A Brief Table of Integrals

1. $\displaystyle\int u\,dv = uv - \int v\,du$

2. $\displaystyle\int a^u\,du = \frac{a^u}{\ln a} + C, \quad a \neq 1, \quad a > 0$

3. $\displaystyle\int \cos u\,du = \sin u + C$

4. $\displaystyle\int \sin u\,du = -\cos u + C$

5. $\displaystyle\int (ax+b)^n\,dx = \frac{(ax+b)^{n+1}}{a(n+1)} + C, \quad n \neq -1$

6. $\displaystyle\int (ax+b)^{-1}\,dx = \frac{1}{a}\ln|ax+b| + C$

7. $\displaystyle\int x(ax+b)^n\,dx = \frac{(ax+b)^{n+1}}{a^2}\left[\frac{ax+b}{n+2} - \frac{b}{n+1}\right] + C, \quad n \neq -1, -2$

8. $\displaystyle\int x(ax+b)^{-1}\,dx = \frac{x}{a} - \frac{b}{a^2}\ln|ax+b| + C$

9. $\displaystyle\int x(ax+b)^{-2}\,dx = \frac{1}{a^2}\left[\ln|ax+b| + \frac{b}{ax+b}\right] + C$

10. $\displaystyle\int \frac{dx}{x(ax+b)} = \frac{1}{b}\ln\left|\frac{x}{ax+b}\right| + C$

11. $\displaystyle\int (\sqrt{ax+b})^n\,dx = \frac{2}{a}\frac{(\sqrt{ax+b})^{n+2}}{n+2} + C, \quad n \neq -2$

12. $\displaystyle\int \frac{\sqrt{ax+b}}{x}\,dx = 2\sqrt{ax+b} + b\int \frac{dx}{x\sqrt{ax+b}}$

13. (a) $\displaystyle\int \frac{dx}{x\sqrt{ax+b}} = \frac{2}{\sqrt{-b}}\tan^{-1}\sqrt{\frac{ax+b}{-b}} + C, \quad \text{if} \quad b < 0$

    (b) $\displaystyle\int \frac{dx}{x\sqrt{ax+b}} = \frac{1}{\sqrt{b}}\ln\left|\frac{\sqrt{ax+b} - \sqrt{b}}{\sqrt{ax+b} + \sqrt{b}}\right| + C, \quad \text{if} \quad b > 0$

14. $\displaystyle\int \frac{\sqrt{ax+b}}{x^2}\,dx = -\frac{\sqrt{ax+b}}{x} + \frac{a}{2}\int \frac{dx}{x\sqrt{ax+b}} + C$

15. $\displaystyle\int \frac{dx}{x^2\sqrt{ax+b}} = -\frac{\sqrt{ax+b}}{bx} - \frac{a}{2b}\int \frac{dx}{x\sqrt{ax+b}} + C$

16. $\displaystyle\int \frac{dx}{a^2+x^2} = \frac{1}{a}\tan^{-1}\frac{x}{a} + C$

17. $\displaystyle\int \frac{dx}{(a^2+x^2)^2} = \frac{x}{2a^2(a^2+x^2)} + \frac{1}{2a^3}\tan^{-1}\frac{x}{a} + C$

18. $\displaystyle\int \frac{dx}{a^2-x^2} = \frac{1}{2a}\ln\left|\frac{x+a}{x-a}\right| + C$

19. $\displaystyle\int \frac{dx}{(a^2-x^2)^2} = \frac{x}{2a^2(a^2-x^2)} + \frac{1}{2a^2}\int \frac{dx}{a^2-x^2}$

20. $\displaystyle\int \frac{dx}{\sqrt{a^2+x^2}} = \sinh^{-1}\frac{x}{a} + C = \ln|x + \sqrt{a^2+x^2}| + C$

Continued

21. $\int \sqrt{a^2 + x^2} \, dx = \frac{x}{2}\sqrt{a^2 + x^2} + \frac{a^2}{2}\sinh^{-1}\frac{x}{a} + C$

22. $\int x^2\sqrt{a^2 + x^2} \, dx = \frac{x(a^2 + 2x^2)\sqrt{a^2 + x^2}}{8} - \frac{a^4}{8}\sinh^{-1}\frac{x}{a} + C$

23. $\int \frac{\sqrt{a^2 + x^2}}{x} \, dx = \sqrt{a^2 + x^2} - a\sinh^{-1}\left|\frac{a}{x}\right| + C$

24. $\int \frac{\sqrt{a^2 + x^2}}{x^2} \, dx = \sinh^{-1}\frac{x}{a} - \frac{\sqrt{a^2 + x^2}}{x} + C$

25. $\int \frac{x^2}{\sqrt{a^2 + x^2}} \, dx = -\frac{a^2}{2}\sinh^{-1}\frac{x}{a} + \frac{x\sqrt{a^2 + x^2}}{2} + C$

26. $\int \frac{dx}{x\sqrt{a^2 + x^2}} = -\frac{1}{a}\ln\left|\frac{a + \sqrt{a^2 + x^2}}{x}\right| + C$

27. $\int \frac{dx}{x^2\sqrt{a^2 + x^2}} = -\frac{\sqrt{a^2 + x^2}}{a^2 x} + C$ 28. $\int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1}\frac{x}{a} + C$

29. $\int \sqrt{a^2 - x^2} \, dx = \frac{x}{2}\sqrt{a^2 - x^2} + \frac{a^2}{2}\sin^{-1}\frac{x}{a} + C$

30. $\int x^2\sqrt{a^2 - x^2} \, dx = \frac{a^4}{8}\sin^{-1}\frac{x}{a} - \frac{1}{8}x\sqrt{a^2 - x^2}\,(a^2 - 2x^2) + C$

31. $\int \frac{\sqrt{a^2 - x^2}}{x} \, dx = \sqrt{a^2 - x^2} - a\ln\left|\frac{a + \sqrt{a^2 - x^2}}{x}\right| + C$

32. $\int \frac{\sqrt{a^2 - x^2}}{x^2} \, dx = -\sin^{-1}\frac{x}{a} - \frac{\sqrt{a^2 - x^2}}{x} + C$

33. $\int \frac{x^2}{\sqrt{a^2 - x^2}} \, dx = \frac{a^2}{2}\sin^{-1}\frac{x}{a} - \frac{1}{2}x\sqrt{a^2 - x^2} + C$

34. $\int \frac{dx}{x\sqrt{a^2 - x^2}} = -\frac{1}{a}\ln\left|\frac{a + \sqrt{a^2 - x^2}}{x}\right| + C$ 35. $\int \frac{dx}{x^2\sqrt{a^2 - x^2}} = -\frac{\sqrt{a^2 - x^2}}{a^2 x} + C$

36. $\int \frac{dx}{\sqrt{x^2 - a^2}} = \cosh^{-1}\frac{x}{a} + C = \ln|x + \sqrt{x^2 - a^2}| + C$

37. $\int \sqrt{x^2 - a^2} \, dx = \frac{x}{2}\sqrt{x^2 - a^2} - \frac{a^2}{2}\cosh^{-1}\frac{x}{a} + C$

38. $\int (\sqrt{x^2 - a^2})^n \, dx = \frac{x(\sqrt{x^2 - a^2})^n}{n + 1} - \frac{na^2}{n + 1}\int (\sqrt{x^2 - a^2})^{n-2} \, dx, \quad n \neq -1$

39. $\int \frac{dx}{(\sqrt{x^2 - a^2})^n} = \frac{x(\sqrt{x^2 - a^2})^{2-n}}{(2 - n)a^2} - \frac{n - 3}{(n - 2)a^2}\int \frac{dx}{(\sqrt{x^2 - a^2})^{n-2}}, \quad n \neq 2$

40. $\int x(\sqrt{x^2 - a^2})^n \, dx = \frac{(\sqrt{x^2 - a^2})^{n+2}}{n + 2} + C, \quad n \neq -2$

41. $\int x^2\sqrt{x^2 - a^2} \, dx = \frac{x}{8}(2x^2 - a^2)\sqrt{x^2 - a^2} - \frac{a^4}{8}\cosh^{-1}\frac{x}{a} + C$

42. $\int \frac{\sqrt{x^2 - a^2}}{x} \, dx = \sqrt{x^2 - a^2} - a\sec^{-1}\left|\frac{x}{a}\right| + C$

43. $\displaystyle\int \frac{\sqrt{x^2-a^2}}{x^2}\,dx = \cosh^{-1}\frac{x}{a} - \frac{\sqrt{x^2-a^2}}{x} + C$

44. $\displaystyle\int \frac{x^2}{\sqrt{x^2-a^2}}\,dx = \frac{a^2}{2}\cosh^{-1}\frac{x}{a} + \frac{x}{2}\sqrt{x^2-a^2} + C$

45. $\displaystyle\int \frac{dx}{x\sqrt{x^2-a^2}} = \frac{1}{a}\sec^{-1}\left|\frac{x}{a}\right| + C = \frac{1}{a}\cos^{-1}\left|\frac{a}{x}\right| + C$

46. $\displaystyle\int \frac{dx}{x^2\sqrt{x^2-a^2}} = \frac{\sqrt{x^2-a^2}}{a^2 x} + C$ 47. $\displaystyle\int \frac{dx}{\sqrt{2ax-x^2}} = \sin^{-1}\left(\frac{x-a}{a}\right) + C$

48. $\displaystyle\int \sqrt{2ax-x^2}\,dx = \frac{x-a}{2}\sqrt{2ax-x^2} + \frac{a^2}{2}\sin^{-1}\left(\frac{x-a}{a}\right) + C$

49. $\displaystyle\int (\sqrt{2ax-x^2})^n\,dx = \frac{(x-a)(\sqrt{2ax-x^2})^n}{n+1} + \frac{na^2}{n+1}\int (\sqrt{2ax-x^2})^{n-2}\,dx,$

50. $\displaystyle\int \frac{dx}{(\sqrt{2ax-x^2})^n} = \frac{(x-a)(\sqrt{2ax-x^2})^{2-n}}{(n-2)a^2} + \frac{(n-3)}{(n-2)a^2}\int \frac{dx}{(\sqrt{2ax-x^2})^{n-2}}$

51. $\displaystyle\int x\sqrt{2ax-x^2}\,dx = \frac{(x+a)(2x-3a)\sqrt{2ax-x^2}}{6} + \frac{a^3}{2}\sin^{-1}\frac{x-a}{a} + C$

52. $\displaystyle\int \frac{\sqrt{2ax-x^2}}{x}\,dx = \sqrt{2ax-x^2} + a\sin^{-1}\frac{x-a}{a} + C$

53. $\displaystyle\int \frac{\sqrt{2ax-x^2}}{x^2}\,dx = -2\sqrt{\frac{2a-x}{x}} - \sin^{-1}\left(\frac{x-a}{a}\right) + C$

54. $\displaystyle\int \frac{x\,dx}{\sqrt{2ax-x^2}} = a\sin^{-1}\frac{x-a}{a} - \sqrt{2ax-x^2} + C$

55. $\displaystyle\int \frac{dx}{x\sqrt{2ax-x^2}} = -\frac{1}{a}\sqrt{\frac{2a-x}{x}} + C$

56. $\displaystyle\int \sin ax\,dx = -\frac{1}{a}\cos ax + C$ 57. $\displaystyle\int \cos ax\,dx = \frac{1}{a}\sin ax + C$

58. $\displaystyle\int \sin^2 ax\,dx = \frac{x}{2} - \frac{\sin 2ax}{4a} + C$ 59. $\displaystyle\int \cos^2 ax\,dx = \frac{x}{2} + \frac{\sin 2ax}{4a} + C$

60. $\displaystyle\int \sin^n ax\,dx = \frac{-\sin^{n-1} ax \cos ax}{na} + \frac{n-1}{n}\int \sin^{n-2} ax\,dx$

61. $\displaystyle\int \cos^n ax\,dx = \frac{\cos^{n-1} ax \sin ax}{na} + \frac{n-1}{n}\int \cos^{n-2} ax\,dx$

62. (a) $\displaystyle\int \sin ax \cos bx\,dx = -\frac{\cos (a+b)x}{2(a+b)} - \frac{\cos (a-b)x}{2(a-b)} + C, \qquad a^2 \neq b^2$

   (b) $\displaystyle\int \sin ax \sin bx\,dx = \frac{\sin (a-b)x}{2(a-b)} - \frac{\sin (a+b)x}{2(a+b)}, \qquad a^2 \neq b^2$

   (c) $\displaystyle\int \cos ax \cos bx\,dx = \frac{\sin (a-b)x}{2(a-b)} + \frac{\sin (a+b)x}{2(a+b)}, \qquad a^2 \neq b^2$

Continued

63. $\int \sin ax \cos ax \, dx = -\dfrac{\cos 2ax}{4a} + C$

64. $\int \sin^n ax \cos ax \, dx = \dfrac{\sin^{n+1} ax}{(n+1)a} + C, \qquad n \neq -1$

65. $\int \dfrac{\cos ax}{\sin ax} \, dx = \dfrac{1}{a} \ln |\sin ax| + C$

66. $\int \cos^n ax \sin ax \, dx = -\dfrac{\cos^{n+1} ax}{(n+1)a} + C, \qquad n \neq -1$

67. $\int \dfrac{\sin ax}{\cos ax} \, dx = -\dfrac{1}{a} \ln |\cos ax| + C$

68. $\int \sin^n ax \cos^m ax \, dx = -\dfrac{\sin^{n-1} ax \cos^{m+1} ax}{a(m+n)} + \dfrac{n-1}{m+n} \int \sin^{n-2} ax \cos^m ax \, dx,$
$$n \neq -m \qquad \text{(If } n = -m, \text{ use No. 86.)}$$

69. $\int \sin^n ax \cos^m ax \, dx = \dfrac{\sin^{n+1} ax \cos^{m-1} ax}{a(m+n)} + \dfrac{m-1}{m+n} \int \sin^n ax \cos^{m-2} ax \, dx,$
$$m \neq -n \qquad \text{(If } m = -n, \text{ use No. 87.)}$$

70. $\int \dfrac{dx}{b + c \sin ax} = \dfrac{-2}{a\sqrt{b^2 - c^2}} \tan^{-1} \left[\sqrt{\dfrac{b-c}{b+c}} \tan \left(\dfrac{\pi}{4} - \dfrac{ax}{2} \right) \right] + C, \qquad b^2 > c^2$

71. $\int \dfrac{dx}{b + c \sin ax} = \dfrac{-1}{a\sqrt{c^2 - b^2}} \ln \left| \dfrac{c + b \sin ax + \sqrt{c^2 - b^2} \cos ax}{b + c \sin ax} \right| + C, \qquad b^2 < c^2$

72. $\int \dfrac{dx}{1 + \sin ax} = -\dfrac{1}{a} \tan \left(\dfrac{\pi}{4} - \dfrac{ax}{2} \right) + C$

73. $\int \dfrac{dx}{1 - \sin ax} = \dfrac{1}{a} \tan \left(\dfrac{\pi}{4} + \dfrac{ax}{2} \right) + C$

74. $\int \dfrac{dx}{b + c \cos ax} = \dfrac{2}{a\sqrt{b^2 - c^2}} \tan^{-1} \left[\sqrt{\dfrac{b-c}{b+c}} \tan \dfrac{ax}{2} \right] + C, \qquad b^2 > c^2$

75. $\int \dfrac{dx}{b + c \cos ax} = \dfrac{1}{a\sqrt{c^2 - b^2}} \ln \left| \dfrac{c + b \cos ax + \sqrt{c^2 - b^2} \sin ax}{b + c \cos ax} \right| + C, \qquad b^2 < c^2$

76. $\int \dfrac{dx}{1 + \cos ax} = \dfrac{1}{a} \tan \dfrac{ax}{2} + C$

77. $\int \dfrac{dx}{1 - \cos ax} = -\dfrac{1}{a} \cot \dfrac{ax}{2} + C$

78. $\int x \sin ax \, dx = \dfrac{1}{a^2} \sin ax - \dfrac{x}{a} \cos ax + C$

79. $\int x \cos ax \, dx = \dfrac{1}{a^2} \cos ax + \dfrac{x}{a} \sin ax + C$

80. $\int x^n \sin ax \, dx = -\dfrac{x^n}{a} \cos ax + \dfrac{n}{a} \int x^{n-1} \cos ax \, dx$

81. $\int x^n \cos ax \, dx = \dfrac{x^n}{a} \sin ax - \dfrac{n}{a} \int x^{n-1} \sin ax \, dx$

82. $\int \tan ax \, dx = \dfrac{1}{a} \ln |\sec ax| + C$

83. $\int \cot ax \, dx = \dfrac{1}{a} \ln |\sin ax| + C$

84. $\int \tan^2 ax \, dx = \dfrac{1}{a} \tan ax - x + C$

85. $\int \cot^2 ax \, dx = -\dfrac{1}{a} \cot ax - x + C$

86. $\int \tan^n ax \, dx = \dfrac{\tan^{n-1} ax}{a(n-1)} - \int \tan^{n-2} ax \, dx, \qquad n \neq 1$

87. $\int \cot^n ax \, dx = -\dfrac{\cot^{n-1} ax}{a(n-1)} - \int \cot^{n-2} ax \, dx, \qquad n \neq 1$

88. $\int \sec ax \, dx = \dfrac{1}{a} \ln |\sec ax + \tan ax| + C$

89. $\int \csc ax \, dx = -\dfrac{1}{a} \ln |\csc ax + \cot ax| + C$

90. $\int \sec^2 ax\, dx = \dfrac{1}{a}\tan ax + C$

91. $\int \csc^2 ax\, dx = -\dfrac{1}{a}\cot ax + C$

92. $\int \sec^n ax\, dx = \dfrac{\sec^{n-2} ax \tan ax}{a(n-1)} + \dfrac{n-2}{n-1}\int \sec^{n-2} ax\, dx, \quad n \neq 1$

93. $\int \csc^n ax\, dx = -\dfrac{\csc^{n-2} ax \cot ax}{a(n-1)} + \dfrac{n-2}{n-1}\int \csc^{n-2} ax\, dx, \quad n \neq 1$

94. $\int \sec^n ax \tan ax\, dx = \dfrac{\sec^n ax}{na} + C, \quad n \neq 0$

95. $\int \csc^n ax \cot ax\, dx = -\dfrac{\csc^n ax}{na} + C, \quad n \neq 0$

96. $\int \sin^{-1} ax\, dx = x \sin^{-1} ax + \dfrac{1}{a}\sqrt{1 - a^2 x^2} + C$

97. $\int \cos^{-1} ax\, dx = x \cos^{-1} ax - \dfrac{1}{a}\sqrt{1 - a^2 x^2} + C$

98. $\int \tan^{-1} ax\, dx = x \tan^{-1} ax - \dfrac{1}{2a}\ln(1 + a^2 x^2) + C$

99. $\int x^n \sin^{-1} ax\, dx = \dfrac{x^{n+1}}{n+1}\sin^{-1} ax - \dfrac{a}{n+1}\int \dfrac{x^{n+1}\, dx}{\sqrt{1 - a^2 x^2}}, \quad n \neq -1$

100. $\int x^n \cos^{-1} ax\, dx = \dfrac{x^{n+1}}{n+1}\cos^{-1} ax + \dfrac{a}{n+1}\int \dfrac{x^{n+1}\, dx}{\sqrt{1 - a^2 x^2}}, \quad n \neq -1$

101. $\int x^n \tan^{-1} ax\, dx = \dfrac{x^{n+1}}{n+1}\tan^{-1} ax - \dfrac{a}{n+1}\int \dfrac{x^{n+1}\, dx}{1 + a^2 x^2}, \quad n \neq -1$

102. $\int e^{ax}\, dx = \dfrac{1}{a}e^{ax} + C$

103. $\int b^{ax}\, dx = \dfrac{1}{a}\dfrac{b^{ax}}{\ln b} + C, \quad b > 0, \ b \neq 1$

104. $\int x e^{ax}\, dx = \dfrac{e^{ax}}{a^2}(ax - 1) + C$

105. $\int x^n e^{ax}\, dx = \dfrac{1}{a}x^n e^{ax} - \dfrac{n}{a}\int x^{n-1} e^{ax}\, dx$

106. $\int x^n b^{ax}\, dx = \dfrac{x^n b^{ax}}{a \ln b} - \dfrac{n}{a \ln b}\int x^{n-1} b^{ax}\, dx, \quad b > 0, \ b \neq 1$

107. $\int e^{ax} \sin bx\, dx = \dfrac{e^{ax}}{a^2 + b^2}(a \sin bx - b \cos bx) + C$

108. $\int e^{ax} \cos bx\, dx = \dfrac{e^{ax}}{a^2 + b^2}(a \cos bx + b \sin bx) + C$

109. $\int \ln ax\, dx = x \ln ax - x + C$

110. $\int x^n (\ln ax)^m\, dx = \dfrac{x^{n+1}(\ln ax)^m}{n+1} - \dfrac{m}{n+1}\int x^n (\ln ax)^{m-1}\, dx, \quad n \neq -1$

111. $\int x^{-1}(\ln ax)^m = \dfrac{(\ln ax)^{m+1}}{m+1} + C, \quad m \neq -1$

112. $\int \dfrac{dx}{x \ln ax} = \ln|\ln ax| + C$

113. $\int \sinh ax\, dx = \dfrac{1}{a}\cosh ax + C$

114. $\int \cosh ax\, dx = \dfrac{1}{a}\sinh ax + C$

115. $\int \sinh^2 ax\, dx = \dfrac{\sinh 2ax}{4a} - \dfrac{x}{2} + C$

116. $\int \cosh^2 ax\, dx = \dfrac{\sinh 2ax}{4a} + \dfrac{x}{2} + C$

117. $\int \sinh^n ax\, dx = \dfrac{\sinh^{n-1} ax \cosh ax}{na} - \dfrac{n-1}{n}\int \sinh^{n-2} ax\, dx, \quad n \neq 0$

118. $\int \cosh^n ax \, dx = \dfrac{\cosh^{n-1} ax \sinh ax}{na} + \dfrac{n-1}{n} \int \cosh^{n-2} ax \, dx, \qquad n \neq 0$

119. $\int x \sinh ax \, dx = \dfrac{x}{a} \cosh ax - \dfrac{1}{a^2} \sinh ax + C$

120. $\int x \cosh ax \, dx = \dfrac{x}{a} \sinh ax - \dfrac{1}{a^2} \cosh ax + C$

121. $\int x^n \sinh ax \, dx = \dfrac{x^n}{a} \cosh ax - \dfrac{n}{a} \int x^{n-1} \cosh ax \, dx$

122. $\int x^n \cosh ax \, dx = \dfrac{x^n}{a} \sinh ax - \dfrac{n}{a} \int x^{n-1} \sinh ax \, dx$

123. $\int \tanh ax \, dx = \dfrac{1}{a} \ln (\cosh ax) + C$

124. $\int \coth ax \, dx = \dfrac{1}{a} \ln |\sinh ax| + C$

125. $\int \tanh^2 ax \, dx = x - \dfrac{1}{a} \tanh ax + C$

126. $\int \coth^2 ax \, dx = x - \dfrac{1}{a} \coth ax + C$

127. $\int \tanh^n ax \, dx = -\dfrac{\tanh^{n-1} ax}{(n-1)a} + \int \tanh^{n-2} ax \, dx, \qquad n \neq 1$

128. $\int \coth^n ax \, dx = -\dfrac{\coth^{n-1} ax}{(n-1)a} + \int \coth^{n-2} ax \, dx, \qquad n \neq 1$

129. $\int \operatorname{sech} ax \, dx = \dfrac{1}{a} \sin^{-1} (\tanh ax) + C$

130. $\int \operatorname{csch} ax \, dx = \dfrac{1}{a} \ln \left| \tanh \dfrac{ax}{2} \right| + C$

131. $\int \operatorname{sech}^2 ax \, dx = \dfrac{1}{a} \tanh ax + C$

132. $\int \operatorname{csch}^2 ax \, dx = -\dfrac{1}{a} \coth ax + C$

133. $\int \operatorname{sech}^n ax \, dx = \dfrac{\operatorname{sech}^{n-2} ax \tanh ax}{(n-1)a} + \dfrac{n-2}{n-1} \int \operatorname{sech}^{n-2} ax \, dx, \qquad n \neq 1$

134. $\int \operatorname{csch}^n ax \, dx = -\dfrac{\operatorname{csch}^{n-2} ax \coth ax}{(n-1)a} - \dfrac{n-2}{n-1} \int \operatorname{csch}^{n-2} ax \, dx, \qquad n \neq 1$

135. $\int \operatorname{sech}^n ax \tanh ax \, dx = -\dfrac{\operatorname{sech}^n ax}{na} + C, \qquad n \neq 0$

136. $\int \operatorname{csch}^n ax \coth ax \, dx = -\dfrac{\operatorname{csch}^n ax}{na} + C, \qquad n \neq 0$

137. $\int e^{ax} \sinh bx \, dx = \dfrac{e^{ax}}{2} \left[\dfrac{e^{bx}}{a+b} - \dfrac{e^{-bx}}{a-b} \right] + C, \qquad a^2 \neq b^2$

138. $\int e^{ax} \cosh bx \, dx = \dfrac{e^{ax}}{2} \left[\dfrac{e^{bx}}{a+b} + \dfrac{e^{-bx}}{a-b} \right] + C, \qquad a^2 \neq b^2$

139. $\int_0^\infty x^{n-1} e^{-x} \, dx = \Gamma(n) = (n-1)!, \qquad n > 0.$

140. $\int_0^\infty e^{-ax^2} \, dx = \dfrac{1}{2} \sqrt{\dfrac{\pi}{a}}, \qquad a > 0$

141. $\int_0^{\pi/2} \sin^n x \, dx = \int_0^{\pi/2} \cos^n x \, dx = \begin{cases} \dfrac{1 \cdot 3 \cdot 5 \cdots (n-1)}{2 \cdot 4 \cdot 6 \cdots n} \cdot \dfrac{\pi}{2}, & \text{if } n \text{ is an even integer} \geq 2, \\[2ex] \dfrac{2 \cdot 4 \cdot 6 \cdots (n-1)}{3 \cdot 5 \cdot 7 \cdots n}, & \text{if } n \text{ is an odd integer} \geq 3 \end{cases}$