

A Brief Table of Integrals

Basic Forms

1. $\int k \, dx = kx + C, \quad k \text{ any number}$
2. $\int x^n \, dx = \frac{x^{n+1}}{n+1} + C, \quad n \neq -1$
3. $\int \frac{dx}{x} = \ln|x| + C$
4. $\int e^x \, dx = e^x + C$
5. $\int a^x \, dx = \frac{a^x}{\ln a} + C \quad (a > 0, a \neq 1)$
6. $\int \sin x \, dx = -\cos x + C$
7. $\int \cos x \, dx = \sin x + C$
8. $\int \sec^2 x \, dx = \tan x + C$
9. $\int \csc^2 x \, dx = -\cot x + C$
10. $\int \sec x \tan x \, dx = \sec x + C$
11. $\int \csc x \cot x \, dx = -\csc x + C$
12. $\int \tan x \, dx = \ln|\sec x| + C$
13. $\int \cot x \, dx = \ln|\sin x| + C$
14. $\int \sinh x \, dx = \cosh x + C$
15. $\int \cosh x \, dx = \sinh x + C$
16. $\int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1} \frac{x}{a} + C$
17. $\int \frac{dx}{a^2 + x^2} = \frac{1}{a} \tan^{-1} \frac{x}{a} + C$
18. $\int \frac{dx}{x\sqrt{x^2 - a^2}} = \frac{1}{a} \sec^{-1} \left| \frac{x}{a} \right| + C$
19. $\int \frac{dx}{\sqrt{a^2 + x^2}} = \sinh^{-1} \frac{x}{a} + C \quad (a > 0)$
20. $\int \frac{dx}{\sqrt{x^2 - a^2}} = \cosh^{-1} \frac{x}{a} + C \quad (x > a > 0)$

Forms Involving $ax + b$

21. $\int (ax + b)^n \, dx = \frac{(ax + b)^{n+1}}{a(n+1)} + C, \quad n \neq -1$
22. $\int x(ax + b)^n \, dx = \frac{(ax + b)^{n+1}}{a^2} \left[\frac{ax + b}{n+2} - \frac{b}{n+1} \right] + C, \quad n \neq -1, -2$
23. $\int (ax + b)^{-1} \, dx = \frac{1}{a} \ln|ax + b| + C$
24. $\int x(ax + b)^{-1} \, dx = \frac{x}{a} - \frac{b}{a^2} \ln|ax + b| + C$
25. $\int x(ax + b)^{-2} \, dx = \frac{1}{a^2} \left[\ln|ax + b| + \frac{b}{ax + b} \right] + C$
26. $\int \frac{dx}{x(ax + b)} = \frac{1}{b} \ln \left| \frac{x}{ax + b} \right| + C$
27. $\int (\sqrt{ax + b})^n \, dx = \frac{2}{a} \frac{(\sqrt{ax + b})^{n+2}}{n+2} + C, \quad n \neq -2$
28. $\int \frac{\sqrt{ax + b}}{x} \, dx = 2\sqrt{ax + b} + b \int \frac{dx}{x\sqrt{ax + b}}$

29. (a) $\int \frac{dx}{x\sqrt{ax+b}} = \frac{1}{\sqrt{b}} \ln \left| \frac{\sqrt{ax+b} - \sqrt{b}}{\sqrt{ax+b} + \sqrt{b}} \right| + C$

(b) $\int \frac{dx}{x\sqrt{ax-b}} = \frac{2}{\sqrt{b}} \tan^{-1} \sqrt{\frac{ax-b}{b}} + C$

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

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

Forms Involving $a^2 + x^2$

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

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

34. $\int \frac{dx}{\sqrt{a^2+x^2}} = \sinh^{-1} \frac{x}{a} + C = \ln(x + \sqrt{a^2+x^2}) + C$

35. $\int \sqrt{a^2+x^2} dx = \frac{x}{2}\sqrt{a^2+x^2} + \frac{a^2}{2} \ln(x + \sqrt{a^2+x^2}) + C$

36. $\int x^2\sqrt{a^2+x^2} dx = \frac{x}{8}(a^2+2x^2)\sqrt{a^2+x^2} - \frac{a^4}{8} \ln(x + \sqrt{a^2+x^2}) + C$

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

38. $\int \frac{\sqrt{a^2+x^2}}{x^2} dx = \ln(x + \sqrt{a^2+x^2}) - \frac{\sqrt{a^2+x^2}}{x} + C$

39. $\int \frac{x^2}{\sqrt{a^2+x^2}} dx = -\frac{a^2}{2} \ln(x + \sqrt{a^2+x^2}) + \frac{x\sqrt{a^2+x^2}}{2} + C$

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

41. $\int \frac{dx}{x^2\sqrt{a^2+x^2}} = -\frac{\sqrt{a^2+x^2}}{a^2x} + C$

Forms Involving $a^2 - x^2$

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

43. $\int \frac{dx}{(a^2-x^2)^2} = \frac{x}{2a^2(a^2-x^2)} + \frac{1}{4a^3} \ln \left| \frac{x+a}{x-a} \right| + C$

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

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

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

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

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

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

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

51. $\int \frac{dx}{x^2\sqrt{a^2-x^2}} = -\frac{\sqrt{a^2-x^2}}{a^2x} + C$

Forms Involving $x^2 - a^2$

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

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

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

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

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

57. $\int x^2 \sqrt{x^2 - a^2} dx = \frac{x}{8} (2x^2 - a^2) \sqrt{x^2 - a^2} - \frac{a^4}{8} \ln |x + \sqrt{x^2 - a^2}| + C$

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

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

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

61. $\int \frac{dx}{x \sqrt{x^2 - a^2}} = \frac{1}{a} \sec^{-1} \left| \frac{x}{a} \right| + C = \frac{1}{a} \cos^{-1} \left| \frac{a}{x} \right| + C \quad 62. \int \frac{dx}{x^2 \sqrt{x^2 - a^2}} = \frac{\sqrt{x^2 - a^2}}{a^2 x} + C$

Trigonometric Forms

63. $\int \sin ax dx = -\frac{1}{a} \cos ax + C$

64. $\int \cos ax dx = \frac{1}{a} \sin ax + C$

65. $\int \sin^2 ax dx = \frac{x}{2} - \frac{\sin 2ax}{4a} + C$

66. $\int \cos^2 ax dx = \frac{x}{2} + \frac{\sin 2ax}{4a} + C$

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

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

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

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

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

70. $\int \sin ax \cos ax dx = -\frac{\cos 2ax}{4a} + C$

71. $\int \sin^n ax \cos ax dx = \frac{\sin^{n+1} ax}{(n+1)a} + C, \quad n \neq -1$

72. $\int \frac{\cos ax}{\sin ax} dx = \frac{1}{a} \ln |\sin ax| + C$

73. $\int \cos^n ax \sin ax dx = -\frac{\cos^{n+1} ax}{(n+1)a} + C, \quad n \neq -1$

74. $\int \frac{\sin ax}{\cos ax} dx = -\frac{1}{a} \ln |\cos ax| + C$

75. $\int \sin^n ax \cos^m ax dx = -\frac{\sin^{n-1} ax \cos^{m+1} ax}{a(m+n)} + \frac{n-1}{m+n} \int \sin^{n-2} ax \cos^m ax dx, \quad n \neq -m \quad (\text{reduces } \sin^n ax)$

76. $\int \sin^n ax \cos^m ax dx = \frac{\sin^{n+1} ax \cos^{m-1} ax}{a(m+n)} + \frac{m-1}{m+n} \int \sin^n ax \cos^{m-2} ax dx, \quad m \neq -n \quad (\text{reduces } \cos^m ax)$

77. $\int \frac{dx}{b + c \sin ax} = \frac{-2}{a\sqrt{b^2 - c^2}} \tan^{-1} \left[\sqrt{\frac{b-c}{b+c}} \tan \left(\frac{\pi}{4} - \frac{ax}{2} \right) \right] + C, \quad b^2 > c^2$
78. $\int \frac{dx}{b + c \sin ax} = \frac{-1}{a\sqrt{c^2 - b^2}} \ln \left| \frac{c + b \sin ax + \sqrt{c^2 - b^2} \cos ax}{b + c \sin ax} \right| + C, \quad b^2 < c^2$
79. $\int \frac{dx}{1 + \sin ax} = -\frac{1}{a} \tan \left(\frac{\pi}{4} - \frac{ax}{2} \right) + C \quad 80. \int \frac{dx}{1 - \sin ax} = \frac{1}{a} \tan \left(\frac{\pi}{4} + \frac{ax}{2} \right) + C$
81. $\int \frac{dx}{b + c \cos ax} = \frac{2}{a\sqrt{b^2 - c^2}} \tan^{-1} \left[\sqrt{\frac{b-c}{b+c}} \tan \frac{ax}{2} \right] + C, \quad b^2 > c^2$
82. $\int \frac{dx}{b + c \cos ax} = \frac{1}{a\sqrt{c^2 - b^2}} \ln \left| \frac{c + b \cos ax + \sqrt{c^2 - b^2} \sin ax}{b + c \cos ax} \right| + C, \quad b^2 < c^2$
83. $\int \frac{dx}{1 + \cos ax} = \frac{1}{a} \tan \frac{ax}{2} + C \quad 84. \int \frac{dx}{1 - \cos ax} = -\frac{1}{a} \cot \frac{ax}{2} + C$
85. $\int x \sin ax dx = \frac{1}{a^2} \sin ax - \frac{x}{a} \cos ax + C \quad 86. \int x \cos ax dx = \frac{1}{a^2} \cos ax + \frac{x}{a} \sin ax + C$
87. $\int x^n \sin ax dx = -\frac{x^n}{a} \cos ax + \frac{n}{a} \int x^{n-1} \cos ax dx \quad 88. \int x^n \cos ax dx = \frac{x^n}{a} \sin ax - \frac{n}{a} \int x^{n-1} \sin ax dx$
89. $\int \tan ax dx = \frac{1}{a} \ln |\sec ax| + C \quad 90. \int \cot ax dx = \frac{1}{a} \ln |\sin ax| + C$
91. $\int \tan^2 ax dx = \frac{1}{a} \tan ax - x + C \quad 92. \int \cot^2 ax dx = -\frac{1}{a} \cot ax - x + C$
93. $\int \tan^n ax dx = \frac{\tan^{n-1} ax}{a(n-1)} - \int \tan^{n-2} ax dx, \quad n \neq 1 \quad 94. \int \cot^n ax dx = -\frac{\cot^{n-1} ax}{a(n-1)} - \int \cot^{n-2} ax dx, \quad n \neq 1$
95. $\int \sec ax dx = \frac{1}{a} \ln |\sec ax + \tan ax| + C \quad 96. \int \csc ax dx = -\frac{1}{a} \ln |\csc ax + \cot ax| + C$
97. $\int \sec^2 ax dx = \frac{1}{a} \tan ax + C \quad 98. \int \csc^2 ax dx = -\frac{1}{a} \cot ax + C$
99. $\int \sec^n ax dx = \frac{\sec^{n-2} ax \tan ax}{a(n-1)} + \frac{n-2}{n-1} \int \sec^{n-2} ax dx, \quad n \neq 1$
100. $\int \csc^n ax dx = -\frac{\csc^{n-2} ax \cot ax}{a(n-1)} + \frac{n-2}{n-1} \int \csc^{n-2} ax dx, \quad n \neq 1$
101. $\int \sec^n ax \tan ax dx = \frac{\sec^n ax}{na} + C, \quad n \neq 0 \quad 102. \int \csc^n ax \cot ax dx = -\frac{\csc^n ax}{na} + C, \quad n \neq 0$

Inverse Trigonometric Forms

103. $\int \sin^{-1} ax dx = x \sin^{-1} ax + \frac{1}{a} \sqrt{1 - a^2 x^2} + C \quad 104. \int \cos^{-1} ax dx = x \cos^{-1} ax - \frac{1}{a} \sqrt{1 - a^2 x^2} + C$
105. $\int \tan^{-1} ax dx = x \tan^{-1} ax - \frac{1}{2a} \ln(1 + a^2 x^2) + C$
106. $\int x^n \sin^{-1} ax dx = \frac{x^{n+1}}{n+1} \sin^{-1} ax - \frac{a}{n+1} \int \frac{x^{n+1} dx}{\sqrt{1 - a^2 x^2}}, \quad n \neq -1$

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

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

Exponential and Logarithmic Forms

109. $\int e^{ax} dx = \frac{1}{a} e^{ax} + C$

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

111. $\int xe^{ax} dx = \frac{e^{ax}}{a^2} (ax - 1) + C$

112. $\int x^n e^{ax} dx = \frac{1}{a} x^n e^{ax} - \frac{n}{a} \int x^{n-1} e^{ax} dx$

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

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

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

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

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

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

119. $\int \frac{dx}{x \ln ax} = \ln |\ln ax| + C$

Forms Involving $\sqrt{2ax - x^2}, a > 0$

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

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

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

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

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

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

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

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

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

Hyperbolic Forms

129. $\int \sinh ax dx = \frac{1}{a} \cosh ax + C$

130. $\int \cosh ax dx = \frac{1}{a} \sinh ax + C$

131. $\int \sinh^2 ax dx = \frac{\sinh 2ax}{4a} - \frac{x}{2} + C$

132. $\int \cosh^2 ax dx = \frac{\sinh 2ax}{4a} + \frac{x}{2} + C$

$$133. \int \sinh^n ax dx = \frac{\sinh^{n-1} ax \cosh ax}{na} - \frac{n-1}{n} \int \sinh^{n-2} ax dx, \quad n \neq 0$$

$$134. \int \cosh^n ax dx = \frac{\cosh^{n-1} ax \sinh ax}{na} + \frac{n-1}{n} \int \cosh^{n-2} ax dx, \quad n \neq 0$$

$$135. \int x \sinh ax dx = \frac{x}{a} \cosh ax - \frac{1}{a^2} \sinh ax + C$$

$$136. \int x \cosh ax dx = \frac{x}{a} \sinh ax - \frac{1}{a^2} \cosh ax + C$$

$$137. \int x^n \sinh ax dx = \frac{x^n}{a} \cosh ax - \frac{n}{a} \int x^{n-1} \cosh ax dx$$

$$138. \int x^n \cosh ax dx = \frac{x^n}{a} \sinh ax - \frac{n}{a} \int x^{n-1} \sinh ax dx$$

$$139. \int \tanh ax dx = \frac{1}{a} \ln(\cosh ax) + C$$

$$140. \int \coth ax dx = \frac{1}{a} \ln |\sinh ax| + C$$

$$141. \int \tanh^2 ax dx = x - \frac{1}{a} \tanh ax + C$$

$$142. \int \coth^2 ax dx = x - \frac{1}{a} \coth ax + C$$

$$143. \int \tanh^n ax dx = -\frac{\tanh^{n-1} ax}{(n-1)a} + \int \tanh^{n-2} ax dx, \quad n \neq 1$$

$$144. \int \coth^n ax dx = -\frac{\coth^{n-1} ax}{(n-1)a} + \int \coth^{n-2} ax dx, \quad n \neq 1$$

$$145. \int \operatorname{sech} ax dx = \frac{1}{a} \sin^{-1}(\tanh ax) + C$$

$$146. \int \operatorname{csch} ax dx = \frac{1}{a} \ln \left| \tanh \frac{ax}{2} \right| + C$$

$$147. \int \operatorname{sech}^2 ax dx = \frac{1}{a} \tanh ax + C$$

$$148. \int \operatorname{csch}^2 ax dx = -\frac{1}{a} \coth ax + C$$

$$149. \int \operatorname{sech}^n ax dx = \frac{\operatorname{sech}^{n-2} ax \tanh ax}{(n-1)a} + \frac{n-2}{n-1} \int \operatorname{sech}^{n-2} ax dx, \quad n \neq 1$$

$$150. \int \operatorname{csch}^n ax dx = -\frac{\operatorname{csch}^{n-2} ax \coth ax}{(n-1)a} - \frac{n-2}{n-1} \int \operatorname{csch}^{n-2} ax dx, \quad n \neq 1$$

$$151. \int \operatorname{sech}^n ax \tanh ax dx = -\frac{\operatorname{sech}^n ax}{na} + C, \quad n \neq 0$$

$$152. \int \operatorname{csch}^n ax \coth ax dx = -\frac{\operatorname{csch}^n ax}{na} + C, \quad n \neq 0$$

$$153. \int e^{ax} \sinh bx dx = \frac{e^{ax}}{2} \left[\frac{e^{bx}}{a+b} - \frac{e^{-bx}}{a-b} \right] + C, \quad a^2 \neq b^2$$

$$154. \int e^{ax} \cosh bx dx = \frac{e^{ax}}{2} \left[\frac{e^{bx}}{a+b} + \frac{e^{-bx}}{a-b} \right] + C, \quad a^2 \neq b^2$$

Some Definite Integrals

$$155. \int_0^\infty x^{n-1} e^{-x} dx = \Gamma(n) = (n-1)!, \quad n > 0$$

$$156. \int_0^\infty e^{-ax^2} dx = \frac{1}{2} \sqrt{\frac{\pi}{a}}, \quad a > 0$$

$$157. \int_0^{\pi/2} \sin^n x dx = \int_0^{\pi/2} \cos^n x dx = \begin{cases} \frac{1 \cdot 3 \cdot 5 \cdots (n-1)}{2 \cdot 4 \cdot 6 \cdots n} \cdot \frac{\pi}{2}, & \text{if } n \text{ is an even integer } \geq 2 \\ \frac{2 \cdot 4 \cdot 6 \cdots (n-1)}{3 \cdot 5 \cdot 7 \cdots n}, & \text{if } n \text{ is an odd integer } \geq 3 \end{cases}$$