln\left(-c^2x^6+1\right)}{9c^4}$$

command

```
int(x^11*(a+b*arctanh(c*x^3))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
risch	$\frac{b^2\left(x^{12}c^4-1\right)\ln\left(cx^3+1\right)^2}{48c^4}+\frac{b\left(-3x^{12}b\ln\left(-cx^3+1\right)c^4+6ac^4x^{12}+2bc^3x^9+6bcx^3+3b\ln\left(-cx^3+1\right)\right)\ln\left(cx^3+1\right)}{72c^4}+\frac{b^2x^{12}\ln\left(-cx^3+$

Maple 2021.1 output

$$\int x^{11}\left(a+b\operatorname{arctanh}\left(cx^3\right)\right)^2\,dx$$

37.4 Problem number 172

$$\int x\left(a+b\tanh^{-1}\left(\frac{c}{x^2}\right)\right)^2\,dx$$

Optimal antiderivative

$$-\frac{c\left(a+b\operatorname{arccoth}\left(\frac{x^2}{c}\right)\right)^2}{2}+\frac{x^2\left(a+b\operatorname{arccoth}\left(\frac{x^2}{c}\right)\right)^2}{2}$$
$$-bc\left(a+b\operatorname{arccoth}\left(\frac{x^2}{c}\right)\right)\ln\left(2-\frac{2}{1+\frac{c}{x^2}}\right)+\frac{b^2c\operatorname{polylog}\left(2,-1+\frac{2}{1+\frac{c}{x^2}}\right)}{2}$$

command

```
int(x*(a+b*arctanh(c/x^2))^2,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	6869

Maple 2021.1 output

$$\int x\Big(a+b\operatorname{arctanh}\left(\frac{c}{x^2}\right)\Big)^2\,dx$$

38 Test file number 194

Test folder name:

`test_cases/7_Inverse_hyperbolic_functions/7.3_Inverse_hyperbolic_tangent/194_7.3.4_u-a+b_arctanh-c_x-^p`

38.1 Problem number 534

$$\int \left(a+b\tanh^{-1}(cx)\right)\left(d+e\log\left(f+gx^2\right)\right)\,dx$$

Optimal antiderivative

$$-2aex-2bex\operatorname{arctanh}(cx)-\frac{be\ln\left(-c^2x^2+1\right)}{c}$$
$$+x(a+b\operatorname{arctanh}(cx))\left(d+e\ln\left(gx^2+f\right)\right)+\frac{b\ln\left(\frac{g(-c^2x^2+1)}{c^2f+g}\right)\left(d+e\ln\left(gx^2+f\right)\right)}{2c}$$
$$+\frac{be\operatorname{polylog}\left(2,\frac{c^2(gx^2+f)}{c^2f+g}\right)}{2c}+\frac{be\ln(-cx+1)\ln\left(\frac{c\left(\sqrt{-f}-x\sqrt{g}\right)}{c\sqrt{-f}-\sqrt{g}}\right)\sqrt{-f}}{2\sqrt{g}}$$
$$-\frac{be\ln(cx+1)\ln\left(\frac{c\left(\sqrt{-f}-x\sqrt{g}\right)}{c\sqrt{-f}+\sqrt{g}}\right)\sqrt{-f}}{2\sqrt{g}}$$
$$+\frac{be\ln(cx+1)\ln\left(\frac{c\left(\sqrt{-f}+x\sqrt{g}\right)}{c\sqrt{-f}-\sqrt{g}}\right)\sqrt{-f}}{2\sqrt{g}}$$
$$-\frac{be\ln(-cx+1)\ln\left(\frac{c\left(\sqrt{-f}+x\sqrt{g}\right)}{c\sqrt{-f}+\sqrt{g}}\right)\sqrt{-f}}{2\sqrt{g}}$$
$$+\frac{be\operatorname{polylog}\left(2,-\frac{(-cx+1)\sqrt{g}}{c\sqrt{-f}-\sqrt{g}}\right)\sqrt{-f}}{2\sqrt{g}}$$
$$+\frac{be\operatorname{polylog}\left(2,-\frac{(cx+1)\sqrt{g}}{c\sqrt{-f}-\sqrt{g}}\right)\sqrt{-f}}{2\sqrt{g}}-\frac{be\operatorname{polylog}\left(2,\frac{(-cx+1)\sqrt{g}}{c\sqrt{-f}+\sqrt{g}}\right)\sqrt{-f}}{2\sqrt{g}}$$
$$-\frac{be\operatorname{polylog}\left(2,\frac{(cx+1)\sqrt{g}}{c\sqrt{-f}+\sqrt{g}}\right)\sqrt{-f}}{2\sqrt{g}}+\frac{2ae\arctan\left(\frac{x\sqrt{g}}{\sqrt{f}}\right)\sqrt{f}}{\sqrt{g}}$$

command

```
int((a+b*arctanh(c*x))*(d+e*ln(g*x^2+f)),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	3574

Maple 2021.1 output

$$\int (a+b\operatorname{arctanh}(cx))\left(d+e\ln\left(gx^2+f\right)\right)\,dx$$

39 Test file number 198

Test folder name:

`test_cases/7_Inverse_hyperbolic_functions/7.4_Inverse_hyperbolic_cotangent/198_7.4.1_Inverse_`

39.1 Problem number 173

$$\int \frac{1}{x^2 \coth^{-1}(\tanh(a+bx))^2}\,dx$$

Optimal antiderivative

$$-\frac{2b}{(bx-\operatorname{arccoth}(\tanh(bx+a)))^2 \operatorname{arccoth}(\tanh(bx+a))} + \frac{1}{x\,(bx-\operatorname{arccoth}(\tanh(bx+a)))\operatorname{arccoth}(\tanh(bx+a))} + \frac{2b\ln(x)}{(bx-\operatorname{arccoth}(\tanh(bx+a)))^3} - \frac{2b\ln(\operatorname{arccoth}(\tanh(bx+a)))}{(bx-\operatorname{arccoth}(\tanh(bx+a)))^3}$$

command

```
int(1/x^2/arccoth(tanh(b*x+a))^2,x)
```

Maple 2022.1 output

output too large to display

Maple 2021.1 output

$$\int \frac{1}{x^2 \operatorname{arccoth}(\tanh(bx+a))^2}\,dx$$

39.2 Problem number 181

$$\int \frac{1}{x \coth^{-1}(\tanh(a+bx))^3}\,dx$$

Optimal antiderivative

$$-\frac{1}{2\,(bx-\operatorname{arccoth}(\tanh(bx+a)))\operatorname{arccoth}(\tanh(bx+a))^2} + \frac{1}{(bx-\operatorname{arccoth}(\tanh(bx+a)))^2 \operatorname{arccoth}(\tanh(bx+a))} - \frac{\ln(x)}{(bx-\operatorname{arccoth}(\tanh(bx+a)))^3} + \frac{\ln(\operatorname{arccoth}(\tanh(bx+a)))}{(bx-\operatorname{arccoth}(\tanh(bx+a)))^3}$$

command

```
int(1/x/arccoth(tanh(b*x+a))^3,x)
```

Maple 2022.1 output

output too large to display

Maple 2021.1 output

$$\int \frac{1}{x\operatorname{arccoth}\left(\tanh\left(bx+a\right)\right)^{3}}\,dx$$

39.3 Problem number 279

$$\int \left(a+b\coth^{-1}(cx)\right)\left(d+e\log\left(f+gx^{2}\right)\right)\,dx$$

Optimal antiderivative

$$\begin{aligned}
&-2aex-2bex\operatorname{arccoth}(cx)-\frac{be\ln\left(-c^{2}x^{2}+1\right)}{c}\\
&+x(a+b\operatorname{arccoth}(cx))\left(d+e\ln\left(g\,x^{2}+f\right)\right)+\frac{b\ln\left(\frac{g\left(-c^{2}x^{2}+1\right)}{c^{2}f+g}\right)\left(d+e\ln\left(g\,x^{2}+f\right)\right)}{2c}\\
&+\frac{be\operatorname{polylog}\left(2,\frac{c^{2}\left(g\,x^{2}+f\right)}{c^{2}f+g}\right)}{2c}+\frac{2ae\arctan\left(\frac{x\sqrt{g}}{\sqrt{f}}\right)\sqrt{f}}{\sqrt{g}}\\
&-\frac{be\arctan\left(\frac{x\sqrt{g}}{\sqrt{f}}\right)\ln\left(1-\frac{1}{cx}\right)\sqrt{f}}{\sqrt{g}}+\frac{be\arctan\left(\frac{x\sqrt{g}}{\sqrt{f}}\right)\ln\left(1+\frac{1}{cx}\right)\sqrt{f}}{\sqrt{g}}\\
&+\frac{be\arctan\left(\frac{x\sqrt{g}}{\sqrt{f}}\right)\ln\left(-\frac{2(-cx+1)\sqrt{f}\,\sqrt{g}}{\left(ic\sqrt{f}-\sqrt{g}\right)\left(\sqrt{f}-ix\sqrt{g}\right)}\right)\sqrt{f}}{\sqrt{g}}\\
&-\frac{be\arctan\left(\frac{x\sqrt{g}}{\sqrt{f}}\right)\ln\left(\frac{2(cx+1)\sqrt{f}\,\sqrt{g}}{\left(ic\sqrt{f}+\sqrt{g}\right)\left(\sqrt{f}-ix\sqrt{g}\right)}\right)\sqrt{f}}{\sqrt{g}}\\
&-\frac{ibe\operatorname{polylog}\left(2,1+\frac{2(-cx+1)\sqrt{f}\,\sqrt{g}}{\left(ic\sqrt{f}-\sqrt{g}\right)\left(\sqrt{f}-ix\sqrt{g}\right)}\right)\sqrt{f}}{2\sqrt{g}}\\
&+\frac{ibe\operatorname{polylog}\left(2,1-\frac{2(cx+1)\sqrt{f}\,\sqrt{g}}{\left(ic\sqrt{f}+\sqrt{g}\right)\left(\sqrt{f}-ix\sqrt{g}\right)}\right)\sqrt{f}}{2\sqrt{g}}
\end{aligned}$$

command

```
int((a+b*arccoth(c*x))*(d+e*ln(g*x^2+f)),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	3508

Maple 2021.1 output

$$\int (a + b \operatorname{arccoth}(cx)) \left(d + e \ln\left(g\, x^2 + f\right)\right)\, dx$$

40 Test file number 208

Test folder name:

```
test_cases/8_Special_functions/208_8.8_Polylogarithm_function
```

40.1 Problem number 145

$$\int \frac{\operatorname{PolyLog}(2, x)}{-1 + x}\, dx$$

Optimal antiderivative

$$\ln(1-x)^2 \ln(x) + 2 \ln(1-x) \operatorname{polylog}(2, 1-x) + \ln(1-x) \operatorname{polylog}(2, x) - 2 \operatorname{polylog}(3, 1-x)$$

command

```
int(polylog(2,x)/(-1+x),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
default	$\ln(-1+x) \operatorname{polylog}(2, x) + \ln(1-x)^2 \ln(x) + 2 \ln(1-x) \operatorname{polylog}(2, 1-x) - 2 \operatorname{polylog}(3, 1-x) - (\ln$

Maple 2021.1 output

$$\int \frac{\operatorname{polylog}(2, x)}{-1 + x}\, dx$$

40.2 Problem number 146

$$\int -\frac{\operatorname{PolyLog}(2,x)}{1-x}\,dx$$

Optimal antiderivative

$$\ln(1-x)^2\ln(x)+2\ln(1-x)\operatorname{polylog}(2,1-x)+\ln(1-x)\operatorname{polylog}(2,x)-2\operatorname{polylog}(3,1-x)$$

command

```
int(-polylog(2,x)/(1-x),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
default	$\ln(-1+x)\operatorname{polylog}(2,x)+\ln(1-x)^2\ln(x)+2\ln(1-x)\operatorname{polylog}(2,1-x)-2\operatorname{polylog}(3,1-x)-(\ln$

Maple 2021.1 output

$$\int -\frac{\operatorname{polylog}(2,x)}{1-x}\,dx$$

40.3 Problem number 147

$$\int \frac{\operatorname{PolyLog}(2,x)}{(-1+x)x}\,dx$$

Optimal antiderivative

$$\begin{aligned}&\ln(1-x)^2\ln(x)+2\ln(1-x)\operatorname{polylog}(2,1-x)\\&+\ln(1-x)\operatorname{polylog}(2,x)-2\operatorname{polylog}(3,1-x)-\operatorname{polylog}(3,x)\end{aligned}$$

command

```
int(polylog(2,x)/(-1+x)/x,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
default	$\ln(-1+x)\operatorname{polylog}(2,x)+\ln(-1+x)^2\ln(x)+2\ln(-1+x)\operatorname{polylog}(2,1-x)-2\operatorname{polylog}(3,1-x)+$

Maple 2021.1 output

$$\int \frac{\operatorname{polylog}(2,x)}{(-1+x)\,x}\,dx$$

40.4 Problem number 148

$$\int -\frac{\text{PolyLog}(2,x)}{(1-x)x}\,dx$$

Optimal antiderivative

$$\ln(1-x)^2\ln(x)+2\ln(1-x)\,\text{polylog}(2,1-x)\\+\ln(1-x)\,\text{polylog}(2,x)-2\,\text{polylog}(3,1-x)-\text{polylog}(3,x)$$

command

```
int(-polylog(2,x)/(1-x)/x,x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
default	$\ln(-1+x)\,\text{polylog}(2,x)+\ln(-1+x)^2\ln(x)+2\ln(-1+x)\,\text{polylog}(2,1-x)-2\,\text{polylog}(3,1-x)+$

Maple 2021.1 output

$$\int -\frac{\text{polylog}(2,x)}{(1-x)\,x}\,dx$$

41 Test file number 209

Test folder name:

```
test_cases/209_Blake_problems
```

41.1 Problem number 1041

$$\int \frac{\sqrt[4]{-1+x^4}\left(1-x^4+x^8\right)}{x^6\left(1+2x^8\right)}\,dx$$

Optimal antiderivative

Unintegrable

command

```
int((x^4-1)^(1/4)*(x^8-x^4+1)/x^6/(2*x^8+1),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size

trager	Expression too large to display	2830
risch	Expression too large to display	5228

Maple 2021.1 output

$$\int \frac{\left(x^4-1\right)^{\frac{1}{4}}\left(x^8-x^4+1\right)}{x^6\left(2x^8+1\right)}\,dx$$

41.2 Problem number 1147

$$\int \frac{-1+2x^4}{\sqrt[4]{-1+x^4}\,\left(-2-x^4+2x^8\right)}\,dx$$

Optimal antiderivative

Unintegrable

command

```
int((2*x^4-1)/(x^4-1)^(1/4)/(2*x^8-x^4-2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
trager	Expression too large to display	2469

Maple 2021.1 output

$$\int \frac{2x^4-1}{\left(x^4-1\right)^{\frac{1}{4}}\left(2x^8-x^4-2\right)}\,dx$$

41.3 Problem number 1153

$$\int \frac{\sqrt{1-x^6}\,\left(1+2x^6\right)\left(1+x^2-x^4-2x^6-x^8+x^{12}\right)}{\left(-1+x^6\right)\left(-1+2x^6-3x^{12}+x^{18}\right)}\,dx$$

Optimal antiderivative

$$-\frac{\arctan\left(\frac{x}{\sqrt{-x^6+1}}\right)}{3}-\frac{\arctan\left(\frac{x\sqrt{-x^6+1}}{x^6+x^2-1}\right)}{3}-\frac{\operatorname{arctanh}\left(\frac{\sqrt{3}\,x\sqrt{-x^6+1}}{x^6-x^2-1}\right)\sqrt{3}}{3}$$

command

```
int((-x^6+1)^(1/2)*(2*x^6+1)*(x^12-x^8-2*x^6-x^4+x^2+1)/(x^6-1)/(x^18-3*x^12+2*x^6-
1),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
trager	Expression too large to display	1681

Maple 2021.1 output

$$\int \frac{\sqrt{-x^6+1}\,\left(2x^6+1\right)\left(x^{12}-x^8-2x^6-x^4+x^2+1\right)}{\left(x^6-1\right)\left(x^{18}-3x^{12}+2x^6-1\right)}\,dx$$

41.4 Problem number 1668

$$\int \frac{\left(1+x^3\right)^{2/3}\left(2+x^3\right)\left(4+3x^3\right)}{x^6\left(4+2x^3+x^6\right)}\,dx$$

Optimal antiderivative

Unintegrable

command

```
int((x^3+1)^(2/3)*(x^3+2)*(3*x^3+4)/x^6/(x^6+2*x^3+4),x)
```

Maple 2022.1 output

Expression too large to display

Maple 2021.1 output

$$\int \frac{\left(x^3+1\right)^{\frac{2}{3}}\left(x^3+2\right)\left(3x^3+4\right)}{x^6\left(x^6+2x^3+4\right)}\,dx$$

41.5 Problem number 1670

$$\int \frac{\left(-1+x^3\right)^{2/3}\left(4+x^6\right)}{x^6\left(4+2x^3+x^6\right)}\,dx$$

Optimal antiderivative

Unintegrable

command

```
int((x^3-1)^(2/3)*(x^6+4)/x^6/(x^6+2*x^3+4),x)
```

Maple 2022.1 output

Expression too large to display

Maple 2021.1 output

$$\int \frac{\left(x^3-1\right)^{\frac{2}{3}}\left(x^6+4\right)}{x^6\left(x^6+2x^3+4\right)}\,dx$$

41.6 Problem number 1671

$$\int \frac{\left(-1+x^3\right)^{2/3}\left(4+x^6\right)}{x^6\left(4+2x^3+x^6\right)}\,dx$$

Optimal antiderivative

Unintegrable

command

```
int((x^3-1)^(2/3)*(x^6+4)/x^6/(x^6+2*x^3+4),x)
```

Maple 2022.1 output

Expression too large to display

Maple 2021.1 output

$$\int \frac{\left(x^3-1\right)^{\frac{2}{3}}\left(x^6+4\right)}{x^6\left(x^6+2x^3+4\right)}\,dx$$

41.7 Problem number 1919

$$\int \frac{\left(-1+x^6\right)\left(1+x^6\right)^{2/3}}{x^3\left(2-x^3+2x^6\right)}\,dx$$

Optimal antiderivative

$$\frac{\left(x^6+1\right)^{\frac{2}{3}}}{4x^2}-\frac{\arctan\left(\frac{\sqrt{3}\,x}{x+2\,2^{\frac{1}{3}}\left(x^6+1\right)^{\frac{1}{3}}}\right)2^{\frac{1}{3}}\sqrt{3}}{12}+\frac{\ln\left(-x+2^{\frac{1}{3}}\left(x^6+1\right)^{\frac{1}{3}}\right)2^{\frac{1}{3}}}{12}$$
$$-\frac{\ln\left(x^2+2^{\frac{1}{3}}x\left(x^6+1\right)^{\frac{1}{3}}+2^{\frac{2}{3}}\left(x^6+1\right)^{\frac{2}{3}}\right)2^{\frac{1}{3}}}{24}$$

command

```
int((x^6-1)*(x^6+1)^(2/3)/x^3/(2*x^6-x^3+2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
trager	Expression too large to display	1475

Maple 2021.1 output

$$\int \frac{\left(x^6-1\right)\left(x^6+1\right)^{\frac{2}{3}}}{x^3\left(2x^6-x^3+2\right)}\,dx$$

41.8 Problem number 1951

$$\int \frac{1}{\sqrt[4]{-x^2+x^4}\,\left(-1+x^8\right)}\,dx$$

Optimal antiderivative

Unintegrable

command

```
int(1/(x^4-x^2)^(1/4)/(x^8-1),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	3569
trager	Expression too large to display	3684

Maple 2021.1 output

$$\int \frac{1}{\left(x^4-x^2\right)^{\frac{1}{4}}\left(x^8-1\right)}\,dx$$

41.9 Problem number 3025

$$\int \frac{1-x^3+x^6}{\sqrt[3]{x^2+x^4}\,\left(-1+x^6\right)}\,dx$$

Optimal antiderivative

$$-\frac{\sqrt{3}\ \arctan\left(\frac{\sqrt{3}\ x}{-x+2\left(x^4+x^2\right)^{\frac{1}{3}}}\right)}{6}-\frac{\arctan\left(\frac{\sqrt{3}\ x}{x+2\left(x^4+x^2\right)^{\frac{1}{3}}}\right)\sqrt{3}}{2}$$
$$-\frac{\sqrt{3}\ \arctan\left(\frac{\sqrt{3}\ x}{-x+2^{\frac{2}{3}}\left(x^4+x^2\right)^{\frac{1}{3}}}\right)2^{\frac{2}{3}}}{8}-\frac{\sqrt{3}\ \arctan\left(\frac{\sqrt{3}\ x}{x+2^{\frac{2}{3}}\left(x^4+x^2\right)^{\frac{1}{3}}}\right)2^{\frac{2}{3}}}{24}$$
$$+\frac{\ln\left(-x+\left(x^4+x^2\right)^{\frac{1}{3}}\right)}{2}-\frac{\ln\left(x+\left(x^4+x^2\right)^{\frac{1}{3}}\right)}{6}$$
$$+\frac{\ln\left(-2x+2^{\frac{2}{3}}\left(x^4+x^2\right)^{\frac{1}{3}}\right)2^{\frac{2}{3}}}{24}-\frac{\ln\left(2x+2^{\frac{2}{3}}\left(x^4+x^2\right)^{\frac{1}{3}}\right)2^{\frac{2}{3}}}{8}$$
$$+\frac{\ln\left(x^2-x\left(x^4+x^2\right)^{\frac{1}{3}}+\left(x^4+x^2\right)^{\frac{2}{3}}\right)}{12}-\frac{\ln\left(x^2+x\left(x^4+x^2\right)^{\frac{1}{3}}+\left(x^4+x^2\right)^{\frac{2}{3}}\right)}{4}$$
$$+\frac{\ln\left(-2x^2+2^{\frac{2}{3}}x\left(x^4+x^2\right)^{\frac{1}{3}}-2^{\frac{1}{3}}\left(x^4+x^2\right)^{\frac{2}{3}}\right)2^{\frac{2}{3}}}{16}$$
$$-\frac{\ln\left(2x^2+2^{\frac{2}{3}}x\left(x^4+x^2\right)^{\frac{1}{3}}+2^{\frac{1}{3}}\left(x^4+x^2\right)^{\frac{2}{3}}\right)2^{\frac{2}{3}}}{48}$$

command

```
int((x^6-x^3+1)/(x^4+x^2)^(1/3)/(x^6-1),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
trager	Expression too large to display	15564

Maple 2021.1 output

$$\int \frac{x^6-x^3+1}{\left(x^4+x^2\right)^{\frac{1}{3}}\left(x^6-1\right)}\,dx$$

42 Test file number 210

Test folder name:

```
test_cases/210_Hebisch
```

42.1 Problem number 9

$$\int \frac{2400+1176x+102x^2-6x^3+\left(800+392x+34x^2-2x^3\right)\log\left(\frac{x+x^2+(-100-25x)\log(x)}{100+25x}\right)}{-4x^2-5x^3-x^4+\left(400x+200x^2+25x^3\right)\log(x)}\,dx$$

Optimal antiderivative

$$\left(3+\ln\left(\frac{x^2+x}{25x+100}-\ln\left(x\right)\right)\right)^2$$

command

```
int(((-2*x^3+34*x^2+392*x+800)*ln(((-25*x-100)*ln(x)+x^2+x)/(25*x+100))-6*x^3+102*x^2+1176*x+
x^4-5*x^3-4*x^2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
default	$6\ln\left(25x\ln\left(x\right)-x^2+100\ln\left(x\right)-x\right)-6\ln\left(4+x\right)-4\ln\left(5\right)\ln\left(25x\ln\left(x\right)-x^2+100\ln\left(x\right)-x\right)+4\l$

Maple 2021.1 output

$$\int \frac{\left(-2x^3+34x^2+392x+800\right)\ln\left(\frac{(-25x-100)\ln(x)+x^2+x}{25x+100}\right)-6x^3+102x^2+1176x+2400}{\left(25x^3+200x^2+400x\right)\ln\left(x\right)-x^4-5x^3-4x^2}\,dx$$

42.2 Problem number 378

$$\int \frac{\left(1-9\log\left(\frac{3}{x}\right)\right)\log(\log(3))+\log\left(\frac{3}{x}\right)\log(\log(3))\log\left(\log\left(\frac{3}{x}\right)\right)}{\left(81-72x+16x^2\right)\log\left(\frac{3}{x}\right)+\left(-18+8x\right)\log\left(\frac{3}{x}\right)\log\left(\log\left(\frac{3}{x}\right)\right)+\log\left(\frac{3}{x}\right)\log^2\left(\log\left(\frac{3}{x}\right)\right)}\,dx$$

Optimal antiderivative

$$\ln\left(\ln\left(3\right)\right)\left(\frac{x}{4x+\ln\left(\ln\left(\frac{3}{x}\right)\right)-9}+16\right)$$

command

```
int((ln(3/x)*ln(ln(3))*ln(ln(3/x))+(-9*ln(3/x)+1)*ln(ln(3)))/(ln(3/x)*ln(ln(3/x))^2+(8*x-
18)*ln(3/x)*ln(ln(3/x))+(16*x^2-72*x+81)*ln(3/x)),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size

default	$\frac{\ln(\ln(3))}{\frac{\ln\left(\ln(3)+\ln\left(\frac{1}{x}\right)\right)}{x}-\frac{9}{x}+4}$	26

Maple 2021.1 output

$$\int \frac{\ln\left(\frac{3}{x}\right)\ln\left(\ln\left(3\right)\right)\ln\left(\ln\left(\frac{3}{x}\right)\right)+\left(-9\ln\left(\frac{3}{x}\right)+1\right)\ln\left(\ln\left(3\right)\right)}{\ln\left(\frac{3}{x}\right)\ln\left(\ln\left(\frac{3}{x}\right)\right)^2+\left(8x-18\right)\ln\left(\frac{3}{x}\right)\ln\left(\ln\left(\frac{3}{x}\right)\right)+\left(16x^2-72x+81\right)\ln\left(\frac{3}{x}\right)}\,dx$$

42.3 Problem number 457

$$\int \frac{\left(-56+2x+56x^3\right)\log\left(\frac{-28+3x-14x^3-x\log(x)}{x}\right)}{28x-3x^2+14x^4+x^2\log(x)}\,dx$$

Optimal antiderivative

$$\ln\left(3-\ln\left(x\right)-7x\left(2x+\frac{4}{x^2}\right)\right)^2$$

command

```
int((56*x^3+2*x-56)*ln((-x*ln(x)-14*x^3+3*x-28)/x)/(x^2*ln(x)+14*x^4-3*x^2+28*x),x,method=_RE
```

Maple 2022.1 output

method	result	size
default	$\ln\left(-\frac{14x^3+x\ln(x)-3x+28}{x}\right)^2$	23

Maple 2021.1 output

$$\int \frac{\left(56x^3+2x-56\right)\ln\left(\frac{-x\ln(x)-14x^3+3x-28}{x}\right)}{x^2\ln\left(x\right)+14x^4-3x^2+28x}\,dx$$

42.4 Problem number 617

$$\int \frac{-12x^2-4x^3-2x^4+e^3\left(5+12x+4x^2+2x^3\right)+\left(-6x^2-2x^3-x^4+e^3\left(6x+2x^2+x^3\right)\right)\log\left(\frac{-e^3+x}{x}\right)+\left(4x^2+\right.}{-2x^2-4x^3-2x^4+e^3\left(2x+4x^2+2x^3\right)+\left(-x^2-2x^3-x^4+e^3\left(x+2x^2+x^3\right)\right)\log\left(\frac{-e^3+x}{x}\right)+\left(4x^2+4x\right.}$$

Optimal antiderivative

$$-1+\frac{5}{\ln\left(4\ln\left(\frac{x-e^3}{x}\right)+8\right)-1-x}+x$$

command

```
int((((x*exp(3)-x^2)*ln((x-exp(3))/x)+2*x*exp(3)-2*x^2)*ln(4*ln((x-exp(3))/x)+8)^2+(((-
2*x^2-2*x)*exp(3)+2*x^3+2*x^2)*ln((x-exp(3))/x)+(-4*x^2-4*x)*exp(3)+4*x^3+4*x^2)*ln(4*ln((x-
exp(3))/x)+8)+((x^3+2*x^2+6*x)*exp(3)-x^4-2*x^3-6*x^2)*ln((x-exp(3))/x)+(2*x^3+4*x^2+12*x+5)*
2*x^4-4*x^3-12*x^2)/(((x*exp(3)-x^2)*ln((x-exp(3))/x)+2*x*exp(3)-2*x^2)*ln(4*ln((x-
exp(3))/x)+8)^2+(((-2*x^2-2*x)*exp(3)+2*x^3+2*x^2)*ln((x-exp(3))/x)+(-4*x^2-4*x)*exp(3)+4*x^3
exp(3))/x)+8)+((x^3+2*x^2+x)*exp(3)-x^4-2*x^3-x^2)*ln((x-exp(3))/x)+(2*x^3+4*x^2+2*x)*exp(3)-
2*x^4-4*x^3-2*x^2),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	$-\frac{\mathrm{e}^3}{-\frac{-x+\mathrm{e}^3}{x}-1}+\frac{-\frac{5\left(-x+\mathrm{e}^3\right)}{x}-5}{-\frac{2\ln(2)\left(-x+\mathrm{e}^3\right)}{x}-\frac{\ln\left(\ln\left(-\frac{-x+\mathrm{e}^3}{x}\right)+2\right)\left(-x+\mathrm{e}^3\right)}{x}+\mathrm{e}^3-2\ln(2)+\frac{-x+\mathrm{e}^3}{x}-\ln\left(\ln\left(-\frac{-x+\mathrm{e}^3}{x}\right)+2\right)+1}$	112

Maple 2021.1 output

$$\int \frac{\left(\left(x\,\mathrm{e}^3-x^2\right)\ln\left(\frac{x-\mathrm{e}^3}{x}\right)+2x\,\mathrm{e}^3-2x^2\right)\ln\left(4\ln\left(\frac{x-\mathrm{e}^3}{x}\right)+8\right)^2+\left(\left(\left(-2x^2-2x\right)\mathrm{e}^3+2x^3+2x^2\right)\ln\left(\frac{x-\mathrm{e}^3}{x}\right)+(-4\right.}{\left(\left(x\,\mathrm{e}^3-x^2\right)\ln\left(\frac{x-\mathrm{e}^3}{x}\right)+2x\,\mathrm{e}^3-2x^2\right)\ln\left(4\ln\left(\frac{x-\mathrm{e}^3}{x}\right)+8\right)^2+\left(\left(\left(-2x^2-2x\right)\mathrm{e}^3+2x^3+2x^2\right)\ln\left(\frac{x-\mathrm{e}^3}{x}\right)+\right.}$$

42.5 Problem number 1142

$$\int \frac{50625+54000x+20990x^2+3560x^3+225x^4+e^4\left(81+54x+12x^2\right)+e^2\left(-4050-3510x-1106x^2-120x^3\right)+}{16875x^2+18000x^3+7050x^4+1200x^5+75x^6+e^4\,(27}$$

Optimal antiderivative

$$\frac{\ln(x)-2+\frac{\left(\mathrm{e}^2+\frac{4}{3}\right)x}{(3+x)(25+5x-\mathrm{e}^2)}}{x}$$

command

```
int((((-3*x^2-18*x-27)*exp(2)^2+(30*x^3+330*x^2+1170*x+1350)*exp(2)-75*x^4-1200*x^3-
7050*x^2-18000*x-16875)*ln(x)+(12*x^2+54*x+81)*exp(2)^2+(-120*x^3-1106*x^2-3510*x-
4050)*exp(2)+225*x^4+3560*x^3+20990*x^2+54000*x+50625)/((3*x^4+18*x^3+27*x^2)*exp(2)^2+(-
30*x^5-330*x^4-1170*x^3-1350*x^2)*exp(2)+75*x^6+1200*x^5+7050*x^4+18000*x^3+16875*x^2),x,meth
```

Maple 2022.1 output

method	result	size
default	$\frac{\ln(x)}{x}+\frac{1}{x}+\frac{15x^2+\left(-4\,\mathrm{e}^2+\frac{356}{3}\right)x-9\,\mathrm{e}^2+225}{x(3+x)(\mathrm{e}^2-5x-25)}$	48
risch	$\frac{\ln(x)}{x}-\frac{9\,\mathrm{e}^2x-30x^2+18\,\mathrm{e}^2-236x-450}{3(\mathrm{e}^2x-5x^2+3\,\mathrm{e}^2-40x-75)x}$	52

norman	$\frac{(3\,\mathrm{e}^2-75)\ln(x)+10x^2+(-3\,\mathrm{e}^2+\frac{236}{3})x-5x^2\ln(x)+(\mathrm{e}^2-40)x\ln(x)+150-6\,\mathrm{e}^2}{x(3+x)(\mathrm{e}^2-5x-25)}$	62

Maple 2021.1 output

hanged

42.6 Problem number 2368

$$\int \frac{-4x^2+2x^5-4x^3\log(2)+2x\log^2(2)+\left(-4x^2-4x^5+\left(4+8x^3\right)\log(2)-4x\log^2(2)\right)\log\left(\frac{-1-x^3+x\log(2)}{-x^2+\log(2)}\right)\log\left($$
$$\left(x^3+x^6+\left(-x-2x^4\right)\log(2)+x^2\log^2(2)\right)\log\left(\frac{-1-x^3+x\log(2)}{-x^2+\log(2)}\right)\log\left(\log\left(\frac{-1-x^3+x\log(2)}{-x^2+\log(2)}\right)\right)$$

Optimal antiderivative

$$\ln\left(\frac{48\ln\left(\ln\left(x+\frac{1}{x^2-\ln(2)}\right)\right)^2}{x^4}\right)$$

command

```
int(((-4*x*ln(2)^2+(8*x^3+4)*ln(2)-4*x^5-4*x^2)*ln((x*ln(2)-x^3-1)/(ln(2)-x^2))*ln(ln((x*ln(2
x^3-1)/(ln(2)-x^2)))+2*x*ln(2)^2-4*x^3*ln(2)+2*x^5-4*x^2)/(x^2*ln(2)^2+(-2*x^4-x)*ln(2)+x^6+x
x^3-1)/(ln(2)-x^2))/ln(ln((x*ln(2)-x^3-1)/(ln(2)-x^2))),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	$-4\ln(x)+2\ln\left(\ln\left(\ln\left(\frac{x\ln(2)-x^3-1}{\ln(2)-x^2}\right)\right)\right)$	33

Maple 2021.1 output

$$\int \frac{\left(-4x\ln(2)^2+\left(8x^3+4\right)\ln(2)-4x^5-4x^2\right)\ln\left(\frac{x\ln(2)-x^3-1}{\ln(2)-x^2}\right)\ln\left(\ln\left(\frac{x\ln(2)-x^3-1}{\ln(2)-x^2}\right)\right)+2x\ln(2)^2-4x^3\ln(2)+2}{\left(x^2\ln(2)^2+\left(-2x^4-x\right)\ln(2)+x^6+x^3\right)\ln\left(\frac{x\ln(2)-x^3-1}{\ln(2)-x^2}\right)\ln\left(\ln\left(\frac{x\ln(2)-x^3-1}{\ln(2)-x^2}\right)\right)}$$

42.7 Problem number 2704

$$\int \frac{2e^{\frac{1}{5}(-10-2\log(x))}}{\left(-20x+5e^{\frac{1}{5}(-10-2\log(x))}x\right)\log\left(4-e^{\frac{1}{5}(-10-2\log(x))}\right)}\,dx$$

Optimal antiderivative

$$\ln(3)-\ln\left(\ln\left(-\mathrm{e}^{-\frac{2\ln(x)}{5}-2}+4\right)\right)$$

command

```
int(2*exp(-2/5*ln(x)-2)/(5*x*exp(-2/5*ln(x)-2)-20*x)/ln(-exp(-2/5*ln(x)-2)+4),x,method=_RETUR
```

Maple 2022.1 output

method	result	size
default	$-\ln\left(\ln\left(-\frac{\mathrm{e}^{-2}}{x^{\frac{2}{5}}}+4\right)\right)$	14

Maple 2021.1 output

$$\int \frac{2\,\mathrm{e}^{-\frac{2\ln(x)}{5}-2}}{\left(5x\,\mathrm{e}^{-\frac{2\ln(x)}{5}-2}-20x\right)\ln\left(-\mathrm{e}^{-\frac{2\ln(x)}{5}-2}+4\right)}\,dx$$

42.8 Problem number 3170

$$\int e^{\frac{8589934592-38654705664x+81604378624x^2-107374182400x^3+98650030080x^4-67175972864x^5+35114713088x^6-14394851328x^7+4685824000x^8-1218314240x}{4294967296-17179869184x+32212254720x^2-37580963840x^3+30534533120x^4-18320719872x^5+8396996608x^6-2998927360x^7+843448320x^8-187}}\frac{}{-17179}$$

Optimal antiderivative

$$3\,\mathrm{e}^{2-x-\frac{x^{34}}{(-4+x)^{16}}}$$

command

```
int((-54*x^34+408*x^33-3*x^17+204*x^16-6528*x^15+130560*x^14-1827840*x^13+19009536*x^12-
152076288*x^11+955908096*x^10-4779540480*x^9+19118161920*x^8-61178118144*x^7+155726118912*x^6
311452237824*x^5+479157288960*x^4-547608330240*x^3+438086664192*x^2-219043332096*x+5153960755
x^34-x^17+66*x^16-2048*x^15+39680*x^14-537600*x^13+5404672*x^12-41746432*x^11+253034496*x^10-
1218314240*x^9+4685824000*x^8-14394851328*x^7+35114713088*x^6-67175972864*x^5+98650030080*x^4
107374182400*x^3+81604378624*x^2-38654705664*x+8589934592)/(x^16-64*x^15+1920*x^14-
35840*x^13+465920*x^12-4472832*x^11+32800768*x^10-187432960*x^9+843448320*x^8-2998927360*x^7+
18320719872*x^5+30534533120*x^4-37580963840*x^3+32212254720*x^2-17179869184*x+4294967296))/(x
68*x^16+2176*x^15-43520*x^14+609280*x^13-6336512*x^12+50692096*x^11-318636032*x^10+1593180160
6372720640*x^8+20392706048*x^7-51908706304*x^6+103817412608*x^5-159719096320*x^4+182536110080
146028888064*x^2+73014444032*x-17179869184),x)
```

Maple 2022.1 output

$$3\,\mathrm{e}^{-\frac{x^{34}+x^{17}-66x^{16}+2048x^{15}-39680x^{14}+537600x^{13}-5404672x^{12}+41746432x^{11}-253034496x^{10}+1218314240x^9-4685824000x^8+14394851328x^7-35114713088x^6}{x^{16}-64x^{15}+1920x^{14}-35840x^{13}+465920x^{12}-4472832x^{11}+32800768x^{10}-187432960x^9+843448320x^8-2998927360x^7+8396996608x^6-183207198}}$$

Maple 2021.1 output

hanged

42.9 Problem number 3299

$$\int \frac{-16e^x x - 16e^x \log(x) + \left(e^x\left(-8-4x+4x^2\right) + e^x(4+4x)\log(x)\right)\log\left(9x^2\right)}{\left(x^3+3x^2\log(x)+3x\log^2(x)+\log^3(x)\right)\log^3\left(9x^2\right)}\,dx$$

Optimal antiderivative

$$\frac{4\,\mathrm{e}^x x}{\ln\left(9x^2\right)^2\left(x+\ln\left(x\right)\right)^2} - 2$$

command

```
int((((4*x+4)*exp(x)*ln(x)+(4*x^2-4*x-8)*exp(x))*ln(9*x^2)-16*exp(x)*ln(x)-16*exp(x)*x)/(ln(x
```

Maple 2022.1 output

$$-\frac{16x\,\mathrm{e}^x}{\left(x+\ln\left(x\right)\right)^2\left(\pi\mathrm{csgn}\left(ix^2\right)^3+\pi\mathrm{csgn}\left(ix\right)^2\mathrm{csgn}\left(ix^2\right)-2\pi\,\mathrm{csgn}\left(ix\right)\mathrm{csgn}\left(ix^2\right)^2+4i\ln\left(3\right)+4i\ln\left(x\right)\right)^2}$$

Maple 2021.1 output

$$\int \frac{\left(\left(4x+4\right)\mathrm{e}^x\ln\left(x\right)+\left(4x^2-4x-8\right)\mathrm{e}^x\right)\ln\left(9x^2\right)-16\,\mathrm{e}^x\ln\left(x\right)-16\,\mathrm{e}^x x}{\left(\ln\left(x\right)^3+3x\ln\left(x\right)^2+3x^2\ln\left(x\right)+x^3\right)\ln\left(9x^2\right)^3}\,dx$$

42.10 Problem number 3440

$$\int \frac{e^{\frac{-4x+x\log\left(\frac{e^{2x}}{x^6}\right)}{\log\left(\frac{e^{2x}}{x^6}\right)}}\left(-24+8x-4\log\left(\frac{e^{2x}}{x^6}\right)+\log^2\left(\frac{e^{2x}}{x^6}\right)\right)}{\log^2\left(\frac{e^{2x}}{x^6}\right)}\,dx$$

Optimal antiderivative

$$4+\mathrm{e}^{25}+\mathrm{e}^{x-\frac{4x}{\ln\left(\frac{\mathrm{e}^{2x}}{x^6}\right)}}$$

command

```
int((ln(exp(x)^2/x^6)^2-4*ln(exp(x)^2/x^6)+8*x-24)*exp((x*ln(exp(x)^2/x^6)-4*x)/ln(exp(x)^2/x
```

Maple 2022.1 output

$$\frac{\left(-2x+\ln\left(\frac{\mathrm{e}^{2x}}{x^6}\right)+6\ln\left(x\right)\right)\mathrm{e}^{\frac{x\ln\left(\frac{\mathrm{e}^{2x}}{x^6}\right)-4x}{\ln\left(\frac{\mathrm{e}^{2x}}{x^6}\right)}}+2x\,\mathrm{e}^{\frac{x\ln\left(\frac{\mathrm{e}^{2x}}{x^6}\right)-4x}{\ln\left(\frac{\mathrm{e}^{2x}}{x^6}\right)}}-6\ln\left(x\right)\mathrm{e}^{\frac{x\ln\left(\frac{\mathrm{e}^{2x}}{x^6}\right)-4x}{\ln\left(\frac{\mathrm{e}^{2x}}{x^6}\right)}}}{\ln\left(\frac{\mathrm{e}^{2x}}{x^6}\right)}$$

Maple 2021.1 output

hanged

42.11 Problem number 3539

$$\int \frac{e^{-x^2} x \left(2x^2 + e^{2+2e^{e^3}} \left(-2+2x^2\right) + e^2 \left(-8+6x^2+2x^4\right) + e^{e^{e^3}} \left(-2x + e^2 \left(4x-4x^3\right)\right)\right) + e^{-x^2} x \left(8-6x^2-2x^4+\right.}{4 + e^{2e^{e^3}} - 2e^{e^{e^3}} x + x^2}$$

Optimal antiderivative

$$\mathrm{e}^{\ln(x)-x^2} \left(\ln\left(\left(\mathrm{e}^{\mathrm{e}^{\mathrm{e}^3}} - x\right)^2 + 4\right) - \mathrm{e}^2\right) x$$

command

```
int((((-2*x^2+2)*exp(exp(exp(3)))^2+(4*x^3-4*x)*exp(exp(exp(3)))-2*x^4-6*x^2+8)*exp(ln(x)-
x^2)*ln(exp(exp(exp(3)))^2-2*x*exp(exp(exp(3)))+x^2+4)+((2*x^2-2)*exp(2)*exp(exp(exp(3)))^2+(
4*x^3+4*x)*exp(2)-2*x)*exp(exp(exp(3)))+(2*x^4+6*x^2-8)*exp(2)+2*x^2)*exp(ln(x)-x^2))/(exp(ex
2*x*exp(exp(exp(3)))+x^2+4),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	$\left(-\mathrm{e}^2 x + x \ln\left(\mathrm{e}^{2\,\mathrm{e}^{\mathrm{e}^3}} - 2x\,\mathrm{e}^{\mathrm{e}^{\mathrm{e}^3}} + x^2 + 4\right)\right) \mathrm{e}^{-x^2} x$	36

Maple 2021.1 output

hanged

42.12 Problem number 3551

$$\int \frac{e^{\frac{2563093129+2096362816x+688675888x^2+115651112x^3+10505414x^4+513920x^5+13600x^6+184x^7+x^8}{1+4x+6x^2+4x^3+x^4}} \left(-8156009700 - 4911736672x - 10303\right.}{1+5x+10x^2+10x^3+5x^4+x^5}$$

Optimal antiderivative

$$\mathrm{e}^{\left(\left(\frac{225+45x}{1+x}+x\right)^2+2\right)^2}$$

command

```
int((4*x^8+560*x^7+28488*x^6+595520*x^5+2569600*x^4-73629456*x^3-1030398440*x^2-4911736672*x-
8156009700)*exp((x^8+184*x^7+13600*x^6+513920*x^5+10505414*x^4+115651112*x^3+688675888*x^2+20
```

Maple 2022.1 output

$$\mathrm{e}^{\frac{x^8+184x^7+13600x^6+513920x^5+10505414x^4+115651112x^3+688675888x^2+2096362816x+2563093129}{x^4+4x^3+6x^2+4x+1}}$$

Maple 2021.1 output

hanged

42.13 Problem number 4154

$$\int \frac{\left(200x-80x^2+8x^3\right)\log\left(\frac{25}{x^2}\right)+\left(400x-160x^2+16x^3+\left(200x-120x^2+16x^3\right)\log\left(\frac{25}{x^2}\right)\right)\log\left(\frac{12}{x}\right)}{\log^3\left(\frac{25}{x^2}\right)\log^3\left(\frac{12}{x}\right)}\,dx$$

Optimal antiderivative

$$\frac{4x^2(5-x)^2}{\ln\left(\frac{12}{x}\right)^2\ln\left(\frac{25}{x^2}\right)^2}$$

command

```
int((((16*x^3-120*x^2+200*x)*ln(25/x^2)+16*x^3-160*x^2+400*x)*ln(12/x)+(8*x^3-80*x^2+200*x)*l
```

Maple 2022.1 output

output too large to display

Maple 2021.1 output

$$\int \frac{\left(\left(16x^3-120x^2+200x\right)\ln\left(\frac{25}{x^2}\right)+16x^3-160x^2+400x\right)\ln\left(\frac{12}{x}\right)+\left(8x^3-80x^2+200x\right)\ln\left(\frac{25}{x^2}\right)}{\ln\left(\frac{25}{x^2}\right)^3\ln\left(\frac{12}{x}\right)^3}\,dx$$

42.14 Problem number 4308

$$\int \frac{e^{e^x}\left(-10+5x-2x^2-x^3+e^x\left(-10x+9x^2-4x^3+x^4\right)+\left(-10+5x+2x^2-x^3+e^x\left(-10x+9x^2-4x^3+x^4\right)\right.\right.}{\left(5-2x+x^2+2x\log\left(1+\log\left(4-4x+x^2\right)\right)+\log^2\left(1+\log\left(4-4x+x^2\right)\right)\right)\left(-10+9x-4\right.}$$

Optimal antiderivative

$$\mathrm{e}^{\mathrm{e}^x-\ln\left(\left(x+\ln\left(1+\ln\left((2-x)^2\right)\right)\right)^2+5-2x\right)}x$$

command

```
int(((((x^2-2*x)*exp(x)+x-2)*ln(x^2-4*x+4)+(x^2-2*x)*exp(x)+x-2)*ln(ln(x^2-4*x+4)+1)^2+((2*x^
4*x^2)*exp(x)*ln(x^2-4*x+4)+(2*x^3-4*x^2)*exp(x)-4*x)*ln(ln(x^2-4*x+4)+1)+((x^4-4*x^3+9*x^2-
10*x)*exp(x)-x^3+2*x^2+5*x-10)*ln(x^2-4*x+4)+(x^4-4*x^3+9*x^2-10*x)*exp(x)-x^3-2*x^2+5*x-
10)*exp(-ln(ln(ln(x^2-4*x+4)+1)^2+2*x*ln(ln(x^2-4*x+4)+1)+x^2-2*x+5)+exp(x))/(((x-
2)*ln(x^2-4*x+4)+x-2)*ln(ln(x^2-4*x+4)+1)^2+((2*x^2-4*x)*ln(x^2-4*x+4)+2*x^2-4*x)*ln(ln(x^2-
4*x+4)+1)+(x^3-4*x^2+9*x-10)*ln(x^2-4*x+4)+x^3-4*x^2+9*x-10),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result

risch	$\frac{x\,\mathrm{e}^{\mathrm{e}^x}}{\ln\left(2\ln(x-2)-\frac{i\pi\,\mathrm{csgn}\left(i(x-2)^2\right)\left(-\mathrm{csgn}\left(i(x-2)^2\right)+\mathrm{csgn}(i(x-2))\right)^2}{2}+1\right)^2+2x\ln\left(2\ln(x-2)-\frac{i\pi\,\mathrm{csgn}\left(i(x-2)^2\right)\left(-\mathrm{csgn}\left(i(x-2)^2\right)+\mathrm{csgn}(i(x-$

Maple 2021.1 output

$$\int \frac{\left(\left(\left(\left(x^2-2x\right)\mathrm{e}^x+x-2\right)\ln\left(x^2-4x+4\right)+\left(x^2-2x\right)\mathrm{e}^x+x-2\right)\ln\left(\ln\left(x^2-4x+4\right)+1\right)^2+\left(\left(2x^3-4x^2\right)\mathrm{e}^x\right.\right.}{\left((x-2)\ln\left(x^2-4x+4\right)+x\right.}$$

42.15 Problem number 5108

$$\int \frac{\left(6-2x-4x^2\right)\log^2(1-x)+\left(x^2+\left(x-x^2\right)\log(1-x)-4x\log^2(1-x)\right)\log\left(-\frac{e^{-\frac{x}{4\log(1-x)}}}{-1+x}\right)+(-2+2x)\log^2(}{(-2+2x)\log^2(1-x)}$$

Optimal antiderivative

$$\left(\ln\left(\frac{\mathrm{e}^{-\frac{x}{4\ln(1-x)}}}{1-x}\right)^2-4-x\right)x+x$$

command

```
int(((2*x-2)*ln(1-x)^2*ln(-exp(-1/4*x/ln(1-x))/(x-1))^2+(-4*x*ln(1-x)^2+(-x^2+x)*ln(1-
x)+x^2)*ln(-exp(-1/4*x/ln(1-x))/(x-1))+(-4*x^2-2*x+6)*ln(1-x)^2)/(2*x-2)/ln(1-x)^2,x,method=_
```

Maple 2022.1 output

method	result
default	$-3x-\frac{1}{2}-\frac{x}{2\ln(1-x)}+(x-1)\ln\left(x-1\right)^2-2(x-1)\ln\left(x-1\right)-2\ln\left(-\frac{\mathrm{e}^{-\frac{x}{4\ln(1-x)}}}{x-1}\right)-2(1-x)\ln\left(1-\right.$

Maple 2021.1 output

$$\int \frac{(2x-2)\ln\left(1-x\right)^2\ln\left(-\frac{\mathrm{e}^{-\frac{x}{4\ln(1-x)}}}{x-1}\right)^2+\left(-4x\ln\left(1-x\right)^2+\left(-x^2+x\right)\ln\left(1-x\right)+x^2\right)\ln\left(-\frac{\mathrm{e}^{-\frac{x}{4\ln(1-x)}}}{x-1}\right)+(-}{(2x-2)\ln\left(1-x\right)^2}$$

42.16 Problem number 5756

$$\int \frac{-10x - x^2 + \left(-75 + 20x + 17x^2 + 2x^3\right) \log(3)}{\left(-5x^2 - x^3 + \left(-75x - 5x^2 + 7x^3 + x^4\right) \log(3)\right) \log\left(\frac{-x^2+\left(-15x+2x^2+x^3\right)\log(3)}{5+x}\right) \log\left(5 \log\left(\frac{-x^2+\left(-15x+2x^2+x^3\right)\log(3)}{5+x}\right.\right.} dx$$

Optimal antiderivative

$$\ln\left(\ln\left(5 \ln\left(\ln(3)\, x(-3+x) - \frac{x^2}{5+x}\right)\right)\right)$$

command

```
int(((2*x^3+17*x^2+20*x-75)*ln(3)-x^2-10*x)/((x^4+7*x^3-5*x^2-75*x)*ln(3)-x^3-5*x^2)/ln(((x^3
15*x)*ln(3)-x^2)/(5+x))/ln(5*ln(((x^3+2*x^2-15*x)*ln(3)-x^2)/(5+x))),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	$\ln\left(\ln(5) + \ln\left(\ln\left(\frac{x\left(x^2\ln(3)+2x\ln(3)-15\ln(3)-x\right)}{5+x}\right)\right)\right)$	33

Maple 2021.1 output

$$\int \frac{\left(2x^3 + 17x^2 + 20x - 75\right)\ln(3) - x^2 - 10x}{\left(\left(x^4 + 7x^3 - 5x^2 - 75x\right)\ln(3) - x^3 - 5x^2\right)\ln\left(\frac{\left(x^3+2x^2-15x\right)\ln(3)-x^2}{5+x}\right)\ln\left(5\ln\left(\frac{\left(x^3+2x^2-15x\right)\ln(3)-x^2}{5+x}\right)\right)} dx$$

42.17 Problem number 6758

$$\int \frac{x + (4+8x)\log\left(\frac{2+4x}{x}\right)}{(16+32x)\log\left(\frac{2+4x}{x}\right) + \left(8x+16x^2\right)\log\left(\frac{2+4x}{x}\right)\log\left(\log\left(\frac{2+4x}{x}\right)\right) + \left(x^2+2x^3\right)\log\left(\frac{2+4x}{x}\right)\log^2\left(\log\left(\frac{2+4x}{x}\right)\right)} dx$$

Optimal antiderivative

$$-1 + \frac{x}{4 + \ln\left(\ln\left(\frac{2}{x}+4\right)\right)x}$$

command

```
int(((8*x+4)*ln((4*x+2)/x)+x)/((2*x^3+x^2)*ln((4*x+2)/x)*ln(ln((4*x+2)/x))^2+(16*x^2+8*x)*ln(
```

Maple 2022.1 output

method	result	size
default	$\frac{1}{-8+\frac{8x+4}{x}+\ln\left(\ln(2)+\ln\left(\frac{2x+1}{x}\right)\right)}$	29

Maple 2021.1 output

$$\int \frac{(8x+4)\ln\left(\frac{4x+2}{x}\right) + x}{\left(2x^3+x^2\right)\ln\left(\frac{4x+2}{x}\right)\ln\left(\ln\left(\frac{4x+2}{x}\right)\right)^2 + \left(16x^2+8x\right)\ln\left(\frac{4x+2}{x}\right)\ln\left(\ln\left(\frac{4x+2}{x}\right)\right) + (32x+16)\ln\left(\frac{4x+2}{x}\right)} dx$$

42.18 Problem number 6840

$$\int \frac{18+6\log\left(\log\left(\frac{-4+16x^3}{9x^3}\right)\right)}{(-x+4x^4)\log\left(\frac{-4+16x^3}{9x^3}\right)}\,dx$$

Optimal antiderivative

$$\left(3+\ln\left(\ln\left(\frac{\frac{16x^3}{9}-\frac{4}{9}}{x^3}\right)\right)\right)^2$$

command

```
int((6*ln(ln(1/9*(16*x^3-4)/x^3))+18)/(4*x^4-x)/ln(1/9*(16*x^3-4)/x^3),x,method=_RETURNVERBOS
```

Maple 2022.1 output

method	result	size
default	$\ln\left(2\ln(2)-2\ln(3)+\ln\left(\frac{4x^3-1}{x^3}\right)\right)^2+6\ln\left(2\ln(2)-2\ln(3)+\ln\left(4-\frac{1}{x^3}\right)\right)$	46

Maple 2021.1 output

$$\int \frac{6\ln\left(\ln\left(\frac{16x^3-4}{9x^3}\right)\right)+18}{(4x^4-x)\ln\left(\frac{16x^3-4}{9x^3}\right)}\,dx$$

42.19 Problem number 6876

$$\int \frac{e^{\frac{-x^3+\log\left(\frac{x^4}{\log^2(x)}\right)+x\log\left(\frac{\log(3x)}{\log(x)}\right)}{-x^2+\log\left(\frac{\log(3x)}{\log(x)}\right)}}\left(\left(2x^2+(-4x^2+x^5)\log(x)\right)\log(3x)+\left(-\log(x)+\left(1+2x^2\log(x)\right)\log(3x)\right)\log\left(\frac{}{\text{lo}}\right.\right.}{x^5\log(x)\log(3x)-2x^3\log(x)\log(3x)\log\left(\frac{\log(3x)}{\log(x)}\right)+}$$

Optimal antiderivative

$$e^{x+\frac{\ln\left(\frac{x^4}{\ln(x)^2}\right)}{\ln\left(\frac{\ln(3x)}{\ln(x)}\right)-x^2}}$$

command

```
int((x*ln(x)*ln(3*x)*ln(ln(3*x)/ln(x))^2+((-2*x^3+4)*ln(x)-2)*ln(3*x)*ln(ln(3*x)/ln(x))+((2*x
ln(x))*ln(x^4/ln(x)^2)+((x^5-4*x^2)*ln(x)+2*x^2)*ln(3*x))*exp((x*ln(ln(3*x)/ln(x))+ln(x^4/ln(
x^3)/(ln(ln(3*x)/ln(x))-x^2))/(x*ln(x)*ln(3*x)*ln(ln(3*x)/ln(x))^2-2*x^3*ln(x)*ln(3*x)*ln(ln(
```

Maple 2022.1 output

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Maple 2021.1 output

$$\int \frac{\left(x \ln(x) \ln(3x) \ln\left(\frac{\ln(3x)}{\ln(x)}\right)^2 + \left(\left(-2x^3+4\right)\ln(x) - 2\right)\ln(3x)\ln\left(\frac{\ln(3x)}{\ln(x)}\right) + \left(\left(2x^2\ln(x)+1\right)\ln(3x) - \ln(x)\right)\ln\right.}{x\ln(x)\ln(3x)\ln\left(\frac{\ln(3x)}{\ln(x)}\right)^2 - 2x^3\ln(x)\ln(3x)\ln\left(\frac{\ln(3x)}{\ln(x)}\right) +}$$

42.20 Problem number 7628

$$\int \frac{\left(216+324x+72x^2-80x^3-32x^4\right)\log^3\left(\frac{-24-25x-6x^2}{4+4x+x^2}\right) + \left(3456+9936x+11304x^2+6352x^3+1760x^4+192x\right.}{16+14x+3x^2}$$

Optimal antiderivative

$$\ln\left(-6-\frac{x}{(2+x)^2}\right)^4 (3+2x)^4$$

command

```
int(((192*x^5+1760*x^4+6352*x^3+11304*x^2+9936*x+3456)*ln((-6*x^2-25*x-24)/(x^2+4*x+4))^4+(-
32*x^4-80*x^3+72*x^2+324*x+216)*ln((-6*x^2-25*x-24)/(x^2+4*x+4))^3)/(3*x^2+14*x+16),x,method=
```

Maple 2022.1 output

method	result	size
risch	$(2x+3)^4 \ln\left(\frac{-6x^2-25x-24}{x^2+4x+4}\right)^4$	33

Maple 2021.1 output

$$\int \frac{\left(192x^5+1760x^4+6352x^3+11304x^2+9936x+3456\right)\ln\left(\frac{-6x^2-25x-24}{x^2+4x+4}\right)^4 + \left(-32x^4-80x^3+72x^2+324x+2\right.}{3x^2+14x+16}$$

42.21 Problem number 7955

$$\int \frac{35-16x+x^2+(-5+2x)\log\left(\frac{1}{100}e^{-x}x^3\right)}{\left(20x-4x^2+(-5x+x^2)\log\left(\frac{1}{100}e^{-x}x^3\right)\right)\log\left(\frac{5x-x^2}{-4+\log\left(\frac{1}{100}e^{-x}x^3\right)}\right)}\,dx$$

Optimal antiderivative

$$\ln\left(\ln\left(\frac{(-5+x)\,x}{4-\ln\left(\frac{x^3 e^{-x}}{100}\right)}\right)\right)$$

command

```
int(((2*x-5)*ln(1/100*x^3/exp(x))+x^2-16*x+35)/((x^2-5*x)*ln(1/100*x^3/exp(x))-4*x^2+20*x)/ln
x^2+5*x)/(ln(1/100*x^3/exp(x))-4)),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	$\ln\left(\ln\left(\frac{(x-5)x}{4-\ln\left(\frac{x^3\mathrm{e}^{-x}}{100}\right)}\right)\right)$	24

Maple 2021.1 output

$$\int \frac{(2x-5)\ln\left(\frac{x^3\mathrm{e}^{-x}}{100}\right)+x^2-16x+35}{\left((x^2-5x)\ln\left(\frac{x^3\mathrm{e}^{-x}}{100}\right)-4x^2+20x\right)\ln\left(\frac{-x^2+5x}{\ln\left(\frac{x^3\mathrm{e}^{-x}}{100}\right)-4}\right)}\,dx$$

42.22 Problem number 8010

$$\int \frac{\left(-126-447x-576x^2-320x^3-64x^4\right)\log\left(\frac{2}{2+x}\right)-2\log\left(\log\left(\frac{2}{2+x}\right)\right)}{\left(-28-140x-255x^2-224x^3-96x^4-16x^5\right)\log\left(\frac{2}{2+x}\right)+(2+x)\log\left(\frac{2}{2+x}\right)\log^2\left(\log\left(\frac{2}{2+x}\right)\right)}\,dx$$

Optimal antiderivative

$$\ln\left(x+2+\ln\left(\ln\left(\frac{2}{2+x}\right)\right)^2-(2x+2)^4\right)$$

command

```
int((-2*ln(ln(2/(2+x)))+(-64*x^4-320*x^3-576*x^2-447*x-126)*ln(2/(2+x)))/((2+x)*ln(2/(2+x))*l
16*x^5-96*x^4-224*x^3-255*x^2-140*x-28)*ln(2/(2+x))),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	$\ln\left(\ln\left(\ln(2)+\ln\left(\frac{1}{2+x}\right)\right)^2-\left(\frac{16}{(2+x)^4}-\frac{65}{(2+x)^3}+\frac{96}{(2+x)^2}-\frac{64}{2+x}+16\right)(2+x)^4\right)$	52

Maple 2021.1 output

$$\int \frac{-2\ln\left(\ln\left(\frac{2}{2+x}\right)\right)+\left(-64x^4-320x^3-576x^2-447x-126\right)\ln\left(\frac{2}{2+x}\right)}{(2+x)\ln\left(\frac{2}{2+x}\right)\ln\left(\ln\left(\frac{2}{2+x}\right)\right)^2+\left(-16x^5-96x^4-224x^3-255x^2-140x-28\right)\ln\left(\frac{2}{2+x}\right)}\,dx$$

42.23 Problem number 8333

$$\int \frac{\left(-20+104x-40x^2+4x^3+\left(100x-40x^2+4x^3\right)\log(4)-20\log(x)\right)\log\left(\frac{5-x+5x^2-x^3+\left(5x^2-x^3\right)\log(4)-2x\log(x)}{-25+5x}\right)}{25-10x+26x^2-10x^3+x^4+\left(25x^2-10x^3+x^4\right)\log(4)+\left(-10x+2x^2\right)\log(x)}$$

Optimal antiderivative

$$\ln\left(\frac{2\ln(x)\,x}{5\,(5-x)}-\frac{2x^2\ln(2)}{5}-\frac{x^2}{5}-\frac{1}{5}\right)^2$$

command

```
int((-20*ln(x)+2*(4*x^3-40*x^2+100*x)*ln(2)+4*x^3-40*x^2+104*x-20)*ln((-2*x*ln(x)+2*(-
x^3+5*x^2)*ln(2)-x^3+5*x^2-x+5)/(5*x-25))/((2*x^2-10*x)*ln(x)+2*(x^4-10*x^3+25*x^2)*ln(2)+x^4
10*x^3+26*x^2-10*x+25),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	Expression too large to display	1051

Maple 2021.1 output

$$\int \frac{\left(-20\ln(x)+2\left(4x^3-40x^2+100x\right)\ln(2)+4x^3-40x^2+104x-20\right)\ln\left(\frac{-2x\ln(x)+2\left(-x^3+5x^2\right)\ln(2)-x^3+5x^2-x+5}{5x-25}\right)}{\left(2x^2-10x\right)\ln(x)+2\left(x^4-10x^3+25x^2\right)\ln(2)+x^4-10x^3+26x^2-10x+25}$$

42.24 Problem number 8714

$$\int \frac{12-16x}{\left(-x+x^2\right)\log\left(\frac{-x^3+x^4}{9\log(\log(4))}\right)+\left(-2x+2x^2\right)\log\left(\frac{-x^3+x^4}{9\log(\log(4))}\right)\log\left(\log\left(\frac{-x^3+x^4}{9\log(\log(4))}\right)\right)+\left(-x+x^2\right)\log\left(\frac{-x^3+x^4}{9\log(\log(4))}\right)}$$

Optimal antiderivative

$$\frac{4}{1+\ln\left(\ln\left(\frac{x^2\left(x^2-x\right)}{9\ln(2\ln(2))}\right)\right)}$$

command

```
int((-16*x+12)/((x^2-x)*ln(1/9*(x^4-x^3)/ln(2*ln(2)))*ln(ln(1/9*(x^4-x^3)/ln(2*ln(2))))^2+(2*
2*x)*ln(1/9*(x^4-x^3)/ln(2*ln(2)))*ln(ln(1/9*(x^4-x^3)/ln(2*ln(2))))+(x^2-x)*ln(1/9*(x^4-
x^3)/ln(2*ln(2)))),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
default	$\frac{4}{\ln(-2\ln(3)-\ln(\ln(2)+\ln(\ln(2)))+\ln(x^3(x-1)))+1}$	30

Maple 2021.1 output

$$\int \frac{-16x+12}{(x^2-x)\ln\left(\frac{x^4-x^3}{9\ln(2\ln(2))}\right)\ln\left(\ln\left(\frac{x^4-x^3}{9\ln(2\ln(2))}\right)\right)^2+(2x^2-2x)\ln\left(\frac{x^4-x^3}{9\ln(2\ln(2))}\right)\ln\left(\ln\left(\frac{x^4-x^3}{9\ln(2\ln(2))}\right)\right)+(x^2-x)\ln\left(\frac{}{9}\right.$$

42.25 Problem number 9197

$$\int \frac{(-3-3\log(x))\log\left(\frac{3+16x\log(-2+e^5)\log(x)}{4x\log(-2+e^5)\log(x)}\right)}{6x\log(x)+32x^2\log(-2+e^5)\log^2(x)}\,dx$$

Optimal antiderivative

$$\frac{\ln\left(4+\frac{3}{4x\ln(x)\ln(e^5-2)}\right)^2}{4}$$

command

```
int((-3*ln(x)-3)*ln(1/4*(16*x*ln(x)*ln(exp(5)-2)+3)/x/ln(x)/ln(exp(5)-2))/(32*x^2*ln(x)^2*ln(
2)+6*x*ln(x)),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
default	$\frac{\ln(x)\ln(\ln(e^5-2))}{2}+\frac{\ln(\ln(e^5-2))\ln(\ln(x))}{2}-\frac{\ln(\ln(e^5-2))\ln(16x\ln(x)\ln(e^5-2)+3)}{2}+\ln(2)\ln(x)+\ln(2)\ln(\ln(x))$

Maple 2021.1 output

$$\int \frac{(-3\ln(x)-3)\ln\left(\frac{16x\ln(x)\ln(e^5-2)+3}{4x\ln(x)\ln(e^5-2)}\right)}{32x^2\ln(x)^2\ln(e^5-2)+6x\ln(x)}\,dx$$

42.26 Problem number 10116

$$\int \frac{e^{\frac{-942080000-1040384000x-455411200x^2-98920960x^3-10674689x^4-458240x^5}{40960000+32768000x+9830400x^2+1310720x^3+65536x^4}}\left(-358400000-358240000x-143248000x^2-2864320\right.}{51200000+51200000x+20480000x^2+4096000x^3+409600x^4+16384x^5}$$

Optimal antiderivative

$$e^{3x+x^2+2-\left(\frac{x^2}{256(5+x)^2}-5-x\right)^2}$$

command

```
int((-114560*x^5-2864000*x^4-28643205*x^3-143248000*x^2-358240000*x-358400000)*exp((-
458240*x^5-10674689*x^4-98920960*x^3-455411200*x^2-1040384000*x-942080000)/(65536*x^4+1310720
```

Maple 2022.1 output

$$e^{-\frac{458240x^5+10674689x^4+98920960x^3+455411200x^2+1040384000x+942080000}{65536\left(x^4+20x^3+150x^2+500x+625\right)}}$$

Maple 2021.1 output

hanged

42.27 Problem number 10131

$$\int \frac{\left(7x-7x^3\right)\log(x)+\left(28x-28x^2\right)\log^2(x)+\left(2-2x^2+4x^2\log(x)+8x\log^2(x)\right)\log\left(\frac{1-x^2+(4-4x)\log(x)}{4\log(x)}\right)}{\left(-x+x^3\right)\log(x)+\left(-4x+4x^2\right)\log^2(x)}\,dx$$

Optimal antiderivative

$$\ln\left(1-x-\frac{x^2-1}{4\ln(x)}\right)^2-7x$$

command

```
int(((8*x*ln(x)^2+4*x^2*ln(x)-2*x^2+2)*ln(1/4*((-4*x+4)*ln(x)-x^2+1)/ln(x))+(-28*x^2+28*x)*ln
7*x^3+7*x)*ln(x))/((4*x^2-4*x)*ln(x)^2+(x^3-x)*ln(x)),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result
default	$-7x-4\ln(2)\ln(x-1)-4\ln(2)\ln(x+4\ln(x)+1)+4\ln(2)\ln(\ln(x))+\ln\left(-\frac{4x\ln(x)+x^2-4\ln(x)-1}{\ln(x)}\right)^2$

Maple 2021.1 output

$$\int \frac{\left(8x\ln(x)^2+4x^2\ln(x)-2x^2+2\right)\ln\left(\frac{(-4x+4)\ln(x)-x^2+1}{4\ln(x)}\right)+\left(-28x^2+28x\right)\ln(x)^2+\left(-7x^3+7x\right)\ln(x)}{\left(4x^2-4x\right)\ln(x)^2+\left(x^3-x\right)\ln(x)}\,dx$$

42.28 Problem number 10190

$$\int \frac{-40x-22x^2+2x^3+\left(8x+6x^2\right)\log\left(x^3\right)+\left(200+134x-4x^2+\left(-80-52x+2x^2\right)\log\left(x^3\right)+(8+6x)\log^2\left(x\right.\right.}{4x+x^2}$$

Optimal antiderivative

$$\left(\left(\ln\left(x^3\right)-5\right)\ln\left(2(4+x)^2x\right)+x\right)^2$$

command

```
int((((24+6*x)*ln(x^3)-30*x-120)*ln(2*x^3+16*x^2+32*x)^2+((6*x+8)*ln(x^3)^2+(2*x^2-
52*x-80)*ln(x^3)-4*x^2+134*x+200)*ln(2*x^3+16*x^2+32*x)+(6*x^2+8*x)*ln(x^3)+2*x^3-
22*x^2-40*x)/(x^2+4*x),x,method=_RETURNVERBOSE)
```

Maple 2022.1 output

method	result	size
risch	Expression too large to display	17841276

Maple 2021.1 output

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