

CAS integration tests. Progress report
Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 vs. Maxima 5.44
via sagemath 9.3

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1 Table summary of progress report

Table 1: Table summary of progress report

#	test file #	integral #	Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6	Maxima 5.44 via sagemath 9.3
1	2	21	1 (pass)	-1 (time out)
2	14	910	1 (pass)	0 (not solved)
3	14	911	1 (pass)	0 (not solved)
4	14	912	1 (pass)	0 (not solved)
5	21	1093	1 (pass)	0 (not solved)
6	21	1094	1 (pass)	0 (not solved)
7	21	1095	1 (pass)	0 (not solved)
8	21	1096	1 (pass)	0 (not solved)
9	21	1097	1 (pass)	0 (not solved)
10	21	1098	1 (pass)	0 (not solved)
11	21	1105	1 (pass)	0 (not solved)
12	21	1106	1 (pass)	0 (not solved)
13	21	1107	1 (pass)	0 (not solved)
14	21	1108	1 (pass)	0 (not solved)
15	21	1109	1 (pass)	0 (not solved)
16	21	1116	1 (pass)	0 (not solved)
17	21	1117	1 (pass)	0 (not solved)
18	21	1118	1 (pass)	0 (not solved)
19	21	1119	1 (pass)	0 (not solved)
20	21	1120	1 (pass)	0 (not solved)
21	21	1126	1 (pass)	0 (not solved)
22	21	1127	1 (pass)	0 (not solved)
23	21	1128	1 (pass)	0 (not solved)
24	21	1129	1 (pass)	0 (not solved)
25	21	1130	1 (pass)	0 (not solved)
26	21	1131	1 (pass)	0 (not solved)
27	27	516	1 (pass)	0 (not solved)

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#	test file #	integral #	Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6	Maxima 5.44 via sagemath 9.3
28	27	519	1 (pass)	0 (not solved)
29	27	522	1 (pass)	0 (not solved)
30	27	527	1 (pass)	0 (not solved)
31	27	530	1 (pass)	0 (not solved)
32	27	533	1 (pass)	0 (not solved)
33	27	535	1 (pass)	0 (not solved)
34	27	538	1 (pass)	0 (not solved)
35	27	541	1 (pass)	0 (not solved)
36	27	543	1 (pass)	0 (not solved)
37	27	546	1 (pass)	0 (not solved)
38	27	549	1 (pass)	0 (not solved)
39	27	551	1 (pass)	0 (not solved)
40	27	554	1 (pass)	0 (not solved)
41	27	557	1 (pass)	0 (not solved)
42	27	559	1 (pass)	0 (not solved)
43	27	562	1 (pass)	0 (not solved)
44	27	565	1 (pass)	0 (not solved)
45	38	99	1 (pass)	-1 (time out)
46	54	46	1 (pass)	0 (not solved)
47	54	47	1 (pass)	0 (not solved)
48	54	52	1 (pass)	0 (not solved)
49	54	53	1 (pass)	0 (not solved)
50	54	58	1 (pass)	0 (not solved)
51	54	59	1 (pass)	0 (not solved)
52	55	17	1 (pass)	0 (not solved)
53	60	83	1 (pass)	-1 (time out)
54	62	182	1 (pass)	0 (not solved)
55	64	128	1 (pass)	0 (not solved)
56	66	209	1 (pass)	-1 (time out)

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#	test file #	integral #	Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6	Maxima 5.44 via sagemath 9.3
57	84	6	1 (pass)	-1 (time out)
58	84	7	1 (pass)	-1 (time out)
59	89	111	1 (pass)	-1 (time out)
60	89	117	1 (pass)	-1 (time out)
61	89	122	1 (pass)	-1 (time out)
62	89	123	1 (pass)	-1 (time out)
63	89	124	1 (pass)	-1 (time out)
64	89	125	1 (pass)	-1 (time out)
65	89	128	1 (pass)	-1 (time out)
66	89	134	1 (pass)	-1 (time out)
67	89	135	1 (pass)	-1 (time out)
68	89	137	1 (pass)	-1 (time out)
69	89	143	1 (pass)	-1 (time out)
70	89	785	1 (pass)	-1 (time out)
71	92	89	1 (pass)	-1 (time out)
72	92	90	1 (pass)	-1 (time out)
73	92	96	1 (pass)	-1 (time out)
74	92	100	1 (pass)	-1 (time out)
75	92	101	1 (pass)	-1 (time out)
76	92	102	1 (pass)	-1 (time out)
77	92	103	1 (pass)	-1 (time out)
78	92	105	1 (pass)	-1 (time out)
79	92	106	1 (pass)	-1 (time out)
80	92	111	1 (pass)	-1 (time out)
81	92	112	1 (pass)	-1 (time out)
82	92	113	1 (pass)	-1 (time out)
83	92	120	1 (pass)	-1 (time out)
84	92	182	1 (pass)	-1 (time out)
85	92	519	1 (pass)	-1 (time out)

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Table 1 – continued from previous page

#	test file #	integral #	Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6	Maxima 5.44 via sagemath 9.3
86	94	89	1 (pass)	-1 (time out)
87	94	98	1 (pass)	-1 (time out)
88	94	100	1 (pass)	-1 (time out)
89	94	103	1 (pass)	-1 (time out)
90	94	104	1 (pass)	-1 (time out)
91	94	105	1 (pass)	-1 (time out)
92	94	106	1 (pass)	-1 (time out)
93	94	107	1 (pass)	-1 (time out)
94	94	108	1 (pass)	-1 (time out)
95	94	115	1 (pass)	-1 (time out)
96	94	116	1 (pass)	-1 (time out)
97	94	188	1 (pass)	-1 (time out)
98	94	280	1 (pass)	-1 (time out)
99	94	388	1 (pass)	-1 (time out)
100	94	389	1 (pass)	-1 (time out)
101	94	396	1 (pass)	-1 (time out)
102	94	397	1 (pass)	-1 (time out)
103	94	402	1 (pass)	-1 (time out)
104	94	403	1 (pass)	-1 (time out)
105	94	404	1 (pass)	-1 (time out)
106	94	405	1 (pass)	-1 (time out)
107	94	406	1 (pass)	-1 (time out)
108	94	407	1 (pass)	-1 (time out)
109	94	414	1 (pass)	-1 (time out)
110	94	415	1 (pass)	-1 (time out)
111	94	476	1 (pass)	-1 (time out)
112	94	484	1 (pass)	-1 (time out)
113	94	485	1 (pass)	-1 (time out)
114	94	493	1 (pass)	-1 (time out)

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Table 1 – continued from previous page

#	test file #	integral #	Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6	Maxima 5.44 via sagemath 9.3
115	94	494	1 (pass)	-1 (time out)
116	94	495	1 (pass)	-1 (time out)
117	94	1230	1 (pass)	-1 (time out)
118	94	1317	1 (pass)	-1 (time out)
119	94	1325	1 (pass)	-1 (time out)
120	94	1326	1 (pass)	-1 (time out)
121	94	1334	1 (pass)	-1 (time out)
122	94	1335	1 (pass)	-1 (time out)
123	94	1336	1 (pass)	-1 (time out)
124	101	313	1 (pass)	-1 (time out)
125	118	236	1 (pass)	-1 (time out)
126	118	253	1 (pass)	-1 (time out)
127	118	256	1 (pass)	-1 (time out)
128	118	260	1 (pass)	-1 (time out)
129	118	263	1 (pass)	-1 (time out)
130	118	264	1 (pass)	-1 (time out)
131	118	416	1 (pass)	-1 (time out)
132	118	428	1 (pass)	-1 (time out)
133	118	431	1 (pass)	-1 (time out)
134	118	434	1 (pass)	-1 (time out)
135	118	435	1 (pass)	-1 (time out)
136	118	438	1 (pass)	-1 (time out)
137	123	242	1 (pass)	-1 (time out)
138	123	243	1 (pass)	-1 (time out)
139	123	255	1 (pass)	-1 (time out)
140	123	257	1 (pass)	-1 (time out)
141	123	258	1 (pass)	-1 (time out)
142	123	260	1 (pass)	-1 (time out)
143	123	262	1 (pass)	-1 (time out)

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#	test file #	integral #	Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6	Maxima 5.44 via sagemath 9.3
144	123	263	1 (pass)	-1 (time out)
145	123	264	1 (pass)	-1 (time out)
146	123	266	1 (pass)	-1 (time out)
147	123	267	1 (pass)	-1 (time out)
148	123	268	1 (pass)	-1 (time out)
149	123	537	1 (pass)	-1 (time out)
150	123	549	1 (pass)	-1 (time out)
151	123	554	1 (pass)	-1 (time out)
152	123	555	1 (pass)	-1 (time out)
153	123	556	1 (pass)	-1 (time out)
154	123	557	1 (pass)	-1 (time out)
155	123	561	1 (pass)	-1 (time out)
156	125	270	1 (pass)	-1 (time out)
157	125	272	1 (pass)	-1 (time out)
158	125	284	1 (pass)	-1 (time out)
159	125	286	1 (pass)	-1 (time out)
160	125	287	1 (pass)	-1 (time out)
161	125	289	1 (pass)	-1 (time out)
162	125	291	1 (pass)	-1 (time out)
163	125	292	1 (pass)	-1 (time out)
164	125	293	1 (pass)	-1 (time out)
165	125	294	1 (pass)	-1 (time out)
166	125	490	1 (pass)	-1 (time out)
167	125	586	1 (pass)	-1 (time out)
168	125	595	1 (pass)	-1 (time out)
169	125	596	1 (pass)	-1 (time out)
170	125	597	1 (pass)	-1 (time out)
171	125	598	1 (pass)	-1 (time out)
172	125	599	1 (pass)	-1 (time out)

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#	test file #	integral #	Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6	Maxima 5.44 via sagemath 9.3
173	125	600	1 (pass)	-1 (time out)
174	125	613	1 (pass)	-1 (time out)
175	125	614	1 (pass)	-1 (time out)
176	125	615	1 (pass)	-1 (time out)
177	125	616	1 (pass)	-1 (time out)
178	125	617	1 (pass)	-1 (time out)
179	125	619	1 (pass)	-1 (time out)
180	125	620	1 (pass)	-1 (time out)
181	125	621	1 (pass)	-1 (time out)
182	125	622	1 (pass)	-1 (time out)
183	125	623	1 (pass)	-1 (time out)
184	125	624	1 (pass)	-1 (time out)
185	125	1150	1 (pass)	-1 (time out)
186	125	1158	1 (pass)	-1 (time out)
187	125	1162	1 (pass)	-1 (time out)
188	125	1163	1 (pass)	-1 (time out)
189	125	1165	1 (pass)	-1 (time out)
190	125	1166	1 (pass)	-1 (time out)
191	125	1167	1 (pass)	-1 (time out)
192	125	1168	1 (pass)	-1 (time out)
193	125	1169	1 (pass)	-1 (time out)
194	125	1261	1 (pass)	-1 (time out)
195	125	1268	1 (pass)	-1 (time out)
196	125	1269	1 (pass)	-1 (time out)
197	125	1270	1 (pass)	-1 (time out)
198	125	1271	1 (pass)	-1 (time out)
199	125	1276	1 (pass)	-1 (time out)
200	125	1281	1 (pass)	-1 (time out)
201	125	1282	1 (pass)	-1 (time out)

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#	test file #	integral #	Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6	Maxima 5.44 via sagemath 9.3
202	125	1285	1 (pass)	-1 (time out)
203	125	1286	1 (pass)	-1 (time out)
204	125	1287	1 (pass)	-1 (time out)
205	125	1288	1 (pass)	-1 (time out)
206	125	1290	1 (pass)	-1 (time out)
207	137	171	1 (pass)	-1 (time out)
208	139	70	1 (pass)	-1 (time out)
209	139	71	1 (pass)	-1 (time out)
210	141	197	1 (pass)	-1 (time out)
211	141	198	1 (pass)	-1 (time out)
212	196	459	1 (pass)	-1 (time out)
213	197	54	1 (pass)	-1 (time out)
214	199	359	1 (pass)	0 (not solved)
215	199	360	1 (pass)	0 (not solved)
216	199	361	1 (pass)	0 (not solved)
217	205	1	1 (pass)	0 (not solved)
218	205	2	1 (pass)	0 (not solved)
219	205	3	1 (pass)	0 (not solved)
220	205	4	1 (pass)	0 (not solved)
221	205	5	1 (pass)	0 (not solved)
222	205	6	1 (pass)	0 (not solved)
223	205	7	1 (pass)	0 (not solved)
224	205	8	1 (pass)	0 (not solved)
225	205	10	1 (pass)	0 (not solved)
226	205	11	1 (pass)	0 (not solved)
227	205	12	1 (pass)	0 (not solved)
228	205	13	1 (pass)	0 (not solved)
229	205	14	1 (pass)	0 (not solved)
230	205	15	1 (pass)	0 (not solved)

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#	test file #	integral #	Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6	Maxima 5.44 via sagemath 9.3
231	205	16	1 (pass)	0 (not solved)
232	205	17	1 (pass)	0 (not solved)
233	205	18	1 (pass)	0 (not solved)
234	205	22	1 (pass)	0 (not solved)
235	205	25	1 (pass)	0 (not solved)
236	205	26	1 (pass)	0 (not solved)
237	205	27	1 (pass)	0 (not solved)
238	205	28	1 (pass)	0 (not solved)
239	205	57	1 (pass)	0 (not solved)
240	205	65	1 (pass)	0 (not solved)
241	205	66	1 (pass)	0 (not solved)
242	205	67	1 (pass)	0 (not solved)
243	205	68	1 (pass)	0 (not solved)
244	205	69	1 (pass)	0 (not solved)
245	205	79	1 (pass)	0 (not solved)
246	205	110	1 (pass)	0 (not solved)
247	205	111	1 (pass)	0 (not solved)
248	205	112	1 (pass)	0 (not solved)
249	205	113	1 (pass)	0 (not solved)
250	205	114	1 (pass)	0 (not solved)
251	205	115	1 (pass)	0 (not solved)
252	205	116	1 (pass)	0 (not solved)
253	205	117	1 (pass)	0 (not solved)
254	205	119	1 (pass)	0 (not solved)
255	205	120	1 (pass)	0 (not solved)
256	205	121	1 (pass)	0 (not solved)
257	205	122	1 (pass)	0 (not solved)
258	205	123	1 (pass)	0 (not solved)
259	205	124	1 (pass)	0 (not solved)

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Table 1 – continued from previous page

#	test file #	integral #	Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6	Maxima 5.44 via sagemath 9.3
260	205	125	1 (pass)	0 (not solved)
261	205	126	1 (pass)	0 (not solved)
262	205	127	1 (pass)	0 (not solved)
263	205	131	1 (pass)	0 (not solved)
264	205	134	1 (pass)	0 (not solved)
265	205	135	1 (pass)	0 (not solved)
266	205	136	1 (pass)	0 (not solved)
267	205	137	1 (pass)	0 (not solved)
268	205	166	1 (pass)	0 (not solved)
269	205	174	1 (pass)	0 (not solved)
270	205	175	1 (pass)	0 (not solved)
271	205	176	1 (pass)	0 (not solved)
272	205	177	1 (pass)	0 (not solved)
273	205	178	1 (pass)	0 (not solved)
274	205	188	1 (pass)	0 (not solved)
275	206	2	1 (pass)	0 (not solved)
276	206	3	1 (pass)	0 (not solved)
277	206	4	1 (pass)	0 (not solved)
278	206	5	1 (pass)	0 (not solved)
279	206	7	1 (pass)	0 (not solved)
280	206	8	1 (pass)	0 (not solved)
281	206	18	1 (pass)	0 (not solved)
282	206	19	1 (pass)	0 (not solved)
283	206	20	1 (pass)	0 (not solved)
284	206	21	1 (pass)	0 (not solved)
285	206	35	1 (pass)	0 (not solved)
286	206	41	1 (pass)	0 (not solved)
287	206	70	1 (pass)	0 (not solved)
288	206	71	1 (pass)	0 (not solved)

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Table 1 – continued from previous page

#	test file #	integral #	Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6	Maxima 5.44 via sagemath 9.3
289	206	72	1 (pass)	0 (not solved)
290	206	73	1 (pass)	0 (not solved)
291	206	75	1 (pass)	0 (not solved)
292	206	76	1 (pass)	0 (not solved)
293	206	86	1 (pass)	0 (not solved)
294	206	87	1 (pass)	0 (not solved)
295	206	88	1 (pass)	0 (not solved)
296	206	89	1 (pass)	0 (not solved)
297	206	103	1 (pass)	0 (not solved)
298	210	595	1 (pass)	-1 (time out)
299	210	3948	1 (pass)	-1 (time out)
300	210	6099	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 21

$$\int \frac{1}{(\cos(x) + \cos(3x))^5} dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{523 \operatorname{arctanh}(\sin(x))}{256} + \frac{\sin(x)}{32(1-2(\sin^2(x)))^4} - \frac{17 \sin(x)}{192(1-2(\sin^2(x)))^3} \\ & + \frac{203 \sin(x)}{768(1-2(\sin^2(x)))^2} - \frac{437 \sin(x)}{512(1-2(\sin^2(x)))} \\ & + \frac{1483 \operatorname{arctanh}(\sin(x)\sqrt{2})\sqrt{2}}{1024} - \frac{43 \sec(x) \tan(x)}{256} - \frac{(\sec^3(x)) \tan(x)}{128} \end{aligned}$$

command

```
integrate(1/(cos(x)+cos(3*x))^5,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

3 Test file number 14

Test folder name:

test_cases/1_Algebraic_functions/1.1_Binomial_products/1.1.1_Linear/14_1.1.1.3-a+b_x-
^m-c+d_x-^n-e+f_x-^p

3.1 Problem number 910

$$\int \frac{1}{\sqrt[4]{1-x} (ex)^{5/2} \sqrt[4]{1+x}} dx$$

Optimal antiderivative

$$-\frac{2(1-x)^{\frac{3}{4}}(1+x)^{\frac{3}{4}}}{3e(ex)^{\frac{3}{2}}}$$

command

```
integrate(1/(1-x)^(1/4)/(e*x)^(5/2)/(1+x)^(1/4),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{2(x^3 - x)e^{(-\frac{5}{2})}}{3(x+1)^{\frac{1}{4}}x^{\frac{5}{2}}(-x+1)^{\frac{1}{4}}}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{1}{(ex)^{\frac{5}{2}}(x+1)^{\frac{1}{4}}(-x+1)^{\frac{1}{4}}} dx$$

3.2 Problem number 911

$$\int \frac{1}{\sqrt[4]{1-x} (ex)^{9/2} \sqrt[4]{1+x}} dx$$

Optimal antiderivative

$$-\frac{2(-x^2+1)^{\frac{3}{4}}}{3e(ex)^{\frac{7}{2}}} + \frac{8(-x^2+1)^{\frac{7}{4}}}{21e(ex)^{\frac{7}{2}}}$$

command

```
integrate(1/(1-x)^(1/4)/(e*x)^(9/2)/(1+x)^(1/4),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{2(4x^5 - x^3 - 3x)e^{(-\frac{9}{2})}}{21(x+1)^{\frac{1}{4}}x^{\frac{9}{2}}(-x+1)^{\frac{1}{4}}}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{1}{(ex)^{\frac{9}{2}}(x+1)^{\frac{1}{4}}(-x+1)^{\frac{1}{4}}} dx$$

3.3 Problem number 912

$$\int \frac{1}{\sqrt[4]{1-x} (ex)^{13/2} \sqrt[4]{1+x}} dx$$

Optimal antiderivative

$$-\frac{2(-x^2+1)^{\frac{3}{4}}}{3e(ex)^{\frac{11}{2}}} + \frac{16(-x^2+1)^{\frac{7}{4}}}{21e(ex)^{\frac{11}{2}}} - \frac{64(-x^2+1)^{\frac{11}{4}}}{231e(ex)^{\frac{11}{2}}}$$

command

```
integrate(1/(1-x)^(1/4)/(e*x)^(13/2)/(1+x)^(1/4),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{2(32x^7 - 8x^5 - 3x^3 - 21x)e^{(-\frac{13}{2})}}{231(x+1)^{\frac{1}{4}}x^{\frac{13}{2}}(-x+1)^{\frac{1}{4}}}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{1}{(ex)^{\frac{13}{2}} (x+1)^{\frac{1}{4}} (-x+1)^{\frac{1}{4}}} dx$$

4 Test file number 21

Test folder name:

```
test_cases/1_Algebraic_functions/1.1_Binomial_products/1.1.2_Quadratic/21_1.1.2.4-  
e_x-^m-a+b_x^2-^p-c+d_x^2-^q
```

4.1 Problem number 1093

$$\int \frac{(ex)^{5/2} (c + dx^2)}{(a + bx^2)^{3/4}} dx$$

Optimal antiderivative

$$\frac{(-7ad + 8bc) e(ex)^{\frac{3}{2}} (bx^2 + a)^{\frac{1}{4}}}{16b^2} + \frac{d(ex)^{\frac{7}{2}} (bx^2 + a)^{\frac{1}{4}}}{4be}$$

$$+ \frac{3a(-7ad + 8bc) e^{\frac{5}{2}} \arctan\left(\frac{b^{\frac{1}{4}} \sqrt{ex}}{(bx^2+a)^{\frac{1}{4}} \sqrt{e}}\right)}{32b^{\frac{11}{4}}} - \frac{3a(-7ad + 8bc) e^{\frac{5}{2}} \operatorname{arctanh}\left(\frac{b^{\frac{1}{4}} \sqrt{ex}}{(bx^2+a)^{\frac{1}{4}} \sqrt{e}}\right)}{32b^{\frac{11}{4}}}$$

command

```
integrate((e*x)^(5/2)*(d*x^2+c)/(b*x^2+a)^(3/4),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{64} d \left(\frac{4 \left(\frac{11 (bx^2+a)^{\frac{1}{4}} a^2 b}{\sqrt{x}} - \frac{7 (bx^2+a)^{\frac{5}{4}} a^2}{x^{\frac{5}{2}}} \right)}{b^4 - \frac{2 (bx^2+a) b^3}{x^2} + \frac{(bx^2+a)^2 b^2}{x^4}} + \frac{21 \left(\frac{2 a^2 \arctan \left(\frac{(bx^2+a)^{\frac{1}{4}}}{b^{\frac{1}{4}} \sqrt{x}} \right)}{b^{\frac{3}{4}}} - \frac{a^2 \log \left(-\frac{b^{\frac{1}{4}} - (bx^2+a)^{\frac{1}{4}}}{\sqrt{x}}}{b^{\frac{1}{4}} + \frac{(bx^2+a)^{\frac{1}{4}}}{\sqrt{x}}} \right)}{b^{\frac{3}{4}}} \right)}{b^2} - 8c \frac{3 \left(\frac{2 a a}{\dots} \right)}{\dots} \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{(dx^2 + c)(ex)^{\frac{5}{2}}}{(bx^2 + a)^{\frac{3}{4}}} dx$$

4.2 Problem number 1094

$$\int \frac{\sqrt{ex} (c + dx^2)}{(a + bx^2)^{3/4}} dx$$

Optimal antiderivative

$$\frac{d(ex)^{\frac{3}{2}} (bx^2 + a)^{\frac{1}{4}}}{2be} - \frac{(-3ad + 4bc) \arctan \left(\frac{b^{\frac{1}{4}} \sqrt{ex}}{(bx^2+a)^{\frac{1}{4}} \sqrt{e}} \right) \sqrt{e}}{4b^{\frac{7}{4}}} + \frac{(-3ad + 4bc) \operatorname{arctanh} \left(\frac{b^{\frac{1}{4}} \sqrt{ex}}{(bx^2+a)^{\frac{1}{4}} \sqrt{e}} \right) \sqrt{e}}{4b^{\frac{7}{4}}}$$

command

```
integrate((e*x)^(1/2)*(d*x^2+c)/(b*x^2+a)^(3/4),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{8} \left(4c \frac{2 \arctan\left(\frac{(bx^2+a)^{\frac{1}{4}}}{b^{\frac{1}{4}}\sqrt{x}}\right) - \log\left(\frac{b^{\frac{1}{4}} - \frac{(bx^2+a)^{\frac{1}{4}}}{\sqrt{x}}}{b^{\frac{1}{4}} + \frac{(bx^2+a)^{\frac{1}{4}}}{\sqrt{x}}}\right)}{b^{\frac{3}{4}}} - d \frac{2a \arctan\left(\frac{(bx^2+a)^{\frac{1}{4}}}{b^{\frac{1}{4}}\sqrt{x}}\right) - a \log\left(\frac{b^{\frac{1}{4}} - \frac{(bx^2+a)^{\frac{1}{4}}}{\sqrt{x}}}{b^{\frac{1}{4}} + \frac{(bx^2+a)^{\frac{1}{4}}}{\sqrt{x}}}\right)}{b^{\frac{3}{4}}} \right) - \frac{3}{b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{(dx^2 + c)\sqrt{ex}}{(bx^2 + a)^{\frac{3}{4}}} dx$$

4.3 Problem number 1095

$$\int \frac{c + dx^2}{(ex)^{3/2} (a + bx^2)^{3/4}} dx$$

Optimal antiderivative

$$-\frac{d \arctan\left(\frac{b^{\frac{1}{4}}\sqrt{ex}}{(bx^2+a)^{\frac{1}{4}}\sqrt{e}}\right)}{b^{\frac{3}{4}}e^{\frac{3}{2}}} + \frac{d \operatorname{arctanh}\left(\frac{b^{\frac{1}{4}}\sqrt{ex}}{(bx^2+a)^{\frac{1}{4}}\sqrt{e}}\right)}{b^{\frac{3}{4}}e^{\frac{3}{2}}} - \frac{2c(bx^2 + a)^{\frac{1}{4}}}{ae\sqrt{ex}}$$

command

`integrate((d*x^2+c)/(e*x)^(3/2)/(b*x^2+a)^(3/4),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{2} \left(d \frac{2 \arctan\left(\frac{(bx^2+a)^{\frac{1}{4}}}{b^{\frac{1}{4}}\sqrt{x}}\right) - \log\left(\frac{b^{\frac{1}{4}} - \frac{(bx^2+a)^{\frac{1}{4}}}{\sqrt{x}}}{b^{\frac{1}{4}} + \frac{(bx^2+a)^{\frac{1}{4}}}{\sqrt{x}}}\right)}{b^{\frac{3}{4}}} - \frac{4(bx^2 + a)^{\frac{1}{4}}c}{a\sqrt{x}} \right) e^{(-\frac{3}{2})}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{dx^2 + c}{(bx^2 + a)^{\frac{3}{4}} (ex)^{\frac{3}{2}}} dx$$

4.4 Problem number 1096

$$\int \frac{c + dx^2}{(ex)^{7/2} (a + bx^2)^{3/4}} dx$$

Optimal antiderivative

$$-\frac{2c(bx^2 + a)^{\frac{1}{4}}}{5ae(ex)^{\frac{5}{2}}} + \frac{2(-5ad + 4bc)(bx^2 + a)^{\frac{1}{4}}}{5a^2e^3\sqrt{ex}}$$

command

```
integrate((d*x^2+c)/(e*x)^(7/2)/(b*x^2+a)^(3/4),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{2}{5} \left(\frac{c \left(\frac{5(bx^2+a)^{\frac{1}{4}}b}{\sqrt{x}} - \frac{(bx^2+a)^{\frac{5}{4}}}{x^{\frac{5}{2}}} \right)}{a^2} - \frac{5(bx^2+a)^{\frac{1}{4}}d}{a\sqrt{x}} \right) e^{(-\frac{7}{2})}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{dx^2 + c}{(bx^2 + a)^{\frac{3}{4}} (ex)^{\frac{7}{2}}} dx$$

4.5 Problem number 1097

$$\int \frac{c + dx^2}{(ex)^{11/2} (a + bx^2)^{3/4}} dx$$

Optimal antiderivative

$$-\frac{2c(bx^2 + a)^{\frac{1}{4}}}{9ae(ex)^{\frac{9}{2}}} + \frac{2(-9ad + 8bc)(bx^2 + a)^{\frac{1}{4}}}{9a^2e^3(ex)^{\frac{5}{2}}} - \frac{8(-9ad + 8bc)(bx^2 + a)^{\frac{5}{4}}}{45a^3e^3(ex)^{\frac{5}{2}}}$$

command

`integrate((d*x^2+c)/(e*x)^(11/2)/(b*x^2+a)^(3/4),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{2}{45} \left(\frac{9d \left(\frac{5(bx^2+a)^{\frac{1}{4}}b}{\sqrt{x}} - \frac{(bx^2+a)^{\frac{5}{4}}}{x^{\frac{5}{2}}} \right)}{a^2} - \frac{\left(\frac{45(bx^2+a)^{\frac{1}{4}}b^2}{\sqrt{x}} - \frac{18(bx^2+a)^{\frac{5}{4}}b}{x^{\frac{5}{2}}} + \frac{5(bx^2+a)^{\frac{9}{4}}}{x^{\frac{9}{2}}} \right) c}{a^3} \right) e^{(-\frac{11}{2})}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{dx^2 + c}{(bx^2 + a)^{\frac{3}{4}} (ex)^{\frac{11}{2}}} dx$$

4.6 Problem number 1098

$$\int \frac{c + dx^2}{(ex)^{15/2} (a + bx^2)^{3/4}} dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{2c(bx^2 + a)^{\frac{1}{4}}}{13ae(ex)^{\frac{13}{2}}} + \frac{2(-13ad + 12bc)(bx^2 + a)^{\frac{1}{4}}}{13a^2e^3(ex)^{\frac{9}{2}}} \\ & -\frac{16(-13ad + 12bc)(bx^2 + a)^{\frac{5}{4}}}{65a^3e^3(ex)^{\frac{9}{2}}} + \frac{64(-13ad + 12bc)(bx^2 + a)^{\frac{9}{4}}}{585a^4e^3(ex)^{\frac{9}{2}}} \end{aligned}$$

command

`integrate((d*x^2+c)/(e*x)^(15/2)/(b*x^2+a)^(3/4),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{2}{585} \left(\frac{13 \left(\frac{45(bx^2+a)^{\frac{1}{4}}b^2}{\sqrt{x}} - \frac{18(bx^2+a)^{\frac{5}{4}}b}{x^{\frac{5}{2}}} + \frac{5(bx^2+a)^{\frac{9}{4}}}{x^{\frac{9}{2}}} \right) d}{a^3} - \frac{3 \left(\frac{195(bx^2+a)^{\frac{1}{4}}b^3}{\sqrt{x}} - \frac{117(bx^2+a)^{\frac{5}{4}}b^2}{x^{\frac{5}{2}}} + \frac{65(bx^2+a)^{\frac{9}{4}}b}{x^{\frac{9}{2}}} - \frac{15(bx^2+a)^{\frac{13}{4}}}{x^{\frac{13}{2}}} \right) c}{a^4} \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{dx^2 + c}{(bx^2 + a)^{\frac{3}{4}} (ex)^{\frac{15}{2}}} dx$$

4.7 Problem number 1105

$$\int \frac{(ex)^{3/2} (c + dx^2)}{(a + bx^2)^{5/4}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{d(ex)^{\frac{5}{2}}}{2be(bx^2 + a)^{\frac{1}{4}}} + \frac{(-5ad + 4bc)e^{\frac{3}{2}} \arctan\left(\frac{b^{\frac{1}{4}}\sqrt{ex}}{(bx^2+a)^{\frac{1}{4}}\sqrt{e}}\right)}{4b^{\frac{9}{4}}} \\ & + \frac{(-5ad + 4bc)e^{\frac{3}{2}} \operatorname{arctanh}\left(\frac{b^{\frac{1}{4}}\sqrt{ex}}{(bx^2+a)^{\frac{1}{4}}\sqrt{e}}\right)}{4b^{\frac{9}{4}}} - \frac{(-5ad + 4bc)e\sqrt{ex}}{2b^2(bx^2 + a)^{\frac{1}{4}}} \end{aligned}$$

command

`integrate((e*x)^(3/2)*(d*x^2+c)/(b*x^2+a)^(5/4),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{8} \left(d \left(\frac{4 \left(4ab - \frac{5(bx^2+a)a}{x^2} \right)}{\frac{(bx^2+a)^{\frac{1}{4}}b^3}{\sqrt{x}} - \frac{(bx^2+a)^{\frac{5}{4}}b^2}{x^{\frac{5}{2}}}} + \frac{5a \left(\frac{2 \arctan\left(\frac{(bx^2+a)^{\frac{1}{4}}}{b^{\frac{1}{4}}\sqrt{x}}\right)}{b^{\frac{1}{4}}} + \frac{\log\left(\frac{b^{\frac{1}{4}} - \frac{(bx^2+a)^{\frac{1}{4}}}{\sqrt{x}}}{b^{\frac{1}{4}} + \frac{(bx^2+a)^{\frac{1}{4}}}{\sqrt{x}}}\right)}{b^{\frac{1}{4}}}\right)}{b^2} \right) - 4c \left(\frac{2 \arctan\left(\frac{(bx^2+a)^{\frac{1}{4}}}{b^{\frac{1}{4}}\sqrt{x}}\right)}{b^{\frac{1}{4}}} + \dots \right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{(dx^2 + c)(ex)^{\frac{3}{2}}}{(bx^2 + a)^{\frac{5}{4}}} dx$$

4.8 Problem number 1106

$$\int \frac{c + dx^2}{\sqrt{ex} (a + bx^2)^{5/4}} dx$$

Optimal antiderivative

$$\frac{d \arctan \left(\frac{b^{1/4} \sqrt{ex}}{(bx^2+a)^{1/4} \sqrt{e}} \right)}{b^{5/4} \sqrt{e}} + \frac{d \operatorname{arctanh} \left(\frac{b^{1/4} \sqrt{ex}}{(bx^2+a)^{1/4} \sqrt{e}} \right)}{b^{5/4} \sqrt{e}} + \frac{2(-ad + bc) \sqrt{ex}}{abe (bx^2 + a)^{1/4}}$$

command

`integrate((d*x^2+c)/(e*x)^(1/2)/(b*x^2+a)^(5/4),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{2} d \left(\frac{2 \arctan \left(\frac{(bx^2+a)^{1/4}}{b^{1/4} \sqrt{x}} \right)}{b^{1/4}} + \frac{\log \left(\frac{b^{1/4} - \frac{(bx^2+a)^{1/4}}{\sqrt{x}}}{b^{1/4} + \frac{(bx^2+a)^{1/4}}{\sqrt{x}}} \right)}{b^{1/4}} + \frac{4 \sqrt{x}}{(bx^2 + a)^{1/4} b} - \frac{4c \sqrt{x}}{(bx^2 + a)^{1/4} a} \right) e^{(-\frac{1}{2})}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{dx^2 + c}{(bx^2 + a)^{5/4} \sqrt{ex}} dx$$

4.9 Problem number 1107

$$\int \frac{c + dx^2}{(ex)^{5/2} (a + bx^2)^{5/4}} dx$$

Optimal antiderivative

$$-\frac{2c}{3ae (ex)^{3/2} (bx^2 + a)^{1/4}} - \frac{2(-3ad + 4bc) \sqrt{ex}}{3a^2 e^3 (bx^2 + a)^{1/4}}$$

command

`integrate((d*x^2+c)/(e*x)^(5/2)/(b*x^2+a)^(5/4),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{2}{3} \left(c \left(\frac{3b\sqrt{x}}{(bx^2+a)^{\frac{1}{4}}a^2} + \frac{(bx^2+a)^{\frac{3}{4}}}{a^2x^{\frac{3}{2}}} \right) - \frac{3d\sqrt{x}}{(bx^2+a)^{\frac{1}{4}}a} \right) e^{(-\frac{5}{2})}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{dx^2 + c}{(bx^2 + a)^{\frac{5}{4}} (ex)^{\frac{5}{2}}} dx$$

4.10 Problem number 1108

$$\int \frac{c + dx^2}{(ex)^{9/2} (a + bx^2)^{5/4}} dx$$

Optimal antiderivative

$$-\frac{2c}{7ae (ex)^{\frac{7}{2}} (bx^2 + a)^{\frac{1}{4}}} - \frac{2(-7ad + 8bc)}{7a^2e^3 (ex)^{\frac{3}{2}} (bx^2 + a)^{\frac{1}{4}}} + \frac{8(-7ad + 8bc) (bx^2 + a)^{\frac{3}{4}}}{21a^3e^3 (ex)^{\frac{3}{2}}}$$

command

`integrate((d*x^2+c)/(e*x)^(9/2)/(b*x^2+a)^(5/4),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{2}{21} \left(7d \left(\frac{3b\sqrt{x}}{(bx^2+a)^{\frac{1}{4}}a^2} + \frac{(bx^2+a)^{\frac{3}{4}}}{a^2x^{\frac{3}{2}}} \right) - c \left(\frac{21b^2\sqrt{x}}{(bx^2+a)^{\frac{1}{4}}a^3} + \frac{\frac{14(bx^2+a)^{\frac{3}{4}}b}{x^{\frac{3}{2}}} - \frac{3(bx^2+a)^{\frac{7}{4}}}{x^{\frac{7}{2}}}}{a^3} \right) \right) e^{(-\frac{9}{2})}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{dx^2 + c}{(bx^2 + a)^{\frac{5}{4}} (ex)^{\frac{9}{2}}} dx$$

4.11 Problem number 1109

$$\int \frac{c + dx^2}{(ex)^{13/2} (a + bx^2)^{5/4}} dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{2c}{11ae (ex)^{\frac{11}{2}} (bx^2 + a)^{\frac{1}{4}}} - \frac{2(-11ad + 12bc)}{11a^2e^3 (ex)^{\frac{7}{2}} (bx^2 + a)^{\frac{1}{4}}} \\ & + \frac{16(-11ad + 12bc) (bx^2 + a)^{\frac{3}{4}}}{33a^3e^3 (ex)^{\frac{7}{2}}} - \frac{64(-11ad + 12bc) (bx^2 + a)^{\frac{7}{4}}}{231a^4e^3 (ex)^{\frac{7}{2}}} \end{aligned}$$

command

```
integrate((d*x^2+c)/(e*x)^(13/2)/(b*x^2+a)^(5/4),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{2}{231} \left(11d \left(\frac{21b^2\sqrt{x}}{(bx^2+a)^{\frac{1}{4}}a^3} + \frac{14(bx^2+a)^{\frac{3}{4}}b}{x^{\frac{3}{2}}} - \frac{3(bx^2+a)^{\frac{7}{4}}}{x^{\frac{7}{2}}} \right) - 3c \left(\frac{77b^3\sqrt{x}}{(bx^2+a)^{\frac{1}{4}}a^4} + \frac{77(bx^2+a)^{\frac{3}{4}}b^2}{x^{\frac{3}{2}}} - \frac{33(bx^2+a)^{\frac{7}{4}}b}{x^{\frac{7}{2}}} + \frac{7(bx^2+a)^{\frac{11}{4}}}{x} \right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{dx^2 + c}{(bx^2 + a)^{\frac{5}{4}} (ex)^{\frac{13}{2}}} dx$$

4.12 Problem number 1116

$$\int \frac{(ex)^{5/2} (c + dx^2)}{(a + bx^2)^{7/4}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{2(-ad + bc) (ex)^{\frac{7}{2}}}{3abe (bx^2 + a)^{\frac{3}{4}}} - \frac{(-7ad + 4bc) e (ex)^{\frac{3}{2}} (bx^2 + a)^{\frac{1}{4}}}{6ab^2} \\ & - \frac{(-7ad + 4bc) e^{\frac{5}{2}} \arctan \left(\frac{b^{\frac{1}{4}} \sqrt{ex}}{(bx^2+a)^{\frac{1}{4}} \sqrt{e}} \right)}{4b^{\frac{11}{4}}} + \frac{(-7ad + 4bc) e^{\frac{5}{2}} \operatorname{arctanh} \left(\frac{b^{\frac{1}{4}} \sqrt{ex}}{(bx^2+a)^{\frac{1}{4}} \sqrt{e}} \right)}{4b^{\frac{11}{4}}} \end{aligned}$$

command

```
integrate((e*x)^(5/2)*(d*x^2+c)/(b*x^2+a)^(7/4),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{24} d \left(\frac{4 \left(4ab - \frac{7(bx^2+a)a}{x^2} \right)}{\frac{(bx^2+a)^{\frac{3}{4}} b^3}{x^{\frac{3}{2}}} - \frac{(bx^2+a)^{\frac{7}{4}} b^2}{x^{\frac{7}{2}}}} - \frac{21 \left(\frac{2a \arctan \left(\frac{(bx^2+a)^{\frac{1}{4}}}{b^{\frac{1}{4}} \sqrt{x}} \right)}{b^{\frac{3}{4}}} - \frac{a \log \left(-\frac{b^{\frac{1}{4}} - (bx^2+a)^{\frac{1}{4}}}{\sqrt{x}} \right)}{b^{\frac{3}{4}} \frac{(bx^2+a)^{\frac{1}{4}}}{\sqrt{x}}} \right)}{b^2} \right) + 4c \left(\frac{2 \arctan \left(\frac{(bx^2+a)^{\frac{1}{4}}}{b^{\frac{1}{4}} \sqrt{x}} \right)}{b^{\frac{3}{4}}} \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{(dx^2 + c)(ex)^{\frac{5}{2}}}{(bx^2 + a)^{\frac{7}{4}}} dx$$

4.13 Problem number 1117

$$\int \frac{\sqrt{ex} (c + dx^2)}{(a + bx^2)^{7/4}} dx$$

Optimal antiderivative

$$\frac{2(-ad + bc)(ex)^{\frac{3}{2}}}{3abe(bx^2 + a)^{\frac{3}{4}}} - \frac{d \arctan \left(\frac{b^{\frac{1}{4}} \sqrt{ex}}{(bx^2+a)^{\frac{1}{4}} \sqrt{e}} \right) \sqrt{e}}{b^{\frac{7}{4}}} + \frac{d \operatorname{arctanh} \left(\frac{b^{\frac{1}{4}} \sqrt{ex}}{(bx^2+a)^{\frac{1}{4}} \sqrt{e}} \right) \sqrt{e}}{b^{\frac{7}{4}}}$$

command

```
integrate((e*x)^(1/2)*(d*x^2+c)/(b*x^2+a)^(7/4),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{6} \left(d \left(\frac{3 \left(\frac{2 \arctan\left(\frac{(bx^2+a)^{\frac{1}{4}}}{b^{\frac{1}{4}}\sqrt{x}}\right)}{b^{\frac{3}{4}}} - \frac{\log\left(\frac{b^{\frac{1}{4}} - (bx^2+a)^{\frac{1}{4}}}{\sqrt{x}}\right)}{b^{\frac{1}{4}} + (bx^2+a)^{\frac{1}{4}}\sqrt{x}}\right)}{b} - \frac{4x^{\frac{3}{2}}}{(bx^2+a)^{\frac{3}{4}}b} + \frac{4cx^{\frac{3}{2}}}{(bx^2+a)^{\frac{3}{4}}a} \right) e^{\frac{1}{2}} \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{(dx^2 + c)\sqrt{ex}}{(bx^2 + a)^{\frac{7}{4}}} dx$$

4.14 Problem number 1118

$$\int \frac{c + dx^2}{(ex)^{3/2} (a + bx^2)^{7/4}} dx$$

Optimal antiderivative

$$\frac{2(-ad + 4bc)(ex)^{\frac{3}{2}}}{3a^2e^3(bx^2 + a)^{\frac{3}{4}}} - \frac{2c}{ae(bx^2 + a)^{\frac{3}{4}}\sqrt{ex}}$$

command

`integrate((d*x^2+c)/(e*x)^(3/2)/(b*x^2+a)^(7/4),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{2}{3} \left(c \left(\frac{bx^{\frac{3}{2}}}{(bx^2 + a)^{\frac{3}{4}}a^2} + \frac{3(bx^2 + a)^{\frac{1}{4}}}{a^2\sqrt{x}} \right) - \frac{dx^{\frac{3}{2}}}{(bx^2 + a)^{\frac{3}{4}}a} \right) e^{(-\frac{3}{2})}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{dx^2 + c}{(bx^2 + a)^{\frac{7}{4}} (ex)^{\frac{3}{2}}} dx$$

4.15 Problem number 1119

$$\int \frac{c + dx^2}{(ex)^{7/2} (a + bx^2)^{7/4}} dx$$

Optimal antiderivative

$$-\frac{2c}{5ae (ex)^{\frac{5}{2}} (bx^2 + a)^{\frac{3}{4}}} - \frac{2(-5ad + 8bc)}{15a^2e^3 (bx^2 + a)^{\frac{3}{4}} \sqrt{ex}} + \frac{8(-5ad + 8bc) (bx^2 + a)^{\frac{1}{4}}}{15a^3e^3 \sqrt{ex}}$$

command

`integrate((d*x^2+c)/(e*x)^(7/2)/(b*x^2+a)^(7/4),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{2}{15} \left(5d \left(\frac{bx^{\frac{3}{2}}}{(bx^2 + a)^{\frac{3}{4}}a^2} + \frac{3(bx^2 + a)^{\frac{1}{4}}}{a^2\sqrt{x}} \right) - c \left(\frac{5b^2x^{\frac{3}{2}}}{(bx^2 + a)^{\frac{3}{4}}a^3} + \frac{3 \left(\frac{10(bx^2 + a)^{\frac{1}{4}}b}{\sqrt{x}} - \frac{(bx^2 + a)^{\frac{5}{4}}}{x^{\frac{5}{2}}} \right)}{a^3} \right) \right) e^{(-\frac{7}{2})}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{dx^2 + c}{(bx^2 + a)^{\frac{7}{4}} (ex)^{\frac{7}{2}}} dx$$

4.16 Problem number 1120

$$\int \frac{c + dx^2}{(ex)^{11/2} (a + bx^2)^{7/4}} dx$$

Optimal antiderivative

$$-\frac{2c}{9ae (ex)^{\frac{9}{2}} (bx^2 + a)^{\frac{3}{4}}} - \frac{2(-3ad + 4bc)}{9a^2e^3 (ex)^{\frac{5}{2}} (bx^2 + a)^{\frac{3}{4}}} + \frac{16(-3ad + 4bc) (bx^2 + a)^{\frac{1}{4}}}{9a^3e^3 (ex)^{\frac{5}{2}}} - \frac{64(-3ad + 4bc) (bx^2 + a)^{\frac{5}{4}}}{45a^4e^3 (ex)^{\frac{5}{2}}}$$

command

`integrate((d*x^2+c)/(e*x)^(11/2)/(b*x^2+a)^(7/4),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{2}{45} \left(3d \left(\frac{5b^2x^{\frac{3}{2}}}{(bx^2+a)^{\frac{3}{4}}a^3} + \frac{3 \left(\frac{10(bx^2+a)^{\frac{1}{4}}b}{\sqrt{x}} - \frac{(bx^2+a)^{\frac{5}{4}}}{x^{\frac{5}{2}}} \right)}{a^3} \right) - c \left(\frac{15b^3x^{\frac{3}{2}}}{(bx^2+a)^{\frac{3}{4}}a^4} + \frac{135(bx^2+a)^{\frac{1}{4}}b^2}{\sqrt{x}} - \frac{27(bx^2+a)^{\frac{5}{4}}b}{x^{\frac{5}{2}}} + \frac{5(bx^2+a)^{\frac{9}{4}}}{x^{\frac{5}{2}}} \right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{dx^2 + c}{(bx^2 + a)^{\frac{7}{4}} (ex)^{\frac{11}{2}}} dx$$

4.17 Problem number 1126

$$\int \frac{(ex)^{7/2} (c + dx^2)}{(a + bx^2)^{9/4}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{2(-ad + bc)(ex)^{\frac{9}{2}}}{5abe(bx^2 + a)^{\frac{5}{4}}} - \frac{(-9ad + 4bc)e(ex)^{\frac{5}{2}}}{10ab^2(bx^2 + a)^{\frac{1}{4}}} + \frac{(-9ad + 4bc)e^{\frac{7}{2}} \arctan\left(\frac{b^{\frac{1}{4}}\sqrt{ex}}{(bx^2+a)^{\frac{1}{4}}\sqrt{e}}\right)}{4b^{\frac{13}{4}}} \\ & + \frac{(-9ad + 4bc)e^{\frac{7}{2}} \operatorname{arctanh}\left(\frac{b^{\frac{1}{4}}\sqrt{ex}}{(bx^2+a)^{\frac{1}{4}}\sqrt{e}}\right)}{4b^{\frac{13}{4}}} - \frac{(-9ad + 4bc)e^3\sqrt{ex}}{2b^3(bx^2 + a)^{\frac{1}{4}}} \end{aligned}$$

command

`integrate((e*x)^(7/2)*(d*x^2+c)/(b*x^2+a)^(9/4),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{40} \left(4c \left(\frac{4 \left(b + \frac{5(bx^2+a)}{x^2} \right) x^{\frac{5}{2}}}{(bx^2+a)^{\frac{5}{4}}b^2} + \frac{5 \left(\frac{2 \arctan\left(\frac{(bx^2+a)^{\frac{1}{4}}}{b^{\frac{1}{4}}\sqrt{x}}\right)}{b^{\frac{1}{4}}} + \frac{\log\left(-\frac{b^{\frac{1}{4}} - \frac{(bx^2+a)^{\frac{1}{4}}}{\sqrt{x}}}{b^{\frac{1}{4}} + \frac{(bx^2+a)^{\frac{1}{4}}}{\sqrt{x}}}\right)}{b^{\frac{1}{4}}}\right)}{b^2} \right) - d \left(\frac{4 \left(4ab^2 + \frac{36(bx^2+a)ab}{x^2} - \frac{(bx^2+a)^{\frac{5}{4}}b^4}{x^{\frac{5}{2}}} - \frac{(bx^2+a)^{\frac{9}{4}}}{x^{\frac{5}{2}}} \right)}{b^2} \right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{(dx^2 + c)(ex)^{\frac{7}{2}}}{(bx^2 + a)^{\frac{9}{4}}} dx$$

4.18 Problem number 1127

$$\int \frac{(ex)^{3/2} (c + dx^2)}{(a + bx^2)^{9/4}} dx$$

Optimal antiderivative

$$\frac{2(-ad + bc)(ex)^{\frac{5}{2}}}{5abe(bx^2 + a)^{\frac{5}{4}}} + \frac{de^{\frac{3}{2}} \arctan\left(\frac{b^{\frac{1}{4}}\sqrt{ex}}{(bx^2+a)^{\frac{1}{4}}\sqrt{e}}\right)}{b^{\frac{9}{4}}} + \frac{de^{\frac{3}{2}} \operatorname{arctanh}\left(\frac{b^{\frac{1}{4}}\sqrt{ex}}{(bx^2+a)^{\frac{1}{4}}\sqrt{e}}\right)}{b^{\frac{9}{4}}} - \frac{2de\sqrt{ex}}{b^2(bx^2 + a)^{\frac{1}{4}}}$$

command

`integrate((e*x)^(3/2)*(d*x^2+c)/(b*x^2+a)^(9/4),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{10} d \left(\frac{4 \left(b + \frac{5(bx^2+a)}{x^2} \right) x^{\frac{5}{2}}}{(bx^2 + a)^{\frac{5}{4}} b^2} + \frac{5 \left(\frac{2 \arctan\left(\frac{(bx^2+a)^{\frac{1}{4}}}{b^{\frac{1}{4}}\sqrt{x}}\right)}{b^{\frac{1}{4}}} + \frac{\log\left(-\frac{b^{\frac{1}{4}} - \frac{(bx^2+a)^{\frac{1}{4}}}{\sqrt{x}}}{b^{\frac{1}{4}} + \frac{(bx^2+a)^{\frac{1}{4}}}{\sqrt{x}}}\right)}{b^{\frac{1}{4}}}\right)}{b^2} - \frac{4cx^{\frac{5}{2}}}{(bx^2 + a)^{\frac{5}{4}} a} \right) e^{\frac{3}{2}}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{(dx^2 + c)(ex)^{\frac{3}{2}}}{(bx^2 + a)^{\frac{9}{4}}} dx$$

4.19 Problem number 1128

$$\int \frac{c + dx^2}{\sqrt{ex} (a + bx^2)^{9/4}} dx$$

Optimal antiderivative

$$\frac{2(-ad + bc) \sqrt{ex}}{5abe (bx^2 + a)^{5/4}} + \frac{2(ad + 4bc) \sqrt{ex}}{5a^2be (bx^2 + a)^{1/4}}$$

command

`integrate((d*x^2+c)/(e*x)^(1/2)/(b*x^2+a)^(9/4),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{2}{5} \left(\frac{\left(b - \frac{5(bx^2+a)}{x^2}\right) cx^{\frac{5}{2}}}{(bx^2 + a)^{\frac{5}{4}} a^2} - \frac{dx^{\frac{5}{2}}}{(bx^2 + a)^{\frac{5}{4}} a} \right) e^{(-\frac{1}{2})}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{dx^2 + c}{(bx^2 + a)^{\frac{9}{4}} \sqrt{ex}} dx$$

4.20 Problem number 1129

$$\int \frac{c + dx^2}{(ex)^{5/2} (a + bx^2)^{9/4}} dx$$

Optimal antiderivative

$$-\frac{2c}{3ae (ex)^{\frac{3}{2}} (bx^2 + a)^{\frac{5}{4}}} - \frac{2(-3ad + 8bc) \sqrt{ex}}{15a^2e^3 (bx^2 + a)^{\frac{5}{4}}} - \frac{8(-3ad + 8bc) \sqrt{ex}}{15a^3e^3 (bx^2 + a)^{\frac{1}{4}}}$$

command

`integrate((d*x^2+c)/(e*x)^(5/2)/(b*x^2+a)^(9/4),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{2}{15} \left(c \left(\frac{3 \left(b^2 - \frac{10(bx^2+a)b}{x^2} \right) x^{\frac{5}{2}}}{(bx^2 + a)^{\frac{5}{4}} a^3} - \frac{5 (bx^2 + a)^{\frac{3}{4}}}{a^3 x^{\frac{3}{2}}} \right) - \frac{3 \left(b - \frac{5(bx^2+a)}{x^2} \right) dx^{\frac{5}{2}}}{(bx^2 + a)^{\frac{5}{4}} a^2} \right) e^{(-\frac{5}{2})}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{dx^2 + c}{(bx^2 + a)^{\frac{9}{4}} (ex)^{\frac{5}{2}}} dx$$

4.21 Problem number 1130

$$\int \frac{c + dx^2}{(ex)^{9/2} (a + bx^2)^{9/4}} dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{2c}{7ae (ex)^{\frac{7}{2}} (bx^2 + a)^{\frac{5}{4}}} - \frac{2(-7ad + 12bc)}{35a^2e^3 (ex)^{\frac{3}{2}} (bx^2 + a)^{\frac{5}{4}}} \\ & - \frac{16(-7ad + 12bc)}{35a^3e^3 (ex)^{\frac{3}{2}} (bx^2 + a)^{\frac{1}{4}}} + \frac{64(-7ad + 12bc) (bx^2 + a)^{\frac{3}{4}}}{105a^4e^3 (ex)^{\frac{3}{2}}} \end{aligned}$$

command

`integrate((d*x^2+c)/(e*x)^(9/2)/(b*x^2+a)^(9/4),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{2}{105} \left(7d \left(\frac{3 \left(b^2 - \frac{10(bx^2+a)b}{x^2} \right) x^{\frac{5}{2}}}{(bx^2 + a)^{\frac{5}{4}} a^3} - \frac{5 (bx^2 + a)^{\frac{3}{4}}}{a^3 x^{\frac{3}{2}}} \right) - 3c \left(\frac{7 \left(b^3 - \frac{15(bx^2+a)b^2}{x^2} \right) x^{\frac{5}{2}}}{(bx^2 + a)^{\frac{5}{4}} a^4} - \frac{5 \left(\frac{7(bx^2+a)^{\frac{3}{4}} b}{x^{\frac{3}{2}}} - \frac{(bx^2+a)^{\frac{7}{4}}}{x^{\frac{7}{2}}} \right)}{a^4} \right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{dx^2 + c}{(bx^2 + a)^{\frac{9}{4}} (ex)^{\frac{9}{2}}} dx$$

4.22 Problem number 1131

$$\int \frac{c + dx^2}{(ex)^{13/2} (a + bx^2)^{9/4}} dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{2c}{11ae (ex)^{\frac{11}{2}} (bx^2 + a)^{\frac{5}{4}}} - \frac{2(-11ad + 16bc)}{55a^2e^3 (ex)^{\frac{7}{2}} (bx^2 + a)^{\frac{5}{4}}} - \frac{24(-11ad + 16bc)}{55a^3e^3 (ex)^{\frac{7}{2}} (bx^2 + a)^{\frac{1}{4}}} \\ & + \frac{64(-11ad + 16bc) (bx^2 + a)^{\frac{3}{4}}}{55a^4e^3 (ex)^{\frac{7}{2}}} - \frac{256(-11ad + 16bc) (bx^2 + a)^{\frac{7}{4}}}{385a^5e^3 (ex)^{\frac{7}{2}}} \end{aligned}$$

command

`integrate((d*x^2+c)/(e*x)^(13/2)/(b*x^2+a)^(9/4),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{2}{385} \left(11d \left(\frac{7 \left(b^3 - \frac{15(bx^2+a)b^2}{x^2} \right) x^{\frac{5}{2}}}{(bx^2+a)^{\frac{5}{4}} a^4} - \frac{5 \left(\frac{7(bx^2+a)^{\frac{3}{4}} b}{x^{\frac{3}{2}}} - \frac{(bx^2+a)^{\frac{7}{4}}}{x^{\frac{7}{2}}} \right)}{a^4} \right) - c \left(\frac{77 \left(b^4 - \frac{20(bx^2+a)b^3}{x^2} \right) x^{\frac{5}{2}}}{(bx^2+a)^{\frac{5}{4}} a^5} - \frac{5 \left(\frac{154(bx^2+a)^{\frac{3}{4}} b}{x^{\frac{3}{2}}} - \frac{(bx^2+a)^{\frac{7}{4}}}{x^{\frac{7}{2}}} \right)}{a^4} \right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{dx^2 + c}{(bx^2 + a)^{\frac{9}{4}} (ex)^{\frac{13}{2}}} dx$$

5 Test file number 27

Test folder name:

test_cases/1_Algebraic_functions/1.1_Binomial_products/1.1.3_General/27_1.1.3.4-e_x-
^m-a+b_x^n-^p-c+d_x^n-^q

5.1 Problem number 516

$$\int (ex)^{7/2} \sqrt{a + bx^3} (A + Bx^3) dx$$

Optimal antiderivative

$$\frac{B(ex)^{\frac{9}{2}} (bx^3 + a)^{\frac{3}{2}}}{9be} - \frac{a^2(2Ab - aB) e^{\frac{7}{2}} \operatorname{arctanh} \left(\frac{(ex)^{\frac{3}{2}} \sqrt{b}}{e^{\frac{3}{2}} \sqrt{bx^3 + a}} \right)}{24b^{\frac{5}{2}}} + \frac{a(2Ab - aB) e^2 (ex)^{\frac{3}{2}} \sqrt{bx^3 + a}}{24b^2} + \frac{(2Ab - aB) (ex)^{\frac{9}{2}} \sqrt{bx^3 + a}}{12be}$$

command

`integrate((e*x)^(7/2)*(B*x^3+A)*(b*x^3+a)^(1/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{144} \left(6 \left(\frac{a^2 \log \left(-\frac{\sqrt{b} - \sqrt{bx^3 + a}}{x^{\frac{3}{2}}} \right)}{b^{\frac{3}{2}}} + \frac{2 \left(\frac{\sqrt{bx^3 + a} a^2 b}{x^{\frac{3}{2}}} + \frac{(bx^3 + a)^{\frac{3}{2}} a^2}{x^{\frac{9}{2}}} \right)}{b^3 - \frac{2(bx^3 + a)b^2}{x^3} + \frac{(bx^3 + a)^2 b}{x^6}} \right) A - \left(\frac{3 a^3 \log \left(-\frac{\sqrt{b} - \sqrt{bx^3 + a}}{x^{\frac{3}{2}}} \right)}{b^{\frac{5}{2}}} \right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int (Bx^3 + A) \sqrt{bx^3 + a} (ex)^{\frac{7}{2}} dx$$

5.2 Problem number 519

$$\int \sqrt{ex} \sqrt{a + bx^3} (A + Bx^3) dx$$

Optimal antiderivative

$$\frac{B(ex)^{\frac{3}{2}} (bx^3 + a)^{\frac{3}{2}}}{6be} + \frac{a(4Ab - aB) \operatorname{arctanh}\left(\frac{(ex)^{\frac{3}{2}} \sqrt{b}}{e^{\frac{3}{2}} \sqrt{bx^3 + a}}\right) \sqrt{e}}{12b^{\frac{3}{2}}} + \frac{(4Ab - aB) (ex)^{\frac{3}{2}} \sqrt{bx^3 + a}}{12be}$$

command

```
integrate((B*x^3+A)*(e*x)^(1/2)*(b*x^3+a)^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{24} \left(4 \left(\frac{a \log\left(-\frac{\sqrt{b} - \sqrt{bx^3 + a}}{\sqrt{b} + \sqrt{bx^3 + a}}\right)}{\sqrt{b}} + \frac{2 \sqrt{bx^3 + a} a}{\left(b - \frac{bx^3 + a}{x^3}\right) x^{\frac{3}{2}}}\right) A - \left(\frac{a^2 \log\left(-\frac{\sqrt{b} - \sqrt{bx^3 + a}}{\sqrt{b} + \sqrt{bx^3 + a}}\right)}{b^{\frac{3}{2}}} + \frac{2 \left(\frac{\sqrt{bx^3 + a}}{x^{\frac{3}{2}}}\right)}{b^3 - \frac{2(bx^3 + a)}{x^3}}\right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int (Bx^3 + A) \sqrt{bx^3 + a} \sqrt{ex} dx$$

5.3 Problem number 522

$$\int \frac{\sqrt{a + bx^3} (A + Bx^3)}{(ex)^{5/2}} dx$$

Optimal antiderivative

$$-\frac{2A(bx^3 + a)^{\frac{3}{2}}}{3ae (ex)^{\frac{3}{2}}} + \frac{(2Ab + aB) \operatorname{arctanh}\left(\frac{(ex)^{\frac{3}{2}} \sqrt{b}}{e^{\frac{3}{2}} \sqrt{bx^3 + a}}\right)}{3e^{\frac{5}{2}} \sqrt{b}} + \frac{(2Ab + aB) (ex)^{\frac{3}{2}} \sqrt{bx^3 + a}}{3ae^4}$$

command

```
integrate((B*x^3+A)*(b*x^3+a)^(1/2)/(e*x)^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{6} \left(2 \left(\sqrt{b} \log \left(-\frac{\sqrt{b} - \sqrt{bx^3 + a}}{x^{\frac{3}{2}}}}{\sqrt{b} + \sqrt{bx^3 + a}} \right) + \frac{2\sqrt{bx^3 + a}}{x^{\frac{3}{2}}} \right) A + \left(\frac{a \log \left(-\frac{\sqrt{b} - \sqrt{bx^3 + a}}{x^{\frac{3}{2}}}}{\sqrt{b} + \sqrt{bx^3 + a}} \right)}{\sqrt{b}} + \frac{2\sqrt{bx^3 + a} a}{\left(b - \frac{bx^3 + a}{x^3}\right) x^{\frac{3}{2}}} \right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{(Bx^3 + A) \sqrt{bx^3 + a}}{(ex)^{\frac{5}{2}}} dx$$

5.4 Problem number 527

$$\int (ex)^{7/2} (a + bx^3)^{3/2} (A + Bx^3) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(8Ab - 3aB)(ex)^{\frac{9}{2}}(bx^3 + a)^{\frac{3}{2}}}{72be} + \frac{B(ex)^{\frac{9}{2}}(bx^3 + a)^{\frac{5}{2}}}{12be} \\ & - \frac{a^3(8Ab - 3aB)e^{\frac{7}{2}} \operatorname{arctanh}\left(\frac{(ex)^{\frac{3}{2}}\sqrt{b}}{e^{\frac{3}{2}}\sqrt{bx^3 + a}}\right)}{192b^{\frac{5}{2}}} \\ & + \frac{a^2(8Ab - 3aB)e^2(ex)^{\frac{3}{2}}\sqrt{bx^3 + a}}{192b^2} + \frac{a(8Ab - 3aB)(ex)^{\frac{9}{2}}\sqrt{bx^3 + a}}{96be} \end{aligned}$$

command

`integrate((e*x)^(7/2)*(b*x^3+a)^(3/2)*(B*x^3+A),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{1152} \left(8 \left(\frac{3a^3 \log \left(-\frac{\sqrt{b} - \sqrt{bx^3 + a}}{x^{\frac{3}{2}}}}{\sqrt{b} + \sqrt{bx^3 + a}} \right)}{b^{\frac{3}{2}}} + \frac{2 \left(\frac{3\sqrt{bx^3 + a} a^3 b^2}{x^{\frac{3}{2}}} - \frac{8(bx^3 + a)^{\frac{3}{2}} a^3 b}{x^2} - \frac{3(bx^3 + a)^{\frac{5}{2}} a^3}{x^{\frac{15}{2}}} \right)}{b^4 - \frac{3(bx^3 + a)b^3}{x^3} + \frac{3(bx^3 + a)^2 b^2}{x^6} - \frac{(bx^3 + a)^3 b}{x^9}} \right) A - 3 \left(\frac{3a^4 \log \left(-\frac{\sqrt{b} - \sqrt{bx^3 + a}}{x^{\frac{3}{2}}}}{\sqrt{b} + \sqrt{bx^3 + a}} \right)}{b^{\frac{3}{2}}} + \frac{2 \left(\frac{3\sqrt{bx^3 + a} a^3 b^2}{x^{\frac{3}{2}}} - \frac{8(bx^3 + a)^{\frac{3}{2}} a^3 b}{x^2} - \frac{3(bx^3 + a)^{\frac{5}{2}} a^3}{x^{\frac{15}{2}}} \right)}{b^4 - \frac{3(bx^3 + a)b^3}{x^3} + \frac{3(bx^3 + a)^2 b^2}{x^6} - \frac{(bx^3 + a)^3 b}{x^9}} \right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int (Bx^3 + A)(bx^3 + a)^{\frac{3}{2}}(ex)^{\frac{7}{2}} dx$$

5.5 Problem number 530

$$\int \sqrt{ex} (a + bx^3)^{3/2} (A + Bx^3) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(6Ab - aB)(ex)^{\frac{3}{2}}(bx^3 + a)^{\frac{3}{2}}}{36be} + \frac{B(ex)^{\frac{3}{2}}(bx^3 + a)^{\frac{5}{2}}}{9be} \\ & + \frac{a^2(6Ab - aB) \operatorname{arctanh}\left(\frac{(ex)^{\frac{3}{2}}\sqrt{b}}{e^{\frac{3}{2}}\sqrt{bx^3 + a}}\right) \sqrt{e}}{24b^{\frac{3}{2}}} + \frac{a(6Ab - aB)(ex)^{\frac{3}{2}}\sqrt{bx^3 + a}}{24be} \end{aligned}$$

command

`integrate((b*x^3+a)^(3/2)*(B*x^3+A)*(e*x)^(1/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{144} \left(6 \left(\frac{3a^2 \log\left(-\frac{\sqrt{b} - \sqrt{bx^3 + a}}{x^{\frac{3}{2}}}\right)}{\sqrt{b} + \sqrt{bx^3 + a}} + \frac{2\left(\frac{3\sqrt{bx^3 + a}a^2b}{x^{\frac{3}{2}}} - \frac{5(bx^3 + a)^{\frac{3}{2}}a^2}{x^{\frac{9}{2}}}\right)}{b^2 - \frac{2(bx^3 + a)b}{x^3} + \frac{(bx^3 + a)^2}{x^6}} \right) A - \frac{3a^3 \log\left(-\frac{\sqrt{b} - \sqrt{bx^3 + a}}{x^{\frac{3}{2}}}\right)}{b^{\frac{3}{2}}} \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int (Bx^3 + A)(bx^3 + a)^{\frac{3}{2}} \sqrt{ex} dx$$

5.6 Problem number 533

$$\int \frac{(a + bx^3)^{3/2} (A + Bx^3)}{(ex)^{5/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(4Ab + aB)(ex)^{\frac{3}{2}}(bx^3 + a)^{\frac{3}{2}}}{6ae^4} - \frac{2A(bx^3 + a)^{\frac{5}{2}}}{3ae(ex)^{\frac{3}{2}}} \\ & + \frac{a(4Ab + aB) \operatorname{arctanh}\left(\frac{(ex)^{\frac{3}{2}}\sqrt{b}}{e^{\frac{3}{2}}\sqrt{bx^3 + a}}\right)}{4e^{\frac{5}{2}}\sqrt{b}} + \frac{(4Ab + aB)(ex)^{\frac{3}{2}}\sqrt{bx^3 + a}}{4e^4} \end{aligned}$$

command

`integrate((b*x^3+a)^(3/2)*(B*x^3+A)/(e*x)^(5/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{24} \left(4 \left(3a\sqrt{b} \log \left(-\frac{\sqrt{b} - \frac{\sqrt{bx^3+a}}{x^{\frac{3}{2}}}}{\sqrt{b} + \frac{\sqrt{bx^3+a}}{x^{\frac{3}{2}}}} \right) + \frac{4\sqrt{bx^3+a}a}{x^{\frac{3}{2}}} + \frac{2\sqrt{bx^3+a}ab}{\left(b - \frac{bx^3+a}{x^3}\right)x^{\frac{3}{2}}} \right) A + \left(\frac{3a^2 \log \left(-\frac{\sqrt{b} - \frac{\sqrt{bx^3+a}}{x^{\frac{3}{2}}}}{\sqrt{b} + \frac{\sqrt{bx^3+a}}{x^{\frac{3}{2}}}} \right)}{\sqrt{b}} \right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{(Bx^3 + A)(bx^3 + a)^{\frac{3}{2}}}{(ex)^{\frac{5}{2}}} dx$$

5.7 Problem number 535

$$\int (ex)^{7/2} (a + bx^3)^{5/2} (A + Bx^3) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a(10Ab - 3aB)(ex)^{\frac{9}{2}}(bx^3 + a)^{\frac{3}{2}}}{144be} + \frac{(10Ab - 3aB)(ex)^{\frac{9}{2}}(bx^3 + a)^{\frac{5}{2}}}{120be} \\ & + \frac{B(ex)^{\frac{9}{2}}(bx^3 + a)^{\frac{7}{2}}}{15be} - \frac{a^4(10Ab - 3aB)e^{\frac{7}{2}} \operatorname{arctanh} \left(\frac{(ex)^{\frac{3}{2}}\sqrt{b}}{e^{\frac{3}{2}}\sqrt{bx^3+a}} \right)}{384b^{\frac{5}{2}}} \\ & + \frac{a^3(10Ab - 3aB)e^2(ex)^{\frac{3}{2}}\sqrt{bx^3+a}}{384b^2} + \frac{a^2(10Ab - 3aB)(ex)^{\frac{9}{2}}\sqrt{bx^3+a}}{192be} \end{aligned}$$

command

`integrate((e*x)^(7/2)*(b*x^3+a)^(5/2)*(B*x^3+A),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{11520} \left(10 \left(\frac{15a^4 \log \left(-\frac{\sqrt{b} - \frac{\sqrt{bx^3+a}}{x^{\frac{3}{2}}}}{\sqrt{b} + \frac{\sqrt{bx^3+a}}{x^{\frac{3}{2}}}} \right)}{b^{\frac{3}{2}}} + \frac{2 \left(\frac{15\sqrt{bx^3+a}a^4b^3}{x^{\frac{3}{2}}} - \frac{55(bx^3+a)^{\frac{3}{2}}a^4b^2}{x^{\frac{9}{2}}} + \frac{73(bx^3+a)^{\frac{5}{2}}a^4b}{x^{\frac{15}{2}}} + \frac{15(bx^3+a)}{x^{\frac{21}{2}}} \right)}{b^5 - \frac{4(bx^3+a)b^4}{x^3} + \frac{6(bx^3+a)^2b^3}{x^6} - \frac{4(bx^3+a)^3b^2}{x^9} + \frac{(bx^3+a)^4b}{x^{12}}} \right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int (Bx^3 + A)(bx^3 + a)^{\frac{5}{2}}(ex)^{\frac{7}{2}} dx$$

5.8 Problem number 538

$$\int \sqrt{ex} (a + bx^3)^{5/2} (A + Bx^3) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{5a(8Ab - aB)(ex)^{\frac{3}{2}}(bx^3 + a)^{\frac{3}{2}}}{288be} + \frac{(8Ab - aB)(ex)^{\frac{3}{2}}(bx^3 + a)^{\frac{5}{2}}}{72be} + \frac{B(ex)^{\frac{3}{2}}(bx^3 + a)^{\frac{7}{2}}}{12be} \\ & + \frac{5a^3(8Ab - aB) \operatorname{arctanh}\left(\frac{(ex)^{\frac{3}{2}}\sqrt{b}}{e^{\frac{3}{2}}\sqrt{bx^3 + a}}\right) \sqrt{e}}{192b^{\frac{3}{2}}} + \frac{5a^2(8Ab - aB)(ex)^{\frac{3}{2}}\sqrt{bx^3 + a}}{192be} \end{aligned}$$

command

`integrate((b*x^3+a)^(5/2)*(B*x^3+A)*(e*x)^(1/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{1152} \left(8 \left(\frac{15a^3 \log\left(\frac{\sqrt{b} - \sqrt{bx^3 + a}}{\sqrt{b} + \sqrt{bx^3 + a}}\right)}{\sqrt{b}} + \frac{2 \left(\frac{15\sqrt{bx^3 + a} a^3 b^2}{x^{\frac{3}{2}}} - \frac{40(bx^3 + a)^{\frac{3}{2}} a^3 b}{x^{\frac{9}{2}}} + \frac{33(bx^3 + a)^{\frac{5}{2}} a^3}{x^{\frac{15}{2}}} \right)}{b^3 - \frac{3(bx^3 + a)b^2}{x^3} + \frac{3(bx^3 + a)^2 b}{x^6} - \frac{(bx^3 + a)^3}{x^9}} \right) A - \left(\frac{15a^3}{x^{\frac{3}{2}}} \right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int (Bx^3 + A)(bx^3 + a)^{\frac{5}{2}}\sqrt{ex} dx$$

5.9 Problem number 541

$$\int \frac{(a + bx^3)^{5/2} (A + Bx^3)}{(ex)^{5/2}} dx$$

Optimal antiderivative

$$\frac{5(6Ab + aB)(ex)^{\frac{3}{2}}(bx^3 + a)^{\frac{3}{2}}}{36e^4} + \frac{(6Ab + aB)(ex)^{\frac{3}{2}}(bx^3 + a)^{\frac{5}{2}}}{9ae^4} - \frac{2A(bx^3 + a)^{\frac{7}{2}}}{3ae(ex)^{\frac{3}{2}}}$$

$$+ \frac{5a^2(6Ab + aB) \operatorname{arctanh}\left(\frac{(ex)^{\frac{3}{2}}\sqrt{b}}{e^{\frac{3}{2}}\sqrt{bx^3 + a}}\right)}{24e^{\frac{5}{2}}\sqrt{b}} + \frac{5a(6Ab + aB)(ex)^{\frac{3}{2}}\sqrt{bx^3 + a}}{24e^4}$$

command

```
integrate((b*x^3+a)^(5/2)*(B*x^3+A)/(e*x)^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{144} \left(6 \left(15 a^2 \sqrt{b} \log \left(-\frac{\sqrt{b} - \frac{\sqrt{bx^3 + a}}{x^{\frac{3}{2}}}}{\sqrt{b} + \frac{\sqrt{bx^3 + a}}{x^{\frac{3}{2}}}} \right) + \frac{16 \sqrt{bx^3 + a} a^2}{x^{\frac{3}{2}}} + \frac{2 \left(\frac{7 \sqrt{bx^3 + a} a^2 b^2}{x^{\frac{3}{2}}} - \frac{9 (bx^3 + a)^{\frac{3}{2}} a^2 b}{x^{\frac{9}{2}}} \right)}{b^2 - \frac{2(bx^3 + a)b}{x^3} + \frac{(bx^3 + a)^2}{x^6}} \right) A + \right.$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{(Bx^3 + A)(bx^3 + a)^{\frac{5}{2}}}{(ex)^{\frac{5}{2}}} dx$$

5.10 Problem number 543

$$\int \frac{(ex)^{7/2} (A + Bx^3)}{\sqrt{a + bx^3}} dx$$

Optimal antiderivative

$$-\frac{a(4Ab - 3aB) e^{\frac{7}{2}} \operatorname{arctanh}\left(\frac{(ex)^{\frac{3}{2}}\sqrt{b}}{e^{\frac{3}{2}}\sqrt{bx^3 + a}}\right)}{12b^{\frac{5}{2}}}$$

$$+ \frac{(4Ab - 3aB) e^2 (ex)^{\frac{3}{2}} \sqrt{bx^3 + a}}{12b^2} + \frac{B(ex)^{\frac{9}{2}} \sqrt{bx^3 + a}}{6be}$$

command

```
integrate((e*x)^(7/2)*(B*x^3+A)/(b*x^3+a)^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{24} \left(B \left(\frac{3a^2 \log \left(-\frac{\sqrt{b} - \sqrt{bx^3 + a}}{x^{\frac{3}{2}}} \right)}{b^{\frac{5}{2}}} - \frac{2 \left(\frac{5\sqrt{bx^3 + a}}{x^{\frac{3}{2}}} - \frac{3(bx^3 + a)^{\frac{3}{2}} a^2}{x^{\frac{9}{2}}} \right)}{b^4 - \frac{2(bx^3 + a)b^3}{x^3} + \frac{(bx^3 + a)^2 b^2}{x^6}} \right) - 4A \left(\frac{a \log \left(-\frac{\sqrt{b} - \sqrt{bx^3 + a}}{x^{\frac{3}{2}}} \right)}{b^{\frac{3}{2}}} \right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{(Bx^3 + A)(ex)^{\frac{7}{2}}}{\sqrt{bx^3 + a}} dx$$

5.11 Problem number 546

$$\int \frac{\sqrt{ex} (A + Bx^3)}{\sqrt{a + bx^3}} dx$$

Optimal antiderivative

$$\frac{(2Ab - aB) \operatorname{arctanh} \left(\frac{(ex)^{\frac{3}{2}} \sqrt{b}}{e^{\frac{3}{2}} \sqrt{bx^3 + a}} \right) \sqrt{e}}{3b^{\frac{3}{2}}} + \frac{B(ex)^{\frac{3}{2}} \sqrt{bx^3 + a}}{3be}$$

command

`integrate((B*x^3+A)*(e*x)^(1/2)/(b*x^3+a)^(1/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{6} \left(B \left(\frac{a \log \left(-\frac{\sqrt{b} - \sqrt{bx^3 + a}}{x^{\frac{3}{2}}} \right)}{b^{\frac{3}{2}}} - \frac{2\sqrt{bx^3 + a} a}{\left(b^2 - \frac{(bx^3 + a)b}{x^3} \right) x^{\frac{3}{2}}} \right) - \frac{2A \log \left(-\frac{\sqrt{b} - \sqrt{bx^3 + a}}{x^{\frac{3}{2}}} \right)}{\sqrt{b}} \right) e^{\frac{1}{2}}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{(Bx^3 + A)\sqrt{ex}}{\sqrt{bx^3 + a}} dx$$

5.12 Problem number 549

$$\int \frac{A + Bx^3}{(ex)^{5/2} \sqrt{a + bx^3}} dx$$

Optimal antiderivative

$$\frac{2B \operatorname{arctanh} \left(\frac{(ex)^{\frac{3}{2}} \sqrt{b}}{e^{\frac{3}{2}} \sqrt{bx^3 + a}} \right)}{3e^{\frac{5}{2}} \sqrt{b}} - \frac{2A \sqrt{bx^3 + a}}{3ae (ex)^{\frac{3}{2}}}$$

command

```
integrate((B*x^3+A)/(e*x)^(5/2)/(b*x^3+a)^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{3} \left(\frac{B \log \left(-\frac{\sqrt{b} - \sqrt{bx^3 + a}}{\frac{x^{\frac{3}{2}}}{\sqrt{b} + \sqrt{bx^3 + a}}} \right)}{\sqrt{b}} + \frac{2 \sqrt{bx^3 + a} A}{ax^{\frac{3}{2}}} \right) e^{(-\frac{5}{2})}$$

Maxima 5.44 via sagemath 9.3 output

$$-\frac{B \log \left(-\frac{\sqrt{b} - \sqrt{bx^3 + a}}{\frac{x^{\frac{3}{2}}}{\sqrt{b} + \sqrt{bx^3 + a}}} \right)}{3 \sqrt{b} e^{\frac{5}{2}}} - \frac{2 (b\sqrt{e} x^4 + a\sqrt{e} x) A}{3 \sqrt{bx^3 + a} ae^3 x^{\frac{5}{2}}}$$

5.13 Problem number 551

$$\int \frac{(ex)^{7/2} (A + Bx^3)}{(a + bx^3)^{3/2}} dx$$

Optimal antiderivative

$$\frac{(2Ab - 3aB) e^{\frac{7}{2}} \operatorname{arctanh} \left(\frac{(ex)^{\frac{3}{2}} \sqrt{b}}{e^{\frac{3}{2}} \sqrt{bx^3 + a}} \right)}{3b^{\frac{5}{2}}} - \frac{(2Ab - 3aB) e^2 (ex)^{\frac{3}{2}}}{3b^2 \sqrt{bx^3 + a}} + \frac{B(ex)^{\frac{9}{2}}}{3be \sqrt{bx^3 + a}}$$

command

```
integrate((e*x)^(7/2)*(B*x^3+A)/(b*x^3+a)^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{6} \left(B \left(\frac{2 \left(2ab - \frac{3(bx^3+a)a}{x^3} \right)}{\sqrt{bx^3+a} b^3 - \frac{(bx^3+a)^{\frac{3}{2}} b^2}{x^2}} + \frac{3a \log \left(-\frac{\sqrt{b} - \sqrt{bx^3+a}}{\sqrt{b} + \sqrt{bx^3+a}} \right)}{b^{\frac{5}{2}}} \right) - 2A \left(\frac{2x^{\frac{3}{2}}}{\sqrt{bx^3+a} b} + \frac{\log \left(-\frac{\sqrt{b} - \sqrt{bx^3+a}}{\sqrt{b} + \sqrt{bx^3+a}} \right)}{b^{\frac{3}{2}}} \right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{(Bx^3 + A)(ex)^{\frac{7}{2}}}{(bx^3 + a)^{\frac{3}{2}}} dx$$

5.14 Problem number 554

$$\int \frac{\sqrt{ex} (A + Bx^3)}{(a + bx^3)^{3/2}} dx$$

Optimal antiderivative

$$\frac{2B \operatorname{arctanh} \left(\frac{(ex)^{\frac{3}{2}} \sqrt{b}}{e^{\frac{3}{2}} \sqrt{bx^3+a}} \right) \sqrt{e}}{3b^{\frac{3}{2}}} + \frac{2(Ab - aB)(ex)^{\frac{3}{2}}}{3abe \sqrt{bx^3+a}}$$

command

```
integrate((B*x^3+A)*(e*x)^(1/2)/(b*x^3+a)^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{3} \left(B \left(\frac{2x^{\frac{3}{2}}}{\sqrt{bx^3+a} b} + \frac{\log \left(-\frac{\sqrt{b} - \sqrt{bx^3+a}}{\sqrt{b} + \sqrt{bx^3+a}} \right)}{b^{\frac{3}{2}}} \right) - \frac{2Ax^{\frac{3}{2}}}{\sqrt{bx^3+a} a} \right) e^{\frac{1}{2}}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{(Bx^3 + A)\sqrt{ex}}{(bx^3 + a)^{\frac{3}{2}}} dx$$

5.15 Problem number 557

$$\int \frac{A + Bx^3}{(ex)^{5/2} (a + bx^3)^{3/2}} dx$$

Optimal antiderivative

$$-\frac{2A}{3ae (ex)^{\frac{3}{2}} \sqrt{bx^3 + a}} - \frac{2(2Ab - aB) (ex)^{\frac{3}{2}}}{3a^2e^4 \sqrt{bx^3 + a}}$$

command

`integrate((B*x^3+A)/(e*x)^(5/2)/(b*x^3+a)^(3/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{2}{3} \left(A \left(\frac{bx^{\frac{3}{2}}}{\sqrt{bx^3 + a} a^2} + \frac{\sqrt{bx^3 + a}}{a^2 x^{\frac{3}{2}}} \right) - \frac{Bx^{\frac{3}{2}}}{\sqrt{bx^3 + a} a} \right) e^{(-\frac{5}{2})}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{3}{2}} (ex)^{\frac{5}{2}}} dx$$

5.16 Problem number 559

$$\int \frac{(ex)^{7/2} (A + Bx^3)}{(a + bx^3)^{5/2}} dx$$

Optimal antiderivative

$$\frac{2(Ab - aB) (ex)^{\frac{9}{2}}}{9abe (bx^3 + a)^{\frac{3}{2}}} + \frac{2B e^{\frac{7}{2}} \operatorname{arctanh} \left(\frac{(ex)^{\frac{3}{2}} \sqrt{b}}{e^{\frac{3}{2}} \sqrt{bx^3 + a}} \right)}{3b^{\frac{5}{2}}} - \frac{2B e^2 (ex)^{\frac{3}{2}}}{3b^2 \sqrt{bx^3 + a}}$$

command

`integrate((e*x)^(7/2)*(B*x^3+A)/(b*x^3+a)^(5/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{9} \left(\frac{2Ax^{\frac{9}{2}}}{(bx^3 + a)^{\frac{3}{2}} a} - \left(\frac{2 \left(b + \frac{3(bx^3 + a)}{x^3} \right) x^{\frac{9}{2}}}{(bx^3 + a)^{\frac{3}{2}} b^2} + \frac{3 \log \left(-\frac{\sqrt{b} - \sqrt{bx^3 + a}}{x^{\frac{3}{2}} \sqrt{b} + \sqrt{bx^3 + a}} \right)}{b^{\frac{5}{2}}} \right) B \right) e^{\frac{7}{2}}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{(Bx^3 + A)(ex)^{\frac{7}{2}}}{(bx^3 + a)^{\frac{5}{2}}} dx$$

5.17 Problem number 562

$$\int \frac{\sqrt{ex} (A + Bx^3)}{(a + bx^3)^{5/2}} dx$$

Optimal antiderivative

$$\frac{2(Ab - aB)(ex)^{\frac{3}{2}}}{9abe(bx^3 + a)^{\frac{3}{2}}} + \frac{2(2Ab + aB)(ex)^{\frac{3}{2}}}{9a^2be\sqrt{bx^3 + a}}$$

command

```
integrate((B*x^3+A)*(e*x)^(1/2)/(b*x^3+a)^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{2}{9} \left(\frac{Bx^{\frac{9}{2}}}{(bx^3 + a)^{\frac{3}{2}}a} - \frac{A \left(b - \frac{3(bx^3 + a)}{x^3} \right) x^{\frac{9}{2}}}{(bx^3 + a)^{\frac{3}{2}}a^2} \right) e^{\frac{1}{2}}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{(Bx^3 + A)\sqrt{ex}}{(bx^3 + a)^{\frac{5}{2}}} dx$$

5.18 Problem number 565

$$\int \frac{A + Bx^3}{(ex)^{5/2} (a + bx^3)^{5/2}} dx$$

Optimal antiderivative

$$-\frac{2A}{3ae(ex)^{\frac{3}{2}}(bx^3 + a)^{\frac{3}{2}}} - \frac{2(4Ab - aB)(ex)^{\frac{3}{2}}}{9a^2e^4(bx^3 + a)^{\frac{3}{2}}} - \frac{4(4Ab - aB)(ex)^{\frac{3}{2}}}{9a^3e^4\sqrt{bx^3 + a}}$$

command

```
integrate((B*x^3+A)/(e*x)^(5/2)/(b*x^3+a)^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{2}{9} \left(\frac{B \left(b - \frac{3(bx^3+a)}{x^3} \right) x^{\frac{9}{2}}}{(bx^3+a)^{\frac{3}{2}} a^2} - A \left(\frac{\left(b^2 - \frac{6(bx^3+a)b}{x^3} \right) x^{\frac{9}{2}}}{(bx^3+a)^{\frac{3}{2}} a^3} - \frac{3\sqrt{bx^3+a}}{a^3 x^{\frac{3}{2}}} \right) \right) e^{(-\frac{5}{2})}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{Bx^3 + A}{(bx^3 + a)^{\frac{5}{2}} (ex)^{\frac{5}{2}}} dx$$

6 Test file number 38

Test folder name:

test_cases/1_Algebraic_functions/1.2_Trinomial_products/1.2.1_Quadratic/38_1.2.1.9_P-x-d+e_x-^m-a+b_x+c_x^2-^p

6.1 Problem number 99

$$\int \frac{(a + cx^2)^{3/2} (d + ex + fx^2)}{(g + hx)^8} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{c(6c^2dg^3 + a^2h^2(-eh + 8fg) - acg(fg^2 - h(-3dh + 8eg))) (-cgx + ah) (cx^2 + a)^{\frac{3}{2}}}{24(a h^2 + c g^2)^4 (hx + g)^4} \\ & - \frac{(d h^2 - egh + f g^2) (cx^2 + a)^{\frac{5}{2}}}{7h(a h^2 + c g^2) (hx + g)^7} + \frac{(7a h^2(-eh + 2fg) + cg(5f g^2 + h(-9dh + 2eg))) (cx^2 + a)^{\frac{5}{2}}}{42h(a h^2 + c g^2)^2 (hx + g)^6} \\ & - \frac{(42a^2 f h^4 - c^2 g^2(5f g^2 + h(-51dh + 2eg)) - ac h^2(26f g^2 - h(-12dh + 61eg))) (cx^2 + a)^{\frac{5}{2}}}{210h(a h^2 + c g^2)^3 (hx + g)^5} \\ & - \frac{a^2 c^3(6c^2dg^3 + a^2h^2(-eh + 8fg) - acg(fg^2 - h(-3dh + 8eg))) \operatorname{arctanh} \left(\frac{-cgx+ah}{\sqrt{a h^2 + c g^2} \sqrt{c x^2 + a}} \right)}{16(a h^2 + c g^2)^{\frac{11}{2}}} \\ & - \frac{a c^2(6c^2dg^3 + a^2h^2(-eh + 8fg) - acg(fg^2 - h(-3dh + 8eg))) (-cgx + ah) \sqrt{c x^2 + a}}{16(a h^2 + c g^2)^5 (hx + g)^2} \end{aligned}$$

command

```
integrate((c*x^2+a)^(3/2)*(f*x^2+e*x+d)/(h*x+g)^8,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

7 Test file number 54

Test folder name:

test_cases/2_Exponentials/54_2.2-c+d_x~m-F~g-e+f_x~n-a+b-F~g-e+f_x~n~p

7.1 Problem number 46

$$\int \frac{(c + dx)^3}{a + b(Fg(e+fx))^n} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(dx + c)^4}{4ad} - \frac{(dx + c)^3 \ln\left(1 + \frac{b(Fg(fx+e))^n}{a}\right)}{afgn \ln(F)} - \frac{3d(dx + c)^2 \operatorname{polylog}\left(2, -\frac{b(Fg(fx+e))^n}{a}\right)}{af^2g^2n^2 \ln(F)^2} \\ & + \frac{6d^2(dx + c) \operatorname{polylog}\left(3, -\frac{b(Fg(fx+e))^n}{a}\right)}{af^3g^3n^3 \ln(F)^3} - \frac{6d^3 \operatorname{polylog}\left(4, -\frac{b(Fg(fx+e))^n}{a}\right)}{af^4g^4n^4 \ln(F)^4} \end{aligned}$$

command

```
integrate((d*x+c)^3/(a+b*(F^(g*(f*x+e)))^n),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\begin{aligned} & c^3 \left(\frac{fgnx + gne}{afgn} - \frac{\log(Ffgnx + gneb + a)}{afgn \log(F)} \right) \\ & - \frac{3 \left(fgnx \log\left(\frac{Ffgnx Fgneb}{a} + 1\right) \log(F) + \operatorname{Li}_2\left(-\frac{Ffgnx Fgneb}{a}\right) \right) cd^2}{af^2g^2n^2 \log(F)^2} \\ & - \frac{3 \left(f^2g^2n^2x^2 \log\left(\frac{Ffgnx Fgneb}{a} + 1\right) \log(F)^2 + 2fgnx \operatorname{Li}_2\left(-\frac{Ffgnx Fgneb}{a}\right) \log(F) - 2 \operatorname{Li}_3\left(-\frac{Ffgnx Fgneb}{a}\right) \right) cd^2}{af^3g^3n^3 \log(F)^3} \\ & - \frac{\left(f^3g^3n^3x^3 \log\left(\frac{Ffgnx Fgneb}{a} + 1\right) \log(F)^3 + 3f^2g^2n^2x^2 \operatorname{Li}_2\left(-\frac{Ffgnx Fgneb}{a}\right) \log(F)^2 - 6fgnx \log(F) \operatorname{Li}_3\left(-\frac{Ffgnx Fgneb}{a}\right) \right) cd^2}{af^4g^4n^4 \log(F)^4} \\ & + \frac{d^3f^4g^4n^4x^4 \log(F)^4 + 4cd^2f^4g^4n^4x^3 \log(F)^4 + 6c^2df^4g^4n^4x^2 \log(F)^4}{4af^4g^4n^4 \log(F)^4} \end{aligned}$$

Maxima 5.44 via sagemath 9.3 output

$$-c^3 \left(\frac{\log\left(\left(Ffgx+eg\right)^nb+a\right)}{afgn \log(F)} - \frac{\log\left(\left(Ffgx+eg\right)^n\right)}{afgn \log(F)} \right) + \int \frac{d^3x^3 + 3cd^2x^2 + 3c^2dx}{(Ffgx)^n(Feg)^nb+a} dx$$

7.2 Problem number 47

$$\int \frac{(c + dx)^2}{a + b (Fg(e+fx))^n} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(dx + c)^3}{3ad} - \frac{(dx + c)^2 \ln \left(1 + \frac{b(Fg(fx+e))^n}{a} \right)}{afgn \ln(F)} \\ & - \frac{2d(dx + c) \operatorname{polylog} \left(2, -\frac{b(Fg(fx+e))^n}{a} \right)}{af^2g^2n^2 \ln(F)^2} + \frac{2d^2 \operatorname{polylog} \left(3, -\frac{b(Fg(fx+e))^n}{a} \right)}{af^3g^3n^3 \ln(F)^3} \end{aligned}$$

command

```
integrate((d*x+c)^2/(a+b*(F^(g*(f*x+e)))^n),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\begin{aligned} & c^2 \left(\frac{fgnx + gne}{afgn} - \frac{\log(Ffgnx + gneb + a)}{afgn \log(F)} \right) \\ & - \frac{2 \left(fgnx \log \left(\frac{Ffgnx Fgneb}{a} + 1 \right) \log(F) + \operatorname{Li}_2 \left(-\frac{Ffgnx Fgneb}{a} \right) \right) cd}{af^2g^2n^2 \log(F)^2} \\ & - \frac{\left(f^2g^2n^2x^2 \log \left(\frac{Ffgnx Fgneb}{a} + 1 \right) \log(F)^2 + 2fgnx \operatorname{Li}_2 \left(-\frac{Ffgnx Fgneb}{a} \right) \log(F) - 2 \operatorname{Li}_3 \left(-\frac{Ffgnx Fgneb}{a} \right) \right) d^2}{af^3g^3n^3 \log(F)^3} \\ & + \frac{d^2 f^3 g^3 n^3 x^3 \log(F)^3 + 3cdf^3g^3n^3x^2 \log(F)^3}{3af^3g^3n^3 \log(F)^3} \end{aligned}$$

Maxima 5.44 via sagemath 9.3 output

$$-c^2 \left(\frac{\log((Ffgx+eg)^n b + a)}{afgn \log(F)} - \frac{\log((Ffgx+eg)^n)}{afgn \log(F)} \right) + \int \frac{d^2x^2 + 2cdx}{(Ffgx)^n (Feg)^n b + a} dx$$

7.3 Problem number 52

$$\int \frac{(c + dx)^3}{(a + b (Fg(e+fx))^n)^2} dx$$

Optimal antiderivative

$$\begin{aligned}
& \frac{(dx+c)^4}{4a^2d} - \frac{(dx+c)^3}{a^2fgn \ln(F)} + \frac{(dx+c)^3}{af(a+b(Fg(fx+e))^n)gn \ln(F)} \\
& + \frac{3d(dx+c)^2 \ln\left(1 + \frac{b(Fg(fx+e))^n}{a}\right)}{a^2f^2g^2n^2 \ln(F)^2} - \frac{(dx+c)^3 \ln\left(1 + \frac{b(Fg(fx+e))^n}{a}\right)}{a^2fgn \ln(F)} \\
& + \frac{6d^2(dx+c) \operatorname{polylog}\left(2, -\frac{b(Fg(fx+e))^n}{a}\right)}{a^2f^3g^3n^3 \ln(F)^3} \\
& - \frac{3d(dx+c)^2 \operatorname{polylog}\left(2, -\frac{b(Fg(fx+e))^n}{a}\right)}{a^2f^2g^2n^2 \ln(F)^2} - \frac{6d^3 \operatorname{polylog}\left(3, -\frac{b(Fg(fx+e))^n}{a}\right)}{a^2f^4g^4n^4 \ln(F)^4} \\
& + \frac{6d^2(dx+c) \operatorname{polylog}\left(3, -\frac{b(Fg(fx+e))^n}{a}\right)}{a^2f^3g^3n^3 \ln(F)^3} - \frac{6d^3 \operatorname{polylog}\left(4, -\frac{b(Fg(fx+e))^n}{a}\right)}{a^2f^4g^4n^4 \ln(F)^4}
\end{aligned}$$

command

`integrate((d*x+c)^3/(a+b*(F^(g*(f*x+e)))^n)^2,x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\begin{aligned}
& c^3 \left(\frac{fgnx + gne}{a^2fgn} + \frac{1}{(Ffgnx+gneab + a^2)fgn \log(F)} - \frac{\log(Ffgnx+gneb + a)}{a^2fgn \log(F)} \right) \\
& + \frac{d^3x^3 + 3cd^2x^2 + 3c^2dx}{Ffgnx Fgneabfgn \log(F) + a^2fgn \log(F)} - \frac{3c^2dx}{a^2fgn \log(F)} + \frac{3c^2d \log(Ffgnx Fgneb + a)}{a^2f^2g^2n^2 \log(F)^2} \\
& - \frac{3(c^2dfgn \log(F) - 2cd^2) \left(fgnx \log\left(\frac{Ffgnx Fgneb}{a} + 1\right) \log(F) + \operatorname{Li}_2\left(-\frac{Ffgnx Fgneb}{a}\right) \right)}{a^2f^3g^3n^3 \log(F)^3} \\
& - \frac{\left(f^3g^3n^3x^3 \log\left(\frac{Ffgnx Fgneb}{a} + 1\right) \log(F)^3 + 3f^2g^2n^2x^2 \operatorname{Li}_2\left(-\frac{Ffgnx Fgneb}{a}\right) \log(F)^2 - 6fgnx \log(F) \operatorname{Li}_3\left(-\frac{Ffgnx Fgneb}{a}\right) \right)}{a^2f^4g^4n^4 \log(F)^4} \\
& - \frac{3 \left(f^2g^2n^2x^2 \log\left(\frac{Ffgnx Fgneb}{a} + 1\right) \log(F)^2 + 2fgnx \operatorname{Li}_2\left(-\frac{Ffgnx Fgneb}{a}\right) \log(F) - 2 \operatorname{Li}_3\left(-\frac{Ffgnx Fgneb}{a}\right) \right) (cd^2fgn \log(F))}{a^2f^4g^4n^4 \log(F)^4} \\
& + \frac{d^3f^4g^4n^4x^4 \log(F)^4 + 4(cd^2fgn \log(F) - d^3)f^3g^3n^3x^3 \log(F)^3 + 6(c^2df^2g^2n^2 \log(F)^2 - 2cd^2fgn \log(F))f^2g^2n^2x^2 \log(F)^2}{4a^2f^4g^4n^4 \log(F)^4}
\end{aligned}$$

Maxima 5.44 via sagemath 9.3 output

$$\begin{aligned}
& c^3 \left(\frac{1}{((Ffgx+eg)^n abn + a^2n)fg \log(F)} + \frac{\log(Ffgx+eg)}{a^2fg \log(F)} - \frac{\log\left(\frac{(Ffgx+eg)^n b+a}{b}\right)}{a^2fgn \log(F)} \right) \\
& + \frac{d^3x^3 + 3cd^2x^2 + 3c^2dx}{(Ffgx)^n (Feg)^n abfgn \log(F) + a^2fgn \log(F)} \\
& + \int \frac{d^3fgnx^3 \log(F) - 3c^2d + 3(cd^2fgn \log(F) - d^3)x^2 + 3(c^2dfgn \log(F) - 2cd^2)x}{(Ffgx)^n (Feg)^n abfgn \log(F) + a^2fgn \log(F)} dx
\end{aligned}$$

7.4 Problem number 53

$$\int \frac{(c + dx)^2}{(a + b(F^{g(e+fx)})^n)^2} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(dx + c)^3}{3a^2d} - \frac{(dx + c)^2}{a^2fgn \ln(F)} + \frac{(dx + c)^2}{af(a + b(F^{g(fx+e)})^n) g n \ln(F)} \\ & + \frac{2d(dx + c) \ln\left(1 + \frac{b(F^{g(fx+e)})^n}{a}\right)}{a^2f^2g^2n^2 \ln(F)^2} \\ & - \frac{(dx + c)^2 \ln\left(1 + \frac{b(F^{g(fx+e)})^n}{a}\right)}{a^2fgn \ln(F)} + \frac{2d^2 \operatorname{polylog}\left(2, -\frac{b(F^{g(fx+e)})^n}{a}\right)}{a^2f^3g^3n^3 \ln(F)^3} \\ & - \frac{2d(dx + c) \operatorname{polylog}\left(2, -\frac{b(F^{g(fx+e)})^n}{a}\right)}{a^2f^2g^2n^2 \ln(F)^2} + \frac{2d^2 \operatorname{polylog}\left(3, -\frac{b(F^{g(fx+e)})^n}{a}\right)}{a^2f^3g^3n^3 \ln(F)^3} \end{aligned}$$

command

`integrate((d*x+c)^2/(a+b*(F^(g*(f*x+e)))^n)^2,x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\begin{aligned} & c^2 \left(\frac{fgnx + gne}{a^2fgn} + \frac{1}{(Ffgnx+gneab + a^2)fgn \log(F)} - \frac{\log(Ffgnx+gneb + a)}{a^2fgn \log(F)} \right) \\ & + \frac{d^2x^2 + 2cdx}{Ffgnx Fgneb abfgn \log(F) + a^2fgn \log(F)} - \frac{2cdx}{a^2fgn \log(F)} + \frac{2cd \log(Ffgnx Fgneb + a)}{a^2f^2g^2n^2 \log(F)^2} \\ & - \frac{\left(f^2g^2n^2x^2 \log\left(\frac{Ffgnx Fgneb}{a} + 1\right) \log(F)^2 + 2fgnx \operatorname{Li}_2\left(-\frac{Ffgnx Fgneb}{a}\right) \log(F) - 2 \operatorname{Li}_3\left(-\frac{Ffgnx Fgneb}{a}\right)\right) d^2}{a^2f^3g^3n^3 \log(F)^3} \\ & - \frac{2(cdfgn \log(F) - d^2) \left(fgnx \log\left(\frac{Ffgnx Fgneb}{a} + 1\right) \log(F) + \operatorname{Li}_2\left(-\frac{Ffgnx Fgneb}{a}\right)\right)}{a^2f^3g^3n^3 \log(F)^3} \\ & + \frac{d^2f^3g^3n^3x^3 \log(F)^3 + 3(cdfgn \log(F) - d^2)f^2g^2n^2x^2 \log(F)^2}{3a^2f^3g^3n^3 \log(F)^3} \end{aligned}$$

Maxima 5.44 via sagemath 9.3 output

$$\begin{aligned} & c^2 \left(\frac{1}{((Ffgx+eg)^n abn + a^2n) fg \log(F)} + \frac{\log(Ffgx+eg)}{a^2fg \log(F)} - \frac{\log\left(\frac{(Ffgx+eg)^n b+a}{b}\right)}{a^2fgn \log(F)} \right) \\ & + \frac{d^2x^2 + 2cdx}{(Ffgx)^n (Feg)^n abfgn \log(F) + a^2fgn \log(F)} \\ & + \int \frac{d^2fgnx^2 \log(F) - 2cd + 2(cdfgn \log(F) - d^2)x}{(Ffgx)^n (Feg)^n abfgn \log(F) + a^2fgn \log(F)} dx \end{aligned}$$

7.5 Problem number 58

$$\int \frac{(c + dx)^3}{(a + b(Fg(e+fx))^n)^3} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(dx + c)^4}{4a^3d} + \frac{3d(dx + c)^2}{2a^3f^2g^2n^2 \ln(F)^2} - \frac{3d(dx + c)^2}{2a^2f^2(a + b(Fg(fx+e))^n)g^2n^2 \ln(F)^2} \\ & - \frac{3(dx + c)^3}{2a^3fgn \ln(F)} + \frac{(dx + c)^3}{2af(a + b(Fg(fx+e))^n)^2 g n \ln(F)} \\ & + \frac{(dx + c)^3}{a^2f(a + b(Fg(fx+e))^n)gn \ln(F)} - \frac{3d^2(dx + c) \ln\left(1 + \frac{b(Fg(fx+e))^n}{a}\right)}{a^3f^3g^3n^3 \ln(F)^3} \\ & + \frac{9d(dx + c)^2 \ln\left(1 + \frac{b(Fg(fx+e))^n}{a}\right)}{2a^3f^2g^2n^2 \ln(F)^2} - \frac{(dx + c)^3 \ln\left(1 + \frac{b(Fg(fx+e))^n}{a}\right)}{a^3fgn \ln(F)} \\ & - \frac{3d^3 \operatorname{polylog}\left(2, -\frac{b(Fg(fx+e))^n}{a}\right)}{a^3f^4g^4n^4 \ln(F)^4} + \frac{9d^2(dx + c) \operatorname{polylog}\left(2, -\frac{b(Fg(fx+e))^n}{a}\right)}{a^3f^3g^3n^3 \ln(F)^3} \\ & - \frac{3d(dx + c)^2 \operatorname{polylog}\left(2, -\frac{b(Fg(fx+e))^n}{a}\right)}{a^3f^2g^2n^2 \ln(F)^2} - \frac{9d^3 \operatorname{polylog}\left(3, -\frac{b(Fg(fx+e))^n}{a}\right)}{a^3f^4g^4n^4 \ln(F)^4} \\ & + \frac{6d^2(dx + c) \operatorname{polylog}\left(3, -\frac{b(Fg(fx+e))^n}{a}\right)}{a^3f^3g^3n^3 \ln(F)^3} - \frac{6d^3 \operatorname{polylog}\left(4, -\frac{b(Fg(fx+e))^n}{a}\right)}{a^3f^4g^4n^4 \ln(F)^4} \end{aligned}$$

command

```
integrate((d*x+c)^3/(a+b*(F^(g*(f*x+e)))^n)^3,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

Optimal antiderivative

$$\begin{aligned}
& \frac{(dx+c)^3}{3a^3d} + \frac{d^2x}{a^3f^2g^2n^2\ln(F)^2} - \frac{d(dx+c)}{a^2f^2(a+b(Fg(fx+e))^n)g^2n^2\ln(F)^2} - \frac{3(dx+c)^2}{2a^3fgn\ln(F)} \\
& + \frac{(dx+c)^2}{2af(a+b(Fg(fx+e))^n)^2gn\ln(F)} + \frac{(dx+c)^2}{a^2f(a+b(Fg(fx+e))^n)gn\ln(F)} \\
& - \frac{d^2\ln\left(a+b(Fg(fx+e))^n\right)}{a^3f^3g^3n^3\ln(F)^3} + \frac{3d(dx+c)\ln\left(1+\frac{b(Fg(fx+e))^n}{a}\right)}{a^3f^2g^2n^2\ln(F)^2} \\
& - \frac{(dx+c)^2\ln\left(1+\frac{b(Fg(fx+e))^n}{a}\right)}{a^3fgn\ln(F)} + \frac{3d^2\operatorname{polylog}\left(2,-\frac{b(Fg(fx+e))^n}{a}\right)}{a^3f^3g^3n^3\ln(F)^3} \\
& - \frac{2d(dx+c)\operatorname{polylog}\left(2,-\frac{b(Fg(fx+e))^n}{a}\right)}{a^3f^2g^2n^2\ln(F)^2} + \frac{2d^2\operatorname{polylog}\left(3,-\frac{b(Fg(fx+e))^n}{a}\right)}{a^3f^3g^3n^3\ln(F)^3}
\end{aligned}$$

command

```
integrate((d*x+c)^2/(a+b*(F^(g*(f*x+e)))^n)^3,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\begin{aligned}
& \frac{1}{2}c^2\left(\frac{2Ffgnx+gneb+3a}{(2Ffgnx+gnea^3b+F^2fgnx+2gnea^2b^2+a^4)fgn\log(F)} + \frac{2(fgnx+gne)}{a^3fgn} - \frac{2\log(Ffgnx+gneb+a)}{a^3fgn\log(F)}\right) \\
& + \frac{3ad^2fgnx^2\log(F) - 2acd + 2(Fgneb^2d^2fgnx^2\log(F) - Fgnebcd + (2Fgnebcdfgn\log(F) - Fgneb^2d^2)x)Ffgnx}{2(2FfgnxFgnea^3bf^2g^2n^2\log(F)^2 + F^2fgnxF^2gnea^2b^2f^2g^2n^2\log(F)^2 + a^4f^2g^2n^2\log(F)^2)} \\
& - \frac{(3cdfgn\log(F) - d^2)x}{a^3f^2g^2n^2\log(F)^2} \\
& - \frac{\left(f^2g^2n^2x^2\log\left(\frac{FfgnxFgneb}{a} + 1\right)\log(F)^2 + 2fgnx\operatorname{Li}_2\left(-\frac{FfgnxFgneb}{a}\right)\log(F) - 2\operatorname{Li}_3\left(-\frac{FfgnxFgneb}{a}\right)\right)d^2}{a^3f^3g^3n^3\log(F)^3} \\
& - \frac{(2cdfgn\log(F) - 3d^2)\left(fgnx\log\left(\frac{FfgnxFgneb}{a} + 1\right)\log(F) + \operatorname{Li}_2\left(-\frac{FfgnxFgneb}{a}\right)\right)}{a^3f^3g^3n^3\log(F)^3} \\
& + \frac{(3cdfgn\log(F) - d^2)\log(FfgnxFgneb+a)}{a^3f^3g^3n^3\log(F)^3} \\
& + \frac{2d^2f^3g^3n^3x^3\log(F)^3 + 3(2cdfgn\log(F) - 3d^2)f^2g^2n^2x^2\log(F)^2}{6a^3f^3g^3n^3\log(F)^3}
\end{aligned}$$

Maxima 5.44 via sagemath 9.3 output

$$\frac{1}{2} c^2 \left(\frac{2 (F^{fgx+eg})^n b + 3 a}{\left(2 (F^{fgx+eg})^n a^3 b n + (F^{fgx+eg})^{2n} a^2 b^2 n + a^4 n \right) f g \log (F)} + \frac{2 \log (F^{fgx+eg})}{a^3 f g \log (F)} - \frac{2 \log \left(\frac{(F^{fgx+eg})^n b + a}{b} \right)}{a^3 f g n \log (F)} \right) \\ + \frac{3 a d^2 f g n x^2 \log (F) - 2 a c d + 2 \left((F^{eg})^n b d^2 f g n x^2 \log (F) - (F^{eg})^n b c d + \left(2 (F^{eg})^n b c d f g n \log (F) - (F^{eg})^n b d^2 \right) x \right)}{2 \left(2 (F^{fgx})^n (F^{eg})^n a^3 b f^2 g^2 n^2 \log (F)^2 + (F^{fgx})^{2n} (F^{eg})^{2n} a^2 b^2 f^2 g^2 n^2 \log (F)^2 + a^4 f^2 g^2 n^2 \log (F)^2 \right)} \\ + \int \frac{d^2 f^2 g^2 n^2 x^2 \log (F)^2 - 3 c d f g n \log (F) + d^2 + \left(2 c d f^2 g^2 n^2 \log (F)^2 - 3 d^2 f g n \log (F) \right) x}{(F^{fgx})^n (F^{eg})^n a^2 b f^2 g^2 n^2 \log (F)^2 + a^3 f^2 g^2 n^2 \log (F)^2} dx$$

8 Test file number 55

Test folder name:

test_cases/2_Exponentials/55_2.3_Exponential_functions

8.1 Problem number 17

$$\int \left(a + b \left(F^{e(c+dx)} \right)^n \right)^p \left(G^{h(f+gx)} \right)^{\frac{den \log(F)}{gh \log(G)}} dx$$

Optimal antiderivative

$$\frac{\left(a + b \left(F^{e(dx+c)} \right)^n \right)^{1+p} \left(G^{h(gx+f)} \right)^{\frac{den \ln(F)}{gh \ln(G)}} \left(F^{e(dx+c)} \right)^{-n}}{b den (1+p) \ln (F)}$$

command

`integrate((a+b*(F^(e*(d*x+c)))^n)^p*(G^(h*(g*x+f)))^(d*e*n*log(F)/g/h/log(G)),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{\left(F^{den x} F^{cen + \frac{defn}{g}} b + F^{\frac{defn}{g}} a \right) \left(F^{den x} F^{cen} b + a \right)^p}{F^{cen} b den (p+1) \log (F)}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \left(\left(F^{(dx+c)e} \right)^n b + a \right)^p \left(G^{(gx+f)h} \right)^{\frac{den \log(F)}{gh \log(G)}} dx$$

9 Test file number 60

Test folder name:

test_cases/3_Logarithms/60_3.2.2-f+g_x-^m-h+i_x-^q-A+B_log-e-a+b_x-over-c+d_x-^n-^p

9.1 Problem number 83

$$\int \frac{(ci + dix)^3 \left(A + B \log \left(\frac{e(a+bx)}{c+dx} \right) \right)^2}{(ag + bgx)^7} dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{B^2 d^2 i^3 (dx + c)^4}{32 (-ad + bc)^3 g^7 (bx + a)^4} + \frac{4b B^2 d i^3 (dx + c)^5}{125 (-ad + bc)^3 g^7 (bx + a)^5} \\ & -\frac{b^2 B^2 i^3 (dx + c)^6}{108 (-ad + bc)^3 g^7 (bx + a)^6} - \frac{B d^2 i^3 (dx + c)^4 \left(A + B \ln \left(\frac{e(bx+a)}{dx+c} \right) \right)}{8 (-ad + bc)^3 g^7 (bx + a)^4} \\ & + \frac{4b B d i^3 (dx + c)^5 \left(A + B \ln \left(\frac{e(bx+a)}{dx+c} \right) \right)}{25 (-ad + bc)^3 g^7 (bx + a)^5} \\ & - \frac{b^2 B i^3 (dx + c)^6 \left(A + B \ln \left(\frac{e(bx+a)}{dx+c} \right) \right)}{18 (-ad + bc)^3 g^7 (bx + a)^6} - \frac{d^2 i^3 (dx + c)^4 \left(A + B \ln \left(\frac{e(bx+a)}{dx+c} \right) \right)^2}{4 (-ad + bc)^3 g^7 (bx + a)^4} \\ & + \frac{2bd i^3 (dx + c)^5 \left(A + B \ln \left(\frac{e(bx+a)}{dx+c} \right) \right)^2}{5 (-ad + bc)^3 g^7 (bx + a)^5} - \frac{b^2 i^3 (dx + c)^6 \left(A + B \ln \left(\frac{e(bx+a)}{dx+c} \right) \right)^2}{6 (-ad + bc)^3 g^7 (bx + a)^6} \end{aligned}$$

command

```
integrate((d*i*x+c*i)^3*(A+B*log(e*(b*x+a)/(d*x+c)))^2/(b*g*x+a*g)^7,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

10 Test file number 62

Test folder name:

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

10.1 Problem number 182

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

Optimal antiderivative

$$\begin{aligned} & -\frac{bf}{2d(-ei + fh)^2(ix + h)} - \frac{bf^2 \ln(fx + e)}{2d(-ei + fh)^3} + \frac{a + b \ln(c(fx + e))}{2d(-ei + fh)(ix + h)^2} \\ & - \frac{fi(fx + e)(a + b \ln(c(fx + e)))}{d(-ei + fh)^3(ix + h)} + \frac{3bf^2 \ln(ix + h)}{2d(-ei + fh)^3} \\ & - \frac{f^2(a + b \ln(c(fx + e))) \ln\left(1 + \frac{-ei + fh}{i(fx + e)}\right)}{d(-ei + fh)^3} + \frac{bf^2 \operatorname{polylog}\left(2, \frac{ei - fh}{i(fx + e)}\right)}{d(-ei + fh)^3} \end{aligned}$$

command

```
integrate((a+b*log(c*(f*x+e)))/(d*f*x+d*e)/(i*x+h)^3,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\begin{aligned} & \frac{i \left(\log(fx + e) \log\left(-\frac{fx+e}{ifh+e} + 1\right) + \operatorname{Li}_2\left(\frac{fx+e}{ifh+e}\right) \right) bf^2}{-i df^3 h^3 - 3 df^2 h^2 e + 3i df h e^2 + de^3} \\ & + \frac{(2i af^2 + (2i f^2 \log(c) - 3i f^2)b) \log(-2i h + 2x)}{-2i df^3 h^3 - 6 df^2 h^2 e + 6i df h e^2 + 2 de^3} \\ & + \frac{16 \left(3i af^2 h^2 + (ibf^2 h^2 - 2bf^2 h x - ibf^2 x^2) \log(fx + e)^2 + (3i f^2 h^2 \log(c) - i f^2 h^2)b - (2af^2 h + (2f^2 h \log(c) \right)}{\dots} \end{aligned}$$

Maxima 5.44 via sagemath 9.3 output

$$\begin{aligned} & \frac{1}{2} \left(\frac{2f^2 \log(fx + e)}{df^3 h^3 - 3def^2 h^2 i + 3de^2 f h i^2 - de^3 i^3} - \frac{2f^2 \log(ix + h)}{df^3 h^3 - 3def^2 h^2 i + 3de^2 f h i^2 - de^3 i^3} + \frac{\log(fx + e) + \log(c)}{df^2 h^4 - 2defh^3 i + de^2 h^2 i^2} \right) \\ & + b \int \frac{dx}{dfi^3 x^4 + deh^3 + (3fhi^2 + ei^3)dx^3 + 3(fh^2 i + ehi^2)dx^2 + (fh^3 + 3eh^2 i)dx} \end{aligned}$$

11 Test file number 64

Test folder name:

test_cases/3_Logarithms/64_3.5_Logarithm_functions

11.1 Problem number 128

$$\int \log \left(b \left(F^{e(c+dx)} \right)^n + \pi \right) dx$$

Optimal antiderivative

$$x \ln(\pi) - \frac{\text{polylog} \left(2, -\frac{b(F^{e(dx+c)})^n}{\pi} \right)}{\text{den} \ln(F)}$$

command

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

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$x \log \left(\pi + F^{(dx+c)ne} b \right) - \frac{\left(dnxe \log \left(\frac{F^{dnxe} F^{cne} b}{\pi} + 1 \right) \log(F) + \text{Li}_2 \left(-\frac{F^{dnxe} F^{cne} b}{\pi} \right) \right) e^{(-1)}}{dn \log(F)}$$

Maxima 5.44 via sagemath 9.3 output

$$-\frac{1}{2} \text{den} x^2 \log(F) + \pi \text{den} \int \frac{x}{\pi + (F^{dex})^n (F^{ce})^n b} dx \log(F) + x \log \left(\pi + (F^{dex})^n (F^{ce})^n b \right)$$

12 Test file number 66

Test folder name:

test_cases/4_Trig_functions/4.1_Sine/66_4.1.10-c+d_x-^m-a+b_sin-^n

12.1 Problem number 209

$$\int \frac{(e + fx)^3 \csc^3(c + dx)}{a + a \sin(c + dx)} dx$$

Optimal antiderivative

$$\begin{aligned}
& -\frac{9if^3 \operatorname{polylog}(4, -e^{i(dx+c)})}{ad^4} - \frac{6f^2(fx+e) \operatorname{arctanh}(e^{i(dx+c)})}{ad^3} \\
& - \frac{3(fx+e)^3 \operatorname{arctanh}(e^{i(dx+c)})}{ad} + \frac{(fx+e)^3 \cot\left(\frac{c}{2} + \frac{\pi}{4} + \frac{dx}{2}\right)}{ad} \\
& + \frac{(fx+e)^3 \cot(dx+c)}{ad} - \frac{3f(fx+e)^2 \operatorname{csc}(dx+c)}{2ad^2} \\
& - \frac{(fx+e)^3 \cot(dx+c) \operatorname{csc}(dx+c)}{2ad} - \frac{6f(fx+e)^2 \ln(1 - ie^{i(dx+c)})}{ad^2} \\
& - \frac{3f(fx+e)^2 \ln(1 - e^{2i(dx+c)})}{ad^2} + \frac{12if^2(fx+e) \operatorname{polylog}(2, ie^{i(dx+c)})}{ad^3} \\
& + \frac{9if^3 \operatorname{polylog}(4, e^{i(dx+c)})}{ad^4} + \frac{3if^3 \operatorname{polylog}(2, -e^{i(dx+c)})}{ad^4} + \frac{2i(fx+e)^3}{ad} \\
& + \frac{9if(fx+e)^2 \operatorname{polylog}(2, -e^{i(dx+c)})}{2ad^2} - \frac{9if(fx+e)^2 \operatorname{polylog}(2, e^{i(dx+c)})}{2ad^2} \\
& - \frac{9f^2(fx+e) \operatorname{polylog}(3, -e^{i(dx+c)})}{ad^3} - \frac{12f^3 \operatorname{polylog}(3, ie^{i(dx+c)})}{ad^4} \\
& + \frac{9f^2(fx+e) \operatorname{polylog}(3, e^{i(dx+c)})}{ad^3} - \frac{3f^3 \operatorname{polylog}(3, e^{2i(dx+c)})}{2ad^4} \\
& - \frac{3if^3 \operatorname{polylog}(2, e^{i(dx+c)})}{ad^4} + \frac{3if^2(fx+e) \operatorname{polylog}(2, e^{2i(dx+c)})}{ad^3}
\end{aligned}$$

command

```
integrate((f*x+e)^3*csc(d*x+c)^3/(a+a*sin(d*x+c)),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

13 Test file number 84

Test folder name:

test_cases/4_Trig_functions/4.2_Cosine/84_4.2.1.1-a+b_cos-^n

13.1 Problem number 6

$$\int \frac{1}{(a + a \cos(c + dx))^{3/2}} dx$$

Optimal antiderivative

$$\frac{\sin(dx + c)}{2d(a + a \cos(dx + c))^{\frac{3}{2}}} + \frac{\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a + a \cos(dx + c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}$$

command

```
integrate(1/(a+a*cos(d*x+c))^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

13.2 Problem number 7

$$\int \frac{1}{(a + a \cos(c + dx))^{5/2}} dx$$

Optimal antiderivative

$$\frac{\sin(dx + c)}{4d(a + a \cos(dx + c))^{\frac{5}{2}}} + \frac{3 \sin(dx + c)}{16ad(a + a \cos(dx + c))^{\frac{3}{2}}} + \frac{3 \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a + a \cos(dx + c)}}\right)\sqrt{2}}{32a^{\frac{5}{2}}d}$$

command

```
integrate(1/(a+a*cos(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

14 Test file number 89

Test folder name:

test_cases/4_Trig_functions/4.2_Cosine/89_4.2.2.1-a+b_cos-^m-c+d_cos-ⁿ

14.1 Problem number 111

$$\int (a + a \cos(c + dx))^{3/2} \sec^4(c + dx) dx$$

Optimal antiderivative

$$\frac{11a^{3/2} \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{8d} + \frac{11a^2 \tan(dx+c)}{8d\sqrt{a+a\cos(dx+c)}} + \frac{11a^2 \sec(dx+c) \tan(dx+c)}{12d\sqrt{a+a\cos(dx+c)}} + \frac{a^2(\sec^2(dx+c)) \tan(dx+c)}{3d\sqrt{a+a\cos(dx+c)}}$$

command

`integrate((a+a*cos(d*x+c))^(3/2)*sec(d*x+c)^4,x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

14.2 Problem number 117

$$\int (a + a \cos(c + dx))^{5/2} \sec^2(c + dx) dx$$

Optimal antiderivative

$$\frac{5a^{5/2} \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{d} + \frac{a^3 \sin(dx+c)}{d\sqrt{a+a\cos(dx+c)}} + \frac{a^2 \sqrt{a+a\cos(dx+c)} \tan(dx+c)}{d}$$

command

`integrate((a+a*cos(d*x+c))^(5/2)*sec(d*x+c)^2,x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

14.3 Problem number 122

$$\int \frac{\cos^4(c + dx)}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{d\sqrt{a}} - \frac{148\sin(dx+c)}{105d\sqrt{a+a\cos(dx+c)}} \\ & - \frac{2(\cos^2(dx+c))\sin(dx+c)}{35d\sqrt{a+a\cos(dx+c)}} + \frac{2(\cos^3(dx+c))\sin(dx+c)}{7d\sqrt{a+a\cos(dx+c)}} \\ & + \frac{62\sin(dx+c)\sqrt{a+a\cos(dx+c)}}{105ad} \end{aligned}$$

command

```
integrate(cos(d*x+c)^4/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

14.4 Problem number 123

$$\int \frac{\cos^3(c + dx)}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{d\sqrt{a}} + \frac{28\sin(dx+c)}{15d\sqrt{a+a\cos(dx+c)}} \\ & + \frac{2(\cos^2(dx+c))\sin(dx+c)}{5d\sqrt{a+a\cos(dx+c)}} - \frac{2\sin(dx+c)\sqrt{a+a\cos(dx+c)}}{15ad} \end{aligned}$$

command

```
integrate(cos(d*x+c)^3/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

14.5 Problem number 124

$$\int \frac{\cos^2(c + dx)}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\frac{\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{d\sqrt{a}} - \frac{4\sin(dx+c)}{3d\sqrt{a+a\cos(dx+c)}} + \frac{2\sin(dx+c)\sqrt{a+a\cos(dx+c)}}{3ad}$$

command

```
integrate(cos(d*x+c)^2/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

14.6 Problem number 125

$$\int \frac{\cos(c + dx)}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$-\frac{\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{d\sqrt{a}} + \frac{2\sin(dx+c)}{d\sqrt{a+a\cos(dx+c)}}$$

command

```
integrate(cos(d*x+c)/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

14.7 Problem number 128

$$\int \frac{\sec^2(c + dx)}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$-\frac{\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{d\sqrt{a}} + \frac{\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{d\sqrt{a}} + \frac{\tan(dx+c)}{d\sqrt{a+a\cos(dx+c)}}$$

command

```
integrate(sec(d*x+c)^2/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

14.8 Problem number 134

$$\int \frac{\cos(c + dx)}{(a + a \cos(c + dx))^{3/2}} dx$$

Optimal antiderivative

$$-\frac{\sin(dx+c)}{2d(a+a\cos(dx+c))^{\frac{3}{2}}} + \frac{3\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}$$

command

```
integrate(cos(d*x+c)/(a+a*cos(d*x+c))^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

14.9 Problem number 135

$$\int \frac{1}{(a + a \cos(c + dx))^{3/2}} dx$$

Optimal antiderivative

$$\frac{\sin(dx + c)}{2d(a + a \cos(dx + c))^{\frac{3}{2}}} + \frac{\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a + a \cos(dx + c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}$$

command

```
integrate(1/(a+a*cos(d*x+c))^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

14.10 Problem number 137

$$\int \frac{\sec^2(c + dx)}{(a + a \cos(c + dx))^{3/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{3 \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx + c)}}\right)}{a^{\frac{3}{2}}d} + \frac{9 \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a + a \cos(dx + c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d} \\ & -\frac{\tan(dx + c)}{2d(a + a \cos(dx + c))^{\frac{3}{2}}} + \frac{3 \tan(dx + c)}{2ad\sqrt{a + a \cos(dx + c)}} \end{aligned}$$

command

```
integrate(sec(d*x+c)^2/(a+a*cos(d*x+c))^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

14.11 Problem number 143

$$\int \frac{1}{(a + a \cos(c + dx))^{5/2}} dx$$

Optimal antiderivative

$$\frac{\sin(dx + c)}{4d(a + a \cos(dx + c))^{5/2}} + \frac{3 \sin(dx + c)}{16ad(a + a \cos(dx + c))^{3/2}} + \frac{3 \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a + a \cos(dx + c)}}\right) \sqrt{2}}{32a^{5/2}d}$$

command

```
integrate(1/(a+a*cos(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

14.12 Problem number 785

$$\int \frac{B + B \cos(c + dx)}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\frac{2B \sin(dx + c)}{d\sqrt{a + a \cos(dx + c)}}$$

command

```
integrate((B+B*cos(d*x+c))/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

15 Test file number 92

Test folder name:

test_cases/4_Trig_functions/4.2_Cosine/92_4.2.3.1-a+b_cos-^m-c+d_cos-^n-A+B_cos-

15.1 Problem number 89

$$\int (a + a \cos(c + dx))^{3/2} (A + B \cos(c + dx)) \sec^4(c + dx) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a^{\frac{3}{2}}(11A + 14B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx + c)}}\right)}{8d} \\ & + \frac{a^2(11A + 14B) \tan(dx + c)}{8d\sqrt{a + a \cos(dx + c)}} + \frac{a^2(7A + 6B) \sec(dx + c) \tan(dx + c)}{12d\sqrt{a + a \cos(dx + c)}} \\ & + \frac{aA(\sec^2(dx + c)) \sqrt{a + a \cos(dx + c)} \tan(dx + c)}{3d} \end{aligned}$$

command

```
integrate((a+a*cos(d*x+c))^(3/2)*(A+B*cos(d*x+c))*sec(d*x+c)^4,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

15.2 Problem number 90

$$\int (a + a \cos(c + dx))^{3/2} (A + B \cos(c + dx)) \sec^5(c + dx) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a^{\frac{3}{2}}(75A + 88B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx + c)}}\right)}{64d} + \frac{a^2(75A + 88B) \tan(dx + c)}{64d\sqrt{a + a \cos(dx + c)}} \\ & + \frac{a^2(75A + 88B) \sec(dx + c) \tan(dx + c)}{96d\sqrt{a + a \cos(dx + c)}} + \frac{a^2(9A + 8B) (\sec^2(dx + c)) \tan(dx + c)}{24d\sqrt{a + a \cos(dx + c)}} \\ & + \frac{aA(\sec^3(dx + c)) \sqrt{a + a \cos(dx + c)} \tan(dx + c)}{4d} \end{aligned}$$

command

```
integrate((a+a*cos(d*x+c))^(3/2)*(A+B*cos(d*x+c))*sec(d*x+c)^5,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

15.3 Problem number 96

$$\int (a + a \cos(c + dx))^{5/2} (A + B \cos(c + dx)) \sec^3(c + dx) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a^{5/2} (19A + 20B) \operatorname{arctanh} \left(\frac{\sin(dx+c) \sqrt{a}}{\sqrt{a + a \cos(dx+c)}} \right)}{4d} - \frac{a^3 (9A - 4B) \sin(dx+c)}{4d \sqrt{a + a \cos(dx+c)}} \\ & + \frac{aA (a + a \cos(dx+c))^{3/2} \sec(dx+c) \tan(dx+c)}{2d} \\ & + \frac{a^2 (7A + 4B) \sqrt{a + a \cos(dx+c)} \tan(dx+c)}{4d} \end{aligned}$$

command

```
integrate((a+a*cos(d*x+c))^(5/2)*(A+B*cos(d*x+c))*sec(d*x+c)^3,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

15.4 Problem number 100

$$\int \frac{\cos^3(c + dx)(A + B \cos(c + dx))}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{(A - B) \operatorname{arctanh} \left(\frac{\sin(dx+c)\sqrt{a} \sqrt{2}}{2\sqrt{a+a\cos(dx+c)}} \right) \sqrt{2}}{d\sqrt{a}} + \frac{4(49A - 37B) \sin(dx+c)}{105d\sqrt{a+a\cos(dx+c)}} \\ & + \frac{2(7A - B) (\cos^2(dx+c)) \sin(dx+c)}{35d\sqrt{a+a\cos(dx+c)}} + \frac{2B(\cos^3(dx+c)) \sin(dx+c)}{7d\sqrt{a+a\cos(dx+c)}} \\ & - \frac{2(7A - 31B) \sin(dx+c) \sqrt{a+a\cos(dx+c)}}{105ad} \end{aligned}$$

command

```
integrate(cos(d*x+c)^3*(A+B*cos(d*x+c))/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

15.5 Problem number 101

$$\int \frac{\cos^2(c+dx)(A+B\cos(c+dx))}{\sqrt{a+a\cos(c+dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(A - B) \operatorname{arctanh} \left(\frac{\sin(dx+c)\sqrt{a} \sqrt{2}}{2\sqrt{a+a\cos(dx+c)}} \right) \sqrt{2}}{d\sqrt{a}} - \frac{4(5A - 7B) \sin(dx+c)}{15d\sqrt{a+a\cos(dx+c)}} \\ & + \frac{2B(\cos^2(dx+c)) \sin(dx+c)}{5d\sqrt{a+a\cos(dx+c)}} + \frac{2(5A - B) \sin(dx+c) \sqrt{a+a\cos(dx+c)}}{15ad} \end{aligned}$$

command

```
integrate(cos(d*x+c)^2*(A+B*cos(d*x+c))/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

15.6 Problem number 102

$$\int \frac{\cos(c + dx)(A + B \cos(c + dx))}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\frac{(A - B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{d\sqrt{a}} + \frac{2(3A - 2B)\sin(dx+c)}{3d\sqrt{a+a\cos(dx+c)}} + \frac{2B\sin(dx+c)\sqrt{a+a\cos(dx+c)}}{3ad}$$

command

```
integrate(cos(d*x+c)*(A+B*cos(d*x+c))/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

15.7 Problem number 103

$$\int \frac{A + B \cos(c + dx)}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\frac{(A - B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{d\sqrt{a}} + \frac{2B\sin(dx+c)}{d\sqrt{a+a\cos(dx+c)}}$$

command

```
integrate((A+B*cos(d*x+c))/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

15.8 Problem number 105

$$\int \frac{(A + B \cos(c + dx)) \sec^2(c + dx)}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{(A - 2B) \operatorname{arctanh} \left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx + c)}} \right)}{d\sqrt{a}} \\ & + \frac{(A - B) \operatorname{arctanh} \left(\frac{\sin(dx+c)\sqrt{a} \sqrt{2}}{2\sqrt{a + a \cos(dx + c)}} \right) \sqrt{2}}{d\sqrt{a}} + \frac{A \tan(dx + c)}{d\sqrt{a + a \cos(dx + c)}} \end{aligned}$$

command

`integrate((A+B*cos(d*x+c))*sec(d*x+c)^2/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")`
 Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

15.9 Problem number 106

$$\int \frac{(A + B \cos(c + dx)) \sec^3(c + dx)}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(7A - 4B) \operatorname{arctanh} \left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx + c)}} \right)}{4d\sqrt{a}} \\ & - \frac{(A - B) \operatorname{arctanh} \left(\frac{\sin(dx+c)\sqrt{a} \sqrt{2}}{2\sqrt{a + a \cos(dx + c)}} \right) \sqrt{2}}{d\sqrt{a}} \\ & - \frac{(A - 4B) \tan(dx + c)}{4d\sqrt{a + a \cos(dx + c)}} + \frac{A \sec(dx + c) \tan(dx + c)}{2d\sqrt{a + a \cos(dx + c)}} \end{aligned}$$

command

`integrate((A+B*cos(d*x+c))*sec(d*x+c)^3/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")`
 Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

15.10 Problem number 111

$$\int \frac{A + B \cos(c + dx)}{(a + a \cos(c + dx))^{3/2}} dx$$

Optimal antiderivative

$$\frac{(A - B) \sin(dx + c)}{2d(a + a \cos(dx + c))^{\frac{3}{2}}} + \frac{(A + 3B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a + a \cos(dx + c)}}\right) \sqrt{2}}{4a^{\frac{3}{2}}d}$$

command

```
integrate((A+B*cos(d*x+c))/(a+a*cos(d*x+c))^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

15.11 Problem number 112

$$\int \frac{(A + B \cos(c + dx)) \sec(c + dx)}{(a + a \cos(c + dx))^{3/2}} dx$$

Optimal antiderivative

$$\frac{2A \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx + c)}}\right)}{a^{\frac{3}{2}}d} - \frac{(A - B) \sin(dx + c)}{2d(a + a \cos(dx + c))^{\frac{3}{2}}} - \frac{(5A - B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a + a \cos(dx + c)}}\right) \sqrt{2}}{4a^{\frac{3}{2}}d}$$

command

```
integrate((A+B*cos(d*x+c))*sec(d*x+c)/(a+a*cos(d*x+c))^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

15.12 Problem number 113

$$\int \frac{(A + B \cos(c + dx)) \sec^2(c + dx)}{(a + a \cos(c + dx))^{3/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(3A - 2B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx+c)}}\right)}{a^{\frac{3}{2}}d} \\ & + \frac{(9A - 5B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a + a \cos(dx+c)}}\right) \sqrt{2}}{4a^{\frac{3}{2}}d} \\ & - \frac{(A - B) \tan(dx+c)}{2d(a + a \cos(dx+c))^{\frac{3}{2}}} + \frac{(3A - B) \tan(dx+c)}{2ad\sqrt{a + a \cos(dx+c)}} \end{aligned}$$

command

```
integrate((A+B*cos(d*x+c))*sec(d*x+c)^2/(a+a*cos(d*x+c))^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

15.13 Problem number 120

$$\int \frac{(A + B \cos(c + dx)) \sec(c + dx)}{(a + a \cos(c + dx))^{5/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{2A \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx+c)}}\right)}{a^{\frac{5}{2}}d} - \frac{(A - B) \sin(dx+c)}{4d(a + a \cos(dx+c))^{\frac{5}{2}}} \\ & - \frac{(11A - 3B) \sin(dx+c)}{16ad(a + a \cos(dx+c))^{\frac{3}{2}}} - \frac{(43A - 3B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a + a \cos(dx+c)}}\right) \sqrt{2}}{32a^{\frac{5}{2}}d} \end{aligned}$$

command

```
integrate((A+B*cos(d*x+c))*sec(d*x+c)/(a+a*cos(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

15.14 Problem number 182

$$\int \cos^{\frac{3}{2}}(c + dx)(a + a \cos(c + dx))^{5/2}(A + B \cos(c + dx)) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a^{\frac{5}{2}}(326A + 283B) \arcsin\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx + c)}}\right)}{128d} \\ & + \frac{aB\left(\cos^{\frac{5}{2}}(dx + c)\right)(a + a \cos(dx + c))^{\frac{3}{2}} \sin(dx + c)}{5d} \\ & + \frac{a^3(326A + 283B)\left(\cos^{\frac{3}{2}}(dx + c)\right) \sin(dx + c)}{192d\sqrt{a + a \cos(dx + c)}} \\ & + \frac{a^3(170A + 157B)\left(\cos^{\frac{5}{2}}(dx + c)\right) \sin(dx + c)}{240d\sqrt{a + a \cos(dx + c)}} \\ & + \frac{a^3(326A + 283B) \sin(dx + c) (\sqrt{\cos}(dx + c))}{128d\sqrt{a + a \cos(dx + c)}} \\ & + \frac{a^2(10A + 13B)\left(\cos^{\frac{5}{2}}(dx + c)\right) \sin(dx + c) \sqrt{a + a \cos(dx + c)}}{40d} \end{aligned}$$

command

```
integrate(cos(d*x+c)^(3/2)*(a+a*cos(d*x+c))^(5/2)*(A+B*cos(d*x+c)),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

15.15 Problem number 519

$$\int \frac{(a + a \cos(c + dx))^{5/2}(A + B \cos(c + dx))}{\sec^{\frac{3}{2}}(c + dx)} dx$$

Optimal antiderivative

$$\begin{aligned}
& \frac{aB(a + a \cos(dx + c))^{\frac{3}{2}} \sin(dx + c)}{5d \sec(dx + c)^{\frac{5}{2}}} + \frac{a^3(170A + 157B) \sin(dx + c)}{240d \sec(dx + c)^{\frac{5}{2}} \sqrt{a + a \cos(dx + c)}} \\
& + \frac{a^3(326A + 283B) \sin(dx + c)}{192d \sec(dx + c)^{\frac{3}{2}} \sqrt{a + a \cos(dx + c)}} \\
& + \frac{a^2(10A + 13B) \sin(dx + c) \sqrt{a + a \cos(dx + c)}}{40d \sec(dx + c)^{\frac{5}{2}}} \\
& + \frac{a^3(326A + 283B) \sin(dx + c)}{128d \sqrt{a + a \cos(dx + c)} \sqrt{\sec(dx + c)}} \\
& + \frac{a^{\frac{5}{2}}(326A + 283B) \arcsin\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)})}{128d}
\end{aligned}$$

command

```
integrate((a+a*cos(d*x+c))^(5/2)*(A+B*cos(d*x+c))/sec(d*x+c)^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16 Test file number 94

Test folder name:

test_cases/4_Trig_functions/4.2_Cosine/94_4.2.4.2-a+b_cos-^m-c+d_cos-ⁿ-A+B_cos+C_cos²-

16.1 Problem number 89

$$\int (a + a \cos(c + dx))^{\frac{3}{2}} (A + C \cos^2(c + dx)) \sec^4(c + dx) dx$$

Optimal antiderivative

$$\begin{aligned}
& \frac{a^{\frac{3}{2}}(11A + 24C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx + c)}}\right)}{8d} \\
& + \frac{A(a + a \cos(dx + c))^{\frac{3}{2}} (\sec^2(dx + c)) \tan(dx + c)}{3d} \\
& + \frac{a^2(19A + 24C) \tan(dx + c)}{24d \sqrt{a + a \cos(dx + c)}} + \frac{aA \sec(dx + c) \sqrt{a + a \cos(dx + c)} \tan(dx + c)}{4d}
\end{aligned}$$

command

```
integrate((a+a*cos(d*x+c))^(3/2)*(A+C*cos(d*x+c)^2)*sec(d*x+c)^4,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.2 Problem number 98

$$\int (a + a \cos(c + dx))^{5/2} (A + C \cos^2(c + dx)) \sec^4(c + dx) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{5a^{5/2}(5A + 8C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx+c)}}\right)}{8d} - \frac{a^3(49A - 24C) \sin(dx+c)}{24d \sqrt{a + a \cos(dx+c)}} \\ & + \frac{5aA(a + a \cos(dx+c))^{3/2} \sec(dx+c) \tan(dx+c)}{12d} \\ & + \frac{A(a + a \cos(dx+c))^{5/2} (\sec^2(dx+c)) \tan(dx+c)}{3d} \\ & + \frac{a^2(31A + 24C) \sqrt{a + a \cos(dx+c)} \tan(dx+c)}{24d} \end{aligned}$$

command

```
integrate((a+a*cos(d*x+c))^(5/2)*(A+C*cos(d*x+c)^2)*sec(d*x+c)^4,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.3 Problem number 100

$$\int (a + a \cos(c + dx))^{5/2} (A + C \cos^2(c + dx)) \sec^6(c + dx) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a^{5/2} (283A + 400C) \operatorname{arctanh} \left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx+c)}} \right)}{128d} \\ & + \frac{aA(a + a \cos(dx+c))^{3/2} (\sec^3(dx+c)) \tan(dx+c)}{8d} \\ & + \frac{A(a + a \cos(dx+c))^{5/2} (\sec^4(dx+c)) \tan(dx+c)}{5d} \\ & + \frac{a^3(283A + 400C) \tan(dx+c)}{128d\sqrt{a + a \cos(dx+c)}} + \frac{a^3(787A + 1040C) \sec(dx+c) \tan(dx+c)}{960d\sqrt{a + a \cos(dx+c)}} \\ & + \frac{a^2(79A + 80C) (\sec^2(dx+c)) \sqrt{a + a \cos(dx+c)} \tan(dx+c)}{240d} \end{aligned}$$

command

```
integrate((a+a*cos(d*x+c))^(5/2)*(A+C*cos(d*x+c)^2)*sec(d*x+c)^6,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.4 Problem number 103

$$\int \frac{\cos^2(c + dx) (A + C \cos^2(c + dx))}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(A + C) \operatorname{arctanh} \left(\frac{\sin(dx+c)\sqrt{a} \sqrt{2}}{2\sqrt{a + a \cos(dx+c)}} \right) \sqrt{2}}{d\sqrt{a}} - \frac{4(35A + 37C) \sin(dx+c)}{105d\sqrt{a + a \cos(dx+c)}} \\ & - \frac{2C(\cos^2(dx+c)) \sin(dx+c)}{35d\sqrt{a + a \cos(dx+c)}} + \frac{2C(\cos^3(dx+c)) \sin(dx+c)}{7d\sqrt{a + a \cos(dx+c)}} \\ & + \frac{2(35A + 31C) \sin(dx+c) \sqrt{a + a \cos(dx+c)}}{105ad} \end{aligned}$$

command

```
integrate(cos(d*x+c)^2*(A+C*cos(d*x+c)^2)/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.5 Problem number 104

$$\int \frac{\cos(c + dx) (A + C \cos^2(c + dx))}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{(A + C) \operatorname{arctanh} \left(\frac{\sin(dx+c)\sqrt{a} \sqrt{2}}{2\sqrt{a + a \cos(dx + c)}} \right) \sqrt{2}}{d\sqrt{a}} + \frac{2(15A + 14C) \sin(dx + c)}{15d\sqrt{a + a \cos(dx + c)}} \\ & + \frac{2C(\cos^2(dx + c)) \sin(dx + c)}{5d\sqrt{a + a \cos(dx + c)}} - \frac{2C \sin(dx + c)}{15ad} \end{aligned}$$

command

```
integrate(cos(d*x+c)*(A+C*cos(d*x+c)^2)/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.6 Problem number 105

$$\int \frac{A + C \cos^2(c + dx)}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(A + C) \operatorname{arctanh} \left(\frac{\sin(dx+c)\sqrt{a} \sqrt{2}}{2\sqrt{a + a \cos(dx + c)}} \right) \sqrt{2}}{d\sqrt{a}} \\ & - \frac{4C \sin(dx + c)}{3d\sqrt{a + a \cos(dx + c)}} + \frac{2C \sin(dx + c) \sqrt{a + a \cos(dx + c)}}{3ad} \end{aligned}$$

command

```
integrate((A+C*cos(d*x+c)^2)/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.7 Problem number 106

$$\int \frac{(A + C \cos^2(c + dx)) \sec(c + dx)}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\frac{2A \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{d\sqrt{a}} - \frac{(A+C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{d\sqrt{a}} + \frac{2C \sin(dx+c)}{d\sqrt{a+a\cos(dx+c)}}$$

command

```
integrate((A+C*cos(d*x+c)^2)*sec(d*x+c)/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.8 Problem number 107

$$\int \frac{(A + C \cos^2(c + dx)) \sec^2(c + dx)}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$-\frac{A \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{d\sqrt{a}} + \frac{(A+C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{d\sqrt{a}} + \frac{A \tan(dx+c)}{d\sqrt{a+a\cos(dx+c)}}$$

command

```
integrate((A+C*cos(d*x+c)^2)*sec(d*x+c)^2/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.9 Problem number 108

$$\int \frac{(A + C \cos^2(c + dx)) \sec^3(c + dx)}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(7A + 8C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx+c)}}\right)}{4d\sqrt{a}} \\ & - \frac{(A + C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a + a \cos(dx+c)}}\right)\sqrt{2}}{d\sqrt{a}} \\ & - \frac{A \tan(dx+c)}{4d\sqrt{a + a \cos(dx+c)}} + \frac{A \sec(dx+c) \tan(dx+c)}{2d\sqrt{a + a \cos(dx+c)}} \end{aligned}$$

command

```
integrate((A+C*cos(d*x+c)^2)*sec(d*x+c)^3/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.10 Problem number 115

$$\int \frac{(A + C \cos^2(c + dx)) \sec(c + dx)}{(a + a \cos(c + dx))^{3/2}} dx$$

Optimal antiderivative

$$\frac{2A \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{a^{\frac{3}{2}}d} - \frac{(A+C)\sin(dx+c)}{2d(a+a\cos(dx+c))^{\frac{3}{2}}}$$

$$- \frac{(5A-3C)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}$$

command

```
integrate((A+C*cos(d*x+c)^2)*sec(d*x+c)/(a+a*cos(d*x+c))^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.11 Problem number 116

$$\int \frac{(A + C \cos^2(c + dx)) \sec^2(c + dx)}{(a + a \cos(c + dx))^{3/2}} dx$$

Optimal antiderivative

$$-\frac{3A \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{a^{\frac{3}{2}}d} + \frac{(9A+C)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}$$

$$- \frac{(A+C)\tan(dx+c)}{2d(a+a\cos(dx+c))^{\frac{3}{2}}} + \frac{(3A+C)\tan(dx+c)}{2ad\sqrt{a+a\cos(dx+c)}}$$

command

```
integrate((A+C*cos(d*x+c)^2)*sec(d*x+c)^2/(a+a*cos(d*x+c))^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.12 Problem number 188

$$\int \cos^{\frac{3}{2}}(c + dx)(a + a \cos(c + dx))^{5/2} (A + C \cos^2(c + dx)) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a^{\frac{5}{2}}(1304A + 1015C) \arcsin\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx+c)}}\right)}{512d} \\ & + \frac{aC\left(\cos^{\frac{5}{2}}(dx+c)\right)(a + a \cos(dx+c))^{\frac{3}{2}} \sin(dx+c)}{12d} \\ & + \frac{C\left(\cos^{\frac{5}{2}}(dx+c)\right)(a + a \cos(dx+c))^{\frac{5}{2}} \sin(dx+c)}{6d} \\ & + \frac{a^3(1304A + 1015C)\left(\cos^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{768d\sqrt{a + a \cos(dx+c)}} \\ & + \frac{a^3(136A + 109C)\left(\cos^{\frac{5}{2}}(dx+c)\right) \sin(dx+c)}{192d\sqrt{a + a \cos(dx+c)}} \\ & + \frac{a^3(1304A + 1015C) \sin(dx+c) (\sqrt{\cos(dx+c)})}{512d\sqrt{a + a \cos(dx+c)}} \\ & + \frac{a^2(24A + 23C)\left(\cos^{\frac{5}{2}}(dx+c)\right) \sin(dx+c) \sqrt{a + a \cos(dx+c)}}{96d} \end{aligned}$$

command

```
integrate(cos(d*x+c)^(3/2)*(a+a*cos(d*x+c))^(5/2)*(A+C*cos(d*x+c)^2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.13 Problem number 280

$$\int \frac{B \cos(c + dx) + C \cos^2(c + dx)}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{(B - C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a} \sqrt{2}}{2\sqrt{a + a \cos(dx+c)}}\right) \sqrt{2}}{d\sqrt{a}} \\ & + \frac{2(3B - 2C) \sin(dx+c)}{3d\sqrt{a + a \cos(dx+c)}} + \frac{2C \sin(dx+c) \sqrt{a + a \cos(dx+c)}}{3ad} \end{aligned}$$

command

```
integrate((B*cos(d*x+c)+C*cos(d*x+c)^2)/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.14 Problem number 388

$$\int (a + a \cos(c + dx))^{3/2} (A + B \cos(c + dx) + C \cos^2(c + dx)) \sec^4(c + dx) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a^{3/2} (11A + 14B + 24C) \operatorname{arctanh} \left(\frac{\sin(dx+c) \sqrt{a}}{\sqrt{a + a \cos(dx+c)}} \right)}{8d} \\ & + \frac{A(a + a \cos(dx+c))^{3/2} (\sec^2(dx+c)) \tan(dx+c)}{3d} + \frac{a^2(19A + 30B + 24C) \tan(dx+c)}{24d \sqrt{a + a \cos(dx+c)}} \\ & + \frac{a(A + 2B) \sec(dx+c) \sqrt{a + a \cos(dx+c)} \tan(dx+c)}{4d} \end{aligned}$$

command

```
integrate((a+a*cos(d*x+c))^(3/2)*(A+B*cos(d*x+c)+C*cos(d*x+c)^2)*sec(d*x+c)^4,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.15 Problem number 389

$$\int (a + a \cos(c + dx))^{3/2} (A + B \cos(c + dx) + C \cos^2(c + dx)) \sec^5(c + dx) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a^{\frac{3}{2}}(75A + 88B + 112C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{64d} \\ & + \frac{A(a+a\cos(dx+c))^{\frac{3}{2}}(\sec^3(dx+c))\tan(dx+c)}{4d} \\ & + \frac{a^2(75A + 88B + 112C)\tan(dx+c)}{64d\sqrt{a+a\cos(dx+c)}} + \frac{a^2(39A + 56B + 48C)\sec(dx+c)\tan(dx+c)}{96d\sqrt{a+a\cos(dx+c)}} \\ & + \frac{a(3A + 8B)(\sec^2(dx+c))\sqrt{a+a\cos(dx+c)}\tan(dx+c)}{24d} \end{aligned}$$

command

```
integrate((a+a*cos(d*x+c))^(3/2)*(A+B*cos(d*x+c)+C*cos(d*x+c)^2)*sec(d*x+c)^5,x, algorithm="m
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.16 Problem number 396

$$\int (a + a \cos(c + dx))^{5/2} (A + B \cos(c + dx) + C \cos^2(c + dx)) \sec^3(c + dx) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a^{\frac{5}{2}}(19A + 20B + 8C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{4d} \\ & - \frac{a^3(27A - 12B - 56C) \sin(dx+c)}{12d\sqrt{a+a\cos(dx+c)}} \\ & - \frac{a^2(21A + 12B - 8C) \sin(dx+c)\sqrt{a+a\cos(dx+c)}}{12d} \\ & + \frac{a(5A + 4B)(a+a\cos(dx+c))^{\frac{3}{2}}\tan(dx+c)}{4d} \\ & + \frac{A(a+a\cos(dx+c))^{\frac{5}{2}}\sec(dx+c)\tan(dx+c)}{2d} \end{aligned}$$

command

```
integrate((a+a*cos(d*x+c))^(5/2)*(A+B*cos(d*x+c)+C*cos(d*x+c)^2)*sec(d*x+c)^3,x, algorithm="m
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.17 Problem number 397

$$\int (a + a \cos(c + dx))^{5/2} (A + B \cos(c + dx) + C \cos^2(c + dx)) \sec^4(c + dx) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a^{5/2} (25A + 38B + 40C) \operatorname{arctanh} \left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx + c)}} \right)}{8d} \\ & - \frac{a^3 (49A + 54B - 24C) \sin(dx + c)}{24d \sqrt{a + a \cos(dx + c)}} \\ & + \frac{a(5A + 6B) (a + a \cos(dx + c))^{3/2} \sec(dx + c) \tan(dx + c)}{12d} \\ & + \frac{A(a + a \cos(dx + c))^{5/2} (\sec^2(dx + c)) \tan(dx + c)}{3d} \\ & + \frac{a^2 (31A + 42B + 24C) \sqrt{a + a \cos(dx + c)} \tan(dx + c)}{24d} \end{aligned}$$

command

`integrate((a+a*cos(d*x+c))^(5/2)*(A+B*cos(d*x+c)+C*cos(d*x+c)^2)*sec(d*x+c)^4,x, algorithm="m`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.18 Problem number 402

$$\int \frac{\cos^2(c + dx) (A + B \cos(c + dx) + C \cos^2(c + dx))}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(A - B + C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{d\sqrt{a}} - \frac{4(35A - 49B + 37C)\sin(dx+c)}{105d\sqrt{a+a\cos(dx+c)}} \\ & + \frac{2(7B - C)(\cos^2(dx+c))\sin(dx+c)}{35d\sqrt{a+a\cos(dx+c)}} + \frac{2C(\cos^3(dx+c))\sin(dx+c)}{7d\sqrt{a+a\cos(dx+c)}} \\ & + \frac{2(35A - 7B + 31C)\sin(dx+c)\sqrt{a+a\cos(dx+c)}}{105ad} \end{aligned}$$

command

`integrate(cos(d*x+c)^2*(A+B*cos(d*x+c)+C*cos(d*x+c)^2)/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.19 Problem number 403

$$\int \frac{\cos(c+dx)(A+B\cos(c+dx)+C\cos^2(c+dx))}{\sqrt{a+a\cos(c+dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{(A - B + C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{d\sqrt{a}} + \frac{2(15A - 10B + 14C)\sin(dx+c)}{15d\sqrt{a+a\cos(dx+c)}} \\ & + \frac{2C(\cos^2(dx+c))\sin(dx+c)}{5d\sqrt{a+a\cos(dx+c)}} + \frac{2(5B - C)\sin(dx+c)\sqrt{a+a\cos(dx+c)}}{15ad} \end{aligned}$$

command

`integrate(cos(d*x+c)*(A+B*cos(d*x+c)+C*cos(d*x+c)^2)/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.20 Problem number 404

$$\int \frac{A + B \cos(c + dx) + C \cos^2(c + dx)}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\frac{(A - B + C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right) \sqrt{2}}{d\sqrt{a}} + \frac{2(3B - 2C) \sin(dx+c)}{3d\sqrt{a+a\cos(dx+c)}} + \frac{2C \sin(dx+c) \sqrt{a+a\cos(dx+c)}}{3ad}$$

command

```
integrate((A+B*cos(d*x+c)+C*cos(d*x+c)^2)/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.21 Problem number 405

$$\int \frac{(A + B \cos(c + dx) + C \cos^2(c + dx)) \sec(c + dx)}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\frac{2A \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{d\sqrt{a}} - \frac{(A - B + C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right) \sqrt{2}}{d\sqrt{a}} + \frac{2C \sin(dx+c)}{d\sqrt{a+a\cos(dx+c)}}$$

command

```
integrate((A+B*cos(d*x+c)+C*cos(d*x+c)^2)*sec(d*x+c)/(a+a*cos(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.22 Problem number 406

$$\int \frac{(A + B \cos(c + dx) + C \cos^2(c + dx)) \sec^2(c + dx)}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{(A - 2B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx + c)}}\right)}{d\sqrt{a}} \\ & + \frac{(A - B + C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a} \sqrt{2}}{2\sqrt{a + a \cos(dx + c)}}\right) \sqrt{2}}{d\sqrt{a}} + \frac{A \tan(dx + c)}{d\sqrt{a + a \cos(dx + c)}} \end{aligned}$$

command

`integrate((A+B*cos(d*x+c)+C*cos(d*x+c)^2)*sec(d*x+c)^2/(a+a*cos(d*x+c))^(1/2),x, algorithm="m`
Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.23 Problem number 407

$$\int \frac{(A + B \cos(c + dx) + C \cos^2(c + dx)) \sec^3(c + dx)}{\sqrt{a + a \cos(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(7A - 4B + 8C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx + c)}}\right)}{4d\sqrt{a}} \\ & - \frac{(A - B + C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a} \sqrt{2}}{2\sqrt{a + a \cos(dx + c)}}\right) \sqrt{2}}{d\sqrt{a}} \\ & - \frac{(A - 4B) \tan(dx + c)}{4d\sqrt{a + a \cos(dx + c)}} + \frac{A \sec(dx + c) \tan(dx + c)}{2d\sqrt{a + a \cos(dx + c)}} \end{aligned}$$

command

`integrate((A+B*cos(d*x+c)+C*cos(d*x+c)^2)*sec(d*x+c)^3/(a+a*cos(d*x+c))^(1/2),x, algorithm="m`
Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.24 Problem number 414

$$\int \frac{(A + B \cos(c + dx) + C \cos^2(c + dx)) \sec(c + dx)}{(a + a \cos(c + dx))^{3/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{2A \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{a^{\frac{3}{2}}d} - \frac{(A-B+C)\sin(dx+c)}{2d(a+a\cos(dx+c))^{\frac{3}{2}}} \\ & - \frac{(5A-B-3C)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d} \end{aligned}$$

command

`integrate((A+B*cos(d*x+c)+C*cos(d*x+c)^2)*sec(d*x+c)/(a+a*cos(d*x+c))^(3/2),x, algorithm="maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output`

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.25 Problem number 415

$$\int \frac{(A + B \cos(c + dx) + C \cos^2(c + dx)) \sec^2(c + dx)}{(a + a \cos(c + dx))^{3/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(3A-2B)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{a^{\frac{3}{2}}d} \\ & + \frac{(9A-5B+C)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d} \\ & - \frac{(A-B+C)\tan(dx+c)}{2d(a+a\cos(dx+c))^{\frac{3}{2}}} + \frac{(3A-B+C)\tan(dx+c)}{2ad\sqrt{a+a\cos(dx+c)}} \end{aligned}$$

command

`integrate((A+B*cos(d*x+c)+C*cos(d*x+c)^2)*sec(d*x+c)^2/(a+a*cos(d*x+c))^(3/2),x, algorithm="maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output`

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.26 Problem number 476

$$\int \cos^{\frac{3}{2}}(c + dx) \sqrt{a + a \cos(c + dx)} (A + B \cos(c + dx) + C \cos^2(c + dx)) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(48A + 40B + 35C) \arcsin\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx+c)}}\right) \sqrt{a}}{64d} \\ & + \frac{a(48A + 40B + 35C) \left(\cos^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{96d\sqrt{a + a \cos(dx+c)}} \\ & + \frac{a(8B + C) \left(\cos^{\frac{5}{2}}(dx+c)\right) \sin(dx+c)}{24d\sqrt{a + a \cos(dx+c)}} \\ & + \frac{a(48A + 40B + 35C) \sin(dx+c) (\sqrt{\cos(dx+c)})}{64d\sqrt{a + a \cos(dx+c)}} \\ & + \frac{C \left(\cos^{\frac{5}{2}}(dx+c)\right) \sin(dx+c) \sqrt{a + a \cos(dx+c)}}{4d} \end{aligned}$$

command

`integrate(cos(d*x+c)^(3/2)*(A+B*cos(d*x+c)+C*cos(d*x+c)^2)*(a+a*cos(d*x+c))^(1/2),x, algorithm`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.27 Problem number 484

$$\int \cos^{\frac{3}{2}}(c + dx) (a + a \cos(c + dx))^{3/2} (A + B \cos(c + dx) + C \cos^2(c + dx)) dx$$

Optimal antiderivative

$$\begin{aligned}
& \frac{a^{\frac{3}{2}}(176A + 150B + 133C) \arcsin\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{128d} \\
& + \frac{C\left(\cos^{\frac{5}{2}}(dx+c)\right)(a+a\cos(dx+c))^{\frac{3}{2}}\sin(dx+c)}{5d} \\
& + \frac{a^2(176A + 150B + 133C)\left(\cos^{\frac{3}{2}}(dx+c)\right)\sin(dx+c)}{192d\sqrt{a+a\cos(dx+c)}} \\
& + \frac{a^2(80A + 90B + 67C)\left(\cos^{\frac{5}{2}}(dx+c)\right)\sin(dx+c)}{240d\sqrt{a+a\cos(dx+c)}} \\
& + \frac{a^2(176A + 150B + 133C)\sin(dx+c)(\sqrt{\cos}(dx+c))}{128d\sqrt{a+a\cos(dx+c)}} \\
& + \frac{a(10B + 3C)\left(\cos^{\frac{5}{2}}(dx+c)\right)\sin(dx+c)\sqrt{a+a\cos(dx+c)}}{40d}
\end{aligned}$$

command

`integrate(cos(d*x+c)^(3/2)*(a+a*cos(d*x+c))^(3/2)*(A+B*cos(d*x+c)+C*cos(d*x+c)^2),x, algorithm`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.28 Problem number 485

$$\int \sqrt{\cos(c+dx)}(a+a\cos(c+dx))^{3/2}(A+B\cos(c+dx)+C\cos^2(c+dx))dx$$

Optimal antiderivative

$$\begin{aligned}
& \frac{a^{\frac{3}{2}}(112A + 88B + 75C) \arcsin\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{64d} \\
& + \frac{C\left(\cos^{\frac{3}{2}}(dx+c)\right)(a+a\cos(dx+c))^{\frac{3}{2}}\sin(dx+c)}{4d} \\
& + \frac{a^2(48A + 56B + 39C)\left(\cos^{\frac{3}{2}}(dx+c)\right)\sin(dx+c)}{96d\sqrt{a+a\cos(dx+c)}} \\
& + \frac{a^2(112A + 88B + 75C)\sin(dx+c)(\sqrt{\cos}(dx+c))}{64d\sqrt{a+a\cos(dx+c)}} \\
& + \frac{a(8B + 3C)\left(\cos^{\frac{3}{2}}(dx+c)\right)\sin(dx+c)\sqrt{a+a\cos(dx+c)}}{24d}
\end{aligned}$$

command

`integrate(cos(d*x+c)^(1/2)*(a+a*cos(d*x+c))^(3/2)*(A+B*cos(d*x+c)+C*cos(d*x+c)^2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.29 Problem number 493

$$\int \cos^{\frac{3}{2}}(c+dx)(a+a\cos(c+dx))^{5/2}(A+B\cos(c+dx)+C\cos^2(c+dx)) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a^{\frac{5}{2}}(1304A+1132B+1015C)\arcsin\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{512d} \\ & + \frac{a(12B+5C)\left(\cos^{\frac{5}{2}}(dx+c)\right)(a+a\cos(dx+c))^{\frac{3}{2}}\sin(dx+c)}{60d} \\ & + \frac{C\left(\cos^{\frac{5}{2}}(dx+c)\right)(a+a\cos(dx+c))^{\frac{5}{2}}\sin(dx+c)}{6d} \\ & + \frac{a^3(1304A+1132B+1015C)\left(\cos^{\frac{3}{2}}(dx+c)\right)\sin(dx+c)}{768d\sqrt{a+a\cos(dx+c)}} \\ & + \frac{a^3(680A+628B+545C)\left(\cos^{\frac{5}{2}}(dx+c)\right)\sin(dx+c)}{960d\sqrt{a+a\cos(dx+c)}} \\ & + \frac{a^3(1304A+1132B+1015C)\sin(dx+c)(\sqrt{\cos(dx+c)})}{512d\sqrt{a+a\cos(dx+c)}} \\ & + \frac{a^2(120A+156B+115C)\left(\cos^{\frac{5}{2}}(dx+c)\right)\sin(dx+c)\sqrt{a+a\cos(dx+c)}}{480d} \end{aligned}$$

command

`integrate(cos(d*x+c)^(3/2)*(a+a*cos(d*x+c))^(5/2)*(A+B*cos(d*x+c)+C*cos(d*x+c)^2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.30 Problem number 494

$$\int \sqrt{\cos(c+dx)} (a+a\cos(c+dx))^{5/2} (A+B\cos(c+dx)+C\cos^2(c+dx)) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a^{5/2}(400A+326B+283C) \arcsin\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{128d} \\ & + \frac{a(2B+C) \left(\cos^{3/2}(dx+c)\right) (a+a\cos(dx+c))^{3/2} \sin(dx+c)}{8d} \\ & + \frac{C \left(\cos^{3/2}(dx+c)\right) (a+a\cos(dx+c))^{5/2} \sin(dx+c)}{5d} \\ & + \frac{a^3(1040A+950B+787C) \left(\cos^{3/2}(dx+c)\right) \sin(dx+c)}{960d\sqrt{a+a\cos(dx+c)}} \\ & + \frac{a^3(400A+326B+283C) \sin(dx+c) (\sqrt{\cos(dx+c)})}{128d\sqrt{a+a\cos(dx+c)}} \\ & + \frac{a^2(80A+110B+79C) \left(\cos^{3/2}(dx+c)\right) \sin(dx+c) \sqrt{a+a\cos(dx+c)}}{240d} \end{aligned}$$

command

`integrate(cos(d*x+c)^(1/2)*(a+a*cos(d*x+c))^(5/2)*(A+B*cos(d*x+c)+C*cos(d*x+c)^2),x, algorithm`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.31 Problem number 495

$$\int \frac{(a+a\cos(c+dx))^{5/2} (A+B\cos(c+dx)+C\cos^2(c+dx))}{\sqrt{\cos(c+dx)}} dx$$

Optimal antiderivative

$$\begin{aligned}
& \frac{a^{\frac{5}{2}}(304A + 200B + 163C) \arcsin\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right)}{64d} \\
& + \frac{a(8B + 5C)(a + a\cos(dx+c))^{\frac{3}{2}} \sin(dx+c) (\sqrt{\cos(dx+c)})}{24d} \\
& + \frac{C(a + a\cos(dx+c))^{\frac{5}{2}} \sin(dx+c) (\sqrt{\cos(dx+c)})}{4d} \\
& + \frac{a^3(432A + 392B + 299C) \sin(dx+c) (\sqrt{\cos(dx+c)})}{192d\sqrt{a+a\cos(dx+c)}} \\
& + \frac{a^2(16A + 24B + 17C) \sin(dx+c) (\sqrt{\cos(dx+c)}) \sqrt{a+a\cos(dx+c)}}{32d}
\end{aligned}$$

command

```
integrate((a+a*cos(d*x+c))^(5/2)*(A+B*cos(d*x+c)+C*cos(d*x+c)^2)/cos(d*x+c)^(1/2),x, algorithm
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.32 Problem number 1230

$$\int \frac{(a + a\cos(c + dx))^{5/2} (A + C\cos^2(c + dx))}{\sec^{\frac{3}{2}}(c + dx)} dx$$

Optimal antiderivative

$$\begin{aligned}
& \frac{aC(a + a\cos(dx+c))^{\frac{3}{2}} \sin(dx+c)}{12d\sec(dx+c)^{\frac{5}{2}}} + \frac{C(a + a\cos(dx+c))^{\frac{5}{2}} \sin(dx+c)}{6d\sec(dx+c)^{\frac{5}{2}}} \\
& + \frac{a^3(136A + 109C) \sin(dx+c)}{192d\sec(dx+c)^{\frac{5}{2}} \sqrt{a+a\cos(dx+c)}} + \frac{a^3(1304A + 1015C) \sin(dx+c)}{768d\sec(dx+c)^{\frac{3}{2}} \sqrt{a+a\cos(dx+c)}} \\
& + \frac{a^2(24A + 23C) \sin(dx+c) \sqrt{a+a\cos(dx+c)}}{96d\sec(dx+c)^{\frac{5}{2}}} \\
& + \frac{a^3(1304A + 1015C) \sin(dx+c)}{512d\sqrt{a+a\cos(dx+c)} \sqrt{\sec(dx+c)}} \\
& + \frac{a^{\frac{5}{2}}(1304A + 1015C) \arcsin\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a+a\cos(dx+c)}}\right) (\sqrt{\cos(dx+c)}) (\sqrt{\sec(dx+c)})}{512d}
\end{aligned}$$

command

```
integrate((a+a*cos(d*x+c))^(5/2)*(A+C*cos(d*x+c)^2)/sec(d*x+c)^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.33 Problem number 1317

$$\int \frac{\sqrt{a + a \cos(c + dx)} (A + B \cos(c + dx) + C \cos^2(c + dx))}{\sec^{\frac{3}{2}}(c + dx)} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a(8B + C) \sin(dx + c)}{24d \sec(dx + c)^{\frac{5}{2}} \sqrt{a + a \cos(dx + c)}} + \frac{a(48A + 40B + 35C) \sin(dx + c)}{96d \sec(dx + c)^{\frac{3}{2}} \sqrt{a + a \cos(dx + c)}} \\ & + \frac{C \sin(dx + c) \sqrt{a + a \cos(dx + c)}}{4d \sec(dx + c)^{\frac{5}{2}}} + \frac{a(48A + 40B + 35C) \sin(dx + c)}{64d \sqrt{a + a \cos(dx + c)} \sqrt{\sec(dx + c)}} \\ & + \frac{(48A + 40B + 35C) \arcsin\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx + c)}}\right) \sqrt{a} (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)})}{64d} \end{aligned}$$

command

```
integrate((A+B*cos(d*x+c)+C*cos(d*x+c)^2)*(a+a*cos(d*x+c))^(1/2)/sec(d*x+c)^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.34 Problem number 1325

$$\int \frac{(a + a \cos(c + dx))^{3/2} (A + B \cos(c + dx) + C \cos^2(c + dx))}{\sqrt{\sec(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{C(a + a \cos(dx + c))^{\frac{3}{2}} \sin(dx + c)}{4d \sec(dx + c)^{\frac{3}{2}}} + \frac{a^2(48A + 56B + 39C) \sin(dx + c)}{96d \sec(dx + c)^{\frac{3}{2}} \sqrt{a + a \cos(dx + c)}} \\ & + \frac{a(8B + 3C) \sin(dx + c) \sqrt{a + a \cos(dx + c)}}{24d \sec(dx + c)^{\frac{3}{2}}} + \frac{a^2(112A + 88B + 75C) \sin(dx + c)}{64d \sqrt{a + a \cos(dx + c)} \sqrt{\sec(dx + c)}} \\ & + \frac{a^{\frac{3}{2}}(112A + 88B + 75C) \arcsin\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)})}{64d} \end{aligned}$$

command

`integrate((a+a*cos(d*x+c))^(3/2)*(A+B*cos(d*x+c)+C*cos(d*x+c)^2)/sec(d*x+c)^(1/2),x, algorithm`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.35 Problem number 1326

$$\int \frac{(a + a \cos(c + dx))^{3/2} (A + B \cos(c + dx) + C \cos^2(c + dx))}{\sec^{\frac{3}{2}}(c + dx)} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{C(a + a \cos(dx + c))^{\frac{3}{2}} \sin(dx + c)}{5d \sec(dx + c)^{\frac{5}{2}}} + \frac{a^2(80A + 90B + 67C) \sin(dx + c)}{240d \sec(dx + c)^{\frac{5}{2}} \sqrt{a + a \cos(dx + c)}} \\ & + \frac{a^2(176A + 150B + 133C) \sin(dx + c)}{192d \sec(dx + c)^{\frac{3}{2}} \sqrt{a + a \cos(dx + c)}} + \frac{a(10B + 3C) \sin(dx + c) \sqrt{a + a \cos(dx + c)}}{40d \sec(dx + c)^{\frac{5}{2}}} \\ & + \frac{a^2(176A + 150B + 133C) \sin(dx + c)}{128d \sqrt{a + a \cos(dx + c)} \sqrt{\sec(dx + c)}} \\ & + \frac{a^{\frac{3}{2}}(176A + 150B + 133C) \arcsin\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)})}{128d} \end{aligned}$$

command

`integrate((a+a*cos(d*x+c))^(3/2)*(A+B*cos(d*x+c)+C*cos(d*x+c)^2)/sec(d*x+c)^(3/2),x, algorithm`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.36 Problem number 1334

$$\int (a + a \cos(c + dx))^{5/2} (A + B \cos(c + dx) + C \cos^2(c + dx)) \sqrt{\sec(c + dx)} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a(8B + 5C)(a + a \cos(dx + c))^{\frac{3}{2}} \sin(dx + c)}{24d \sqrt{\sec(dx + c)}} + \frac{C(a + a \cos(dx + c))^{\frac{5}{2}} \sin(dx + c)}{4d \sqrt{\sec(dx + c)}} \\ & + \frac{a^3(432A + 392B + 299C) \sin(dx + c)}{192d \sqrt{a + a \cos(dx + c)} \sqrt{\sec(dx + c)}} \\ & + \frac{a^2(16A + 24B + 17C) \sin(dx + c) \sqrt{a + a \cos(dx + c)}}{32d \sqrt{\sec(dx + c)}} \\ & + \frac{a^{\frac{5}{2}}(304A + 200B + 163C) \arcsin\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)})}{64d} \end{aligned}$$

command

`integrate((a+a*cos(d*x+c))^(5/2)*(A+B*cos(d*x+c)+C*cos(d*x+c)^2)*sec(d*x+c)^(1/2),x, algorithm`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.37 Problem number 1335

$$\int \frac{(a + a \cos(c + dx))^{5/2} (A + B \cos(c + dx) + C \cos^2(c + dx))}{\sqrt{\sec(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a(2B + C)(a + a \cos(dx + c))^{\frac{3}{2}} \sin(dx + c)}{8d \sec(dx + c)^{\frac{3}{2}}} \\ & + \frac{C(a + a \cos(dx + c))^{\frac{5}{2}} \sin(dx + c)}{5d \sec(dx + c)^{\frac{3}{2}}} + \frac{a^3(1040A + 950B + 787C) \sin(dx + c)}{960d \sec(dx + c)^{\frac{3}{2}} \sqrt{a + a \cos(dx + c)}} \\ & + \frac{a^2(80A + 110B + 79C) \sin(dx + c) \sqrt{a + a \cos(dx + c)}}{240d \sec(dx + c)^{\frac{3}{2}}} \\ & + \frac{a^3(400A + 326B + 283C) \sin(dx + c)}{128d \sqrt{a + a \cos(dx + c)} \sqrt{\sec(dx + c)}} \\ & + \frac{a^{\frac{5}{2}}(400A + 326B + 283C) \arcsin\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)})}{128d} \end{aligned}$$

command

`integrate((a+a*cos(d*x+c))^(5/2)*(A+B*cos(d*x+c)+C*cos(d*x+c)^2)/sec(d*x+c)^(1/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

16.38 Problem number 1336

$$\int \frac{(a + a \cos(c + dx))^{5/2} (A + B \cos(c + dx) + C \cos^2(c + dx))}{\sec^{\frac{3}{2}}(c + dx)} dx$$

Optimal antiderivative

$$\begin{aligned}
& \frac{a(12B + 5C)(a + a \cos(dx + c))^{\frac{3}{2}} \sin(dx + c)}{60d \sec(dx + c)^{\frac{5}{2}}} + \frac{C(a + a \cos(dx + c))^{\frac{5}{2}} \sin(dx + c)}{6d \sec(dx + c)^{\frac{5}{2}}} \\
& + \frac{a^3(680A + 628B + 545C) \sin(dx + c)}{960d \sec(dx + c)^{\frac{5}{2}} \sqrt{a + a \cos(dx + c)}} + \frac{a^3(1304A + 1132B + 1015C) \sin(dx + c)}{768d \sec(dx + c)^{\frac{3}{2}} \sqrt{a + a \cos(dx + c)}} \\
& + \frac{a^2(120A + 156B + 115C) \sin(dx + c) \sqrt{a + a \cos(dx + c)}}{480d \sec(dx + c)^{\frac{5}{2}}} \\
& + \frac{a^3(1304A + 1132B + 1015C) \sin(dx + c)}{512d \sqrt{a + a \cos(dx + c)} \sqrt{\sec(dx + c)}} \\
& + \frac{a^{\frac{5}{2}}(1304A + 1132B + 1015C) \arcsin\left(\frac{\sin(dx+c)\sqrt{a}}{\sqrt{a + a \cos(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)})}{512d}
\end{aligned}$$

command

```
integrate((a+a*cos(d*x+c))^(5/2)*(A+B*cos(d*x+c)+C*cos(d*x+c)^2)/sec(d*x+c)^(3/2),x, algorithm
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

17 Test file number 101

Test folder name:

```
test_cases/4_Trig_functions/4.3_Tangent/101_4.3.1.2-d_sec-^m-a+b_tan-^n
```

17.1 Problem number 313

$$\int \sec^3(c + dx)(a + ia \tan(c + dx))^{5/2} dx$$

Optimal antiderivative

$$\begin{aligned}
& \frac{64ia^3(\sec^3(dx + c))}{105d \sqrt{a + ia \tan(dx + c)}} + \frac{8ia^2(\sec^3(dx + c)) \sqrt{a + ia \tan(dx + c)}}{21d} \\
& + \frac{256ia^4(\sec^3(dx + c))}{315d (a + ia \tan(dx + c))^{\frac{3}{2}}} + \frac{2ia(\sec^3(dx + c)) (a + ia \tan(dx + c))^{\frac{3}{2}}}{9d}
\end{aligned}$$

command

```
integrate(sec(d*x+c)^3*(a+I*a*tan(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$315 \left(\cos(2dx + 2c)^2 + \sin(2dx + 2c)^2 + 2 \cos(2dx + 2c) + 1 \right)^{\frac{1}{4}} \left(\left(2 \cos(2dx + 2c)^3 + (2 \cos(2dx + 2c) + 1) \sin(2dx + 2c) \right)^{\frac{1}{4}} \right)$$

Maxima 5.44 via sagemath 9.3 output

Timed out

18 Test file number 118

Test folder name:

test_cases/4_Trig_functions/4.5_Secant/118_4.5.1.2-d_sec~n-a+b_sec~m

18.1 Problem number 236

$$\int \frac{(a + a \sec(c + dx))^{5/2}}{\sqrt{\sec(c + dx)}} dx$$

Optimal antiderivative

$$\frac{5a^{\frac{5}{2}} \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx+c)}}\right)}{d} + \frac{a^3 \sin(dx+c) (\sqrt{\sec(dx+c)})}{d \sqrt{a + a \sec(dx+c)}} + \frac{a^2 \sin(dx+c) (\sqrt{\sec(dx+c)}) \sqrt{a + a \sec(dx+c)}}{d}$$

command

```
integrate((a+a*sec(d*x+c))^(5/2)/sec(d*x+c)^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

18.2 Problem number 253

$$\int \frac{\sec^{\frac{3}{2}}(c + dx)}{(a + a \sec(c + dx))^{\frac{3}{2}}} dx$$

Optimal antiderivative

$$\frac{(\sec^{\frac{3}{2}}(dx + c)) \sin(dx + c)}{2d(a + a \sec(dx + c))^{\frac{3}{2}}} + \frac{\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a + a \sec(dx + c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}$$

command

```
integrate(sec(d*x+c)^(3/2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

18.3 Problem number 256

$$\int \frac{1}{\sec^{\frac{3}{2}}(c + dx)(a + a \sec(c + dx))^{\frac{3}{2}}} dx$$

Optimal antiderivative

$$\frac{11 \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a + a \sec(dx + c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d} - \frac{\sin(dx + c)}{2d(a + a \sec(dx + c))^{\frac{3}{2}}\sqrt{\sec(dx + c)}}$$

$$+ \frac{7 \sin(dx + c)}{6ad\sqrt{\sec(dx + c)}\sqrt{a + a \sec(dx + c)}} - \frac{19 \sin(dx + c)(\sqrt{\sec(dx + c)})}{6ad\sqrt{a + a \sec(dx + c)}}$$

command

```
integrate(1/sec(d*x+c)^(3/2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

18.4 Problem number 260

$$\int \frac{\sec^{\frac{5}{2}}(c + dx)}{(a + a \sec(c + dx))^{\frac{5}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{\left(\sec^{\frac{5}{2}}(dx + c)\right) \sin(dx + c)}{4d(a + a \sec(dx + c))^{\frac{5}{2}}} + \frac{3\left(\sec^{\frac{3}{2}}(dx + c)\right) \sin(dx + c)}{16ad(a + a \sec(dx + c))^{\frac{3}{2}}} \\ & + \frac{3 \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a + a \sec(dx + c)}}\right) \sqrt{2}}{32a^{\frac{5}{2}}d} \end{aligned}$$

command

```
integrate(sec(d*x+c)^(5/2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

18.5 Problem number 263

$$\int \frac{1}{\sqrt{\sec(c + dx)} (a + a \sec(c + dx))^{\frac{5}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{75 \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a + a \sec(dx + c)}}\right) \sqrt{2}}{32a^{\frac{5}{2}}d} - \frac{\sin(dx + c) (\sqrt{\sec(dx + c)})}{4d(a + a \sec(dx + c))^{\frac{5}{2}}} \\ & - \frac{13 \sin(dx + c) (\sqrt{\sec(dx + c)})}{16ad(a + a \sec(dx + c))^{\frac{3}{2}}} + \frac{49 \sin(dx + c) (\sqrt{\sec(dx + c)})}{16a^2d\sqrt{a + a \sec(dx + c)}} \end{aligned}$$

command

```
integrate(1/(a+a*sec(d*x+c))^(5/2)/sec(d*x+c)^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

18.6 Problem number 264

$$\int \frac{1}{\sec^{\frac{3}{2}}(c+dx)(a+a\sec(c+dx))^{5/2}} dx$$

Optimal antiderivative

$$\frac{163 \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)}\sqrt{2})}{2\sqrt{a+a\sec(dx+c)}}\right)\sqrt{2}}{32a^{\frac{5}{2}}d \sin(dx+c)} - \frac{17 \sin(dx+c)}{4d(a+a\sec(dx+c))^{\frac{5}{2}}\sqrt{\sec(dx+c)}} - \frac{16ad(a+a\sec(dx+c))^{\frac{3}{2}}\sqrt{\sec(dx+c)}}{95 \sin(dx+c)} + \frac{299 \sin(dx+c)(\sqrt{\sec(dx+c)})}{48a^2d\sqrt{\sec(dx+c)}\sqrt{a+a\sec(dx+c)}} - \frac{17 \sin(dx+c)}{48a^2d\sqrt{a+a\sec(dx+c)}}$$

command

```
integrate(1/sec(d*x+c)^(3/2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

18.7 Problem number 416

$$\int \sqrt{\cos(c+dx)}(a+a\sec(c+dx))^{5/2} dx$$

Optimal antiderivative

$$\frac{5a^{\frac{5}{2}} \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a+a\sec(dx+c)}}\right)(\sqrt{\cos(dx+c)})(\sqrt{\sec(dx+c)})}{d} + \frac{a^3 \sin(dx+c)}{d\sqrt{\cos(dx+c)}\sqrt{a+a\sec(dx+c)}} + \frac{a^2 \sin(dx+c)\sqrt{a+a\sec(dx+c)}}{d\sqrt{\cos(dx+c)}}$$

command

```
integrate((a+a*sec(d*x+c))^(5/2)*cos(d*x+c)^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

18.8 Problem number 428

$$\int \frac{\cos^{\frac{3}{2}}(c+dx)}{(a+a\sec(c+dx))^{3/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{\sin(dx+c)(\sqrt{\cos(dx+c)})}{2d(a+a\sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{11 \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a\sec(dx+c)}}\right)(\sqrt{\cos(dx+c)})(\sqrt{\sec(dx+c)})\sqrt{2}}{4a^{\frac{3}{2}}d} \\ & - \frac{19 \sin(dx+c)}{6ad\sqrt{\cos(dx+c)}\sqrt{a+a\sec(dx+c)}} + \frac{7 \sin(dx+c)(\sqrt{\cos(dx+c)})}{6ad\sqrt{a+a\sec(dx+c)}} \end{aligned}$$

command

```
integrate(cos(d*x+c)^(3/2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

18.9 Problem number 431

$$\int \frac{1}{\cos^{\frac{3}{2}}(c+dx)(a+a\sec(c+dx))^{3/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{\sin(dx+c)}{2d\cos(dx+c)^{\frac{3}{2}}(a+a\sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a\sec(dx+c)}}\right)(\sqrt{\cos(dx+c)})(\sqrt{\sec(dx+c)})\sqrt{2}}{4a^{\frac{3}{2}}d} \end{aligned}$$

command

```
integrate(1/cos(d*x+c)^(3/2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

18.10 Problem number 434

$$\int \frac{\cos^{\frac{3}{2}}(c+dx)}{(a+a\sec(c+dx))^{5/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{\sin(dx+c)(\sqrt{\cos(dx+c)})}{4d(a+a\sec(dx+c))^{\frac{5}{2}}} - \frac{17\sin(dx+c)(\sqrt{\cos(dx+c)})}{16ad(a+a\sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{163 \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a\sec(dx+c)}}\right)(\sqrt{\cos(dx+c)})(\sqrt{\sec(dx+c)})\sqrt{2}}{32a^{\frac{5}{2}}d} \\ & - \frac{299\sin(dx+c)}{48a^2d\sqrt{\cos(dx+c)}\sqrt{a+a\sec(dx+c)}} + \frac{95\sin(dx+c)(\sqrt{\cos(dx+c)})}{48a^2d\sqrt{a+a\sec(dx+c)}} \end{aligned}$$

command

```
integrate(cos(d*x+c)^(3/2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

18.11 Problem number 435

$$\int \frac{\sqrt{\cos(c+dx)}}{(a+a\sec(c+dx))^{5/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{\sin(dx+c)}{4d(a+a\sec(dx+c))^{\frac{5}{2}}\sqrt{\cos(dx+c)}} - \frac{13\sin(dx+c)}{16ad(a+a\sec(dx+c))^{\frac{3}{2}}\sqrt{\cos(dx+c)}} \\ & + \frac{75 \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a\sec(dx+c)}}\right)(\sqrt{\cos(dx+c)})(\sqrt{\sec(dx+c)})\sqrt{2}}{32a^{\frac{5}{2}}d} \\ & + \frac{49\sin(dx+c)}{16a^2d\sqrt{\cos(dx+c)}\sqrt{a+a\sec(dx+c)}} \end{aligned}$$

command

```
integrate(cos(d*x+c)^(1/2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

18.12 Problem number 438

$$\int \frac{1}{\cos^{\frac{5}{2}}(c+dx)(a+a\sec(c+dx))^{\frac{5}{2}}} dx$$

Optimal antiderivative

$$\frac{\sin(dx+c)}{4d \cos(dx+c)^{\frac{5}{2}} (a+a\sec(dx+c))^{\frac{5}{2}}} + \frac{3 \sin(dx+c)}{16ad \cos(dx+c)^{\frac{3}{2}} (a+a\sec(dx+c))^{\frac{3}{2}}} + \frac{3 \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a\sec(dx+c)}}\right) (\sqrt{\cos(dx+c)}) (\sqrt{\sec(dx+c)}) \sqrt{2}}{32a^{\frac{5}{2}}d}$$

command

```
integrate(1/cos(d*x+c)^(5/2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19 Test file number 123

Test folder name:

```
test_cases/4_Trig_functions/4.5_Secant/123_4.5.3.1-a+b_sec-^m-d_sec-^n-A+B_sec-
```

19.1 Problem number 242

$$\int \frac{(a + a \sec(c + dx))^{5/2} (A + B \sec(c + dx))}{\sqrt{\sec(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a^{5/2} (20A + 19B) \operatorname{arcsinh} \left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx+c)}} \right)}{4d} \\ & + \frac{aB(a + a \sec(dx+c))^{3/2} \sin(dx+c) (\sqrt{\sec(dx+c)})}{2d} \\ & + \frac{a^3(4A - 9B) \sin(dx+c) (\sqrt{\sec(dx+c)})}{4d \sqrt{a + a \sec(dx+c)}} \\ & + \frac{a^2(4A + 7B) \sin(dx+c) (\sqrt{\sec(dx+c)}) \sqrt{a + a \sec(dx+c)}}{4d} \end{aligned}$$

command

```
integrate((a+a*sec(d*x+c))^(5/2)*(A+B*sec(d*x+c))/sec(d*x+c)^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19.2 Problem number 243

$$\int \frac{(a + a \sec(c + dx))^{5/2} (A + B \sec(c + dx))}{\sec^{3/2}(c + dx)} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a^{5/2} (2A + 5B) \operatorname{arcsinh} \left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx+c)}} \right)}{d} + \frac{2aA(a + a \sec(dx+c))^{3/2} \sin(dx+c)}{3d \sqrt{\sec(dx+c)}} \\ & + \frac{a^3(14A + 3B) \sin(dx+c) (\sqrt{\sec(dx+c)})}{3d \sqrt{a + a \sec(dx+c)}} \\ & - \frac{a^2(2A - 3B) \sin(dx+c) (\sqrt{\sec(dx+c)}) \sqrt{a + a \sec(dx+c)}}{3d} \end{aligned}$$

command

`integrate((a+a*sec(d*x+c))^(5/2)*(A+B*sec(d*x+c))/sec(d*x+c)^(3/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19.3 Problem number 255

$$\int \frac{\sec^{\frac{7}{2}}(c+dx)(A+B\sec(c+dx))}{(a+a\sec(c+dx))^{3/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{(12A-19B)\operatorname{arcsinh}\left(\frac{\sqrt{a}\tan(dx+c)}{\sqrt{a+a\sec(dx+c)}}\right)}{4a^{\frac{3}{2}}d} + \frac{(A-B)\left(\sec^{\frac{7}{2}}(dx+c)\right)\sin(dx+c)}{2d(a+a\sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(9A-13B)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\left(\sqrt{\sec(dx+c)}\sqrt{2}\right)}{2\sqrt{a+a\sec(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d} \\ & + \frac{(6A-7B)\left(\sec^{\frac{3}{2}}(dx+c)\right)\sin(dx+c)}{4ad\sqrt{a+a\sec(dx+c)}} - \frac{(A-2B)\left(\sec^{\frac{5}{2}}(dx+c)\right)\sin(dx+c)}{2ad\sqrt{a+a\sec(dx+c)}} \end{aligned}$$

command

`integrate(sec(d*x+c)^(7/2)*(A+B*sec(d*x+c))/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19.4 Problem number 257

$$\int \frac{\sec^{\frac{3}{2}}(c+dx)(A+B\sec(c+dx))}{(a+a\sec(c+dx))^{\frac{3}{2}}} dx$$

Optimal antiderivative

$$\frac{2B \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a+a\sec(dx+c)}}\right)}{a^{\frac{3}{2}}d} + \frac{(A-B)\left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{2d(a+a\sec(dx+c))^{\frac{3}{2}}} \\ + \frac{(A-5B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a\sec(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}$$

command

```
integrate(sec(d*x+c)^(3/2)*(A+B*sec(d*x+c))/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19.5 Problem number 258

$$\int \frac{\sqrt{\sec(c+dx)}(A+B\sec(c+dx))}{(a+a\sec(c+dx))^{\frac{3}{2}}} dx$$

Optimal antiderivative

$$-\frac{(A-B)\left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{2d(a+a\sec(dx+c))^{\frac{3}{2}}} + \frac{(3A+B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a\sec(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d}$$

command

```
integrate((A+B*sec(d*x+c))*sec(d*x+c)^(1/2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19.6 Problem number 260

$$\int \frac{A + B \sec(c + dx)}{\sec^{\frac{3}{2}}(c + dx)(a + a \sec(c + dx))^{3/2}} dx$$

Optimal antiderivative

$$\frac{(11A - 7B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)}\sqrt{2})}{2\sqrt{a+a\sec(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d} - \frac{(A - B) \sin(dx + c)}{2d(a + a \sec(dx + c))^{\frac{3}{2}}\sqrt{\sec(dx + c)}} + \frac{(7A - 3B) \sin(dx + c)}{6ad\sqrt{\sec(dx + c)}\sqrt{a + a \sec(dx + c)}} - \frac{(19A - 15B) \sin(dx + c)(\sqrt{\sec(dx + c)})}{6ad\sqrt{a + a \sec(dx + c)}}$$

command

`integrate((A+B*sec(d*x+c))/sec(d*x+c)^(3/2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19.7 Problem number 262

$$\int \frac{\sec^{\frac{7}{2}}(c + dx)(A + B \sec(c + dx))}{(a + a \sec(c + dx))^{5/2}} dx$$

Optimal antiderivative

$$\frac{(2A - 5B) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx + c)}}\right)}{a^{\frac{5}{2}}d} + \frac{(A - B) \left(\sec^{\frac{7}{2}}(dx + c)\right) \sin(dx + c)}{4d(a + a \sec(dx + c))^{\frac{5}{2}}} + \frac{(7A - 15B) \left(\sec^{\frac{5}{2}}(dx + c)\right) \sin(dx + c)}{16ad(a + a \sec(dx + c))^{\frac{3}{2}}} - \frac{(43A - 115B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)}\sqrt{2})}{2\sqrt{a+a\sec(dx+c)}}\right)\sqrt{2}}{32a^{\frac{5}{2}}d} - \frac{(11A - 35B) \left(\sec^{\frac{3}{2}}(dx + c)\right) \sin(dx + c)}{16a^2d\sqrt{a + a \sec(dx + c)}}$$

command

```
integrate(sec(d*x+c)^(7/2)*(A+B*sec(d*x+c))/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19.8 Problem number 263

$$\int \frac{\sec^{\frac{5}{2}}(c+dx)(A+B\sec(c+dx))}{(a+a\sec(c+dx))^{\frac{5}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{2B \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a+a\sec(dx+c)}}\right)}{a^{\frac{5}{2}}d} + \frac{(A-B)\left(\sec^{\frac{5}{2}}(dx+c)\right) \sin(dx+c)}{4d(a+a\sec(dx+c))^{\frac{5}{2}}} \\ & + \frac{(3A-11B)\left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{16ad(a+a\sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(3A-43B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\left(\sqrt{\sec(dx+c)}\right)\sqrt{2}}{2\sqrt{a+a\sec(dx+c)}}\right)\sqrt{2}}{32a^{\frac{5}{2}}d} \end{aligned}$$

command

```
integrate(sec(d*x+c)^(5/2)*(A+B*sec(d*x+c))/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19.9 Problem number 264

$$\int \frac{\sec^{\frac{3}{2}}(c+dx)(A+B\sec(c+dx))}{(a+a\sec(c+dx))^{\frac{5}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{(A-B)\left(\sec^{\frac{5}{2}}(dx+c)\right)\sin(dx+c)}{4d(a+a\sec(dx+c))^{\frac{5}{2}}} + \frac{(5A+3B)\left(\sec^{\frac{3}{2}}(dx+c)\right)\sin(dx+c)}{16ad(a+a\sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(5A+3B)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\left(\sqrt{\sec(dx+c)}\sqrt{2}\right)}{2\sqrt{a+a\sec(dx+c)}}\right)\sqrt{2}}{32a^{\frac{5}{2}}d} \end{aligned}$$

command

`integrate(sec(d*x+c)^(3/2)*(A+B*sec(d*x+c))/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")`
 Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19.10 Problem number 266

$$\int \frac{A+B\sec(c+dx)}{\sqrt{\sec(c+dx)}(a+a\sec(c+dx))^{\frac{5}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{(75A-19B)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\left(\sqrt{\sec(dx+c)}\sqrt{2}\right)}{2\sqrt{a+a\sec(dx+c)}}\right)\sqrt{2}}{32a^{\frac{5}{2}}d} \\ & -\frac{(A-B)\sin(dx+c)\left(\sqrt{\sec(dx+c)}\right)}{4d(a+a\sec(dx+c))^{\frac{5}{2}}} - \frac{(13A-5B)\sin(dx+c)\left(\sqrt{\sec(dx+c)}\right)}{16ad(a+a\sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(49A-9B)\sin(dx+c)\left(\sqrt{\sec(dx+c)}\right)}{16a^2d\sqrt{a+a\sec(dx+c)}} \end{aligned}$$

command

`integrate((A+B*sec(d*x+c))/(a+a*sec(d*x+c))^(5/2)/sec(d*x+c)^(1/2),x, algorithm="maxima")`
 Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19.11 Problem number 267

$$\int \frac{A + B \sec(c + dx)}{\sec^{\frac{3}{2}}(c + dx)(a + a \sec(c + dx))^{5/2}} dx$$

Optimal antiderivative

$$\frac{(163A - 75B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)}\sqrt{2})}{2\sqrt{a+a\sec(dx+c)}}\right)\sqrt{2}}{32a^{\frac{5}{2}}d} - \frac{(A - B) \sin(dx + c)}{4d(a + a \sec(dx + c))^{\frac{5}{2}} \sqrt{\sec(dx + c)}} - \frac{(17A - 9B) \sin(dx + c)}{16ad(a + a \sec(dx + c))^{\frac{3}{2}} \sqrt{\sec(dx + c)}} + \frac{(95A - 39B) \sin(dx + c)}{48a^2d \sqrt{\sec(dx + c)} \sqrt{a + a \sec(dx + c)}} - \frac{(299A - 147B) \sin(dx + c) (\sqrt{\sec(dx + c)})}{48a^2d \sqrt{a + a \sec(dx + c)}}$$

command

`integrate((A+B*sec(d*x+c))/sec(d*x+c)^(3/2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19.12 Problem number 268

$$\int \frac{A + B \sec(c + dx)}{\sec^{\frac{5}{2}}(c + dx)(a + a \sec(c + dx))^{5/2}} dx$$

Optimal antiderivative

$$-\frac{(A - B) \sin(dx + c)}{4d \sec(dx + c)^{\frac{3}{2}} (a + a \sec(dx + c))^{\frac{5}{2}}} - \frac{(21A - 13B) \sin(dx + c)}{16ad \sec(dx + c)^{\frac{3}{2}} (a + a \sec(dx + c))^{\frac{3}{2}}} + \frac{(283A - 163B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)}\sqrt{2})}{2\sqrt{a+a\sec(dx+c)}}\right)\sqrt{2}}{32a^{\frac{5}{2}}d} + \frac{(157A - 85B) \sin(dx + c)}{80a^2d \sec(dx + c)^{\frac{3}{2}} \sqrt{a + a \sec(dx + c)}} - \frac{(787A - 475B) \sin(dx + c)}{240a^2d \sqrt{\sec(dx + c)} \sqrt{a + a \sec(dx + c)}} + \frac{(2671A - 1495B) \sin(dx + c) (\sqrt{\sec(dx + c)})}{240a^2d \sqrt{a + a \sec(dx + c)}}$$

command

```
integrate((A+B*sec(d*x+c))/sec(d*x+c)^(5/2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19.13 Problem number 537

$$\int \sqrt{\cos(c+dx)} (a+a\sec(c+dx))^{5/2} (A+B\sec(c+dx)) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{aB(a+a\sec(dx+c))^{\frac{3}{2}} \sin(dx+c)}{2d\sqrt{\cos(dx+c)}} \\ & + \frac{a^{\frac{5}{2}}(20A+19B) \operatorname{arcsinh}\left(\frac{\sqrt{a}\tan(dx+c)}{\sqrt{a+a\sec(dx+c)}}\right) (\sqrt{\cos(dx+c)}) (\sqrt{\sec(dx+c)})}{4d} \\ & + \frac{a^3(4A-9B) \sin(dx+c)}{4d\sqrt{\cos(dx+c)}\sqrt{a+a\sec(dx+c)}} + \frac{a^2(4A+7B) \sin(dx+c) \sqrt{a+a\sec(dx+c)}}{4d\sqrt{\cos(dx+c)}} \end{aligned}$$

command

```
integrate((a+a*sec(d*x+c))^(5/2)*(A+B*sec(d*x+c))*cos(d*x+c)^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19.14 Problem number 549

$$\int \frac{\cos^{\frac{3}{2}}(c+dx)(A+B\sec(c+dx))}{(a+a\sec(c+dx))^{3/2}} dx$$

Optimal antiderivative

$$\begin{aligned}
 & - \frac{(A - B) \sin(dx + c) (\sqrt{\cos(dx + c)})}{2d (a + a \sec(dx + c))^{\frac{3}{2}}} \\
 & + \frac{(11A - 7B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a} (\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a + a \sec(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)}) \sqrt{2}}{6ad \sqrt{\cos(dx + c)} \sqrt{a + a \sec(dx + c)}} + \frac{4a^{\frac{3}{2}}d}{(7A - 3B) \sin(dx + c) (\sqrt{\cos(dx + c)})} \\
 & - \frac{(19A - 15B) \sin(dx + c)}{6ad \sqrt{\cos(dx + c)} \sqrt{a + a \sec(dx + c)}} + \frac{(7A - 3B) \sin(dx + c) (\sqrt{\cos(dx + c)})}{6ad \sqrt{a + a \sec(dx + c)}}
 \end{aligned}$$

command

`integrate(cos(d*x+c)^(3/2)*(A+B*sec(d*x+c))/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19.15 Problem number 554

$$\int \frac{A + B \sec(c + dx)}{\cos^{\frac{7}{2}}(c + dx)(a + a \sec(c + dx))^{3/2}} dx$$

Optimal antiderivative

$$\begin{aligned}
 & \frac{(A - B) \sin(dx + c)}{2d \cos(dx + c)^{\frac{7}{2}} (a + a \sec(dx + c))^{\frac{3}{2}}} \\
 & - \frac{(12A - 19B) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)})}{4a^{\frac{3}{2}}d} \\
 & + \frac{(9A - 13B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a} (\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a + a \sec(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)}) \sqrt{2}}{4a^{\frac{3}{2}}d} \\
 & - \frac{(A - 2B) \sin(dx + c)}{2ad \cos(dx + c)^{\frac{5}{2}} \sqrt{a + a \sec(dx + c)}} + \frac{(6A - 7B) \sin(dx + c)}{4ad \cos(dx + c)^{\frac{3}{2}} \sqrt{a + a \sec(dx + c)}}
 \end{aligned}$$

command

`integrate((A+B*sec(d*x+c))/cos(d*x+c)^(7/2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19.16 Problem number 555

$$\int \frac{\cos^{\frac{5}{2}}(c+dx)(A+B\sec(c+dx))}{(a+a\sec(c+dx))^{\frac{5}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(A-B)\left(\cos^{\frac{3}{2}}(dx+c)\right)\sin(dx+c)}{4d(a+a\sec(dx+c))^{\frac{5}{2}}} - \frac{(21A-13B)\left(\cos^{\frac{3}{2}}(dx+c)\right)\sin(dx+c)}{16ad(a+a\sec(dx+c))^{\frac{3}{2}}} \\ & - \frac{(283A-163B)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\left(\sqrt{\sec(dx+c)}\sqrt{2}\right)}{2\sqrt{a+a\sec(dx+c)}}\right)\left(\sqrt{\cos(dx+c)}\right)\left(\sqrt{\sec(dx+c)}\right)\sqrt{2}}{32a^{\frac{5}{2}}d} \\ & + \frac{(157A-85B)\left(\cos^{\frac{3}{2}}(dx+c)\right)\sin(dx+c)}{80a^2d\sqrt{a+a\sec(dx+c)}} + \frac{(2671A-1495B)\sin(dx+c)}{240a^2d\sqrt{\cos(dx+c)}\sqrt{a+a\sec(dx+c)}} \\ & - \frac{(787A-475B)\sin(dx+c)\left(\sqrt{\cos(dx+c)}\right)}{240a^2d\sqrt{a+a\sec(dx+c)}} \end{aligned}$$

command

`integrate(cos(d*x+c)^(5/2)*(A+B*sec(d*x+c))/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19.17 Problem number 556

$$\int \frac{\cos^{\frac{3}{2}}(c+dx)(A+B\sec(c+dx))}{(a+a\sec(c+dx))^{\frac{5}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{(A-B)\sin(dx+c)\left(\sqrt{\cos(dx+c)}\right)}{4d(a+a\sec(dx+c))^{\frac{5}{2}}} - \frac{(17A-9B)\sin(dx+c)\left(\sqrt{\cos(dx+c)}\right)}{16ad(a+a\sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(163A-75B)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\left(\sqrt{\sec(dx+c)}\sqrt{2}\right)}{2\sqrt{a+a\sec(dx+c)}}\right)\left(\sqrt{\cos(dx+c)}\right)\left(\sqrt{\sec(dx+c)}\right)\sqrt{2}}{32a^{\frac{5}{2}}d} \\ & - \frac{(299A-147B)\sin(dx+c)}{48a^2d\sqrt{\cos(dx+c)}\sqrt{a+a\sec(dx+c)}} + \frac{(95A-39B)\sin(dx+c)\left(\sqrt{\cos(dx+c)}\right)}{48a^2d\sqrt{a+a\sec(dx+c)}} \end{aligned}$$

command

```
integrate(cos(d*x+c)^(3/2)*(A+B*sec(d*x+c))/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19.18 Problem number 557

$$\int \frac{\sqrt{\cos(c+dx)} (A+B \sec(c+dx))}{(a+a \sec(c+dx))^{5/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{(A-B) \sin(dx+c)}{4d(a+a \sec(dx+c))^{\frac{5}{2}} \sqrt{\cos(dx+c)}} - \frac{(13A-5B) \sin(dx+c)}{16ad(a+a \sec(dx+c))^{\frac{3}{2}} \sqrt{\cos(dx+c)}} \\ & \frac{(75A-19B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a \sec(dx+c)}}\right) (\sqrt{\cos(dx+c)}) (\sqrt{\sec(dx+c)}) \sqrt{2}}{32a^{\frac{5}{2}}d} \\ & + \frac{(49A-9B) \sin(dx+c)}{16a^2d \sqrt{\cos(dx+c)} \sqrt{a+a \sec(dx+c)}} \end{aligned}$$

command

```
integrate((A+B*sec(d*x+c))*cos(d*x+c)^(1/2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

19.19 Problem number 561

$$\int \frac{A + B \sec(c + dx)}{\cos^{\frac{7}{2}}(c + dx)(a + a \sec(c + dx))^{5/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(A - B) \sin(dx + c)}{4d \cos(dx + c)^{\frac{7}{2}} (a + a \sec(dx + c))^{\frac{5}{2}}} + \frac{(7A - 15B) \sin(dx + c)}{16ad \cos(dx + c)^{\frac{5}{2}} (a + a \sec(dx + c))^{\frac{3}{2}}} \\ & + \frac{(2A - 5B) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)})}{a^{\frac{5}{2}} d} \\ & - \frac{(43A - 115B) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a} (\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a + a \sec(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)}) \sqrt{2}}{32a^{\frac{5}{2}} d} \\ & - \frac{(11A - 35B) \sin(dx + c)}{16a^2 d \cos(dx + c)^{\frac{3}{2}} \sqrt{a + a \sec(dx + c)}} \end{aligned}$$

command

```
integrate((A+B*sec(d*x+c))/cos(d*x+c)^(7/2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20 Test file number 125

Test folder name:

```
test_cases/4_Trig_functions/4.5_Secant/125_4.5.4.2-a+b_sec^m-d_sec^n-A+B_sec+C_sec^2-
```

20.1 Problem number 270

$$\int \frac{(a + a \sec(c + dx))^{5/2} (A + C \sec^2(c + dx))}{\sqrt{\sec(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{5a^{\frac{5}{2}}(8A + 5C) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx+c)}}\right)}{8d} \\ & + \frac{5aC(a + a \sec(dx+c))^{\frac{3}{2}} \sin(dx+c) (\sqrt{\sec(dx+c)})}{12d} \\ & + \frac{C(a + a \sec(dx+c))^{\frac{5}{2}} \sin(dx+c) (\sqrt{\sec(dx+c)})}{3d} \\ & + \frac{a^3(24A - 49C) \sin(dx+c) (\sqrt{\sec(dx+c)})}{24d\sqrt{a + a \sec(dx+c)}} \\ & + \frac{a^2(24A + 31C) \sin(dx+c) (\sqrt{\sec(dx+c)}) \sqrt{a + a \sec(dx+c)}}{24d} \end{aligned}$$

command

```
integrate((a+a*sec(d*x+c))^(5/2)*(A+C*sec(d*x+c)^2)/sec(d*x+c)^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.2 Problem number 272

$$\int \frac{(a + a \sec(c + dx))^{5/2} (A + C \sec^2(c + dx))}{\sec^{5/2}(c + dx)} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{5a^{\frac{5}{2}}C \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx+c)}}\right)}{d} + \frac{2A(a + a \sec(dx+c))^{\frac{5}{2}} \sin(dx+c)}{5d \sec(dx+c)^{\frac{3}{2}}} \\ & + \frac{2aA(a + a \sec(dx+c))^{\frac{3}{2}} \sin(dx+c)}{3d\sqrt{\sec(dx+c)}} + \frac{a^3(64A + 15C) \sin(dx+c) (\sqrt{\sec(dx+c)})}{15d\sqrt{a + a \sec(dx+c)}} \\ & - \frac{a^2(16A - 15C) \sin(dx+c) (\sqrt{\sec(dx+c)}) \sqrt{a + a \sec(dx+c)}}{15d} \end{aligned}$$

command

```
integrate((a+a*sec(d*x+c))^(5/2)*(A+C*sec(d*x+c)^2)/sec(d*x+c)^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.3 Problem number 284

$$\int \frac{\sec^{\frac{3}{2}}(c+dx) (A+C \sec^2(c+dx))}{(a+a \sec(c+dx))^{\frac{3}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{3C \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a+a \sec(dx+c)}}\right)}{a^{\frac{3}{2}}d} - \frac{(A+C) \left(\sec^{\frac{5}{2}}(dx+c)\right) \sin(dx+c)}{2d(a+a \sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(A+9C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a \sec(dx+c)}}\right) \sqrt{2}}{4a^{\frac{3}{2}}d} \\ & + \frac{(A+3C) \left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{2ad\sqrt{a+a \sec(dx+c)}} \end{aligned}$$

command

```
integrate(sec(d*x+c)^(3/2)*(A+C*sec(d*x+c)^2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.4 Problem number 286

$$\int \frac{A+C \sec^2(c+dx)}{\sqrt{\sec(c+dx)} (a+a \sec(c+dx))^{\frac{3}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{(7A-C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a \sec(dx+c)}}\right) \sqrt{2}}{4a^{\frac{3}{2}}d} \\ & - \frac{(A+C) \sin(dx+c) (\sqrt{\sec(dx+c)})}{2d(a+a \sec(dx+c))^{\frac{3}{2}}} + \frac{(5A+C) \sin(dx+c) (\sqrt{\sec(dx+c)})}{2ad\sqrt{a+a \sec(dx+c)}} \end{aligned}$$

command

```
integrate((A+C*sec(d*x+c)^2)/(a+a*sec(d*x+c))^(3/2)/sec(d*x+c)^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.5 Problem number 287

$$\int \frac{A + C \sec^2(c + dx)}{\sec^{\frac{3}{2}}(c + dx)(a + a \sec(c + dx))^{3/2}} dx$$

Optimal antiderivative

$$\frac{(11A + 3C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)}\sqrt{2})}{2\sqrt{a+a\sec(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d} - \frac{(A+C)\sin(dx+c)}{2d(a+a\sec(dx+c))^{\frac{3}{2}}\sqrt{\sec(dx+c)}} + \frac{(7A+3C)\sin(dx+c)}{6ad\sqrt{\sec(dx+c)}\sqrt{a+a\sec(dx+c)}} - \frac{(19A+3C)\sin(dx+c)(\sqrt{\sec(dx+c)})}{6ad\sqrt{a+a\sec(dx+c)}}$$

command

`integrate((A+C*sec(d*x+c)^2)/sec(d*x+c)^(3/2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.6 Problem number 289

$$\int \frac{\sec^{\frac{5}{2}}(c + dx)(A + C \sec^2(c + dx))}{(a + a \sec(c + dx))^{5/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{5C \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a+a \sec(dx+c)}}\right)}{a^{\frac{5}{2}}d} - \frac{(A+C)\left(\sec^{\frac{7}{2}}(dx+c)\right) \sin(dx+c)}{4d(a+a \sec(dx+c))^{\frac{5}{2}}} \\ & + \frac{(A-15C)\left(\sec^{\frac{5}{2}}(dx+c)\right) \sin(dx+c)}{16ad(a+a \sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(3A+115C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\left(\sqrt{\sec(dx+c)}\sqrt{2}\right)}{2\sqrt{a+a \sec(dx+c)}}\right) \sqrt{2}}{32a^{\frac{5}{2}}d} \\ & + \frac{(3A+35C)\left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{16a^2d\sqrt{a+a \sec(dx+c)}} \end{aligned}$$

command

```
integrate(sec(d*x+c)^(5/2)*(A+C*sec(d*x+c)^2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.7 Problem number 291

$$\int \frac{\sqrt{\sec(c+dx)}(A+C \sec^2(c+dx))}{(a+a \sec(c+dx))^{5/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{(A+C)\left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{4d(a+a \sec(dx+c))^{\frac{5}{2}}} - \frac{(9A-7C)\left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{16ad(a+a \sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(19A+3C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}\left(\sqrt{\sec(dx+c)}\sqrt{2}\right)}{2\sqrt{a+a \sec(dx+c)}}\right) \sqrt{2}}{32a^{\frac{5}{2}}d} \end{aligned}$$

command

```
integrate((A+C*sec(d*x+c)^2)*sec(d*x+c)^(1/2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.8 Problem number 292

$$\int \frac{A + C \sec^2(c + dx)}{\sqrt{\sec(c + dx)} (a + a \sec(c + dx))^{5/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{5(15A - C) \operatorname{arctanh} \left(\frac{\sin(dx+c)\sqrt{a} (\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a + a \sec(dx+c)}} \right) \sqrt{2}}{32a^{\frac{5}{2}}d} \\ & - \frac{(A + C) \sin(dx+c) (\sqrt{\sec(dx+c)})^{\frac{5}{2}}}{4d(a + a \sec(dx+c))^{\frac{5}{2}}} - \frac{(13A - 3C) \sin(dx+c) (\sqrt{\sec(dx+c)})^{\frac{3}{2}}}{16ad(a + a \sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(49A + C) \sin(dx+c) (\sqrt{\sec(dx+c)})}{16a^2d\sqrt{a + a \sec(dx+c)}} \end{aligned}$$

command

```
integrate((A+C*sec(d*x+c)^2)/(a+a*sec(d*x+c))^(5/2)/sec(d*x+c)^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.9 Problem number 293

$$\int \frac{A + C \sec^2(c + dx)}{\sec^{\frac{3}{2}}(c + dx)(a + a \sec(c + dx))^{5/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(163A + 19C) \operatorname{arctanh} \left(\frac{\sin(dx+c)\sqrt{a} (\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a + a \sec(dx+c)}} \right) \sqrt{2}}{32a^{\frac{5}{2}}d} \\ & - \frac{(A + C) \sin(dx+c)}{4d(a + a \sec(dx+c))^{\frac{5}{2}} \sqrt{\sec(dx+c)}} - \frac{(17A + C) \sin(dx+c)}{16ad(a + a \sec(dx+c))^{\frac{3}{2}} \sqrt{\sec(dx+c)}} \\ & + \frac{5(19A + 3C) \sin(dx+c)}{48a^2d\sqrt{\sec(dx+c)} \sqrt{a + a \sec(dx+c)}} - \frac{(299A + 27C) \sin(dx+c) (\sqrt{\sec(dx+c)})}{48a^2d\sqrt{a + a \sec(dx+c)}} \end{aligned}$$

command

```
integrate((A+C*sec(d*x+c)^2)/sec(d*x+c)^(3/2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.10 Problem number 294

$$\int \frac{A + C \sec^2(c + dx)}{\sec^{\frac{5}{2}}(c + dx)(a + a \sec(c + dx))^{\frac{5}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{(A + C) \sin(dx + c)}{4d \sec(dx + c)^{\frac{3}{2}} (a + a \sec(dx + c))^{\frac{5}{2}}} - \frac{(21A + 5C) \sin(dx + c)}{16ad \sec(dx + c)^{\frac{3}{2}} (a + a \sec(dx + c))^{\frac{3}{2}}} \\ & (283A + 75C) \operatorname{arctanh} \left(\frac{\sin(dx+c) \sqrt{a} (\sqrt{\sec(dx+c)} \sqrt{2})}{2 \sqrt{a + a \sec(dx + c)}} \right) \sqrt{2} \\ & - \frac{32a^{\frac{5}{2}} d}{(157A + 45C) \sin(dx + c)} - \frac{(787A + 195C) \sin(dx + c)}{80a^2 d \sec(dx + c)^{\frac{3}{2}} \sqrt{a + a \sec(dx + c)}} \\ & + \frac{(2671A + 735C) \sin(dx + c) (\sqrt{\sec(dx + c)})}{240a^2 d \sqrt{a + a \sec(dx + c)}} \end{aligned}$$

command

```
integrate((A+C*sec(d*x+c)^2)/sec(d*x+c)^(5/2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.11 Problem number 490

$$\int \cos^4(c + dx) \sqrt{a + a \sec(c + dx)} (A + B \sec(c + dx) + C \sec^2(c + dx)) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(35A + 40B + 48C) \arctan\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx+c)}}\right) \sqrt{a}}{64d} \\ & + \frac{a(35A + 40B + 48C) \sin(dx+c)}{64d \sqrt{a + a \sec(dx+c)}} + \frac{a(35A + 40B + 48C) \cos(dx+c) \sin(dx+c)}{96d \sqrt{a + a \sec(dx+c)}} \\ & + \frac{a(A + 8B) (\cos^2(dx+c)) \sin(dx+c)}{24d \sqrt{a + a \sec(dx+c)}} \\ & + \frac{A(\cos^3(dx+c)) \sin(dx+c) \sqrt{a + a \sec(dx+c)}}{4d} \end{aligned}$$

command

```
integrate(cos(d*x+c)^4*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)*(a+a*sec(d*x+c))^(1/2),x, algorithm="m
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.12 Problem number 586

$$\int \sec^{\frac{5}{2}}(c + dx) (a + a \sec(c + dx))^{3/2} (A + B \sec(c + dx) + C \sec^2(c + dx)) dx$$

Optimal antiderivative

$$\begin{aligned}
& \frac{a^{\frac{3}{2}}(176A + 150B + 133C) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx+c)}}\right)}{128d} \\
& + \frac{C\left(\sec^{\frac{7}{2}}(dx+c)\right)(a + a \sec(dx+c))^{\frac{3}{2}} \sin(dx+c)}{5d} \\
& + \frac{a^2(176A + 150B + 133C)\left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{128d\sqrt{a + a \sec(dx+c)}} \\
& + \frac{a^2(176A + 150B + 133C)\left(\sec^{\frac{5}{2}}(dx+c)\right) \sin(dx+c)}{192d\sqrt{a + a \sec(dx+c)}} \\
& + \frac{a^2(80A + 90B + 67C)\left(\sec^{\frac{7}{2}}(dx+c)\right) \sin(dx+c)}{240d\sqrt{a + a \sec(dx+c)}} \\
& + \frac{a(10B + 3C)\left(\sec^{\frac{7}{2}}(dx+c)\right) \sin(dx+c) \sqrt{a + a \sec(dx+c)}}{40d}
\end{aligned}$$

command

```
integrate(sec(d*x+c)^(5/2)*(a+a*sec(d*x+c))^(3/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.13 Problem number 595

$$\int \sec^{\frac{5}{2}}(c+dx)(a + a \sec(c+dx))^{5/2} (A + B \sec(c+dx) + C \sec^2(c+dx)) dx$$

Optimal antiderivative

$$\begin{aligned}
& \frac{a^{\frac{5}{2}}(1304A + 1132B + 1015C) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx+c)}}\right)}{512d} \\
& + \frac{a(12B + 5C) \left(\sec^{\frac{7}{2}}(dx+c)\right) (a + a \sec(dx+c))^{\frac{3}{2}} \sin(dx+c)}{60d} \\
& + \frac{C \left(\sec^{\frac{7}{2}}(dx+c)\right) (a + a \sec(dx+c))^{\frac{5}{2}} \sin(dx+c)}{6d} \\
& + \frac{a^3(1304A + 1132B + 1015C) \left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{512d \sqrt{a + a \sec(dx+c)}} \\
& + \frac{a^3(1304A + 1132B + 1015C) \left(\sec^{\frac{5}{2}}(dx+c)\right) \sin(dx+c)}{768d \sqrt{a + a \sec(dx+c)}} \\
& + \frac{a^3(680A + 628B + 545C) \left(\sec^{\frac{7}{2}}(dx+c)\right) \sin(dx+c)}{960d \sqrt{a + a \sec(dx+c)}} \\
& + \frac{a^2(120A + 156B + 115C) \left(\sec^{\frac{7}{2}}(dx+c)\right) \sin(dx+c) \sqrt{a + a \sec(dx+c)}}{480d}
\end{aligned}$$

command

```
integrate(sec(d*x+c)^(5/2)*(a+a*sec(d*x+c))^(5/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.14 Problem number 596

$$\int \sec^{\frac{3}{2}}(c+dx)(a+a \sec(c+dx))^{5/2} (A+B \sec(c+dx)+C \sec^2(c+dx)) dx$$

Optimal antiderivative

$$\begin{aligned}
 & \frac{a^{\frac{5}{2}}(400A + 326B + 283C) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx+c)}}\right)}{128d} \\
 & + \frac{a(2B + C) \left(\sec^{\frac{5}{2}}(dx+c)\right) (a + a \sec(dx+c))^{\frac{3}{2}} \sin(dx+c)}{8d} \\
 & + \frac{C \left(\sec^{\frac{5}{2}}(dx+c)\right) (a + a \sec(dx+c))^{\frac{5}{2}} \sin(dx+c)}{5d} \\
 & + \frac{a^3(400A + 326B + 283C) \left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{128d \sqrt{a + a \sec(dx+c)}} \\
 & + \frac{a^3(1040A + 950B + 787C) \left(\sec^{\frac{5}{2}}(dx+c)\right) \sin(dx+c)}{960d \sqrt{a + a \sec(dx+c)}} \\
 & + \frac{a^2(80A + 110B + 79C) \left(\sec^{\frac{5}{2}}(dx+c)\right) \sin(dx+c) \sqrt{a + a \sec(dx+c)}}{240d}
 \end{aligned}$$

command

`integrate(sec(d*x+c)^(3/2)*(a+a*sec(d*x+c))^(5/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2),x, algorithm`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.15 Problem number 597

$$\int \sqrt{\sec(c+dx)} (a + a \sec(c+dx))^{5/2} (A + B \sec(c+dx) + C \sec^2(c+dx)) dx$$

Optimal antiderivative

$$\begin{aligned}
 & \frac{a^{\frac{5}{2}}(304A + 200B + 163C) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx+c)}}\right)}{64d} \\
 & + \frac{a(8B + 5C) \left(\sec^{\frac{3}{2}}(dx+c)\right) (a + a \sec(dx+c))^{\frac{3}{2}} \sin(dx+c)}{24d} \\
 & + \frac{C \left(\sec^{\frac{3}{2}}(dx+c)\right) (a + a \sec(dx+c))^{\frac{5}{2}} \sin(dx+c)}{4d} \\
 & + \frac{a^3(432A + 392B + 299C) \left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{192d \sqrt{a + a \sec(dx+c)}} \\
 & + \frac{a^2(16A + 24B + 17C) \left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c) \sqrt{a + a \sec(dx+c)}}{32d}
 \end{aligned}$$

command

`integrate(sec(d*x+c)^(1/2)*(a+a*sec(d*x+c))^(5/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2),x, algorithm`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.16 Problem number 598

$$\int \frac{(a + a \sec(c + dx))^{5/2} (A + B \sec(c + dx) + C \sec^2(c + dx))}{\sqrt{\sec(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a^{5/2} (40A + 38B + 25C) \operatorname{arcsinh} \left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx+c)}} \right)}{8d} \\ & + \frac{a(6B + 5C) (a + a \sec(dx+c))^{3/2} \sin(dx+c) (\sqrt{\sec(dx+c)})}{12d} \\ & + \frac{C(a + a \sec(dx+c))^{5/2} \sin(dx+c) (\sqrt{\sec(dx+c)})}{3d} \\ & + \frac{a^3(24A - 54B - 49C) \sin(dx+c) (\sqrt{\sec(dx+c)})}{24d \sqrt{a + a \sec(dx+c)}} \\ & + \frac{a^2(24A + 42B + 31C) \sin(dx+c) (\sqrt{\sec(dx+c)}) \sqrt{a + a \sec(dx+c)}}{24d} \end{aligned}$$

command

`integrate((a+a*sec(d*x+c))^(5/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)/sec(d*x+c)^(1/2),x, algorithm`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.17 Problem number 599

$$\int \frac{(a + a \sec(c + dx))^{5/2} (A + B \sec(c + dx) + C \sec^2(c + dx))}{\sec^{3/2}(c + dx)} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a^{5/2}(8A + 20B + 19C) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx+c)}}\right)}{4d} \\ & + \frac{2A(a + a \sec(dx+c))^{5/2} \sin(dx+c)}{3d \sqrt{\sec(dx+c)}} \\ & - \frac{a(4A - 3C)(a + a \sec(dx+c))^{3/2} \sin(dx+c) (\sqrt{\sec(dx+c)})}{6d} \\ & + \frac{a^3(56A + 12B - 27C) \sin(dx+c) (\sqrt{\sec(dx+c)})}{12d \sqrt{a + a \sec(dx+c)}} \\ & - \frac{a^2(8A - 12B - 21C) \sin(dx+c) (\sqrt{\sec(dx+c)}) \sqrt{a + a \sec(dx+c)}}{12d} \end{aligned}$$

command

`integrate((a+a*sec(d*x+c))^(5/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)/sec(d*x+c)^(3/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.18 Problem number 600

$$\int \frac{(a + a \sec(c + dx))^{5/2} (A + B \sec(c + dx) + C \sec^2(c + dx))}{\sec^{5/2}(c + dx)} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a^{5/2}(2B + 5C) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx+c)}}\right)}{d} + \frac{2A(a + a \sec(dx+c))^{5/2} \sin(dx+c)}{5d \sec(dx+c)^{3/2}} \\ & + \frac{2a(A + B)(a + a \sec(dx+c))^{3/2} \sin(dx+c)}{3d \sqrt{\sec(dx+c)}} \\ & + \frac{a^3(64A + 70B + 15C) \sin(dx+c) (\sqrt{\sec(dx+c)})}{15d \sqrt{a + a \sec(dx+c)}} \\ & - \frac{a^2(16A + 10B - 15C) \sin(dx+c) (\sqrt{\sec(dx+c)}) \sqrt{a + a \sec(dx+c)}}{15d} \end{aligned}$$

command

`integrate((a+a*sec(d*x+c))^(5/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)/sec(d*x+c)^(5/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.19 Problem number 613

$$\int \frac{\sec^{\frac{5}{2}}(c+dx) (A+B\sec(c+dx)+C\sec^2(c+dx))}{(a+a\sec(c+dx))^{\frac{3}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(8A-12B+19C) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a+a\sec(dx+c)}}\right)}{4a^{\frac{3}{2}}d} \\ & - \frac{(A-B+C) \left(\sec^{\frac{7}{2}}(dx+c)\right) \sin(dx+c)}{2d(a+a\sec(dx+c))^{\frac{3}{2}}} \\ & - \frac{(5A-9B+13C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)}\sqrt{2})}{2\sqrt{a+a\sec(dx+c)}}\right) \sqrt{2}}{4a^{\frac{3}{2}}d} \\ & - \frac{(2A-6B+7C) \left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{4ad\sqrt{a+a\sec(dx+c)}} \\ & + \frac{(A-B+2C) \left(\sec^{\frac{5}{2}}(dx+c)\right) \sin(dx+c)}{2ad\sqrt{a+a\sec(dx+c)}} \end{aligned}$$

command

`integrate(sec(d*x+c)^(5/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.20 Problem number 614

$$\int \frac{\sec^{\frac{3}{2}}(c+dx) (A+B\sec(c+dx)+C\sec^2(c+dx))}{(a+a\sec(c+dx))^{\frac{3}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(2B-3C) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a+a\sec(dx+c)}}\right)}{a^{\frac{3}{2}}d} - \frac{(A-B+C) \left(\sec^{\frac{5}{2}}(dx+c)\right) \sin(dx+c)}{2d(a+a\sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(A-5B+9C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)}\sqrt{2})}{2\sqrt{a+a\sec(dx+c)}}\right) \sqrt{2}}{4a^{\frac{3}{2}}d} \\ & + \frac{(A-B+3C) \left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{2ad\sqrt{a+a\sec(dx+c)}} \end{aligned}$$

command

`integrate(sec(d*x+c)^(3/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)/(a+a*sec(d*x+c))^(3/2),x, algorithm`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.21 Problem number 615

$$\int \frac{\sqrt{\sec(c+dx)} (A+B\sec(c+dx)+C\sec^2(c+dx))}{(a+a\sec(c+dx))^{\frac{3}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{2C \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a+a\sec(dx+c)}}\right)}{a^{\frac{3}{2}}d} - \frac{(A-B+C) \left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{2d(a+a\sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(3A+B-5C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)}\sqrt{2})}{2\sqrt{a+a\sec(dx+c)}}\right) \sqrt{2}}{4a^{\frac{3}{2}}d} \end{aligned}$$

command

`integrate(sec(d*x+c)^(1/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")`
 Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.22 Problem number 616

$$\int \frac{A + B \sec(c + dx) + C \sec^2(c + dx)}{\sqrt{\sec(c + dx)} (a + a \sec(c + dx))^{3/2}} dx$$

Optimal antiderivative

$$\frac{(7A - 3B - C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)}\sqrt{2})}{2\sqrt{a+a\sec(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d} - \frac{(A - B + C) \sin(dx+c)(\sqrt{\sec(dx+c)})}{2d(a+a\sec(dx+c))^{\frac{3}{2}}} + \frac{(5A - B + C) \sin(dx+c)(\sqrt{\sec(dx+c)})}{2ad\sqrt{a+a\sec(dx+c)}}$$

command

`integrate((A+B*sec(d*x+c)+C*sec(d*x+c)^2)/sec(d*x+c)^(1/2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")`
 Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.23 Problem number 617

$$\int \frac{A + B \sec(c + dx) + C \sec^2(c + dx)}{\sec^{\frac{3}{2}}(c + dx)(a + a \sec(c + dx))^{3/2}} dx$$

Optimal antiderivative

$$\frac{(11A - 7B + 3C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)}\sqrt{2})}{2\sqrt{a+a\sec(dx+c)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}d} - \frac{(A - B + C) \sin(dx+c)}{2d(a+a\sec(dx+c))^{\frac{3}{2}}\sqrt{\sec(dx+c)}} + \frac{(7A - 3B + 3C) \sin(dx+c)}{6ad\sqrt{\sec(dx+c)}\sqrt{a+a\sec(dx+c)}} - \frac{(19A - 15B + 3C) \sin(dx+c)(\sqrt{\sec(dx+c)})}{6ad\sqrt{a+a\sec(dx+c)}}$$

command

`integrate((A+B*sec(d*x+c)+C*sec(d*x+c)^2)/sec(d*x+c)^(3/2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.24 Problem number 619

$$\int \frac{\sec^{\frac{5}{2}}(c+dx) (A+B\sec(c+dx)+C\sec^2(c+dx))}{(a+a\sec(c+dx))^{\frac{5}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(2B-5C) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a+a\sec(dx+c)}}\right)}{a^{\frac{5}{2}}d} - \frac{(A-B+C) \left(\sec^{\frac{7}{2}}(dx+c)\right) \sin(dx+c)}{4d(a+a\sec(dx+c))^{\frac{5}{2}}} \\ & + \frac{(A+7B-15C) \left(\sec^{\frac{5}{2}}(dx+c)\right) \sin(dx+c)}{16ad(a+a\sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(3A-43B+115C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a\sec(dx+c)}}\right) \sqrt{2}}{32a^{\frac{5}{2}}d} \\ & + \frac{(3A-11B+35C) \left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{16a^2d\sqrt{a+a\sec(dx+c)}} \end{aligned}$$

command

`integrate(sec(d*x+c)^(5/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.25 Problem number 620

$$\int \frac{\sec^{\frac{3}{2}}(c+dx) (A+B\sec(c+dx)+C\sec^2(c+dx))}{(a+a\sec(c+dx))^{\frac{5}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{2C \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a+a\sec(dx+c)}}\right)}{a^{\frac{5}{2}}d} - \frac{(A-B+C) \left(\sec^{\frac{5}{2}}(dx+c)\right) \sin(dx+c)}{4d(a+a\sec(dx+c))^{\frac{5}{2}}} \\ & + \frac{(5A+3B-11C) \left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{16ad(a+a\sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(5A+3B-43C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a\sec(dx+c)}}\right) \sqrt{2}}{32a^{\frac{5}{2}}d} \end{aligned}$$

command

`integrate(sec(d*x+c)^(3/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)/(a+a*sec(d*x+c))^(5/2),x, algorithm`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.26 Problem number 621

$$\int \frac{\sqrt{\sec(c+dx)} (A+B\sec(c+dx)+C\sec^2(c+dx))}{(a+a\sec(c+dx))^{\frac{5}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{(A-B+C) \left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{4d(a+a\sec(dx+c))^{\frac{5}{2}}} - \frac{(9A-B-7C) \left(\sec^{\frac{3}{2}}(dx+c)\right) \sin(dx+c)}{16ad(a+a\sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(19A+5B+3C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a\sec(dx+c)}}\right) \sqrt{2}}{32a^{\frac{5}{2}}d} \end{aligned}$$

command

`integrate(sec(d*x+c)^(1/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)/(a+a*sec(d*x+c))^(5/2),x, algorithm`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.27 Problem number 622

$$\int \frac{A + B \sec(c + dx) + C \sec^2(c + dx)}{\sqrt{\sec(c + dx)} (a + a \sec(c + dx))^{5/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(75A - 19B - 5C) \operatorname{arctanh} \left(\frac{\sin(dx+c) \sqrt{a} (\sqrt{\sec(dx+c)}) \sqrt{2}}{2 \sqrt{a + a \sec(dx+c)}} \right) \sqrt{2}}{32a^{\frac{5}{2}} d} \\ & - \frac{(A - B + C) \sin(dx+c) (\sqrt{\sec(dx+c)})}{4d (a + a \sec(dx+c))^{\frac{5}{2}}} \\ & - \frac{(13A - 5B - 3C) \sin(dx+c) (\sqrt{\sec(dx+c)})}{16ad (a + a \sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(49A - 9B + C) \sin(dx+c) (\sqrt{\sec(dx+c)})}{16a^2 d \sqrt{a + a \sec(dx+c)}} \end{aligned}$$

command

`integrate((A+B*sec(d*x+c)+C*sec(d*x+c)^2)/sec(d*x+c)^(1/2)/(a+a*sec(d*x+c))^(5/2),x, algorithm`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.28 Problem number 623

$$\int \frac{A + B \sec(c + dx) + C \sec^2(c + dx)}{\sec^{\frac{3}{2}}(c + dx)(a + a \sec(c + dx))^{5/2}} dx$$

Optimal antiderivative

$$\frac{(163A - 75B + 19C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)}\sqrt{2})}{2\sqrt{a+a\sec(dx+c)}}\right)\sqrt{2}}{32a^{\frac{5}{2}}d} - \frac{(A - B + C) \sin(dx + c)}{4d(a + a \sec(dx + c))^{\frac{5}{2}} \sqrt{\sec(dx + c)}} - \frac{(17A - 9B + C) \sin(dx + c)}{16ad(a + a \sec(dx + c))^{\frac{3}{2}} \sqrt{\sec(dx + c)}} + \frac{(95A - 39B + 15C) \sin(dx + c)}{48a^2d\sqrt{\sec(dx + c)}\sqrt{a + a \sec(dx + c)}} - \frac{(299A - 147B + 27C) \sin(dx + c)(\sqrt{\sec(dx + c)})}{48a^2d\sqrt{a + a \sec(dx + c)}}$$

command

`integrate((A+B*sec(d*x+c)+C*sec(d*x+c)^2)/sec(d*x+c)^(3/2)/(a+a*sec(d*x+c))^(5/2),x, algorithm`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.29 Problem number 624

$$\int \frac{A + B \sec(c + dx) + C \sec^2(c + dx)}{\sec^{\frac{5}{2}}(c + dx)(a + a \sec(c + dx))^{5/2}} dx$$

Optimal antiderivative

$$-\frac{(A - B + C) \sin(dx + c)}{4d \sec(dx + c)^{\frac{3}{2}} (a + a \sec(dx + c))^{\frac{5}{2}}} - \frac{(21A - 13B + 5C) \sin(dx + c)}{16ad \sec(dx + c)^{\frac{3}{2}} (a + a \sec(dx + c))^{\frac{3}{2}}} + \frac{(283A - 163B + 75C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)}\sqrt{2})}{2\sqrt{a+a\sec(dx+c)}}\right)\sqrt{2}}{32a^{\frac{5}{2}}d} + \frac{(157A - 85B + 45C) \sin(dx + c)}{80a^2d \sec(dx + c)^{\frac{3}{2}} \sqrt{a + a \sec(dx + c)}} - \frac{(787A - 475B + 195C) \sin(dx + c)}{240a^2d \sqrt{\sec(dx + c)} \sqrt{a + a \sec(dx + c)}} + \frac{(2671A - 1495B + 735C) \sin(dx + c)(\sqrt{\sec(dx + c)})}{240a^2d \sqrt{a + a \sec(dx + c)}}$$

command

`integrate((A+B*sec(d*x+c)+C*sec(d*x+c)^2)/sec(d*x+c)^(5/2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.30 Problem number 1150

$$\int \sqrt{\cos(c+dx)} (a+a\sec(c+dx))^{5/2} (A+C\sec^2(c+dx)) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{5aC(a+a\sec(dx+c))^{\frac{3}{2}}\sin(dx+c)}{12d\sqrt{\cos(dx+c)}} + \frac{C(a+a\sec(dx+c))^{\frac{5}{2}}\sin(dx+c)}{3d\sqrt{\cos(dx+c)}} \\ & + \frac{5a^{\frac{5}{2}}(8A+5C)\operatorname{arcsinh}\left(\frac{\sqrt{a}\tan(dx+c)}{\sqrt{a+a\sec(dx+c)}}\right)(\sqrt{\cos(dx+c)})(\sqrt{\sec(dx+c)})}{8d} \\ & + \frac{a^3(24A-49C)\sin(dx+c)}{24d\sqrt{\cos(dx+c)}\sqrt{a+a\sec(dx+c)}} \\ & + \frac{a^2(24A+31C)\sin(dx+c)\sqrt{a+a\sec(dx+c)}}{24d\sqrt{\cos(dx+c)}} \end{aligned}$$

command

`integrate((a+a*sec(d*x+c))^(5/2)*(A+C*sec(d*x+c)^2)*cos(d*x+c)^(1/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.31 Problem number 1158

$$\int \frac{A + C \sec^2(c + dx)}{\sqrt{\cos(c + dx)} \sqrt{a + a \sec(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{C \operatorname{arcsinh} \left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx+c)}} \right) (\sqrt{\cos(dx+c)}) (\sqrt{\sec(dx+c)})}{d\sqrt{a}} \\ & + \frac{(A + C) \operatorname{arctanh} \left(\frac{\sin(dx+c)\sqrt{a} (\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a + a \sec(dx+c)}} \right) \sqrt{2} (\sqrt{\cos(dx+c)}) (\sqrt{\sec(dx+c)})}{d\sqrt{a}} \\ & + \frac{C \sin(dx+c)}{d \cos(dx+c)^{\frac{3}{2}} \sqrt{a + a \sec(dx+c)}} \end{aligned}$$

command

```
integrate((A+C*sec(d*x+c)^2)/cos(d*x+c)^(1/2)/(a+a*sec(d*x+c))^(1/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.32 Problem number 1162

$$\int \frac{\cos^{\frac{3}{2}}(c + dx) (A + C \sec^2(c + dx))}{(a + a \sec(c + dx))^{\frac{3}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{(A + C) \sin(dx+c) (\sqrt{\cos(dx+c)})}{2d(a + a \sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(11A + 3C) \operatorname{arctanh} \left(\frac{\sin(dx+c)\sqrt{a} (\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a + a \sec(dx+c)}} \right) (\sqrt{\cos(dx+c)}) (\sqrt{\sec(dx+c)}) \sqrt{2}}{d} \\ & - \frac{(19A + 3C) \sin(dx+c)}{6ad \sqrt{\cos(dx+c)} \sqrt{a + a \sec(dx+c)}} + \frac{4a^{\frac{3}{2}}d (7A + 3C) \sin(dx+c) (\sqrt{\cos(dx+c)})}{6ad \sqrt{a + a \sec(dx+c)}} \end{aligned}$$

command

`integrate(cos(d*x+c)^(3/2)*(A+C*sec(d*x+c)^2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.33 Problem number 1163

$$\int \frac{\sqrt{\cos(c+dx)} (A+C \sec^2(c+dx))}{(a+a \sec(c+dx))^{3/2}} dx$$

Optimal antiderivative

$$\frac{(A+C) \sin(dx+c)}{2d(a+a \sec(dx+c))^{\frac{3}{2}} \sqrt{\cos(dx+c)}} + \frac{(7A-C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a \sec(dx+c)}}\right) (\sqrt{\cos(dx+c)}) (\sqrt{\sec(dx+c)}) \sqrt{2}}{4a^{\frac{3}{2}}d} + \frac{(5A+C) \sin(dx+c)}{2ad\sqrt{\cos(dx+c)} \sqrt{a+a \sec(dx+c)}}$$

command

`integrate((A+C*sec(d*x+c)^2)*cos(d*x+c)^(1/2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.34 Problem number 1165

$$\int \frac{A+C \sec^2(c+dx)}{\cos^{\frac{3}{2}}(c+dx)(a+a \sec(c+dx))^{3/2}} dx$$

Optimal antiderivative

$$\begin{aligned}
& - \frac{(A + C) \sin(dx + c)}{2d \cos(dx + c)^{\frac{5}{2}} (a + a \sec(dx + c))^{\frac{3}{2}}} \\
& - \frac{3C \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)})}{a^{\frac{3}{2}} d} \\
& + \frac{(A + 9C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a} (\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a + a \sec(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)}) \sqrt{2}}{4a^{\frac{3}{2}} d} \\
& + \frac{(A + 3C) \sin(dx + c)}{2ad \cos(dx + c)^{\frac{3}{2}} \sqrt{a + a \sec(dx + c)}}
\end{aligned}$$

command

```
integrate((A+C*sec(d*x+c)^2)/cos(d*x+c)^(3/2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.35 Problem number 1166

$$\int \frac{A + C \sec^2(c + dx)}{\cos^{\frac{5}{2}}(c + dx)(a + a \sec(c + dx))^{3/2}} dx$$

Optimal antiderivative

$$\begin{aligned}
& - \frac{(A + C) \sin(dx + c)}{2d \cos(dx + c)^{\frac{7}{2}} (a + a \sec(dx + c))^{\frac{3}{2}}} \\
& + \frac{(8A + 19C) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)})}{4a^{\frac{3}{2}} d} \\
& - \frac{(5A + 13C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a} (\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a + a \sec(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)}) \sqrt{2}}{4a^{\frac{3}{2}} d} \\
& + \frac{(A + 2C) \sin(dx + c)}{2ad \cos(dx + c)^{\frac{5}{2}} \sqrt{a + a \sec(dx + c)}} - \frac{(2A + 7C) \sin(dx + c)}{4ad \cos(dx + c)^{\frac{3}{2}} \sqrt{a + a \sec(dx + c)}}
\end{aligned}$$

command

`integrate((A+C*sec(d*x+c)^2)/cos(d*x+c)^(5/2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")`
Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.36 Problem number 1167

$$\int \frac{\cos^{\frac{5}{2}}(c+dx) (A+C \sec^2(c+dx))}{(a+a \sec(c+dx))^{5/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(A+C) \left(\cos^{\frac{3}{2}}(dx+c) \right) \sin(dx+c)}{4d(a+a \sec(dx+c))^{\frac{5}{2}}} - \frac{(21A+5C) \left(\cos^{\frac{3}{2}}(dx+c) \right) \sin(dx+c)}{16ad(a+a \sec(dx+c))^{\frac{3}{2}}} \\ & - \frac{(283A+75C) \operatorname{arctanh} \left(\frac{\sin(dx+c) \sqrt{a} (\sqrt{\sec(dx+c)}) \sqrt{2}}{2\sqrt{a+a \sec(dx+c)}} \right) (\sqrt{\cos(dx+c)}) (\sqrt{\sec(dx+c)}) \sqrt{2}}{32a^{\frac{5}{2}}d} \\ & + \frac{(157A+45C) \left(\cos^{\frac{3}{2}}(dx+c) \right) \sin(dx+c)}{80a^2d \sqrt{a+a \sec(dx+c)}} + \frac{(2671A+735C) \sin(dx+c)}{240a^2d \sqrt{\cos(dx+c)} \sqrt{a+a \sec(dx+c)}} \\ & - \frac{(787A+195C) \sin(dx+c) (\sqrt{\cos(dx+c)})}{240a^2d \sqrt{a+a \sec(dx+c)}} \end{aligned}$$

command

`integrate(cos(d*x+c)^(5/2)*(A+C*sec(d*x+c)^2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")`
Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.37 Problem number 1168

$$\int \frac{\cos^{\frac{3}{2}}(c+dx) (A+C \sec^2(c+dx))}{(a+a \sec(c+dx))^{\frac{5}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{(A+C) \sin(dx+c) (\sqrt{\cos(dx+c)})}{4d (a+a \sec(dx+c))^{\frac{5}{2}}} - \frac{(17A+C) \sin(dx+c) (\sqrt{\cos(dx+c)})}{16ad (a+a \sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(163A+19C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a} (\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a \sec(dx+c)}}\right) (\sqrt{\cos(dx+c)}) (\sqrt{\sec(dx+c)}) \sqrt{2}}{32a^{\frac{5}{2}}d} \\ & - \frac{(299A+27C) \sin(dx+c)}{48a^2d \sqrt{\cos(dx+c)} \sqrt{a+a \sec(dx+c)}} + \frac{5(19A+3C) \sin(dx+c) (\sqrt{\cos(dx+c)})}{48a^2d \sqrt{a+a \sec(dx+c)}} \end{aligned}$$

command

```
integrate(cos(d*x+c)^(3/2)*(A+C*sec(d*x+c)^2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.38 Problem number 1169

$$\int \frac{\sqrt{\cos(c+dx)} (A+C \sec^2(c+dx))}{(a+a \sec(c+dx))^{\frac{5}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{(A+C) \sin(dx+c)}{4d (a+a \sec(dx+c))^{\frac{5}{2}} \sqrt{\cos(dx+c)}} - \frac{(13A-3C) \sin(dx+c)}{16ad (a+a \sec(dx+c))^{\frac{3}{2}} \sqrt{\cos(dx+c)}} \\ & - \frac{5(15A-C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a} (\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a \sec(dx+c)}}\right) (\sqrt{\cos(dx+c)}) (\sqrt{\sec(dx+c)}) \sqrt{2}}{32a^{\frac{5}{2}}d} \\ & + \frac{(49A+C) \sin(dx+c)}{16a^2d \sqrt{\cos(dx+c)} \sqrt{a+a \sec(dx+c)}} \end{aligned}$$

command

```
integrate((A+C*sec(d*x+c)^2)*cos(d*x+c)^(1/2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.39 Problem number 1261

$$\int \frac{(a + a \sec(c + dx))^{3/2} (A + B \sec(c + dx) + C \sec^2(c + dx))}{\cos^{5/2}(c + dx)} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{C(a + a \sec(dx + c))^{3/2} \sin(dx + c)}{5d \cos(dx + c)^{7/2}} \\ & + \frac{a^{3/2}(176A + 150B + 133C) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)})}{128d} \\ & + \frac{a^2(80A + 90B + 67C) \sin(dx + c)}{240d \cos(dx + c)^{7/2} \sqrt{a + a \sec(dx + c)}} + \frac{a^2(176A + 150B + 133C) \sin(dx + c)}{192d \cos(dx + c)^{5/2} \sqrt{a + a \sec(dx + c)}} \\ & + \frac{a^2(176A + 150B + 133C) \sin(dx + c)}{128d \cos(dx + c)^{3/2} \sqrt{a + a \sec(dx + c)}} + \frac{a(10B + 3C) \sin(dx + c) \sqrt{a + a \sec(dx + c)}}{40d \cos(dx + c)^{7/2}} \end{aligned}$$

command

`integrate((a+a*sec(d*x+c))^(3/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)/cos(d*x+c)^(5/2),x, algorithm`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.40 Problem number 1268

$$\int \sqrt{\cos(c+dx)} (a+a \sec(c+dx))^{5/2} (A+B \sec(c+dx)+C \sec^2(c+dx)) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a(6B+5C)(a+a \sec(dx+c))^{\frac{3}{2}} \sin(dx+c)}{12d \sqrt{\cos(dx+c)}} + \frac{C(a+a \sec(dx+c))^{\frac{5}{2}} \sin(dx+c)}{3d \sqrt{\cos(dx+c)}} \\ & + \frac{a^{\frac{5}{2}}(40A+38B+25C) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a+a \sec(dx+c)}}\right) (\sqrt{\cos(dx+c)}) (\sqrt{\sec(dx+c)})}{8d} \\ & + \frac{a^3(24A-54B-49C) \sin(dx+c)}{24d \sqrt{\cos(dx+c)} \sqrt{a+a \sec(dx+c)}} \\ & + \frac{a^2(24A+42B+31C) \sin(dx+c) \sqrt{a+a \sec(dx+c)}}{24d \sqrt{\cos(dx+c)}} \end{aligned}$$

command

`integrate(cos(d*x+c)^(1/2)*(a+a*sec(d*x+c))^(5/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.41 Problem number 1269

$$\int \frac{(a+a \sec(c+dx))^{5/2} (A+B \sec(c+dx)+C \sec^2(c+dx))}{\sqrt{\cos(c+dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a(8B+5C)(a+a \sec(dx+c))^{\frac{3}{2}} \sin(dx+c)}{24d \cos(dx+c)^{\frac{3}{2}}} + \frac{C(a+a \sec(dx+c))^{\frac{5}{2}} \sin(dx+c)}{4d \cos(dx+c)^{\frac{3}{2}}} \\ & + \frac{a^{\frac{5}{2}}(304A+200B+163C) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a+a \sec(dx+c)}}\right) (\sqrt{\cos(dx+c)}) (\sqrt{\sec(dx+c)})}{64d} \\ & + \frac{a^3(432A+392B+299C) \sin(dx+c)}{192d \cos(dx+c)^{\frac{3}{2}} \sqrt{a+a \sec(dx+c)}} \\ & + \frac{a^2(16A+24B+17C) \sin(dx+c) \sqrt{a+a \sec(dx+c)}}{32d \cos(dx+c)^{\frac{3}{2}}} \end{aligned}$$

command

`integrate((a+a*sec(d*x+c))^(5/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)/cos(d*x+c)^(1/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.42 Problem number 1270

$$\int \frac{(a + a \sec(c + dx))^{5/2} (A + B \sec(c + dx) + C \sec^2(c + dx))}{\cos^{3/2}(c + dx)} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a(2B + C)(a + a \sec(dx + c))^{3/2} \sin(dx + c)}{8d \cos(dx + c)^{5/2}} + \frac{C(a + a \sec(dx + c))^{5/2} \sin(dx + c)}{5d \cos(dx + c)^{5/2}} \\ & + \frac{a^{5/2}(400A + 326B + 283C) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx+c)}}\right) (\sqrt{\cos(dx+c)}) (\sqrt{\sec(dx+c)})}{128d} \\ & + \frac{a^3(1040A + 950B + 787C) \sin(dx + c)}{960d \cos(dx + c)^{5/2} \sqrt{a + a \sec(dx + c)}} + \frac{a^3(400A + 326B + 283C) \sin(dx + c)}{128d \cos(dx + c)^{3/2} \sqrt{a + a \sec(dx + c)}} \\ & + \frac{a^2(80A + 110B + 79C) \sin(dx + c) \sqrt{a + a \sec(dx + c)}}{240d \cos(dx + c)^{5/2}} \end{aligned}$$

command

`integrate((a+a*sec(d*x+c))^(5/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)/cos(d*x+c)^(3/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.43 Problem number 1271

$$\int \frac{(a + a \sec(c + dx))^{5/2} (A + B \sec(c + dx) + C \sec^2(c + dx))}{\cos^{5/2}(c + dx)} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a(12B + 5C)(a + a \sec(dx + c))^{3/2} \sin(dx + c)}{60d \cos(dx + c)^{7/2}} + \frac{C(a + a \sec(dx + c))^{5/2} \sin(dx + c)}{6d \cos(dx + c)^{7/2}} \\ & + \frac{a^{5/2}(1304A + 1132B + 1015C) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)})}{512d} \\ & + \frac{a^3(680A + 628B + 545C) \sin(dx + c)}{960d \cos(dx + c)^{7/2} \sqrt{a + a \sec(dx + c)}} + \frac{a^3(1304A + 1132B + 1015C) \sin(dx + c)}{768d \cos(dx + c)^{5/2} \sqrt{a + a \sec(dx + c)}} \\ & + \frac{a^3(1304A + 1132B + 1015C) \sin(dx + c)}{512d \cos(dx + c)^{3/2} \sqrt{a + a \sec(dx + c)}} \\ & + \frac{a^2(120A + 156B + 115C) \sin(dx + c) \sqrt{a + a \sec(dx + c)}}{480d \cos(dx + c)^{7/2}} \end{aligned}$$

command

`integrate((a+a*sec(d*x+c))^(5/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)/cos(d*x+c)^(5/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.44 Problem number 1276

$$\int \frac{A + B \sec(c + dx) + C \sec^2(c + dx)}{\sqrt{\cos(c + dx)} \sqrt{a + a \sec(c + dx)}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(2B - C) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)})}{d\sqrt{a}} \\ & + \frac{(A - B + C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a} (\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a + a \sec(dx + c)}}\right) \sqrt{2} (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)})}{d\sqrt{a}} \\ & + \frac{C \sin(dx + c)}{d \cos(dx + c)^{3/2} \sqrt{a + a \sec(dx + c)}} \end{aligned}$$

command

`integrate((A+B*sec(d*x+c)+C*sec(d*x+c)^2)/cos(d*x+c)^(1/2)/(a+a*sec(d*x+c))^(1/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.45 Problem number 1281

$$\int \frac{\cos^{\frac{3}{2}}(c+dx) (A+B\sec(c+dx)+C\sec^2(c+dx))}{(a+a\sec(c+dx))^{3/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{(A-B+C)\sin(dx+c)(\sqrt{\cos(dx+c)})}{2d(a+a\sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(11A-7B+3C)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a\sec(dx+c)}}\right)(\sqrt{\cos(dx+c)})(\sqrt{\sec(dx+c)})\sqrt{2}}{6ad\sqrt{\cos(dx+c)}\sqrt{a+a\sec(dx+c)}} \\ & - \frac{(19A-15B+3C)\sin(dx+c)}{6ad\sqrt{\cos(dx+c)}\sqrt{a+a\sec(dx+c)}} + \frac{4a^{\frac{3}{2}}d(7A-3B+3C)\sin(dx+c)(\sqrt{\cos(dx+c)})}{6ad\sqrt{a+a\sec(dx+c)}} \end{aligned}$$

command

`integrate(cos(d*x+c)^(3/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.46 Problem number 1282

$$\int \frac{\sqrt{\cos(c+dx)} (A + B \sec(c+dx) + C \sec^2(c+dx))}{(a + a \sec(c+dx))^{3/2}} dx$$

Optimal antiderivative

$$\frac{(A - B + C) \sin(dx + c)}{2d(a + a \sec(dx + c))^{\frac{3}{2}} \sqrt{\cos(dx + c)}} + \frac{(7A - 3B - C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a\sec(dx+c)}}\right) (\sqrt{\cos(dx+c)}) (\sqrt{\sec(dx+c)}) \sqrt{2}}{4a^{\frac{3}{2}}d}$$

$$+ \frac{(5A - B + C) \sin(dx + c)}{2ad \sqrt{\cos(dx + c)} \sqrt{a + a \sec(dx + c)}}$$

command

`integrate(cos(d*x+c)^(1/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.47 Problem number 1285

$$\int \frac{A + B \sec(c+dx) + C \sec^2(c+dx)}{\cos^{\frac{5}{2}}(c+dx)(a + a \sec(c+dx))^{3/2}} dx$$

Optimal antiderivative

$$\frac{(A - B + C) \sin(dx + c)}{2d \cos(dx + c)^{\frac{7}{2}} (a + a \sec(dx + c))^{\frac{3}{2}}} + \frac{(8A - 12B + 19C) \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx + c)}}\right) (\sqrt{\cos(dx + c)}) (\sqrt{\sec(dx + c)})}{4a^{\frac{3}{2}}d}$$

$$+ \frac{(5A - 9B + 13C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)})\sqrt{2}}{2\sqrt{a+a\sec(dx+c)}}\right) (\sqrt{\cos(dx+c)}) (\sqrt{\sec(dx+c)}) \sqrt{2}}{4a^{\frac{3}{2}}d}$$

$$+ \frac{(A - B + 2C) \sin(dx + c)}{2ad \cos(dx + c)^{\frac{5}{2}} \sqrt{a + a \sec(dx + c)}} - \frac{(2A - 6B + 7C) \sin(dx + c)}{4ad \cos(dx + c)^{\frac{3}{2}} \sqrt{a + a \sec(dx + c)}}$$

command

`integrate((A+B*sec(d*x+c)+C*sec(d*x+c)^2)/cos(d*x+c)^(5/2)/(a+a*sec(d*x+c))^(3/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.48 Problem number 1286

$$\int \frac{\cos^{\frac{5}{2}}(c+dx) (A+B\sec(c+dx)+C\sec^2(c+dx))}{(a+a\sec(c+dx))^{\frac{5}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(A-B+C) \left(\cos^{\frac{3}{2}}(dx+c) \right) \sin(dx+c)}{4d(a+a\sec(dx+c))^{\frac{5}{2}}} - \frac{(21A-13B+5C) \left(\cos^{\frac{3}{2}}(dx+c) \right) \sin(dx+c)}{16ad(a+a\sec(dx+c))^{\frac{3}{2}}} \\ & - \frac{(283A-163B+75C) \operatorname{arctanh} \left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec(dx+c)}\sqrt{2})}{2\sqrt{a+a\sec(dx+c)}} \right) (\sqrt{\cos(dx+c)})(\sqrt{\sec(dx+c)})\sqrt{2}}{32a^{\frac{5}{2}}d} \\ & + \frac{(157A-85B+45C) \left(\cos^{\frac{3}{2}}(dx+c) \right) \sin(dx+c)}{80a^2d\sqrt{a+a\sec(dx+c)}} + \frac{(2671A-1495B+735C) \sin(dx+c)}{240a^2d\sqrt{\cos(dx+c)}\sqrt{a+a\sec(dx+c)}} \\ & - \frac{(787A-475B+195C) \sin(dx+c)(\sqrt{\cos(dx+c)})}{240a^2d\sqrt{a+a\sec(dx+c)}} \end{aligned}$$

command

`integrate(cos(d*x+c)^(5/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)/(a+a*sec(d*x+c))^(5/2),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.49 Problem number 1287

$$\int \frac{\cos^{\frac{3}{2}}(c+dx) (A+B\sec(c+dx)+C\sec^2(c+dx))}{(a+a\sec(c+dx))^{\frac{5}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(A-B+C)\sin(dx+c)(\sqrt{\cos}(dx+c)}{4d(a+a\sec(dx+c))^{\frac{5}{2}}} - \frac{(17A-9B+C)\sin(dx+c)(\sqrt{\cos}(dx+c)}{16ad(a+a\sec(dx+c))^{\frac{3}{2}}} \\ & + \frac{(163A-75B+19C)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec}(dx+c))\sqrt{2}}{2\sqrt{a+a\sec(dx+c)}}\right)(\sqrt{\cos}(dx+c))(\sqrt{\sec}(dx+c))\sqrt{2}}{32a^{\frac{5}{2}}d} \\ & - \frac{(299A-147B+27C)\sin(dx+c)}{48a^2d\sqrt{\cos}(dx+c)\sqrt{a+a\sec(dx+c)}} + \frac{(95A-39B+15C)\sin(dx+c)(\sqrt{\cos}(dx+c)}{48a^2d\sqrt{a+a\sec(dx+c)}} \end{aligned}$$

command

`integrate(cos(d*x+c)^(3/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)/(a+a*sec(d*x+c))^(5/2),x, algorithm`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.50 Problem number 1288

$$\int \frac{\sqrt{\cos(c+dx)} (A+B\sec(c+dx)+C\sec^2(c+dx))}{(a+a\sec(c+dx))^{\frac{5}{2}}} dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{(A-B+C)\sin(dx+c)}{4d(a+a\sec(dx+c))^{\frac{5}{2}}\sqrt{\cos}(dx+c)} - \frac{(13A-5B-3C)\sin(dx+c)}{16ad(a+a\sec(dx+c))^{\frac{3}{2}}\sqrt{\cos}(dx+c)} \\ & + \frac{(75A-19B-5C)\operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a}(\sqrt{\sec}(dx+c))\sqrt{2}}{2\sqrt{a+a\sec(dx+c)}}\right)(\sqrt{\cos}(dx+c))(\sqrt{\sec}(dx+c))\sqrt{2}}{32a^{\frac{5}{2}}d} \\ & + \frac{(49A-9B+C)\sin(dx+c)}{16a^2d\sqrt{\cos}(dx+c)\sqrt{a+a\sec(dx+c)}} \end{aligned}$$

command

`integrate(cos(d*x+c)^(1/2)*(A+B*sec(d*x+c)+C*sec(d*x+c)^2)/(a+a*sec(d*x+c))^(5/2),x, algorithm`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

20.51 Problem number 1290

$$\int \frac{A + B \sec(c + dx) + C \sec^2(c + dx)}{\cos^{\frac{3}{2}}(c + dx)(a + a \sec(c + dx))^{5/2}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{(A - B + C) \sin(dx + c)}{4d \cos(dx + c)^{\frac{5}{2}} (a + a \sec(dx + c))^{\frac{5}{2}}} + \frac{(5A + 3B - 11C) \sin(dx + c)}{16ad \cos(dx + c)^{\frac{3}{2}} (a + a \sec(dx + c))^{\frac{3}{2}}} \\ & + \frac{2C \operatorname{arcsinh}\left(\frac{\sqrt{a} \tan(dx+c)}{\sqrt{a + a \sec(dx + c)}}\right) (\sqrt{\cos}(dx + c)) (\sqrt{\sec}(dx + c))}{a^{\frac{5}{2}} d} \\ & + \frac{(5A + 3B - 43C) \operatorname{arctanh}\left(\frac{\sin(dx+c)\sqrt{a} (\sqrt{\sec}(dx+c))\sqrt{2}}{2\sqrt{a + a \sec(dx + c)}}\right) (\sqrt{\cos}(dx + c)) (\sqrt{\sec}(dx + c)) \sqrt{2}}{32a^{\frac{5}{2}} d} \end{aligned}$$

command

`integrate((A+B*sec(d*x+c)+C*sec(d*x+c)^2)/cos(d*x+c)^(3/2)/(a+a*sec(d*x+c))^(5/2),x, algorithm`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

21 Test file number 137

Test folder name:

`test_cases/4_Trig_functions/4.7_Miscellaneous/137_4.7.3-c+d_x~m_trig^n_trig^p`

21.1 Problem number 171

$$\int (c + dx)^4 \cos(a + bx) \cot^2(a + bx) dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{8d(dx+c)^3 \operatorname{arctanh}(e^{i(bx+a)})}{b^2} + \frac{24d^3(dx+c) \cos(bx+a)}{b^4} \\ & -\frac{4d(dx+c)^3 \cos(bx+a)}{b^2} - \frac{(dx+c)^4 \operatorname{csc}(bx+a)}{b} \\ & + \frac{12id^2(dx+c)^2 \operatorname{polylog}(2, -e^{i(bx+a)})}{b^3} - \frac{12id^2(dx+c)^2 \operatorname{polylog}(2, e^{i(bx+a)})}{b^3} \\ & - \frac{24d^3(dx+c) \operatorname{polylog}(3, -e^{i(bx+a)})}{b^4} + \frac{24d^3(dx+c) \operatorname{polylog}(3, e^{i(bx+a)})}{b^4} \\ & - \frac{24id^4 \operatorname{polylog}(4, -e^{i(bx+a)})}{b^5} + \frac{24id^4 \operatorname{polylog}(4, e^{i(bx+a)})}{b^5} \\ & - \frac{24d^4 \sin(bx+a)}{b^5} + \frac{12d^2(dx+c)^2 \sin(bx+a)}{b^3} - \frac{(dx+c)^4 \sin(bx+a)}{b} \end{aligned}$$

command

```
integrate((d*x+c)^4*cos(b*x+a)*cot(b*x+a)^2,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

22 Test file number 139

Test folder name:

```
test_cases/4_Trig_functions/4.7_Miscellaneous/139_4.7.5_x^m_trig-a+b_log-c_x^n-p
```

22.1 Problem number 70

$$\int (ex)^m \sin^4(d(a + b \log(cx^n))) dx$$

Optimal antiderivative

$$\begin{aligned}
& \frac{24b^4 d^4 n^4 (ex)^{1+m}}{e(1+m) \left((1+m)^2 + 4b^2 d^2 n^2 \right) \left((1+m)^2 + 16b^2 d^2 n^2 \right)} \\
& - \frac{24b^3 d^3 n^3 (ex)^{1+m} \cos(d(a+b \ln(cx^n))) \sin(d(a+b \ln(cx^n)))}{e \left((1+m)^2 + 4b^2 d^2 n^2 \right) \left((1+m)^2 + 16b^2 d^2 n^2 \right)} \\
& + \frac{12b^2 d^2 (1+m) n^2 (ex)^{1+m} (\sin^2(d(a+b \ln(cx^n))))}{e \left((1+m)^2 + 4b^2 d^2 n^2 \right) \left((1+m)^2 + 16b^2 d^2 n^2 \right)} \\
& - \frac{4bdn(ex)^{1+m} \cos(d(a+b \ln(cx^n))) (\sin^3(d(a+b \ln(cx^n))))}{e \left((1+m)^2 + 16b^2 d^2 n^2 \right)} \\
& + \frac{(1+m)(ex)^{1+m} (\sin^4(d(a+b \ln(cx^n))))}{e \left((1+m)^2 + 16b^2 d^2 n^2 \right)}
\end{aligned}$$

command

```
integrate((e*x)^m*sin(d*(a+b*log(c*x^n)))^4,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

22.2 Problem number 71

$$\int (ex)^m \sin^3(d(a+b \log(cx^n))) dx$$

Optimal antiderivative

$$\begin{aligned}
& \frac{6b^3 d^3 n^3 (ex)^{1+m} \cos(d(a+b \ln(cx^n)))}{e \left((1+m)^2 + b^2 d^2 n^2 \right) \left((1+m)^2 + 9b^2 d^2 n^2 \right)} \\
& + \frac{6b^2 d^2 (1+m) n^2 (ex)^{1+m} \sin(d(a+b \ln(cx^n)))}{e \left((1+m)^2 + b^2 d^2 n^2 \right) \left((1+m)^2 + 9b^2 d^2 n^2 \right)} \\
& - \frac{3bdn(ex)^{1+m} \cos(d(a+b \ln(cx^n))) (\sin^2(d(a+b \ln(cx^n))))}{e \left((1+m)^2 + 9b^2 d^2 n^2 \right)} \\
& + \frac{(1+m)(ex)^{1+m} (\sin^3(d(a+b \ln(cx^n))))}{e \left((1+m)^2 + 9b^2 d^2 n^2 \right)}
\end{aligned}$$

command

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

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

23 Test file number 141

Test folder name:

test_cases/4_Trig_functions/4.7_Miscellaneous/141_4.7.7_Trig_functions

23.1 Problem number 197

$$\int \frac{A + B \sec(x)}{(a + a \cos(x))^{3/2}} dx$$

Optimal antiderivative

$$\frac{2B \operatorname{arctanh}\left(\frac{\sin(x)\sqrt{a}}{\sqrt{a+a\cos(x)}}\right)}{a^{\frac{3}{2}}} + \frac{(A-B)\sin(x)}{2(a+a\cos(x))^{\frac{3}{2}}} + \frac{(A-5B)\operatorname{arctanh}\left(\frac{\sin(x)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(x)}}\right)\sqrt{2}}{4a^{\frac{3}{2}}}$$

command

```
integrate((A+B*sec(x))/(a+a*cos(x))^(3/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

23.2 Problem number 198

$$\int \frac{A + B \sec(x)}{(a + a \cos(x))^{5/2}} dx$$

Optimal antiderivative

$$\frac{2B \operatorname{arctanh}\left(\frac{\sin(x)\sqrt{a}}{\sqrt{a + a \cos(x)}}\right)}{a^{\frac{5}{2}}} + \frac{(A - B) \sin(x)}{4(a + a \cos(x))^{\frac{5}{2}}} + \frac{(3A - 11B) \sin(x)}{16a(a + a \cos(x))^{\frac{3}{2}}} + \frac{(3A - 43B) \operatorname{arctanh}\left(\frac{\sin(x)\sqrt{a}\sqrt{2}}{2\sqrt{a + a \cos(x)}}\right) \sqrt{2}}{32a^{\frac{5}{2}}}$$

command

```
integrate((A+B*sec(x))/(a+a*cos(x))^(5/2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

24 Test file number 196

Test folder name:

test_cases/7_Inverse_hyperbolic_functions/7.3_Inverse_hyperbolic_tangent/196_7.3.6_Exponentia

24.1 Problem number 459

$$\int e^{2 \tanh^{-1}(ax)} \left(c - \frac{c}{ax}\right)^3 dx$$

Optimal antiderivative

$$-\frac{c^3}{2a^3x^2} - \frac{c^3}{a^2x} - c^3x + \frac{c^3 \ln(x)}{a}$$

command

```
integrate((a*x+1)^2/(-a^2*x^2+1)*(c-c/a/x)^3,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-c^3x + \frac{c^3 \log(x)}{a} - \frac{2ac^3x - c^3}{2a^3x^2}$$

Maxima 5.44 via sagemath 9.3 output

Timed out

25 Test file number 197

Test folder name:

test_cases/7_Inverse_hyperbolic_functions/7.3_Inverse_hyperbolic_tangent/197_7.3.7_Inverse_hy

25.1 Problem number 54

$$\int x^m \tanh^{-1}(\tanh(a + bx))^3 dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{6b^3x^{4+m}}{(1+m)(m^3+9m^2+26m+24)} + \frac{6b^2x^{3+m} \operatorname{arctanh}(\tanh(bx+a))}{m^3+6m^2+11m+6} \\ & -\frac{3bx^{2+m} \operatorname{arctanh}(\tanh(bx+a))^2}{m^2+3m+2} + \frac{x^{1+m} \operatorname{arctanh}(\tanh(bx+a))^3}{1+m} \end{aligned}$$

command

```
integrate(x^m*arctanh(tanh(b*x+a))^3,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\begin{aligned} & -\frac{3bx^2x^m \operatorname{arctanh}(\tanh(bx+a))^2}{(m+2)(m+1)} + \frac{x^{m+1} \operatorname{arctanh}(\tanh(bx+a))^3}{m+1} \\ & -\frac{6\left(\frac{b^2x^4x^m}{(m+4)(m+3)(m+2)} - \frac{bx^3x^m \operatorname{arctanh}(\tanh(bx+a))}{(m+3)(m+2)}\right)b}{m+1} \end{aligned}$$

Maxima 5.44 via sagemath 9.3 output

Timed out

26 Test file number 199

Test folder name:

test_cases/7_Inverse_hyperbolic_functions/7.4_Inverse_hyperbolic_cotangent/199_7.4.2_Exponent

26.1 Problem number 359

$$\int e^{n \coth^{-1}(ax)} (c - acx)^{2+\frac{n}{2}} dx$$

Optimal antiderivative

$$\begin{aligned} & - \frac{(n^2 + 14n + 56) \left(1 - \frac{1}{ax}\right)^{-2-\frac{n}{2}} \left(1 + \frac{1}{ax}\right)^{1+\frac{n}{2}} (-acx + c)^{2+\frac{n}{2}}}{a(4+n)(6+n)} \\ & + \frac{2(n^2 + 14n + 56) \left(1 - \frac{1}{ax}\right)^{-2-\frac{n}{2}} \left(1 + \frac{1}{ax}\right)^{1+\frac{n}{2}} (-acx + c)^{2+\frac{n}{2}}}{a^2(6+n)(n^2 + 6n + 8)x} \\ & + \frac{(8+n) \left(1 - \frac{1}{ax}\right)^{-2-\frac{n}{2}} \left(1 + \frac{1}{ax}\right)^{1+\frac{n}{2}} x(-acx + c)^{2+\frac{n}{2}}}{6+n} \\ & - \frac{\left(a - \frac{1}{x}\right) \left(1 - \frac{1}{ax}\right)^{-2-\frac{n}{2}} \left(1 + \frac{1}{ax}\right)^{1+\frac{n}{2}} x(-acx + c)^{2+\frac{n}{2}}}{a} \end{aligned}$$

command

```
integrate(exp(n*arccoth(a*x))*(-a*c*x+c)^(2+1/2*n),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{2 \left((n^2 + 6n + 8)a^3(-c)^{\frac{1}{2}n} c^2 x^3 - (n^2 + 14n + 24)a^2(-c)^{\frac{1}{2}n} c^2 x^2 - (n^2 + 6n - 24)a(-c)^{\frac{1}{2}n} c^2 x + (n^2 + 14n + 56)a^3(-c)^{\frac{1}{2}n} c^2 \right)}{(n^3 + 12n^2 + 44n + 48)a}$$

Maxima 5.44 via sagemath 9.3 output

$$\int (-acx + c)^{\frac{1}{2}n+2} \left(\frac{ax-1}{ax+1} \right)^{\frac{1}{2}n} dx$$

26.2 Problem number 360

$$\int e^{n \coth^{-1}(ax)} (c - acx)^{1+\frac{n}{2}} dx$$

Optimal antiderivative

$$- \frac{2(6+n) \left(1 - \frac{1}{ax}\right)^{-1-\frac{n}{2}} \left(1 + \frac{1}{ax}\right)^{1+\frac{n}{2}} (-acx + c)^{1+\frac{n}{2}}}{a(n^2 + 6n + 8)} + \frac{2 \left(1 - \frac{1}{ax}\right)^{-1-\frac{n}{2}} \left(1 + \frac{1}{ax}\right)^{1+\frac{n}{2}} x(-acx + c)^{1+\frac{n}{2}}}{4+n}$$

command

```
integrate(exp(n*arccoth(a*x))*(-a*c*x+c)^(1+1/2*n),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{2 \left(a^2 (-c)^{\frac{1}{2}n} c(n+2)x^2 - 4a(-c)^{\frac{1}{2}n} cx - (-c)^{\frac{1}{2}n} c(n+6) \right) (ax+1)^{\frac{1}{2}n}}{(n^2 + 6n + 8)a}$$

Maxima 5.44 via sagemath 9.3 output

$$\int (-acx + c)^{\frac{1}{2}n+1} \left(\frac{ax-1}{ax+1} \right)^{\frac{1}{2}n} dx$$

26.3 Problem number 361

$$\int e^{n \operatorname{coth}^{-1}(ax)} (c - acx)^{n/2} dx$$

Optimal antiderivative

$$\frac{2 e^{n \operatorname{arccoth}(ax)} (ax+1) (-acx+c)^{\frac{n}{2}}}{a(2+n)}$$

command

```
integrate(exp(n*arccoth(a*x))*(-a*c*x+c)^(1/2*n),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{2 \left(a(-c)^{\frac{1}{2}n} x + (-c)^{\frac{1}{2}n} \right) (ax+1)^{\frac{1}{2}n}}{a(n+2)}$$

Maxima 5.44 via sagemath 9.3 output

$$\int (-acx + c)^{\frac{1}{2}n} \left(\frac{ax-1}{ax+1} \right)^{\frac{1}{2}n} dx$$

27 Test file number 205

Test folder name:

test_cases/8_Special_functions/205_8.2_Fresnel_integral_functions

27.3 Problem number 3

$$\int x^5 S(bx) dx$$

Optimal antiderivative

$$-\frac{5x \cos\left(\frac{b^2 \pi x^2}{2}\right)}{2b^5 \pi^3} + \frac{x^5 \cos\left(\frac{b^2 \pi x^2}{2}\right)}{6b\pi} + \frac{5 \operatorname{FresnelC}(bx)}{2b^6 \pi^3} + \frac{x^6 S(bx)}{6} - \frac{5x^3 \sin\left(\frac{b^2 \pi x^2}{2}\right)}{6b^3 \pi^2}$$

command

`integrate(x^5*fresnel_sin(b*x),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{\frac{1}{6} x^6 S(bx)}{\sqrt{\frac{1}{2}} \left(20 \sqrt{\frac{1}{2}} \pi^2 b^3 x^3 \sin\left(\frac{1}{2} \pi b^2 x^2\right) + (15i - 15) \left(\frac{1}{4}\right)^{\frac{1}{4}} \pi \operatorname{erf}\left(\sqrt{\frac{1}{2} i \pi} bx\right) - (15i + 15) \left(\frac{1}{4}\right)^{\frac{1}{4}} \pi \operatorname{erf}\left(\sqrt{-\frac{1}{2} i \pi} bx\right) \right)}{12 \pi^4 b^6}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^5 \operatorname{fresnels}(bx) dx$$

27.4 Problem number 4

$$\int x^4 S(bx) dx$$

Optimal antiderivative

$$-\frac{8 \cos\left(\frac{b^2 \pi x^2}{2}\right)}{5b^5 \pi^3} + \frac{x^4 \cos\left(\frac{b^2 \pi x^2}{2}\right)}{5b\pi} + \frac{x^5 S(bx)}{5} - \frac{4x^2 \sin\left(\frac{b^2 \pi x^2}{2}\right)}{5b^3 \pi^2}$$

command

`integrate(x^4*fresnel_sin(b*x),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{5} x^5 S(bx) - \frac{4 \pi b^2 x^2 \sin\left(\frac{1}{2} \pi b^2 x^2\right) - (\pi^2 b^4 x^4 - 8) \cos\left(\frac{1}{2} \pi b^2 x^2\right)}{5 \pi^3 b^5}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^4 \operatorname{fresnels}(bx) dx$$

27.5 Problem number 5

$$\int x^3 S(bx) dx$$

Optimal antiderivative

$$\frac{x^3 \cos\left(\frac{b^2 \pi x^2}{2}\right)}{4b\pi} + \frac{3S(bx)}{4b^4 \pi^2} + \frac{x^4 S(bx)}{4} - \frac{3x \sin\left(\frac{b^2 \pi x^2}{2}\right)}{4b^3 \pi^2}$$

command

```
integrate(x^3*fresnel_sin(b*x),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{\frac{1}{4} x^4 S(bx) + \sqrt{\frac{1}{2}} \left(4 \sqrt{\frac{1}{2}} \pi^2 b^3 x^3 \cos\left(\frac{1}{2} \pi b^2 x^2\right) - 12 \sqrt{\frac{1}{2}} \pi b x \sin\left(\frac{1}{2} \pi b^2 x^2\right) + (3i + 3) \left(\frac{1}{4}\right)^{\frac{1}{4}} \pi \operatorname{erf}\left(\sqrt{\frac{1}{2}} i \pi b x\right) - (3i - 3) \left(\frac{1}{4}\right)^{\frac{1}{4}} \right)}{8 \pi^3 b^4}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^3 \operatorname{fresnels}(bx) dx$$

27.6 Problem number 6

$$\int x^2 S(bx) dx$$

Optimal antiderivative

$$\frac{x^2 \cos\left(\frac{b^2 \pi x^2}{2}\right)}{3b\pi} + \frac{x^3 S(bx)}{3} - \frac{2 \sin\left(\frac{b^2 \pi x^2}{2}\right)}{3b^3 \pi^2}$$

command

```
integrate(x^2*fresnel_sin(b*x),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{3} x^3 S(bx) + \frac{\pi b^2 x^2 \cos\left(\frac{1}{2} \pi b^2 x^2\right) - 2 \sin\left(\frac{1}{2} \pi b^2 x^2\right)}{3 \pi^2 b^3}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^2 \operatorname{fresnels}(bx) dx$$

27.7 Problem number 7

$$\int x S(bx) dx$$

Optimal antiderivative

$$\frac{x \cos\left(\frac{b^2 \pi x^2}{2}\right)}{2b\pi} - \frac{\text{FresnelC}(bx)}{2b^2\pi} + \frac{x^2 S(bx)}{2}$$

command

`integrate(x*fresnel_sin(b*x),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{\frac{1}{2} x^2 S(bx) + \sqrt{\frac{1}{2}} \left(4 \sqrt{\frac{1}{2}} \pi b x \cos\left(\frac{1}{2} \pi b^2 x^2\right) + (i-1) \left(\frac{1}{4}\right)^{\frac{1}{4}} \pi \operatorname{erf}\left(\sqrt{\frac{1}{2}} i \pi b x\right) - (i+1) \left(\frac{1}{4}\right)^{\frac{1}{4}} \pi \operatorname{erf}\left(\sqrt{-\frac{1}{2}} i \pi b x\right) \right)}{4 \pi^2 b^2}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x \operatorname{fresnels}(bx) dx$$

27.8 Problem number 8

$$\int S(bx) dx$$

Optimal antiderivative

$$\frac{\cos\left(\frac{b^2 \pi x^2}{2}\right)}{b\pi} + x S(bx)$$

command

`integrate(fresnel_sin(b*x),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{bx S(bx) + \frac{\cos\left(\frac{1}{2} \pi b^2 x^2\right)}{\pi}}{b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \operatorname{fresnels}(bx) dx$$

27.9 Problem number 10

$$\int \frac{S(bx)}{x^2} dx$$

Optimal antiderivative

$$-\frac{S(bx)}{x} + \frac{b \operatorname{sinIntegral}\left(\frac{b^2 \pi x^2}{2}\right)}{2}$$

command

```
integrate(fresnel_sin(b*x)/x^2,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{4} b \left(i \operatorname{Ei}\left(\frac{1}{2} i \pi b^2 x^2\right) - i \operatorname{Ei}\left(-\frac{1}{2} i \pi b^2 x^2\right) \right) - \frac{S(bx)}{x}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\operatorname{fresnels}(bx)}{x^2} dx$$

27.10 Problem number 11

$$\int \frac{S(bx)}{x^3} dx$$

Optimal antiderivative

$$\frac{b^2 \pi \operatorname{FresnelC}(bx)}{2} - \frac{S(bx)}{2x^2} - \frac{b \sin\left(\frac{b^2 \pi x^2}{2}\right)}{2x}$$

command

```
integrate(fresnel_sin(b*x)/x^3,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{\sqrt{\frac{1}{2}} \sqrt{\pi x^2} \left((i-1) \sqrt{2} \Gamma\left(-\frac{1}{2}, \frac{1}{2} i \pi b^2 x^2\right) - (i+1) \sqrt{2} \Gamma\left(-\frac{1}{2}, -\frac{1}{2} i \pi b^2 x^2\right) \right) b^2}{16x} - \frac{S(bx)}{2x^2}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\operatorname{fresnels}(bx)}{x^3} dx$$

27.11 Problem number 12

$$\int \frac{S(bx)}{x^4} dx$$

Optimal antiderivative

$$\frac{b^3 \pi \operatorname{cosineIntegral}\left(\frac{b^2 \pi x^2}{2}\right)}{12} - \frac{S(bx)}{3x^3} - \frac{b \sin\left(\frac{b^2 \pi x^2}{2}\right)}{6x^2}$$

command

`integrate(fresnel_sin(b*x)/x^4,x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{24} \left(\pi \Gamma\left(-1, \frac{1}{2} i \pi b^2 x^2\right) + \pi \Gamma\left(-1, -\frac{1}{2} i \pi b^2 x^2\right) \right) b^3 - \frac{S(bx)}{3x^3}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\operatorname{fresnels}(bx)}{x^4} dx$$

27.12 Problem number 13

$$\int \frac{S(bx)}{x^5} dx$$

Optimal antiderivative

$$-\frac{b^3 \pi \cos\left(\frac{b^2 \pi x^2}{2}\right)}{12x} - \frac{b^4 \pi^2 S(bx)}{12} - \frac{S(bx)}{4x^4} - \frac{b \sin\left(\frac{b^2 \pi x^2}{2}\right)}{12x^3}$$

command

`integrate(fresnel_sin(b*x)/x^5,x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{\sqrt{\frac{1}{2}} (\pi x^2)^{\frac{3}{2}} \left(-(i+1) \sqrt{2} \Gamma\left(-\frac{3}{2}, \frac{1}{2} i \pi b^2 x^2\right) + (i-1) \sqrt{2} \Gamma\left(-\frac{3}{2}, -\frac{1}{2} i \pi b^2 x^2\right) \right) b^4}{64 x^3} - \frac{S(bx)}{4 x^4}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\operatorname{fresnels}(bx)}{x^5} dx$$

27.13 Problem number 14

$$\int \frac{S(bx)}{x^6} dx$$

Optimal antiderivative

$$-\frac{b^3 \pi \cos\left(\frac{b^2 \pi x^2}{2}\right)}{40x^2} - \frac{S(bx)}{5x^5} - \frac{b^5 \pi^2 \operatorname{Si}\left(\frac{b^2 \pi x^2}{2}\right)}{80} - \frac{b \sin\left(\frac{b^2 \pi x^2}{2}\right)}{20x^4}$$

command

```
integrate(fresnel_sin(b*x)/x^6,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{80} \left(-i \pi^2 \Gamma\left(-2, \frac{1}{2} i \pi b^2 x^2\right) + i \pi^2 \Gamma\left(-2, -\frac{1}{2} i \pi b^2 x^2\right) \right) b^5 - \frac{S(bx)}{5x^5}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\operatorname{fresnels}(bx)}{x^6} dx$$

27.14 Problem number 15

$$\int \frac{S(bx)}{x^7} dx$$

Optimal antiderivative

$$-\frac{b^3 \pi \cos\left(\frac{b^2 \pi x^2}{2}\right)}{90x^3} - \frac{b^6 \pi^3 \operatorname{FresnelC}(bx)}{90} - \frac{S(bx)}{6x^6} - \frac{b \sin\left(\frac{b^2 \pi x^2}{2}\right)}{30x^5} + \frac{b^5 \pi^2 \operatorname{Si}\left(\frac{b^2 \pi x^2}{2}\right)}{90x}$$

command

```
integrate(fresnel_sin(b*x)/x^7,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{\sqrt{\frac{1}{2}} (\pi x^2)^{\frac{5}{2}} \left(-(i-1) \sqrt{2} \Gamma\left(-\frac{5}{2}, \frac{1}{2} i \pi b^2 x^2\right) + (i+1) \sqrt{2} \Gamma\left(-\frac{5}{2}, -\frac{1}{2} i \pi b^2 x^2\right) \right) b^6}{192 x^5} - \frac{S(bx)}{6 x^6}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\operatorname{fresnels}(bx)}{x^7} dx$$

27.15 Problem number 16

$$\int \frac{S(bx)}{x^8} dx$$

Optimal antiderivative

$$-\frac{b^7 \pi^3 \operatorname{cosineIntegral}\left(\frac{b^2 \pi x^2}{2}\right)}{672} - \frac{b^3 \pi \cos\left(\frac{b^2 \pi x^2}{2}\right)}{168x^4} - \frac{S(bx)}{7x^7} - \frac{b \sin\left(\frac{b^2 \pi x^2}{2}\right)}{42x^6} + \frac{b^5 \pi^2 \sin\left(\frac{b^2 \pi x^2}{2}\right)}{336x^2}$$

command

`integrate(fresnel_sin(b*x)/x^8,x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{224} \left(\pi^3 \Gamma\left(-3, \frac{1}{2} i \pi b^2 x^2\right) + \pi^3 \Gamma\left(-3, -\frac{1}{2} i \pi b^2 x^2\right) \right) b^7 - \frac{S(bx)}{7x^7}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\operatorname{fresnels}(bx)}{x^8} dx$$

27.16 Problem number 17

$$\int \frac{S(bx)}{x^9} dx$$

Optimal antiderivative

$$-\frac{b^3 \pi \cos\left(\frac{b^2 \pi x^2}{2}\right)}{280x^5} + \frac{b^7 \pi^3 \cos\left(\frac{b^2 \pi x^2}{2}\right)}{840x} + \frac{b^8 \pi^4 S(bx)}{840} - \frac{S(bx)}{8x^8} - \frac{b \sin\left(\frac{b^2 \pi x^2}{2}\right)}{56x^7} + \frac{b^5 \pi^2 \sin\left(\frac{b^2 \pi x^2}{2}\right)}{840x^3}$$

command

`integrate(fresnel_sin(b*x)/x^9,x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{\sqrt{\frac{1}{2}} (\pi x^2)^{\frac{7}{2}} \left((i+1) \sqrt{2} \Gamma\left(-\frac{7}{2}, \frac{1}{2} i \pi b^2 x^2\right) - (i-1) \sqrt{2} \Gamma\left(-\frac{7}{2}, -\frac{1}{2} i \pi b^2 x^2\right) \right) b^8}{512x^7} - \frac{S(bx)}{8x^8}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\operatorname{fresnels}(bx)}{x^9} dx$$

27.17 Problem number 18

$$\int \frac{S(bx)}{x^{10}} dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{b^3 \pi \cos\left(\frac{b^2 \pi x^2}{2}\right)}{432x^6} + \frac{b^7 \pi^3 \cos\left(\frac{b^2 \pi x^2}{2}\right)}{3456x^2} - \frac{S(bx)}{9x^9} \\ & + \frac{b^9 \pi^4 \operatorname{Si}\left(\frac{b^2 \pi x^2}{2}\right)}{6912} - \frac{b \sin\left(\frac{b^2 \pi x^2}{2}\right)}{72x^8} + \frac{b^5 \pi^2 \sin\left(\frac{b^2 \pi x^2}{2}\right)}{1728x^4} \end{aligned}$$

command

```
integrate(fresnel_sin(b*x)/x^10,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{576} \left(i \pi^4 \Gamma\left(-4, \frac{1}{2} i \pi b^2 x^2\right) - i \pi^4 \Gamma\left(-4, -\frac{1}{2} i \pi b^2 x^2\right) \right) b^9 - \frac{S(bx)}{9x^9}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\operatorname{fresnels}(bx)}{x^{10}} dx$$

27.18 Problem number 22

$$\int S(a + bx) dx$$

Optimal antiderivative

$$\frac{\cos\left(\frac{\pi(bx+a)^2}{2}\right)}{b\pi} + \frac{(bx+a)S(bx+a)}{b}$$

command

```
integrate(fresnel_sin(b*x+a),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{(bx+a)S(bx+a) + \frac{\cos\left(\frac{1}{2}\pi b^2 x^2 + \pi abx + \frac{1}{2}\pi a^2\right)}{\pi}}{b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \operatorname{fresnels}(bx+a) dx$$

27.19 Problem number 25

$$\int x^3 S(a + bx) dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{a^3 \cos\left(\frac{\pi(bx+a)^2}{2}\right)}{b^4\pi} + \frac{3a^2(bx+a) \cos\left(\frac{\pi(bx+a)^2}{2}\right)}{2b^4\pi} - \frac{a(bx+a)^2 \cos\left(\frac{\pi(bx+a)^2}{2}\right)}{b^4\pi} \\ & + \frac{(bx+a)^3 \cos\left(\frac{\pi(bx+a)^2}{2}\right)}{4b^4\pi} - \frac{3a^2 \operatorname{FresnelC}(bx+a)}{2b^4\pi} - \frac{a^4 S(bx+a)}{4b^4} \\ & + \frac{3S(bx+a)}{4b^4\pi^2} + \frac{x^4 S(bx+a)}{4} + \frac{2a \sin\left(\frac{\pi(bx+a)^2}{2}\right)}{b^4\pi^2} - \frac{3(bx+a) \sin\left(\frac{\pi(bx+a)^2}{2}\right)}{4b^4\pi^2} \end{aligned}$$

command

`integrate(x^3*fresnel_sin(b*x+a),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{4} x^4 S(bx + a)$$

$$\left(16 \left(\pi^2 e^{\left(\frac{1}{2}i\pi b^2 x^2 + i\pi abx + \frac{1}{2}i\pi a^2\right)} + \pi^2 e^{\left(-\frac{1}{2}i\pi b^2 x^2 - i\pi abx - \frac{1}{2}i\pi a^2\right)} \right) a^4 + 32 \left(-i\pi \Gamma\left(2, \frac{1}{2}i\pi b^2 x^2 + i\pi abx + \frac{1}{2}i\pi a^2\right) + i\pi \Gamma\left(2, -\frac{1}{2}i\pi b^2 x^2 - i\pi abx - \frac{1}{2}i\pi a^2\right) \right) \right) x^2$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^3 \operatorname{fresnels}(bx + a) dx$$

27.20 Problem number 26

$$\int x^2 S(a + bx) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a^2 \cos\left(\frac{\pi(bx+a)^2}{2}\right)}{b^3\pi} - \frac{a(bx+a) \cos\left(\frac{\pi(bx+a)^2}{2}\right)}{b^3\pi} + \frac{(bx+a)^2 \cos\left(\frac{\pi(bx+a)^2}{2}\right)}{3b^3\pi} \\ & + \frac{a \operatorname{FresnelC}(bx+a)}{b^3\pi} + \frac{a^3 S(bx+a)}{3b^3} + \frac{x^3 S(bx+a)}{3} - \frac{2 \sin\left(\frac{\pi(bx+a)^2}{2}\right)}{3b^3\pi^2} \end{aligned}$$

command

```
integrate(x^2*fresnel_sin(b*x+a),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{3} x^3 S(bx + a) + \frac{\left(12 \left(\pi e^{\left(\frac{1}{2}i \pi b^2 x^2 + i \pi abx + \frac{1}{2}i \pi a^2\right)} + \pi e^{\left(-\frac{1}{2}i \pi b^2 x^2 - i \pi abx - \frac{1}{2}i \pi a^2\right)}\right) a^3 + 4 \left(3 \left(\pi e^{\left(\frac{1}{2}i \pi b^2 x^2 + i \pi abx + \frac{1}{2}i \pi a^2\right)} + \pi e^{\left(-\frac{1}{2}i \pi b^2 x^2 - i \pi abx - \frac{1}{2}i \pi a^2\right)}\right)\right)}{3}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^2 \text{fresnels}(bx + a) dx$$

27.21 Problem number 27

$$\int x S(a + bx) dx$$

Optimal antiderivative

$$-\frac{a \cos\left(\frac{\pi(bx+a)^2}{2}\right)}{b^2 \pi} + \frac{(bx+a) \cos\left(\frac{\pi(bx+a)^2}{2}\right)}{2b^2 \pi} - \frac{\text{FresnelC}(bx+a)}{2b^2 \pi} - \frac{a^2 S(bx+a)}{2b^2} + \frac{x^2 S(bx+a)}{2}$$

command

```
integrate(x*fresnel_sin(b*x+a),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{2} x^2 S(bx + a) + \frac{\left(8 \left(\pi e^{\left(\frac{1}{2}i \pi b^2 x^2 + i \pi abx + \frac{1}{2}i \pi a^2\right)} + \pi e^{\left(-\frac{1}{2}i \pi b^2 x^2 - i \pi abx - \frac{1}{2}i \pi a^2\right)}\right) abx + 8 \left(\pi e^{\left(\frac{1}{2}i \pi b^2 x^2 + i \pi abx + \frac{1}{2}i \pi a^2\right)} + \pi e^{\left(-\frac{1}{2}i \pi b^2 x^2 - i \pi abx - \frac{1}{2}i \pi a^2\right)}\right)\right)}{2}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x \text{fresnels}(bx + a) dx$$

27.22 Problem number 28

$$\int S(a + bx) dx$$

Optimal antiderivative

$$\frac{\cos\left(\frac{\pi(bx+a)^2}{2}\right)}{b\pi} + \frac{(bx+a)S(bx+a)}{b}$$

command

```
integrate(fresnel_sin(b*x+a),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{(bx+a)S(bx+a) + \frac{\cos\left(\frac{1}{2}\pi b^2 x^2 + \pi abx + \frac{1}{2}\pi a^2\right)}{\pi}}{b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \text{fresnels}(bx + a) dx$$

27.23 Problem number 57

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

Optimal antiderivative

$$\frac{\cos\left(\frac{d^2\pi(a+b\ln(cx^n))^2}{2}\right)}{bdn\pi} + \frac{S(d(a+b\ln(cx^n)))(a+b\ln(cx^n))}{bn}$$

command

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

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{(b \log(cx^n) + a)dS((b \log(cx^n) + a)d) + \frac{\cos\left(\frac{1}{2}\pi b^2 d^2 \log(cx^n)^2 + \pi abd^2 \log(cx^n) + \frac{1}{2}\pi a^2 d^2\right)}{\pi}}{bdn}$$

Maxima 5.44 via sagemath 9.3 output

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

27.24 Problem number 65

$$\int S(bx)^2 \sin\left(\frac{1}{2}b^2\pi x^2\right) dx$$

Optimal antiderivative

$$\frac{S(bx)^3}{3b}$$

command

```
integrate(fresnel_sin(b*x)^2*sin(1/2*b^2*pi*x^2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{S(bx)^3}{3b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \text{fresnels}(bx)^2 \sin\left(\frac{1}{2}\pi b^2 x^2\right) dx$$

27.25 Problem number 66

$$\int S(bx) \sin\left(\frac{1}{2}b^2\pi x^2\right) dx$$

Optimal antiderivative

$$\frac{S(bx)^2}{2b}$$

command

```
integrate(fresnel_sin(b*x)*sin(1/2*b^2*pi*x^2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{S(bx)^2}{2b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \text{fresnels}(bx) \sin\left(\frac{1}{2}\pi b^2 x^2\right) dx$$

27.26 Problem number 67

$$\int \frac{\sin\left(\frac{1}{2}b^2\pi x^2\right)}{S(bx)} dx$$

Optimal antiderivative

$$\frac{\ln(S(bx))}{b}$$

command

```
integrate(sin(1/2*b^2*pi*x^2)/fresnel_sin(b*x),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{\log(S(bx))}{b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\sin\left(\frac{1}{2}\pi b^2 x^2\right)}{\text{fresnels}(bx)} dx$$

27.27 Problem number 68

$$\int \frac{\sin\left(\frac{1}{2}b^2\pi x^2\right)}{S(bx)^2} dx$$

Optimal antiderivative

$$-\frac{1}{bS(bx)}$$

command

```
integrate(sin(1/2*b^2*pi*x^2)/fresnel_sin(b*x)^2,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{bS(bx)}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\sin\left(\frac{1}{2}\pi b^2 x^2\right)}{\text{fresnels}(bx)^2} dx$$

27.28 Problem number 69

$$\int \frac{\sin\left(\frac{1}{2}b^2\pi x^2\right)}{S(bx)^3} dx$$

Optimal antiderivative

$$-\frac{1}{2bS(bx)^2}$$

command

```
integrate(sin(1/2*b^2*pi*x^2)/fresnel_sin(b*x)^3,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{2bS(bx)^2}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\sin\left(\frac{1}{2}\pi b^2 x^2\right)}{\text{fresnels}(bx)^3} dx$$

27.29 Problem number 79

$$\int S(bx) \sin\left(\frac{1}{2}b^2\pi x^2\right) dx$$

Optimal antiderivative

$$\frac{S(bx)^2}{2b}$$

command

```
integrate(fresnel_sin(b*x)*sin(1/2*b^2*pi*x^2),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{S(bx)^2}{2b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \text{fresnels}(bx) \sin\left(\frac{1}{2}\pi b^2 x^2\right) dx$$

27.30 Problem number 110

$$\int x^7 \text{FresnelC}(bx) dx$$

Optimal antiderivative

$$\frac{105x \cos\left(\frac{b^2\pi x^2}{2}\right)}{8b^7\pi^4} - \frac{7x^5 \cos\left(\frac{b^2\pi x^2}{2}\right)}{8b^3\pi^2} - \frac{105 \text{FresnelC}(bx)}{8b^8\pi^4} + \frac{x^8 \text{FresnelC}(bx)}{8} + \frac{35x^3 \sin\left(\frac{b^2\pi x^2}{2}\right)}{8b^5\pi^3} - \frac{x^7 \sin\left(\frac{b^2\pi x^2}{2}\right)}{8b\pi}$$

command

```
integrate(x^7*fresnel_cos(b*x),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{\frac{1}{8} x^8 C(bx) - \sqrt{\frac{1}{2}} \left(-(105i - 105) \left(\frac{1}{4}\right)^{\frac{1}{4}} \pi \operatorname{erf}\left(\sqrt{\frac{1}{2}} i \pi bx\right) + (105i + 105) \left(\frac{1}{4}\right)^{\frac{1}{4}} \pi \operatorname{erf}\left(\sqrt{-\frac{1}{2}} i \pi bx\right) + 28 \left(\sqrt{\frac{1}{2}} \pi^3 b^5 x^5 - 15 \pi^3 b^3 x^3\right) \right)}{16 \pi^5 b^8}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^7 \text{fresnelc}(bx) dx$$

27.31 Problem number 111

$$\int x^6 \text{FresnelC}(bx) dx$$

Optimal antiderivative

$$\frac{48 \cos\left(\frac{b^2\pi x^2}{2}\right)}{7b^7\pi^4} - \frac{6x^4 \cos\left(\frac{b^2\pi x^2}{2}\right)}{7b^3\pi^2} + \frac{x^7 \text{FresnelC}(bx)}{7} + \frac{24x^2 \sin\left(\frac{b^2\pi x^2}{2}\right)}{7b^5\pi^3} - \frac{x^6 \sin\left(\frac{b^2\pi x^2}{2}\right)}{7b\pi}$$

command

```
integrate(x^6*fresnel_cos(b*x),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{7} x^7 C(bx) - \frac{6(\pi^2 b^4 x^4 - 8) \cos\left(\frac{1}{2} \pi b^2 x^2\right) + (\pi^3 b^6 x^6 - 24 \pi b^2 x^2) \sin\left(\frac{1}{2} \pi b^2 x^2\right)}{7 \pi^4 b^7}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^6 \text{fresnelc}(bx) dx$$

27.32 Problem number 112

$$\int x^5 \text{FresnelC}(bx) dx$$

Optimal antiderivative

$$-\frac{5x^3 \cos\left(\frac{b^2\pi x^2}{2}\right)}{6b^3\pi^2} + \frac{x^6 \text{FresnelC}(bx)}{6} - \frac{5S(bx)}{2b^6\pi^3} + \frac{5x \sin\left(\frac{b^2\pi x^2}{2}\right)}{2b^5\pi^3} - \frac{x^5 \sin\left(\frac{b^2\pi x^2}{2}\right)}{6b\pi}$$

command

`integrate(x^5*fresnel_cos(b*x),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{\frac{1}{6} x^6 C(bx)}{\sqrt{\frac{1}{2}} \left(20 \sqrt{\frac{1}{2}} \pi^2 b^3 x^3 \cos\left(\frac{1}{2} \pi b^2 x^2\right) + (15i + 15) \left(\frac{1}{4}\right)^{\frac{1}{4}} \pi \operatorname{erf}\left(\sqrt{\frac{1}{2}} i \pi bx\right) - (15i - 15) \left(\frac{1}{4}\right)^{\frac{1}{4}} \pi \operatorname{erf}\left(\sqrt{-\frac{1}{2}} i \pi bx\right) \right)}{12 \pi^4 b^6}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^5 \text{fresnelc}(bx) dx$$

27.33 Problem number 113

$$\int x^4 \text{FresnelC}(bx) dx$$

Optimal antiderivative

$$-\frac{4x^2 \cos\left(\frac{b^2\pi x^2}{2}\right)}{5b^3\pi^2} + \frac{x^5 \text{FresnelC}(bx)}{5} + \frac{8 \sin\left(\frac{b^2\pi x^2}{2}\right)}{5b^5\pi^3} - \frac{x^4 \sin\left(\frac{b^2\pi x^2}{2}\right)}{5b\pi}$$

command

`integrate(x^4*fresnel_cos(b*x),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{5} x^5 C(bx) - \frac{4 \pi b^2 x^2 \cos\left(\frac{1}{2} \pi b^2 x^2\right) + (\pi^2 b^4 x^4 - 8) \sin\left(\frac{1}{2} \pi b^2 x^2\right)}{5 \pi^3 b^5}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^4 \text{fresnelc}(bx) dx$$

27.34 Problem number 114

$$\int x^3 \text{FresnelC}(bx) dx$$

Optimal antiderivative

$$-\frac{3x \cos\left(\frac{b^2 \pi x^2}{2}\right)}{4b^3 \pi^2} + \frac{3 \text{FresnelC}(bx)}{4b^4 \pi^2} + \frac{x^4 \text{FresnelC}(bx)}{4} - \frac{x^3 \sin\left(\frac{b^2 \pi x^2}{2}\right)}{4b\pi}$$

command

```
integrate(x^3*fresnel_cos(b*x),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{\frac{1}{4} x^4 C(bx) + \sqrt{\frac{1}{2}} \left(4 \sqrt{\frac{1}{2}} \pi^2 b^3 x^3 \sin\left(\frac{1}{2} \pi b^2 x^2\right) + 12 \sqrt{\frac{1}{2}} \pi b x \cos\left(\frac{1}{2} \pi b^2 x^2\right) + (3i - 3) \left(\frac{1}{4}\right)^{\frac{1}{4}} \pi \operatorname{erf}\left(\sqrt{\frac{1}{2}} i \pi b x\right) - (3i + 3) \left(\frac{1}{4}\right)^{\frac{1}{4}} \pi \operatorname{erf}\left(\sqrt{\frac{1}{2}} i \pi b x\right) \right)}{8 \pi^3 b^4}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^3 \text{fresnelc}(bx) dx$$

27.35 Problem number 115

$$\int x^2 \text{FresnelC}(bx) dx$$

Optimal antiderivative

$$-\frac{2 \cos\left(\frac{b^2 \pi x^2}{2}\right)}{3b^3 \pi^2} + \frac{x^3 \text{FresnelC}(bx)}{3} - \frac{x^2 \sin\left(\frac{b^2 \pi x^2}{2}\right)}{3b\pi}$$

command

```
integrate(x^2*fresnel_cos(b*x),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{3} x^3 C(bx) - \frac{\pi b^2 x^2 \sin\left(\frac{1}{2} \pi b^2 x^2\right) + 2 \cos\left(\frac{1}{2} \pi b^2 x^2\right)}{3 \pi^2 b^3}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^2 \text{fresnelc}(bx) dx$$

27.36 Problem number 116

$$\int x \text{FresnelC}(bx) dx$$

Optimal antiderivative

$$\frac{x^2 \text{FresnelC}(bx)}{2} + \frac{S(bx)}{2b^2\pi} - \frac{x \sin\left(\frac{b^2\pi x^2}{2}\right)}{2b\pi}$$

command

`integrate(x*fresnel_cos(b*x),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{\frac{1}{2} x^2 C(bx) + \sqrt{\frac{1}{2}} \left(4 \sqrt{\frac{1}{2}} \pi b x \sin\left(\frac{1}{2} \pi b^2 x^2\right) - (i+1) \left(\frac{1}{4}\right)^{\frac{1}{4}} \pi \operatorname{erf}\left(\sqrt{\frac{1}{2}} i \pi b x\right) + (i-1) \left(\frac{1}{4}\right)^{\frac{1}{4}} \pi \operatorname{erf}\left(\sqrt{-\frac{1}{2}} i \pi b x\right) \right)}{4 \pi^2 b^2}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x \text{fresnelc}(bx) dx$$

27.37 Problem number 117

$$\int \text{FresnelC}(bx) dx$$

Optimal antiderivative

$$x \text{FresnelC}(bx) - \frac{\sin\left(\frac{b^2\pi x^2}{2}\right)}{b\pi}$$

command

`integrate(fresnel_cos(b*x),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{bx C(bx) - \frac{\sin\left(\frac{1}{2} \pi b^2 x^2\right)}{\pi}}{b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \text{fresnelc}(bx) dx$$

27.38 Problem number 119

$$\int \frac{\text{FresnelC}(bx)}{x^2} dx$$

Optimal antiderivative

$$\frac{b \operatorname{cosineIntegral}\left(\frac{b^2 \pi x^2}{2}\right)}{2} - \frac{\text{FresnelC}(bx)}{x}$$

command

```
integrate(fresnel_cos(b*x)/x^2,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{4} b \left(\operatorname{Ei}\left(\frac{1}{2} i \pi b^2 x^2\right) + \operatorname{Ei}\left(-\frac{1}{2} i \pi b^2 x^2\right) \right) - \frac{\text{C}(bx)}{x}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\text{fresnelc}(bx)}{x^2} dx$$

27.39 Problem number 120

$$\int \frac{\text{FresnelC}(bx)}{x^3} dx$$

Optimal antiderivative

$$-\frac{b \cos\left(\frac{b^2 \pi x^2}{2}\right)}{2x} - \frac{\text{FresnelC}(bx)}{2x^2} - \frac{b^2 \pi S(bx)}{2}$$

command

```
integrate(fresnel_cos(b*x)/x^3,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{\sqrt{\frac{1}{2}} \sqrt{\pi x^2} \left((i+1) \sqrt{2} \Gamma\left(-\frac{1}{2}, \frac{1}{2} i \pi b^2 x^2\right) - (i-1) \sqrt{2} \Gamma\left(-\frac{1}{2}, -\frac{1}{2} i \pi b^2 x^2\right) \right) b^2}{16 x} - \frac{\text{C}(bx)}{2 x^2}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\text{fresnelc}(bx)}{x^3} dx$$

27.40 Problem number 121

$$\int \frac{\text{FresnelC}(bx)}{x^4} dx$$

Optimal antiderivative

$$-\frac{b \cos\left(\frac{b^2 \pi x^2}{2}\right)}{6x^2} - \frac{\text{FresnelC}(bx)}{3x^3} - \frac{b^3 \pi \text{sinIntegral}\left(\frac{b^2 \pi x^2}{2}\right)}{12}$$

command

`integrate(fresnel_cos(b*x)/x^4,x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{24} \left(i \pi \Gamma\left(-1, \frac{1}{2} i \pi b^2 x^2\right) - i \pi \Gamma\left(-1, -\frac{1}{2} i \pi b^2 x^2\right) \right) b^3 - \frac{C(bx)}{3x^3}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\text{fresnelc}(bx)}{x^4} dx$$

27.41 Problem number 122

$$\int \frac{\text{FresnelC}(bx)}{x^5} dx$$

Optimal antiderivative

$$-\frac{b \cos\left(\frac{b^2 \pi x^2}{2}\right)}{12x^3} - \frac{b^4 \pi^2 \text{FresnelC}(bx)}{12} - \frac{\text{FresnelC}(bx)}{4x^4} + \frac{b^3 \pi \sin\left(\frac{b^2 \pi x^2}{2}\right)}{12x}$$

command

`integrate(fresnel_cos(b*x)/x^5,x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{\sqrt{\frac{1}{2}} (\pi x^2)^{\frac{3}{2}} \left((i-1) \sqrt{2} \Gamma\left(-\frac{3}{2}, \frac{1}{2} i \pi b^2 x^2\right) - (i+1) \sqrt{2} \Gamma\left(-\frac{3}{2}, -\frac{1}{2} i \pi b^2 x^2\right) \right) b^4}{64 x^3} - \frac{C(bx)}{4 x^4}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\text{fresnelc}(bx)}{x^5} dx$$

27.42 Problem number 123

$$\int \frac{\text{FresnelC}(bx)}{x^6} dx$$

Optimal antiderivative

$$-\frac{b^5 \pi^2 \text{cosineIntegral}\left(\frac{b^2 \pi x^2}{2}\right)}{80} - \frac{b \cos\left(\frac{b^2 \pi x^2}{2}\right)}{20x^4} - \frac{\text{FresnelC}(bx)}{5x^5} + \frac{b^3 \pi \sin\left(\frac{b^2 \pi x^2}{2}\right)}{40x^2}$$

command

`integrate(fresnel_cos(b*x)/x^6,x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{80} \left(\pi^2 \Gamma\left(-2, \frac{1}{2} i \pi b^2 x^2\right) + \pi^2 \Gamma\left(-2, -\frac{1}{2} i \pi b^2 x^2\right) \right) b^5 - \frac{C(bx)}{5x^5}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\text{fresnelc}(bx)}{x^6} dx$$

27.43 Problem number 124

$$\int \frac{\text{FresnelC}(bx)}{x^7} dx$$

Optimal antiderivative

$$-\frac{b \cos\left(\frac{b^2 \pi x^2}{2}\right)}{30x^5} + \frac{b^5 \pi^2 \cos\left(\frac{b^2 \pi x^2}{2}\right)}{90x} - \frac{\text{FresnelC}(bx)}{6x^6} + \frac{b^6 \pi^3 S(bx)}{90} + \frac{b^3 \pi \sin\left(\frac{b^2 \pi x^2}{2}\right)}{90x^3}$$

command

`integrate(fresnel_cos(b*x)/x^7,x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{\sqrt{\frac{1}{2}} (\pi x^2)^{\frac{5}{2}} \left(-(i+1) \sqrt{2} \Gamma\left(-\frac{5}{2}, \frac{1}{2} i \pi b^2 x^2\right) + (i-1) \sqrt{2} \Gamma\left(-\frac{5}{2}, -\frac{1}{2} i \pi b^2 x^2\right) \right) b^6}{192 x^5} - \frac{C(bx)}{6 x^6}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\text{fresnelc}(bx)}{x^7} dx$$

27.44 Problem number 125

$$\int \frac{\text{FresnelC}(bx)}{x^8} dx$$

Optimal antiderivative

$$-\frac{b \cos\left(\frac{b^2 \pi x^2}{2}\right)}{42x^6} + \frac{b^5 \pi^2 \cos\left(\frac{b^2 \pi x^2}{2}\right)}{336x^2} - \frac{\text{FresnelC}(bx)}{7x^7} + \frac{b^7 \pi^3 \text{sinIntegral}\left(\frac{b^2 \pi x^2}{2}\right)}{672} + \frac{b^3 \pi \sin\left(\frac{b^2 \pi x^2}{2}\right)}{168x^4}$$

command

`integrate(fresnel_cos(b*x)/x^8,x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{224} \left(-i \pi^3 \Gamma\left(-3, \frac{1}{2} i \pi b^2 x^2\right) + i \pi^3 \Gamma\left(-3, -\frac{1}{2} i \pi b^2 x^2\right) \right) b^7 - \frac{C(bx)}{7x^7}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\text{fresnelc}(bx)}{x^8} dx$$

27.45 Problem number 126

$$\int \frac{\text{FresnelC}(bx)}{x^9} dx$$

Optimal antiderivative

$$-\frac{b \cos\left(\frac{b^2 \pi x^2}{2}\right)}{56x^7} + \frac{b^5 \pi^2 \cos\left(\frac{b^2 \pi x^2}{2}\right)}{840x^3} + \frac{b^8 \pi^4 \text{FresnelC}(bx)}{840} - \frac{\text{FresnelC}(bx)}{8x^8} + \frac{b^3 \pi \sin\left(\frac{b^2 \pi x^2}{2}\right)}{280x^5} - \frac{b^7 \pi^3 \sin\left(\frac{b^2 \pi x^2}{2}\right)}{840x}$$

command

`integrate(fresnel_cos(b*x)/x^9,x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{\sqrt{\frac{1}{2}} (\pi x^2)^{\frac{7}{2}} \left(-(i-1) \sqrt{2} \Gamma\left(-\frac{7}{2}, \frac{1}{2} i \pi b^2 x^2\right) + (i+1) \sqrt{2} \Gamma\left(-\frac{7}{2}, -\frac{1}{2} i \pi b^2 x^2\right) \right) b^8}{512 x^7} - \frac{C(bx)}{8 x^8}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\text{fresnelc}(bx)}{x^9} dx$$

27.46 Problem number 127

$$\int \frac{\text{FresnelC}(bx)}{x^{10}} dx$$

Optimal antiderivative

$$\frac{b^9 \pi^4 \text{cosineIntegral}\left(\frac{b^2 \pi x^2}{2}\right)}{6912} - \frac{b \cos\left(\frac{b^2 \pi x^2}{2}\right)}{72x^8} + \frac{b^5 \pi^2 \cos\left(\frac{b^2 \pi x^2}{2}\right)}{1728x^4}$$

$$- \frac{\text{FresnelC}(bx)}{9x^9} + \frac{b^3 \pi \sin\left(\frac{b^2 \pi x^2}{2}\right)}{432x^6} - \frac{b^7 \pi^3 \sin\left(\frac{b^2 \pi x^2}{2}\right)}{3456x^2}$$

command

```
integrate(fresnel_cos(b*x)/x^10,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{576} \left(\pi^4 \Gamma\left(-4, \frac{1}{2} i \pi b^2 x^2\right) + \pi^4 \Gamma\left(-4, -\frac{1}{2} i \pi b^2 x^2\right) \right) b^9 - \frac{C(bx)}{9x^9}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\text{fresnelc}(bx)}{x^{10}} dx$$

27.47 Problem number 131

$$\int \text{FresnelC}(a + bx) dx$$

Optimal antiderivative

$$\frac{(bx + a) \text{FresnelC}(bx + a)}{b} - \frac{\sin\left(\frac{\pi(bx+a)^2}{2}\right)}{b\pi}$$

command

```
integrate(fresnel_cos(b*x+a),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{(bx + a) C(bx + a) - \frac{\sin\left(\frac{1}{2} \pi b^2 x^2 + \pi abx + \frac{1}{2} \pi a^2\right)}{\pi}}{b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \text{fresnelc}(bx + a) dx$$

27.48 Problem number 134

$$\int x^3 \text{FresnelC}(a + bx) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{2a \cos\left(\frac{\pi(bx+a)^2}{2}\right)}{b^4 \pi^2} - \frac{3(bx+a) \cos\left(\frac{\pi(bx+a)^2}{2}\right)}{4b^4 \pi^2} - \frac{a^4 \text{FresnelC}(bx+a)}{4b^4} \\ & + \frac{3 \text{FresnelC}(bx+a)}{4b^4 \pi^2} + \frac{x^4 \text{FresnelC}(bx+a)}{4} + \frac{3a^2 \text{S}(bx+a)}{2b^4 \pi} + \frac{a^3 \sin\left(\frac{\pi(bx+a)^2}{2}\right)}{b^4 \pi} \\ & - \frac{3a^2(bx+a) \sin\left(\frac{\pi(bx+a)^2}{2}\right)}{2b^4 \pi} + \frac{a(bx+a)^2 \sin\left(\frac{\pi(bx+a)^2}{2}\right)}{b^4 \pi} - \frac{(bx+a)^3 \sin\left(\frac{\pi(bx+a)^2}{2}\right)}{4b^4 \pi} \end{aligned}$$

command

`integrate(x^3*fresnel_cos(b*x+a),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\begin{aligned} & \frac{1}{4} x^4 C(bx+a) \\ & + \frac{\left(16 \left(-i \pi^2 e^{\left(\frac{1}{2} i \pi b^2 x^2 + i \pi abx + \frac{1}{2} i \pi a^2\right)} + i \pi^2 e^{\left(-\frac{1}{2} i \pi b^2 x^2 - i \pi abx - \frac{1}{2} i \pi a^2\right)}\right) a^4 + 32 \left(\pi \Gamma\left(2, \frac{1}{2} i \pi b^2 x^2 + i \pi abx + \frac{1}{2} i \pi a^2\right) + \pi \Gamma\left(2, -\frac{1}{2} i \pi b^2 x^2 - i \pi abx - \frac{1}{2} i \pi a^2\right)\right) a^3}{4b^4 \pi} \end{aligned}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^3 \text{fresnelc}(bx+a) dx$$

27.49 Problem number 135

$$\int x^2 \text{FresnelC}(a + bx) dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{2 \cos\left(\frac{\pi(bx+a)^2}{2}\right)}{3b^3 \pi^2} + \frac{a^3 \text{FresnelC}(bx+a)}{3b^3} + \frac{x^3 \text{FresnelC}(bx+a)}{3} - \frac{a \text{S}(bx+a)}{b^3 \pi} \\ & - \frac{a^2 \sin\left(\frac{\pi(bx+a)^2}{2}\right)}{b^3 \pi} + \frac{a(bx+a) \sin\left(\frac{\pi(bx+a)^2}{2}\right)}{b^3 \pi} - \frac{(bx+a)^2 \sin\left(\frac{\pi(bx+a)^2}{2}\right)}{3b^3 \pi} \end{aligned}$$

command

```
integrate(x^2*fresnel_cos(b*x+a),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{3} x^3 C(bx + a) + \left(12 \left(-i \pi e^{\left(\frac{1}{2} i \pi b^2 x^2 + i \pi abx + \frac{1}{2} i \pi a^2\right)} + i \pi e^{\left(-\frac{1}{2} i \pi b^2 x^2 - i \pi abx - \frac{1}{2} i \pi a^2\right)} \right) a^3 + 4 \left(3 \left(-i \pi e^{\left(\frac{1}{2} i \pi b^2 x^2 + i \pi abx + \frac{1}{2} i \pi a^2\right)} + i \pi e^{\left(-\frac{1}{2} i \pi b^2 x^2 - i \pi abx - \frac{1}{2} i \pi a^2\right)} \right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^2 \text{fresnelc}(bx + a) dx$$

27.50 Problem number 136

$$\int x \text{FresnelC}(a + bx) dx$$

Optimal antiderivative

$$-\frac{a^2 \text{FresnelC}(bx + a)}{2b^2} + \frac{x^2 \text{FresnelC}(bx + a)}{2} + \frac{S(bx + a)}{2b^2\pi} + \frac{a \sin\left(\frac{\pi(bx+a)^2}{2}\right)}{b^2\pi} - \frac{(bx + a) \sin\left(\frac{\pi(bx+a)^2}{2}\right)}{2b^2\pi}$$

command

```
integrate(x*fresnel_cos(b*x+a),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{2} x^2 C(bx + a) + \left(8 \left(-i \pi e^{\left(\frac{1}{2} i \pi b^2 x^2 + i \pi abx + \frac{1}{2} i \pi a^2\right)} + i \pi e^{\left(-\frac{1}{2} i \pi b^2 x^2 - i \pi abx - \frac{1}{2} i \pi a^2\right)} \right) abx + 8 \left(-i \pi e^{\left(\frac{1}{2} i \pi b^2 x^2 + i \pi abx + \frac{1}{2} i \pi a^2\right)} + i \pi e^{\left(-\frac{1}{2} i \pi b^2 x^2 - i \pi abx - \frac{1}{2} i \pi a^2\right)} \right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int x \text{fresnelc}(bx + a) dx$$

27.51 Problem number 137

$$\int \text{FresnelC}(a + bx) dx$$

Optimal antiderivative

$$\frac{(bx + a) \text{FresnelC}(bx + a)}{b} - \frac{\sin\left(\frac{\pi(bx+a)^2}{2}\right)}{b\pi}$$

command

`integrate(fresnel_cos(b*x+a),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{(bx + a) C(bx + a) - \frac{\sin\left(\frac{1}{2} \pi b^2 x^2 + \pi abx + \frac{1}{2} \pi a^2\right)}{\pi}}{b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \text{fresnelc}(bx + a) dx$$

27.52 Problem number 166

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

Optimal antiderivative

$$\frac{\text{FresnelC}(d(a + b \ln(cx^n)))(a + b \ln(cx^n))}{bn} - \frac{\sin\left(\frac{d^2 \pi (a + b \ln(cx^n))^2}{2}\right)}{bdn\pi}$$

command

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

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{(b \log(cx^n) + a)d C((b \log(cx^n) + a)d) - \frac{\sin\left(\frac{1}{2} \pi b^2 d^2 \log(cx^n)^2 + \pi abd^2 \log(cx^n) + \frac{1}{2} \pi a^2 d^2\right)}{\pi}}{bdn}$$

Maxima 5.44 via sagemath 9.3 output

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

27.53 Problem number 174

$$\int \cos\left(\frac{1}{2}b^2\pi x^2\right) \text{FresnelC}(bx)^2 dx$$

Optimal antiderivative

$$\frac{\text{FresnelC}(bx)^3}{3b}$$

command

```
integrate(cos(1/2*b^2*pi*x^2)*fresnel_cos(b*x)^2,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{C(bx)^3}{3b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \cos\left(\frac{1}{2}\pi b^2 x^2\right) \text{fresnelc}(bx)^2 dx$$

27.54 Problem number 175

$$\int \cos\left(\frac{1}{2}b^2\pi x^2\right) \text{FresnelC}(bx) dx$$

Optimal antiderivative

$$\frac{\text{FresnelC}(bx)^2}{2b}$$

command

```
integrate(cos(1/2*b^2*pi*x^2)*fresnel_cos(b*x),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{C(bx)^2}{2b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \cos\left(\frac{1}{2}\pi b^2 x^2\right) \text{fresnelc}(bx) dx$$

27.55 Problem number 176

$$\int \frac{\cos\left(\frac{1}{2}b^2\pi x^2\right)}{\text{FresnelC}(bx)} dx$$

Optimal antiderivative

$$\frac{\ln(\text{FresnelC}(bx))}{b}$$

command

```
integrate(cos(1/2*b^2*pi*x^2)/fresnel_cos(b*x),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{\log(C(bx))}{b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\cos\left(\frac{1}{2}\pi b^2 x^2\right)}{\text{fresnelc}(bx)} dx$$

27.56 Problem number 177

$$\int \frac{\cos\left(\frac{1}{2}b^2\pi x^2\right)}{\text{FresnelC}(bx)^2} dx$$

Optimal antiderivative

$$-\frac{1}{b \text{FresnelC}(bx)}$$

command

```
integrate(cos(1/2*b^2*pi*x^2)/fresnel_cos(b*x)^2,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{b C(bx)}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\cos\left(\frac{1}{2}\pi b^2 x^2\right)}{\text{fresnelc}(bx)^2} dx$$

27.57 Problem number 178

$$\int \frac{\cos\left(\frac{1}{2}b^2\pi x^2\right)}{\text{FresnelC}(bx)^3} dx$$

Optimal antiderivative

$$-\frac{1}{2b \text{FresnelC}(bx)^2}$$

command

```
integrate(cos(1/2*b^2*pi*x^2)/fresnel_cos(b*x)^3,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{2b C(bx)^2}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\cos\left(\frac{1}{2}\pi b^2 x^2\right)}{\text{fresnelc}(bx)^3} dx$$

27.58 Problem number 188

$$\int \cos\left(\frac{1}{2}b^2\pi x^2\right) \text{FresnelC}(bx) dx$$

Optimal antiderivative

$$\frac{\text{FresnelC}(bx)^2}{2b}$$

command

```
integrate(cos(1/2*b^2*pi*x^2)*fresnel_cos(b*x),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{C(bx)^2}{2b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \cos\left(\frac{1}{2}\pi b^2 x^2\right) \text{fresnelc}(bx) dx$$

28 Test file number 206

Test folder name:

test_cases/8_Special_functions/206_8.4_Trig_integral_functions

28.1 Problem number 2

$$\int x^3 \text{Si}(bx) dx$$

Optimal antiderivative

$$-\frac{3x \cos(bx)}{2b^3} + \frac{x^3 \cos(bx)}{4b} + \frac{x^4 \text{sinIntegral}(bx)}{4} + \frac{3 \sin(bx)}{2b^4} - \frac{3x^2 \sin(bx)}{4b^2}$$

command

```
integrate(x^3*sin_integral(b*x),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{4} x^4 \text{Si}(bx) + \frac{(b^3 x^3 - 6bx) \cos(bx) - 3(b^2 x^2 - 2) \sin(bx)}{4b^4}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^3 \text{Si}(bx) dx$$

28.2 Problem number 3

$$\int x^2 \text{Si}(bx) dx$$

Optimal antiderivative

$$-\frac{2 \cos(bx)}{3b^3} + \frac{x^2 \cos(bx)}{3b} + \frac{x^3 \text{sinIntegral}(bx)}{3} - \frac{2x \sin(bx)}{3b^2}$$

command

```
integrate(x^2*sin_integral(b*x),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{3} x^3 \text{Si}(bx) - \frac{2bx \sin(bx) - (b^2 x^2 - 2) \cos(bx)}{3b^3}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^2 \text{Si}(bx) dx$$

28.3 Problem number 4

$$\int x \operatorname{Si}(bx) dx$$

Optimal antiderivative

$$\frac{x \cos(bx)}{2b} + \frac{x^2 \operatorname{SiIntegral}(bx)}{2} - \frac{\sin(bx)}{2b^2}$$

command

```
integrate(x*sin_integral(b*x),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{2} x^2 \operatorname{Si}(bx) + \frac{bx \cos(bx) - \sin(bx)}{2b^2}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x \operatorname{Si}(bx) dx$$

28.4 Problem number 5

$$\int \operatorname{Si}(bx) dx$$

Optimal antiderivative

$$\frac{\cos(bx)}{b} + x \operatorname{SiIntegral}(bx)$$

command

```
integrate(sin_integral(b*x),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{bx \operatorname{Si}(bx) + \cos(bx)}{b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \operatorname{Si}(bx) dx$$

28.5 Problem number 7

$$\int \frac{\text{Si}(bx)}{x^2} dx$$

Optimal antiderivative

$$b \cosineIntegral(bx) - \frac{\sinIntegral(bx)}{x} - \frac{\sin(bx)}{x}$$

command

```
integrate(sin_integral(b*x)/x^2,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{2} b(\Gamma(-1, i bx) + \Gamma(-1, -i bx)) - \frac{\text{Si}(bx)}{x}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\text{Si}(bx)}{x^2} dx$$

28.6 Problem number 8

$$\int \frac{\text{Si}(bx)}{x^3} dx$$

Optimal antiderivative

$$-\frac{b \cos(bx)}{4x} - \frac{b^2 \sinIntegral(bx)}{4} - \frac{\sinIntegral(bx)}{2x^2} - \frac{\sin(bx)}{4x^2}$$

command

```
integrate(sin_integral(b*x)/x^3,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{1}{4} b^2(-i \Gamma(-2, i bx) + i \Gamma(-2, -i bx)) - \frac{\text{Si}(bx)}{2x^2}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\text{Si}(bx)}{x^3} dx$$

28.7 Problem number 18

$$\int x^3 \text{Si}(a + bx) dx$$

Optimal antiderivative

$$\begin{aligned} & \frac{a \cos (bx+a)}{2b^4} - \frac{a^3 \cos (bx+a)}{4b^4} - \frac{3x \cos (bx+a)}{2b^3} + \frac{a^2 x \cos (bx+a)}{4b^3} \\ & - \frac{a x^2 \cos (bx+a)}{4b^2} + \frac{x^3 \cos (bx+a)}{4b} - \frac{a^4 \text{sinIntegral}(bx+a)}{4b^4} + \frac{x^4 \text{sinIntegral}(bx+a)}{4} \\ & + \frac{3 \sin (bx+a)}{2b^4} - \frac{a^2 \sin (bx+a)}{4b^4} + \frac{ax \sin (bx+a)}{2b^3} - \frac{3x^2 \sin (bx+a)}{4b^2} \end{aligned}$$

command

```
integrate(x^3*sin_integral(b*x+a),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{4} x^4 \text{Si}(bx+a)$$

$$\frac{a^4(-i \text{Ei}(i bx + i a) + i \text{Ei}(-i bx - i a)) - 2 \left((bx+a)^3 - 4(bx+a)^2 a - 4a^3 + 6(a^2 - 1)(bx+a) + 8a \right) \cos (bx+a)}{8b^4}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^3 \text{Si}(bx+a) dx$$

28.8 Problem number 19

$$\int x^2 \text{Si}(a + bx) dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{2 \cos (bx+a)}{3b^3} + \frac{a^2 \cos (bx+a)}{3b^3} - \frac{ax \cos (bx+a)}{3b^2} + \frac{x^2 \cos (bx+a)}{3b} \\ & + \frac{a^3 \text{sinIntegral}(bx+a)}{3b^3} + \frac{x^3 \text{sinIntegral}(bx+a)}{3} + \frac{a \sin (bx+a)}{3b^3} - \frac{2x \sin (bx+a)}{3b^2} \end{aligned}$$

command

```
integrate(x^2*sin_integral(b*x+a),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{\frac{1}{3} x^3 \operatorname{Si}(bx+a) - a^3(i \operatorname{Ei}(ibx+ia) - i \operatorname{Ei}(-ibx-ia)) - 2((bx+a)^2 - 3(bx+a)a + 3a^2 - 2) \cos(bx+a) + 2(2bx-a) \sin(bx+a)}{6b^3}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^2 \operatorname{Si}(bx+a) dx$$

28.9 Problem number 20

$$\int x \operatorname{Si}(a+bx) dx$$

Optimal antiderivative

$$-\frac{a \cos(bx+a)}{2b^2} + \frac{x \cos(bx+a)}{2b} - \frac{a^2 \operatorname{sinIntegral}(bx+a)}{2b^2} + \frac{x^2 \operatorname{sinIntegral}(bx+a)}{2} - \frac{\sin(bx+a)}{2b^2}$$

command

`integrate(x*sin_integral(b*x+a),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{2} x^2 \operatorname{Si}(bx+a) - \frac{a^2(-i \operatorname{Ei}(ibx+ia) + i \operatorname{Ei}(-ibx-ia)) - 2(bx-a) \cos(bx+a) + 2 \sin(bx+a)}{4b^2}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x \operatorname{Si}(bx+a) dx$$

28.10 Problem number 21

$$\int \operatorname{Si}(a+bx) dx$$

Optimal antiderivative

$$\frac{\cos(bx+a)}{b} + \frac{(bx+a) \operatorname{sinIntegral}(bx+a)}{b}$$

command

`integrate(sin_integral(b*x+a),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{(bx + a) \operatorname{Si}(bx + a) + \cos(bx + a)}{b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \operatorname{Si}(bx + a) dx$$

28.11 Problem number 35

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

Optimal antiderivative

$$\frac{\cos(d(a + b \ln(cx^n)))}{bdn} + \frac{(a + b \ln(cx^n)) \operatorname{sinIntegral}(d(a + b \ln(cx^n)))}{bn}$$

command

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

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{(b \log(cx^n) + a)d \operatorname{Si}((b \log(cx^n) + a)d) + \cos((b \log(cx^n) + a)d)}{bdn}$$

Maxima 5.44 via sagemath 9.3 output

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

28.12 Problem number 41

$$\int \frac{\sin(bx)\operatorname{Si}(bx)}{x} dx$$

Optimal antiderivative

$$\frac{\operatorname{sinIntegral}(bx)^2}{2}$$

command

`integrate(sin_integral(b*x)*sin(b*x)/x,x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{2} \operatorname{Si}(bx)^2$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\operatorname{Si}(bx) \sin(bx)}{x} dx$$

28.13 Problem number 70

$$\int x^3 \operatorname{CosIntegral}(bx) dx$$

Optimal antiderivative

$$\frac{x^4 \operatorname{cosineIntegral}(bx)}{4} + \frac{3 \cos(bx)}{2b^4} - \frac{3x^2 \cos(bx)}{4b^2} + \frac{3x \sin(bx)}{2b^3} - \frac{x^3 \sin(bx)}{4b}$$

command

`integrate(x^3*fresnel_cos(b*x),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{4} x^4 C(bx)$$

$$\frac{\sqrt{\frac{1}{2}} \left(4 \sqrt{\frac{1}{2}} \pi^2 b^3 x^3 \sin\left(\frac{1}{2} \pi b^2 x^2\right) + 12 \sqrt{\frac{1}{2}} \pi b x \cos\left(\frac{1}{2} \pi b^2 x^2\right) + (3i - 3) \left(\frac{1}{4}\right)^{\frac{1}{4}} \pi \operatorname{erf}\left(\sqrt{\frac{1}{2}} i \pi b x\right) - (3i + 3) \left(\frac{1}{4}\right) \right)}{8 \pi^3 b^4}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^3 \operatorname{Ci}(bx) dx$$

28.14 Problem number 71

$$\int x^2 \text{CosIntegral}(bx) dx$$

Optimal antiderivative

$$\frac{x^3 \text{cosineIntegral}(bx)}{3} - \frac{2x \cos(bx)}{3b^2} + \frac{2 \sin(bx)}{3b^3} - \frac{x^2 \sin(bx)}{3b}$$

command

`integrate(x^2*fresnel_cos(b*x),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{3} x^3 C(bx) - \frac{\pi b^2 x^2 \sin\left(\frac{1}{2} \pi b^2 x^2\right) + 2 \cos\left(\frac{1}{2} \pi b^2 x^2\right)}{3 \pi^2 b^3}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^2 \text{Ci}(bx) dx$$

28.15 Problem number 72

$$\int x \text{CosIntegral}(bx) dx$$

Optimal antiderivative

$$\frac{x^2 \text{cosineIntegral}(bx)}{2} - \frac{\cos(bx)}{2b^2} - \frac{x \sin(bx)}{2b}$$

command

`integrate(x*fresnel_cos(b*x),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{\frac{1}{2} x^2 C(bx)}{4 \pi^2 b^2} \left(4 \sqrt{\frac{1}{2}} \sqrt{\frac{1}{2}} \pi b x \sin\left(\frac{1}{2} \pi b^2 x^2\right) - (i+1) \left(\frac{1}{4}\right)^{\frac{1}{4}} \pi \operatorname{erf}\left(\sqrt{\frac{1}{2}} i \pi b x\right) + (i-1) \left(\frac{1}{4}\right)^{\frac{1}{4}} \pi \operatorname{erf}\left(\sqrt{-\frac{1}{2}} i \pi b x\right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int x \text{Ci}(bx) dx$$

28.16 Problem number 73

$$\int \text{CosIntegral}(bx) dx$$

Optimal antiderivative

$$x \text{ cosineIntegral}(bx) - \frac{\sin(bx)}{b}$$

command

```
integrate(fresnel_cos(b*x),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{bx C(bx) - \frac{\sin(\frac{1}{2}\pi b^2 x^2)}{\pi}}{b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \text{Ci}(bx) dx$$

28.17 Problem number 75

$$\int \frac{\text{CosIntegral}(bx)}{x^2} dx$$

Optimal antiderivative

$$-\frac{\text{cosineIntegral}(bx)}{x} - \frac{\cos(bx)}{x} - b \text{ sinIntegral}(bx)$$

command

```
integrate(fresnel_cos(b*x)/x^2,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{4} b \left(\text{Ei}\left(\frac{1}{2}i\pi b^2 x^2\right) + \text{Ei}\left(-\frac{1}{2}i\pi b^2 x^2\right) \right) - \frac{C(bx)}{x}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\text{Ci}(bx)}{x^2} dx$$

28.18 Problem number 76

$$\int \frac{\text{CosIntegral}(bx)}{x^3} dx$$

Optimal antiderivative

$$-\frac{b^2 \text{cosineIntegral}(bx)}{4} - \frac{\text{cosineIntegral}(bx)}{2x^2} - \frac{\cos(bx)}{4x^2} + \frac{b \sin(bx)}{4x}$$

command

```
integrate(fresnel_cos(b*x)/x^3,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$-\frac{\sqrt{\frac{1}{2}} \sqrt{\pi x^2} \left((i+1) \sqrt{2} \Gamma\left(-\frac{1}{2}, \frac{1}{2} i \pi b^2 x^2\right) - (i-1) \sqrt{2} \Gamma\left(-\frac{1}{2}, -\frac{1}{2} i \pi b^2 x^2\right) \right) b^2}{16 x} - \frac{C(bx)}{2 x^2}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \frac{\text{Ci}(bx)}{x^3} dx$$

28.19 Problem number 86

$$\int x^3 \text{CosIntegral}(a + bx) dx$$

Optimal antiderivative

$$\begin{aligned} & -\frac{a^4 \text{cosineIntegral}(bx+a)}{4b^4} + \frac{x^4 \text{cosineIntegral}(bx+a)}{4} + \frac{3 \cos(bx+a)}{2b^4} \\ & - \frac{a^2 \cos(bx+a)}{4b^4} + \frac{ax \cos(bx+a)}{2b^3} - \frac{3x^2 \cos(bx+a)}{4b^2} - \frac{a \sin(bx+a)}{2b^4} + \frac{a^3 \sin(bx+a)}{4b^4} \\ & + \frac{3x \sin(bx+a)}{2b^3} - \frac{a^2 x \sin(bx+a)}{4b^3} + \frac{a x^2 \sin(bx+a)}{4b^2} - \frac{x^3 \sin(bx+a)}{4b} \end{aligned}$$

command

```
integrate(x^3*fresnel_cos(b*x+a),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\begin{aligned} & \frac{1}{4} x^4 C(bx+a) \\ & + \left(16 \left(-i \pi^2 e^{\left(\frac{1}{2} i \pi b^2 x^2 + i \pi a b x + \frac{1}{2} i \pi a^2\right)} + i \pi^2 e^{\left(-\frac{1}{2} i \pi b^2 x^2 - i \pi a b x - \frac{1}{2} i \pi a^2\right)} \right) a^4 + 32 \left(\pi \Gamma\left(2, \frac{1}{2} i \pi b^2 x^2 + i \pi a b x + \frac{1}{2} i \pi a^2\right) + \pi \Gamma\left(2, -\frac{1}{2} i \pi b^2 x^2 - i \pi a b x - \frac{1}{2} i \pi a^2\right) \right) \right) \end{aligned}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^3 \text{Ci}(bx+a) dx$$

28.20 Problem number 87

$$\int x^2 \text{CosIntegral}(a + bx) dx$$

Optimal antiderivative

$$\frac{a^3 \text{cosineIntegral}(bx + a)}{3b^3} + \frac{x^3 \text{cosineIntegral}(bx + a)}{3} + \frac{a \cos(bx + a)}{3b^3} - \frac{2x \cos(bx + a)}{3b^2} + \frac{2 \sin(bx + a)}{3b^3} - \frac{a^2 \sin(bx + a)}{3b^3} + \frac{ax \sin(bx + a)}{3b^2} - \frac{x^2 \sin(bx + a)}{3b}$$

command

```
integrate(x^2*fresnel_cos(b*x+a),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{3} x^3 C(bx + a)$$

$$\left(12 \left(-i \pi e^{\left(\frac{1}{2} i \pi b^2 x^2 + i \pi a b x + \frac{1}{2} i \pi a^2\right)} + i \pi e^{\left(-\frac{1}{2} i \pi b^2 x^2 - i \pi a b x - \frac{1}{2} i \pi a^2\right)} \right) a^3 + 4 \left(3 \left(-i \pi e^{\left(\frac{1}{2} i \pi b^2 x^2 + i \pi a b x + \frac{1}{2} i \pi a^2\right)} + i \pi e^{\left(-\frac{1}{2} i \pi b^2 x^2 - i \pi a b x - \frac{1}{2} i \pi a^2\right)} \right) \right)$$

Maxima 5.44 via sagemath 9.3 output

$$\int x^2 \text{Ci}(bx + a) dx$$

28.21 Problem number 88

$$\int x \text{CosIntegral}(a + bx) dx$$

Optimal antiderivative

$$-\frac{a^2 \text{cosineIntegral}(bx + a)}{2b^2} + \frac{x^2 \text{cosineIntegral}(bx + a)}{2} - \frac{\cos(bx + a)}{2b^2} + \frac{a \sin(bx + a)}{2b^2} - \frac{x \sin(bx + a)}{2b}$$

command

```
integrate(x*fresnel_cos(b*x+a),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{1}{2} x^2 C(bx + a) + \frac{\left(8 \left(-i \pi e^{\left(\frac{1}{2} i \pi b^2 x^2 + i \pi abx + \frac{1}{2} i \pi a^2\right)} + i \pi e^{\left(-\frac{1}{2} i \pi b^2 x^2 - i \pi abx - \frac{1}{2} i \pi a^2\right)}\right) abx + 8 \left(-i \pi e^{\left(\frac{1}{2} i \pi b^2 x^2 + i \pi abx + \frac{1}{2} i \pi a^2\right)} + i \pi e^{\left(-\frac{1}{2} i \pi b^2 x^2 - i \pi abx - \frac{1}{2} i \pi a^2\right)}\right)\right)}{b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int x \text{Ci}(bx + a) dx$$

28.22 Problem number 89

$$\int \text{CosIntegral}(a + bx) dx$$

Optimal antiderivative

$$\frac{(bx + a) \text{cosineIntegral}(bx + a)}{b} - \frac{\sin(bx + a)}{b}$$

command

`integrate(fresnel_cos(b*x+a),x, algorithm="maxima")`

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{(bx + a) C(bx + a) - \frac{\sin\left(\frac{1}{2} \pi b^2 x^2 + \pi abx + \frac{1}{2} \pi a^2\right)}{\pi}}{b}$$

Maxima 5.44 via sagemath 9.3 output

$$\int \text{Ci}(bx + a) dx$$

28.23 Problem number 103

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

Optimal antiderivative

$$\frac{\text{cosineIntegral}(d(a + b \ln(cx^n)))(a + b \ln(cx^n))}{bn} - \frac{\sin(d(a + b \ln(cx^n)))}{bdn}$$

command

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

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$\frac{(b \log(cx^n) + a) d C((b \log(cx^n) + a) d) - \frac{\sin\left(\frac{1}{2} \pi b^2 d^2 \log(cx^n)^2 + \pi a b d^2 \log(cx^n) + \frac{1}{2} \pi a^2 d^2\right)}{\pi}}{b d n}$$

Maxima 5.44 via sagemath 9.3 output

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

29 Test file number 210

Test folder name:

test_cases/210_Hebisch

29.1 Problem number 595

$$\int e^{\frac{41958+104976x+122472x^2+81648x^3+34020x^4+9072x^5+1512x^6+144x^7+6x^8}{19683x+52488x^2+61236x^3+40824x^4+17010x^5+4536x^6+756x^7+72x^8+3x^9+e^{2x}(6561x+17496x^2+20412x^3+13608x^4+5670x^5+1512x^6+252x^7+24x^8+x^9)}} \frac{177147x^2 + 531441x^3 + 708588x^4 + 551124x^5 + 275562x^6 + 91854x^7 + 20412x^8 + 2916x^9 + 243x^{10}}{177147x^2 + 531441x^3 + 708588x^4 + 551124x^5 + 275562x^6 + 91854x^7 + 20412x^8 + 2916x^9 + 243x^{10}} dx$$

Optimal antiderivative

$$\frac{\frac{2592}{(3+x)^8} + 6}{e^{x(3+e^{2x})}}$$

command

```
integrate((( -12*x^10-330*x^9-4050*x^8-29160*x^7-136080*x^6-428652*x^5-918540*x^4-1312200*x^3-1186164*x^2-629370*x-125874)*exp(x)^2-18*x^9-486*x^8-5832*x^7-40824*x^6-183708*x^5-551124*x^4-1102248*x^3-1417176*x^2-1132866*x-377622)*exp((6*x^8+144*x^7+1512*x^6+9072*x^5+34020*x^4+9072*x^5+1512*x^6+144*x^7+6*x^8)/x)/x,x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

$$e^{\left(-\frac{864}{3x^8+72x^7+756x^6+4536x^5+17010x^4+40824x^3+61236x^2+(x^8+24x^7+252x^6+1512x^5+5670x^4+13608x^3+20412x^2+17496x+6561)e^{(2x)}+52488x+19683} \right)}$$

Maxima 5.44 via sagemath 9.3 output

Timed out

29.2 Problem number 3948

$$\int \frac{-4 - 4x + 2x^2 + 5x^3 + 2x^4 + (7x^2 + 6x^3) \log\left(\frac{3e^{x+x^2}}{4}\right) + (-2 + 3x + 6x^2) \log^2\left(\frac{3e^{x+x^2}}{4}\right) + (1 + 2x) \log^3\left(\frac{3e^{x+x^2}}{4}\right)}{x^3 + 3x^2 \log\left(\frac{3e^{x+x^2}}{4}\right) + 3x \log^2\left(\frac{3e^{x+x^2}}{4}\right) + \log^3\left(\frac{3e^{x+x^2}}{4}\right)}$$

Optimal antiderivative

$$\left(\frac{1}{\ln\left(\frac{3e^{x+x^2}}{4}\right) + x} - x \right)^2 + x + 1$$

command

```
integrate(((1+2*x)*log(3/4*exp(x)*exp(x^2))^3+(6*x^2+3*x-2)*log(3/4*exp(x)*exp(x^2))^2+(6*x^3+4*x-4)/(log(3/4*exp(x)*exp(x^2))^3+3*x*log(3/4*exp(x)*exp(x^2))^2+3*x^2*log(3/4*exp(x)*exp(x^2)))
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out

29.3 Problem number 6099

$$\int \frac{-486x - 486x^2 + 324x^3 + 468x^4 + 162x^5 + 18x^6 + (162x + 324x^2 + 216x^3 + 60x^4 + 6x^5) \log(5) + (648x^4 + 648x^5)}{x^3 + 3x^2 \log(5) + 3x \log^2(5) + \log^3(5)}$$

Optimal antiderivative

$$\left(x + x^2 \ln\left(-\frac{\ln(5)}{2} - \frac{3x}{2} + \frac{3}{2} \right)^2 + 3 \right)^4 x^2$$

command

```
integrate(((10*x^9*log(5)+30*x^10-30*x^9)*log(-1/2*log(5)-3/2*x+3/2)^8+24*x^10*log(-1/2*log(5)-3/2*x+3/2)^7+((36*x^8+96*x^7)*log(5)+108*x^9+180*x^8-288*x^7)*log(-1/2*log(5)-3/2*x+3/2)^6+(72*x^9+216*x^8)*log(-1/2*log(5)-3/2*x+3/2)^5+((48*x^7+252*x^6+324*x^5)*log(5)+1972*x^5)*log(-1/2*log(5)-3/2*x+3/2)^4+(72*x^8+432*x^7+648*x^6)*log(-1/2*log(5)-3/2*x+3/2)^3+(324*x^4-1296*x^3)*log(-1/2*log(5)-3/2*x+3/2)^2+(24*x^7+216*x^6+648*x^5+648*x^4)*log(-1/2*log(5)-3/2*x+3/2)+(6*x^5+60*x^4+216*x^3+324*x^2+162*x)*log(5)+18*x^6+162*x^5+468*x^4+324*x^3+486*x^2-486*x)/(log(5)+3*x-3),x, algorithm="maxima")
```

Maxima 5.46 SBCL 2.0.1.debian via sagemath 9.6 output

output too large to display

Maxima 5.44 via sagemath 9.3 output

Timed out