

IMPORTANT—FORMULAS

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1. $\int 1 dx = x$

2. $\int c dx = cx$ ('c' is any constant)

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

4. $\int [f(x)]^n \cdot f'(x) dx = \frac{[f(x)]^{n+1}}{n+1}$

5. $\int \left(\frac{1}{x}\right) dx = \ell n|x|$

6. $\int [f(x)]^{-1} \cdot f'(x) dx = \ell n f(x)$

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

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

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. $\int \tan x dx = \ell n(\sec x)$

18. $\int \cot x dx = \ell n(\sin x)$

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

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

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

22. $\int \frac{1}{a^2 - x^2} dx = \frac{1}{2a} \ell n \left| \frac{a+x}{a-x} \right|$

23. $\int \frac{1}{\sqrt{x^2 + a^2}} dx = \ell n|x + \sqrt{x^2 + a^2}|$

24. $\int \frac{1}{\sqrt{x^2 - a^2}} dx = \ell n|x + \sqrt{x^2 - a^2}|$

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

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

27. $\int \frac{1}{x\sqrt{x^2 - a^2}} dx = \sec^{-1}\left(\frac{x}{a}\right)$ OR $-\operatorname{cosec}^{-1}\left(\frac{x}{a}\right)$

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

29. $\int \sqrt{x^2 + a^2} dx = \frac{x\sqrt{x^2 + a^2}}{2} + \frac{a^2}{2} \ell n \left| \frac{x + \sqrt{x^2 + a^2}}{a} \right|$

30. $\int \sqrt{x^2 - a^2} dx = \frac{x\sqrt{x^2 - a^2}}{2} - \frac{a^2}{2} \ell n \left| \frac{x + \sqrt{x^2 - a^2}}{a} \right|$

31. $\int (uv) dx = u \int v dx - \int \left[\left(\frac{d}{dx} u \right) \int v dx \right] dx$ } Integration
by Parts