

FUNDAMENTAL INTEGRATION FORMULAS

$$1. \int 1 \, dx = x$$

$$2. \int c \, dx = cx \text{ ('c' is any constant)}$$

$$3. \int x^n \, dx = \frac{x^{n+1}}{n+1}$$

$$4. \int \frac{1}{x} \, dx = \ell n|x|$$

$$5. \int e^{ax} \, dx = \frac{e^{ax}}{a}$$

$$6. \int a^x \, dx = \frac{a^x}{\ell n a}$$

$$7. \int \sin x \, dx = -\cos x$$

$$8. \int \cos x \, dx = \sin x$$

$$9. \int \tan x \, dx = \ell n|\sec x|$$

$$10. \int \cot x \, dx = \ell n|\sin x|$$

$$11. \int \sec x \, dx = \ell n|\sec x + \tan x|$$

$$12. \int \operatorname{cosec} x \, dx = \ell n|\operatorname{cosec} x - \cot x|$$

$$13. \int \sec^2 x \, dx = \tan x$$

$$14. \int \operatorname{cosec}^2 x \, dx = -\cot x$$

$$15. \int \sec x \tan x \, dx = \sec x$$

$$16. \int \operatorname{cosec} x \cot x \, dx = -\operatorname{cosec} x$$

$$17. \int \frac{1}{x^2 + a^2} \, dx = \frac{1}{a} \tan^{-1}\left(\frac{x}{a}\right)$$

$$18. \int \frac{1}{\sqrt{a^2 - x^2}} \, dx = \sin^{-1}\left(\frac{x}{a}\right)$$

$$19. \int \frac{1}{x\sqrt{x^2 - a^2}} \, dx = \sec^{-1}\left(\frac{x}{a}\right)$$

$$20. \int [f(x)]^n f'(x) \, dx = \frac{[f(x)]^{n+1}}{n+1} \quad \{\text{Rule - I}\}$$

$$21. \int \frac{f'(x)}{f(x)} \, dx = \ln[f(x)] \quad \{\text{Rule - II}\}$$

$$22. \int uv \, dx = u \int v \, dx - \int \left[\left(\frac{d}{dx} u \right) \int v \, dx \right] dx \quad \left\{ \begin{array}{l} \text{Integration} \\ \text{by Parts} \end{array} \right\}$$

