

FORMULAS

$$\frac{d}{dx} \sin x = \cos x, \quad \frac{d}{dx} \cos x = -\sin x, \quad \frac{d}{dx} \tan x = \sec^2 x$$

$$\frac{d}{dx} \cot x = -\operatorname{csc}^2 x, \quad \frac{d}{dx} \sec x = \sec x \tan x, \quad \frac{d}{dx} \csc x = -\csc x \cot x$$

$$\frac{d}{dx} \sin^{-1} x = \frac{1}{\sqrt{1-x^2}}, \quad \frac{d}{dx} \cos^{-1} x = \frac{-1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx} \tan^{-1} x = \frac{1}{1+x^2}, \quad \frac{d}{dx} \sec^{-1} x = \frac{1}{|x|\sqrt{x^2-1}}$$

$$\frac{d}{dx} \ln x = \frac{1}{x}, \quad \frac{d}{dx} \log_a x = \frac{1}{x \ln a}$$

$$\frac{d}{dx} e^x = e^x, \quad \frac{d}{dx} a^x = \ln a a^x, \quad \frac{d}{dx} x^a = a x^{a-1}, \quad \frac{d}{dx} x^x = x^x (1 + \ln x)$$

$$\frac{d}{dx} \sinh x = \cosh x, \quad \frac{d}{dx} \cosh x = \sinh x, \quad \frac{d}{dx} \tanh x = \operatorname{sech}^2 x$$

$$\frac{d}{dx} \coth x = -\operatorname{csch}^2 x, \quad \frac{d}{dx} \operatorname{sech} x = -\operatorname{sech} x \tanh x, \quad \frac{d}{dx} \operatorname{csch} x = -\operatorname{csch} x \coth x$$

$$\frac{d}{dx} \sinh^{-1} x = \frac{1}{\sqrt{1+x^2}}, \quad \frac{d}{dx} \cosh^{-1} x = \frac{1}{\sqrt{x^2-1}}$$

$$\frac{d}{dx} \tanh^{-1} x = \frac{1}{1-x^2}, \quad \frac{d}{dx} \operatorname{sech}^{-1} x = \frac{-1}{x\sqrt{1-x^2}}$$

$$1. \int k \, du = ku + C, \quad 2. \int u^r \, du = \begin{cases} \frac{u^{r+1}}{r+1} + C, & \text{if } r \neq -1 \\ \ln |u| + C, & \text{if } r = -1 \end{cases}$$

$$3. \int e^u \, du = e^u + C, \quad 4. \int a^u \, du = \frac{a^u}{\ln a} + C, \quad a \neq 1, \quad a > 0$$

$$5. \int \sin u \, du = -\cos u + C, \quad 6. \int \cos u \, du = \sin u + C$$

$$7. \int \sec^2 u \, du = \tan u + C, \quad 8. \int \csc^2 u \, du = -\cot u + C$$

$$9. \int \sec u \tan u \, du = \sec u + C, \quad 10. \int \csc u \cot u \, du = -\csc u + C$$

$$11. \int \tan u \, du = -\ln |\cos u| + C, \quad 12. \int \cot u \, du = \ln |\sin u| + C$$

$$13. \int \frac{du}{\sqrt{a^2 - u^2}} = \sin^{-1} \left(\frac{u}{a} \right) + C, \quad 14. \int \frac{du}{a^2 + u^2} = \frac{1}{a} \tan^{-1} \left(\frac{u}{a} \right) + C$$

$$15. \int \frac{du}{u\sqrt{u^2 - a^2}} = \frac{1}{a} \sec^{-1} \left(\frac{|u|}{a} \right) + C = \frac{1}{a} \cos^{-1} \frac{a}{|u|} + C$$

$$16. \int \sinh u \, du = \cosh u + C \quad 17. \int \cosh u \, du = \sinh u + C$$

$$18. \sin mx \cos nx = \frac{1}{2} [\sin(m+n)x + \sin(m-n)x]$$

$$19. \sin mx \sin nx = -\frac{1}{2} [\cos(m+n)x - \cos(m-n)x]$$

$$20. \cos mx \cos nx = \frac{1}{2} [\cos(m+n)x + \cos(m-n)x]$$