NOTE Different techniques of integration may produce answers that appear to differ from those shown here; if both are correct, they of course differ only by a constant.

1. $2\arctan\sqrt{x} + C$
3. $\ln|\sec x| + C$
5. $\frac{1}{2}\sec^2\theta + C$
7. $x\tan x - \frac{1}{2}x^2 + \ln|\cos x| + C$
9. $\frac{2}{15}(2-x^3)^{5/2} - \frac{4}{9}(2-x^3)^{3/2} + C$
11. $\frac{1}{2}x(25+x^2)^{1/2} - \frac{25}{2}\ln|x + (25+x^2)^{1/2}| + C$
13. $\frac{2}{3}\sqrt{3}\arctan\frac{1}{3}\sqrt{3}(2x-1) + C$
15. $\frac{103}{87}\sqrt{29}\arctan\frac{1}{29}\sqrt{29}(3x-2) + \frac{5}{6}\ln(9x^2 - 12x + 33) + C$
17. $\frac{2}{3}\arctan(\frac{1}{3}\tan\frac{1}{2}\theta) + C$
19. $\arcsin(\frac{1}{2}\sin x) + C$
21. $-\ln|\ln\cos x| + C$
23. $(1+x)\ln(1+x) + C - x$
25. $\frac{1}{2}x(x^2+9)^{1/2} + \frac{9}{2}\ln|x + (x^2+9)^{1/2}| + C$
27. $\frac{1}{2}(x-1)(2x-x^2)^{1/2} + \frac{1}{2}\arcsin(x-1) + C$
29. $\frac{1}{3}x^3 + 2x - \sqrt{2}\ln\left|\frac{x+\sqrt{2}}{x-\sqrt{2}}\right| + C$
31. $\frac{1}{2}(x^2+x)(x^2+2x+2)^{-1} - \frac{1}{2}\arctan(x+1) + C$
33. $\frac{1}{2}\tan\theta + C$ or $\frac{1}{2}\frac{\sin 2\theta}{1+\cos 2\theta} + C$
35. $\frac{1}{5}\sec^5 x - \frac{1}{3}\sec^3 x + C$
37. $\frac{1}{8}x^2[4(\ln x)^3 - 6(\ln x)^2 + 6(\ln x) - 3] + C$
39. $\frac{1}{2}e^x(1+e^{2x})^{1/2} + \frac{1}{2}\ln[e^x + (1+e^{2x})^{1/2}] + C$
41. $\frac{1}{54}\operatorname{arcsec}|\frac{1}{3}x| + \frac{1}{18}x^{-2}(x^2-9)^{1/2} + C$
43. $\ln|x| + \frac{1}{2}\arctan 2x + C$
45. $\frac{1}{2}(\sec x\tan x - \ln|\sec x + \tan x|) + C$
47. $\ln|x+1| - \frac{2}{3}x^{-3} + C$
49. $\ln|x-1| + \ln(x^2+x+1) + (x-1)^{-1} - 2(x^2+x+1)^{-1} + C$
51. $\frac{1}{3}\ln\left|\frac{1-\cos\theta+3\sin\theta}{1-\cos\theta-3\sin\theta}\right| + C$
53. $\frac{1}{3}(\arcsin x)^3 + C$
55. $\frac{1}{2}\sec^2 z + \ln|\cos z| + C$
57. $\frac{1}{2}\arctan(e^{x^2}) + C$
59. $-\frac{1}{2}(x^2+1)\exp(-x^2) + C$
61. $-x^{-1}\arcsin x - \ln\left|\frac{1+(1-x^2)^{1/2}}{x}\right| + C$
63. $\frac{1}{8}\arcsin x + \frac{1}{8}x(2x^2-1)(1-x^2)^{1/2} + C$
65. $\frac{1}{4}\ln|2x+1| + \frac{5}{4}(2x+1)^{-1} + C$
67. $\frac{1}{2}\ln|e^{2x}-1| + C$
69. $2\ln|x+1| + 3(x+1)^{-1} - \frac{5}{3}(x+1)^{-3} + C$
71. $\frac{1}{2}\ln(x^2+1) + \arctan x - \frac{1}{2}(x^2+1)^{-1} + C$
73. $\frac{1}{45}(x^3+1)^{3/2}(6x^3+4) + C$
75. $\frac{2}{3}(1+\sin x)^{3/2} + C$
77. $\frac{1}{2}\ln|\sec x + \tan x| + C$
79. $-2(1-\sin t)^{1/2} + C$
81. $-2x + \sqrt{3}\arctan\frac{1}{3}\sqrt{3}(2x+1) + \frac{1}{2}(2x+1)\ln(x^2+x+1) + C$
83. $-x^{-1}\arctan x + \ln|x(1+x^2)^{-1/2}| + C$
85. $\frac{1}{2}\ln(x^2+1) + \frac{1}{2}(x^2+1)^{-1} + C$
87. $\frac{1}{2}(x-6)(x^2+4)^{-1/2} + C$
89. $\frac{1}{3}(1+\sin^2 x)^{3/2} + C$
91. $\frac{1}{2}e^x(x\sin x - x\cos x + \cos x) + C$
93. $-\frac{1}{2}(x-1)^{-2}\arctan x + \frac{1}{2}(x^2+1)(x-1)^{-2} - \frac{1}{4}(x-1)^{-1} + C$
95. $\frac{11}{9}\arcsin\frac{1}{2}(3x-1) - \frac{2}{9}(3+6x-9x^2)^{1/2} + C$
97. $\frac{1}{2}\cos^2\theta + \cos\theta + C$
99. $x\operatorname{arcsec}\sqrt{x} - (x-1)^{1/2} + C$
101. $\frac{1}{4}\pi(e^2 - e^{-2} + 4)$
103. (a) $A_b = \pi\left(\sqrt{2} - e^{-b}(1+e^{-2b})^{1/2} + \ln\left[\frac{1+\sqrt{2}}{(e^{-b}+(1+e^{-2b})^{1/2}}\right]\right)$;
(b) $\pi[\sqrt{2} + \ln(1+\sqrt{2})] \approx 7.2118$
105. $\frac{1}{2}\pi\sqrt{2}\left[2\sqrt{14} - \sqrt{2} + \ln\left(\frac{1+\sqrt{2}}{2\sqrt{2}+\sqrt{7}}\right)\right]$, approximately 11.66353
109. $\frac{5}{4}\pi \approx 3.29699$
111. The value of the integral is $\frac{1}{630}$.
113. $\frac{1}{2}(5\sqrt{6} - 3\sqrt{2}) + \frac{1}{2}\ln\left(\frac{1+\sqrt{2}}{\sqrt{3}+\sqrt{2}}\right) \approx 3.869983$
115. The substitution is $u = e^x$.
(a) $\frac{2}{3}\sqrt{3}\arctan\frac{1}{3}\sqrt{3}(1+2e^x) + C$
119. $\frac{1}{4}\sqrt{2}\ln\left|\frac{1+\tan\theta-(2\tan\theta)^{1/2}}{1+\tan\theta+(2\tan\theta)^{1/2}}\right| - \frac{1}{2}\sqrt{2}\arctan(2\cot\theta)^{1/2} + C$