TABLE OF INTEGRALS

1. $\int [f(x) \pm g(x)]\,dx = \int f(x)\,dx \pm \int g(x)\,dx.$

2. $\int cf(x)\,dx = c\int f(x)\,dx.$

3. $\int f(g(x))g'(x)\,dx = \int f(u)\,du\Big|_{u=g(x)}$

4. $\int x^n\,dx = \frac{1}{n+1}x^{n+1} + C, (n \neq -1).$

5. $\int \frac{1}{x}dx = \ln|x| + C.$

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. $\int e^x\,dx = e^x + C.$

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

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

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

16. $\int f(x)g'(x)\,dx = f(x)g(x) - \int g(x)f'(x)\,dx.$

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

18. $\int \frac{1}{x\sqrt{ax+b}}dx = \frac{2}{\sqrt{-b}}\tan^{-1}\sqrt{\frac{ax+b}{-b}} + C, (b < 0).$

19. $\int \frac{1}{x^n\sqrt{ax+b}}dx = -\frac{1}{b(n-1)}\frac{\sqrt{ax+b}}{x^{n-1}} - \frac{(2n-3)a}{(2n-2)b}\int \frac{1}{x^{n-1}\sqrt{ax+b}}dx, (n \neq 1).$

20. $\int \frac{\sqrt{ax+b}}{x}dx = 2\sqrt{ax+b} + b\int \frac{1}{x\sqrt{ax+b}}dx.$

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

22. $\int \frac{1}{(ax+b)(cx+d)}dx = \frac{1}{bc-ad}\ln\left|\frac{cx+d}{ax+b}\right| + C, (bc - ad \neq 0).$

23. $\int \frac{x}{(ax+b)(cx+d)}dx = \frac{1}{bc-ad}\left\{\frac{b}{a}\ln|ax+b| - \frac{d}{c}\ln|cx+d|\right\} + C, (bc - ad \neq 0).$

24. $\int \frac{1}{(ax+b)^2(cx+d)}dx = \frac{1}{bc-ad}\left\{\frac{1}{ax+b} + \frac{c}{bc-ad}\ln\left|\frac{cx+d}{ax+b}\right|\right\} + C, (bc - ad \neq 0).$

25. $\int \frac{x}{(ax+b)^2(cx+d)}dx = -\frac{1}{bc-ad}\left\{\frac{b}{a(ax+b)} + \frac{d}{bc-ad}\ln\left|\frac{cx+d}{ax+b}\right|\right\} + C, (bc - ad \neq 0).$

26. $\int \sqrt{x^2 \pm a^2}\,dx = \frac{x}{2}\sqrt{x^2 \pm a^2} \pm \frac{a^2}{2}\ln|x + \sqrt{x^2 \pm a^2}| + C.$

27. $\int \frac{1}{\sqrt{x^2 \pm a^2}}\,dx = \ln|x + \sqrt{x^2 \pm a^2}| + C.$

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

29. $\int \frac{x^2}{\sqrt{x^2 \pm a^2}}\,dx = \frac{x}{2}\sqrt{x^2 \pm a^2} \mp \frac{a^2}{2}\ln|x + \sqrt{x^2 \pm a^2}| + C.$

30. $\int (x^2 \pm a^2)^{3/2}\,dx = x(x^2 \pm a^2)^{3/2} - 3\int x^2\sqrt{x^2 \pm a^2}\,dx.$

31. $\int \frac{1}{(x^2 \pm a^2)^{3/2}}\,dx = \frac{\pm x}{a^2\sqrt{x^2 \pm a^2}} + C.$

32. $\int \frac{x^2}{(x^2 \pm a^2)^{3/2}}\,dx = \frac{-x}{\sqrt{x^2 \pm a^2}} + \ln|x + \sqrt{x^2 \pm a^2}| + C.$

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

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

35. $\int \frac{\sqrt{x^2 \pm a^2}}{x}\,dx = \sqrt{x^2 \pm a^2} \pm a^2\int \frac{1}{x\sqrt{x^2 \pm a^2}}\,dx.$

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

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

38. $\int x^2\sqrt{a^2 - x^2}\,dx = -\frac{x}{4}(a^2 - x^2)^{3/2} + \frac{a^2}{4}\int \sqrt{a^2 - x^2}\,dx.$

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

40. $\int (a^2 - x^2)^{3/2}\,dx = \frac{x}{4}(a^2 - x^2)^{3/2} + \frac{3a^2}{4}\int \sqrt{a^2 - x^2}\,dx.$

41. $\int \frac{1}{(a^2 - x^2)^{3/2}}\,dx = \frac{x}{a^2\sqrt{a^2 - x^2}} + C.$

42. $\int \frac{x^2}{(a^2 - x^2)^{3/2}}\,dx = \frac{x}{\sqrt{a^2 - x^2}} - \sin^{-1}\frac{x}{a} + C.$

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

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

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

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

47. $\int \frac{1}{(x^2 + a^2)^n}\,dx$
$= \frac{1}{2(n-1)a^2}\left\{\frac{x}{(x^2 + a^2)^{n-1}} + (2n - 3)\int \frac{1}{(x^2 + a^2)^{n-1}}\,dx\right\}, \quad (n \neq 1).$

48. $\int x\sin x\,dx = \sin x - x\cos x + C.$

49. $\int x^n\sin x\,dx = -x^n\cos x + nx^{n-1}\sin x - n(n-1)\int x^{n-2}\sin x\,dx.$

50. $\int x\cos x\,dx = \cos x + x\sin x + C.$

51. $\int x^n\cos x\,dx = x^n\sin x + nx^{n-1}\cos x - n(n-1)\int x^{n-2}\cos x\,dx.$

52. $\int \sin^m\cos^n x\,dx$
$= \begin{cases} \frac{1}{m+n}[-\sin^{m-1}x\cos^{n+1}x + (m-1)\int \sin^{m-2}x\cos^n x\,dx] \\ \frac{1}{m+n}[\sin^{m+1}x\cos^{n-1}x + (n-1)\int \sin^m x\cos^{n-2}x\,dx], \end{cases}$
$(m - n \neq 0).$

53. $\int \sin^n x\,dx = -\frac{1}{n}\sin^{n-1}x\cos x + \frac{n-1}{n}\int \sin^{n-2}x\,dx, \ (n \geq 2).$

54. $\int \sin^2 x\,dx = -\frac{1}{2}\sin x\cos x + \frac{x}{2} + C.$

55. $\int \cos^n x\,dx = \frac{1}{n}\sin x\cos^{n-1} x + \frac{n-1}{n}\int \cos^{n-2} x\,dx,\ (n \geq 2).$

56. $\int \cos^2 x\,dx = \frac{1}{2}\sin x\cos x + \frac{x}{2} + C.$

57. $\int \sin^2 x\cos^2 x\,dx = -\frac{1}{4}\sin x\cos^3 x + \frac{1}{8}\sin x\cos x + \frac{x}{8} + C.$

58. $\int \tan x\,dx = \ln|\sec x| + C.$

59. $\int \tan^2 x\,dx = \tan x - x + C.$

60. $\int \tan^n x\,dx = \frac{1}{n-1}\tan^{n-1} x - \int \tan^{n-2} x\,dx,\ (n \geq 2).$

61. $\int \cot x\,dx = \ln|\sin x| + C.$

62. $\int \cot^2 x\,dx = -\cot x - x + C.$

63. $\int \cot^n x\,dx = -\frac{1}{n-1}\cot^{n-1} x - \int \cot^{n-2} x\,dx,\ (n \geq 2).$

64. $\int \sec x\,dx = \ln|\sec x + \tan x| + C.$

65. $\int \sec^n x\,dx = \frac{1}{n-1}\left\{\sec^{n-2} x\tan x + (n-2)\int \sec^{n-2} x\,dx\right\},$

$(n \geq 2).$

66. $\int \csc x\,dx = \ln|\csc x - \cot x| + C.$

67. $\int \csc^n x\,dx = \frac{1}{n-1}\left\{-\csc^{n-2} x\cot x + (n-2)\int \csc^{n-2} x\,dx\right\},$

$(n \leq 2).$

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

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

70. $\int e^{ax}\sin bx\,dx = \frac{1}{a^2+b^2}(a\sin bx - b\cos bx)e^{ax} + C.$

71. $\int e^{ax}\cos bx\,dx = \frac{1}{a^2+b^2}(a\cos bx + b\sin bx)e^{ax} + C.$

72. $\int \ln|x|\,dx = x\ln|x| - x + C.$

73. $\int x^m \ln^n|x|\,dx = \frac{1}{m+1}\left\{x^{m+1}\ln^n|x| - n\int x^m \ln^{n-1}|x|\,dx\right\},$

$(m \neq -1).$

74. $\int \ln^n|x|\,dx = x\ln^n|x| - n\int \ln^{n-1}|x|\,dx.$

75. $\int x^n \ln|x|\,dx = \frac{x^{n+1}}{n+1}\left(\ln|x| - \frac{1}{n+1}\right) + C,\ (n \neq -1).$

76. $\int \frac{\ln^n|x|}{x}\,dx = \frac{1}{n+1}\ln^{n+1}|x| + C,\ (n \neq -1).$

77. $\int \frac{1}{x\ln|x|}\,dx = \ln|\ln|x|| + C.$

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

79. $\int x^n \sin^{-1} x\,dx = \frac{1}{n+1}\left\{x^{n+1}\sin^{-1} x - \int \frac{x^{n+1}}{\sqrt{1-x^2}}\,dx\right\},\ (n \neq -1).$

80. $\int \tan^{-1} x\,dx = x\tan^{-1} x - \frac{1}{2}\ln(x^2+1) + C.$

81. $\int x^n \tan^{-1} x\,dx = \frac{1}{n+1}\left\{x^{n+1}\tan^{-1} x - \int \frac{x^{n+1}}{x^2+1}\,dx\right\},\ (n \neq -1).$

82. $\int \sec^{-1} x\,dx = x\sec^{-1} x - \ln|x + \sqrt{x^2-1}| + C.$