! For an efficient use of these tables, first read `HowTo.pdf`.

T1.02. Elementary functions.

1. $\int x^n \, dx = \dfrac{x^{n+1}}{n+1}, \; n \neq -1.$
2. $\int \dfrac{dx}{x} = \ln x.$

5. $\int \sin x \, dx = -\cos x.$
6. $\int \cos x \, dx = \sin x.$
7. $\int \dfrac{dx}{\sin^2 x} = \int \csc^2 x \, dx = -\cot \, x.$

8. $\int \dfrac{dx}{\cos^2 x} = \int \sec^2 x \, dx = \tan \, x.$
9. $\int \dfrac{\sin x}{\cos^2 \, x} \, dx = \sec \, x.$
10. $\int \dfrac{\cos x}{\sin^2 \, x} \, dx = -\csc \, x.$

11. $\int \tan \, x \, dx = -\ln \cos x.$
12. $\int \cot \, x \, dx = \ln \sin x.$
13. $\int e^x \, dx = e^x.$

14. $\int a^x \, dx = \dfrac{a^x}{\ln a}.$
15. $\int \ln x \, dx = x \, \ln x - x.$
16. $\int a^x \, \ln a \, dx = a^x, \; a > 0.$

17. $\displaystyle\int \frac{dx}{\sin x} = \int \csc x\, dx = \ln \tan \frac{x}{2}.$

18. $\displaystyle\int \frac{dx}{\cos x} = \int \sec x\, dx = \ln \tan \left(\frac{\pi}{4} + \frac{x}{2}\right) = \ln (\sec x + \tan x).$

19. $\displaystyle\int \frac{dx}{1+x^2} = \arctan x = -\operatorname{arccot} x.$

20. $\displaystyle\int \frac{dx}{1-x^2} = \tanh^{-1} x = \frac{1}{2} \ln \frac{1+x}{1-x}.$

21. $\displaystyle\int \frac{dx}{\sqrt{1-x^2}} = \arcsin x = -\arccos x.$

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

23. $\displaystyle\int \frac{dx}{\sqrt{x^2-1}} = \cosh^{-1} x = \ln (x + \sqrt{x^2-1}).$

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

25. $\displaystyle\int \frac{dx}{a^2-x^2} = \begin{cases} \dfrac{1}{a} \tanh^{-1} \dfrac{x}{a} \\ \text{or} \\ \dfrac{1}{2a} \ln \dfrac{a+x}{a-x}, \end{cases} \qquad a^2 > x^2.$

26. $\displaystyle\int \frac{dx}{x^2-a^2} = \begin{cases} -\dfrac{1}{a} \coth^{-1} \dfrac{x}{a} \\ \text{or} \\ \dfrac{1}{2a} \ln \dfrac{x-a}{x+a}, \end{cases} \qquad x^2 > a^2.$

27. $\displaystyle\int \frac{dx}{\sqrt{a^2-x^2}} = \begin{cases} \sin^{-1} \dfrac{x}{|a|} \\ \text{or} \\ -\cos^{-1} \dfrac{x}{|a|}, \end{cases} \qquad a^2 > x^2.$

28. $\displaystyle\int \frac{dx}{x^2 \pm a^2} = \ln \left(x + \sqrt{x^2 \pm a^2}\right).$

29. $\displaystyle\int \frac{dx}{x\sqrt{x^2-a^2}} = \frac{1}{|a|} \sec^{-1} \frac{x}{a}.$

30. $\displaystyle\int \frac{dx}{x\sqrt{a^2 \pm x^2}} = -\frac{1}{a} \ln \left(\frac{a + \sqrt{a^2 \pm x^2}}{x}\right).$

31. $\displaystyle\int \sin(ax)\, dx = -\frac{1}{a} \cos(ax).$

32. $\displaystyle\int \cos(ax)\, dx = \frac{1}{a} \sin(ax).$

33. $\int \tan(ax)\,dx = -\frac{1}{a}\,\ln\cos(ax) = \frac{1}{a}\,\ln\sec(ax).$

34. $\int \cot(ax)\,dx = \frac{1}{a}\,\ln\sin(ax).$

35. $\int \sec(ax)\,dx = \frac{1}{a}\,\ln\,[\sec(ax)+\tan(ax)] = \frac{1}{a}\,\ln\,\tan\left(\frac{ax}{2}+\frac{\pi}{4}\right).$

36. $\int \csc(ax)\,dx = \frac{1}{a}\,\ln\,[\csc(ax)-\cot(ax)] = \frac{1}{a}\,\ln\,\tan\left(\frac{ax}{2}\right).$

37. $\int \sin^2(ax)\,dx = \frac{x}{2} - \frac{\sin(2ax)}{4a}.$

38. $\int \cos^2(ax)\,dx = \frac{x}{2} + \frac{\sin(2ax)}{4a}.$

39. $\int \tan^2(ax)\,dx = \frac{1}{a}\,\tan(ax) - x.$

40. $\int \cot^2(ax)\,dx = -\frac{1}{a}\,\cot(ax) - x.$

41. $\int \sec^2(ax)\,dx = \frac{1}{a}\,\tan(ax).$

42. $\int \csc^2(ax)\;dx = -\frac{1}{a}\,\cot(ax).$

43. $\int \sin^3(ax)\,dx = -\frac{1}{a}\,\cos(ax) + \frac{1}{3a}\,\cos^3(ax).$

44. $\int \cos^3(ax)\,dx = \frac{1}{a}\,\sin(ax) - \frac{1}{3a}\,\sin^3(ax).$

45. $\int \tan^3(ax)\,dx = \frac{1}{2a}\,\tan^2(ax) + \frac{1}{a}\,\ln\cos(ax).$

46. $\int \cot^3(ax)\,dx = -\frac{1}{2a}\,\cot^2(ax) - \frac{1}{a}\,\ln\sin(ax).$

47. $\int \sec^3(ax)\,dx = \frac{1}{2a}\,\left[\tan(ax)\,\sec(ax) + \ln\,\tan\left(\frac{ax}{2}+\frac{\pi}{4}\right)\right].$

48. $\int \csc^3(ax)\;dx = \frac{1}{2a}\,\left[-\cot(ax)\,\csc(ax) + \ln\,\tan\left(\frac{ax}{2}\right)\right].$

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

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