F.Sc.(Part-2)

Integration

CH # 3

# IMPORTANT—FORMULAS

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|---|---|
| 1. $\int 1\ dx = x$ | 2. $\int c\ dx = cx$ |
| 3. $\int x^n\ dx = \frac{x^{n+1}}{n+1}$ | 4. $\int \frac{1}{x}\ dx = \ln\lvert x\rvert$ |
| 5. $\int [f(x)]^n f'(x)\ dx = \frac{[f(x)]^{n+1}}{n+1}$ | 6. $\int [f(x)]^{-1} f'(x)\ dx = \ln f(x)$ |
| 7. $\int e^x\ dx = e^x$ | 8. $\int a^x\ dx = \frac{a^x}{\ln a}$ |
| 9. $\int \sin x\ dx = -\cos x$ | 10. $\int \sin kx\ dx = -\frac{\cos kx}{k}$ |
| 11. $\int \cos x\ dx = \sin x$ | 12. $\int \cos kx\ dx = \frac{\sin kx}{k}$ |
| 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. $\int \tan x\ dx = \ln\lvert\sec x\rvert$ | 18. $\int \cot x\ dx = \ln\lvert\sin x\rvert$ |
| 19. $\int \sec x\ dx = \ln\lvert\sec x + \tan x\rvert$ | 20. $\int \operatorname{cosec} x\ dx = \ln\lvert\operatorname{cosec} x - \cot x\rvert$ |
| 21. $\int \frac{1}{x^2-a^2}\ dx = \frac{1}{2a}\ln\lvert\frac{x-a}{x+a}\rvert$ | 22. $\int \frac{1}{a^2-x^2}\ dx = \frac{1}{2a}\ln\lvert\frac{a+x}{a-x}\rvert$ |
| 23. $\int \frac{1}{\sqrt{x^2+a^2}}dx = \ln\lvert x+\sqrt{x^2+a^2}\rvert$ | 24. $\int \frac{1}{\sqrt{x^2-a^2}}dx = \ln\lvert x+\sqrt{x^2-a^2}\rvert$ |
| 25. $\int \frac{1}{\sqrt{a^2-x^2}}dx = \sin^{-1}(\frac{x}{a})\ \ OR\ -\cos^{-1}(\frac{x}{a})$ | |
| 26. $\int \frac{1}{a^2+x^2}dx = \frac{1}{a}\tan^{-1}(\frac{x}{a})\ \ OR\ -\frac{1}{a}\cot^{-1}(\frac{x}{a})$ | |
| 27. $\int \frac{1}{x\sqrt{x^2-a^2}}dx = \sec^{-1}(\frac{x}{a})\ \ OR\ -\csc^{-1}(\frac{x}{a})$ | |
| 28. $\int \sqrt{a^2-x^2}\,dx = \frac{x\sqrt{a^2-x^2}}{2} + \frac{a^2}{2}\sin^{-1}(\frac{x}{a})$ | |
| 29. $\int \sqrt{x^2+a^2}\,dx = \frac{x\sqrt{x^2+a^2}}{2} + \frac{a^2}{2}\ln\lvert\frac{x\sqrt{x^2+a^2}}{a}\rvert$ | |
| 30. $\int \sqrt{x^2-a^2}\,dx = \frac{x\sqrt{x^2-a^2}}{2} - \frac{a^2}{2}\ln\lvert\frac{x\sqrt{x^2-a^2}}{a}\rvert$ | |