Rubi 4.16.1.4 Integration Test Results
on the problems in the test-suite directory "5 Inverse trig functions"

Test results for the 227 problems in "5.1.2 (d x)^m (a+b arcsin(c x))^n.m"

Test results for the 703 problems in "5.1.4 (f x)^m (d+e x^2)^p (a+b arcsin(c x))^n.m"

Test results for the 474 problems in "5.1.5 Inverse sine functions.m"

Problem 470: Unable to integrate problem.
\[
\int \frac{x}{\text{ArcSin}[\sin(x)]} \, dx
\]

Optimal (type 3, 27 leaves, ? steps):

\[
\text{ArcSin}[\sin(x)] + \log[\text{ArcSin}[\sin(x)]] \left( -\text{ArcSin}[\sin(x)] + x \sqrt{\cos[x]^2} \sec[x] \right)
\]

Result (type 8, 9 leaves, 0 steps):

\[
\text{CannotIntegrate}[\frac{x}{\text{ArcSin}[\sin(x)]}, x]
\]

Problem 474: Unable to integrate problem.
\[
\int \frac{\sqrt{1-x^2} + x \text{ArcSin}[x]}{\text{ArcSin}[x] - x^2 \text{ArcSin}[x]} \, dx
\]

Optimal (type 3, 16 leaves, ? steps):

\[
-\frac{1}{2} \log[1-x^2] + \log[\text{ArcSin}[x]]
\]

Result (type 8, 32 leaves, 1 step):
Test results for the 227 problems in "5.2.2 (d x)^m (a+b arccos(c x))^n.m"

Test results for the 33 problems in "5.2.4 (f x)^m (d+e x^2)^p (a+b arccos(c x))^n.m"

Test results for the 118 problems in "5.2.5 Inverse cosine functions.m"

Test results for the 166 problems in "5.3.2 (d x)^m (a+b arctan(c x^n))^p.m"

Test results for the 31 problems in "5.3.3 (d+e x)^m (a+b arctan(c x^n))^p.m"

Test results for the 1301 problems in "5.3.4 u (a+b arctan(c x))^p.m"

Problem 1137: Result valid but suboptimal antiderivative.

\[ \int x^3 (d + e x^2)^3 (a + b \text{ArcTan}[c x]) \, dx \]

Optimal (type 3, 240 leaves, ? steps):

\[
\begin{align*}
&\frac{b}{40 c^9} (10 c^6 d^3 - 20 c^4 d^2 e + 15 c^2 d^2 e^2 - 4 e^3) x \\
&\frac{b}{120 c^7} e^2 x^7 \\
&\frac{b}{280 c^3} e^8 x^9 + \frac{b}{40 c^{10} e^2} (c^2 d^2 + 4 e) \text{ArcTan}[c x] \\
&\frac{b}{90 c} (d + e x^2)^4 (a + b \text{ArcTan}[c x]) + \frac{d}{8 e^2} (d + e x^2)^5 (a + b \text{ArcTan}[c x])
\end{align*}
\]

Result (type 3, 285 leaves, 8 steps):

\[
\begin{align*}
&\frac{b}{12 600 c^9 e} (325 c^8 d^4 + 1815 c^6 d^3 e - 4977 c^4 d^2 e^2 + 4305 c^2 d e^3 - 1260 e^4) x \\
&\frac{b}{4200 c^5 e} (25 c^4 d^2 - 135 c^2 d e + 84 e^2) (d + e x^2)^2 \\
&\frac{b}{2520 c^3 e} (23 c^2 d - 36 e) (d + e x^2)^3 - \frac{b x}{90 c e} (d + e x^2)^4 \\
&\frac{b}{40 c^{10} e^2} (c^2 d^2 + 4 e) \text{ArcTan}[c x] - \frac{d}{8 e^2} (d + e x^2)^4 (a + b \text{ArcTan}[c x]) + \frac{(d + e x^2)^5 (a + b \text{ArcTan}[c x])}{10 e^2}
\end{align*}
\]
<table>
<thead>
<tr>
<th>Test results for the 70 problems in &quot;5.3.5 u (a+b arctan(c+d x))^p.m&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test results for the 385 problems in &quot;5.3.6 Exponentials of inverse tangent.m&quot;</td>
</tr>
<tr>
<td>Test results for the 153 problems in &quot;5.3.7 Inverse tangent functions.m&quot;</td>
</tr>
<tr>
<td>Test results for the 234 problems in &quot;5.4.1 Inverse cotangent functions.m&quot;</td>
</tr>
<tr>
<td>Test results for the 12 problems in &quot;5.4.2 Exponentials of inverse cotangent.m&quot;</td>
</tr>
<tr>
<td>Test results for the 174 problems in &quot;5.5.1 u (a+b arcsec(c x))^n.m&quot;</td>
</tr>
<tr>
<td>Test results for the 50 problems in &quot;5.5.2 Inverse secant functions.m&quot;</td>
</tr>
<tr>
<td>Test results for the 178 problems in &quot;5.6.1 u (a+b arccsc(c x))^n.m&quot;</td>
</tr>
<tr>
<td>Test results for the 49 problems in &quot;5.6.2 Inverse cosecant functions.m&quot;</td>
</tr>
</tbody>
</table>
Summary of Integration Test Results

4585 integration problems

A - 4582 optimal antiderivatives
B - 1 valid but suboptimal antiderivatives
C - 0 unnecessarily complex antiderivatives
D - 2 unable to integrate problems
E - 0 integration timeouts
F - 0 invalid antiderivatives