

Table of Integration

Rule 1

$$\int [f(x)]^n \cdot f'(x) dx = \frac{[f(x)]^{n+1}}{n+1} + c \quad ; n \neq -1$$

Function has some power "n" (not equal to one) and derivative of the function is multiplying with it, then we use this rule called power rule.

Rule 2

$$\int \frac{f'(x) dx}{f(x)} = \ln f(x) + c$$

Function is in D^f and the derivative of the function is in N^f , then we use this rule.

$$1. \int c dx = cx$$

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

$$3. \int \frac{dx}{x} = \ln x ; n \neq 0$$

$$4. \int \frac{nx^{n+1} dx}{x^n} = \ln x^n$$

$$5. \int e^x dx = e^x$$

$$6. \int e^{f(x)} \cdot f'(x) dx = e^{f(x)}$$

$$7. \int a^x dx = \frac{a^x}{\ln a} ; a \neq 1 \quad a > 0$$

$$8. \int a^{f(x)} \cdot f'(x) dx = \frac{a^{f(x)}}{\ln a} ; a \neq 1 \quad a > 0$$

$$9. \int \sin x dx = -\cos x dx$$

$$10. \int \cos x dx = \sin x dx$$

$$11. \int \tan x dx = \ln(\sec x) = -\ln(\cos x)$$

$$12. \int \sec x dx = \ln |\sec x + \tan x|$$

$$13. \int \csc x dx = \ln |\csc x - \tan x|$$

$$14. \int \cot x dx = \ln(\sin x)$$

$$15. \int \sin^2 x dx = \int \frac{1 - \cos 2x}{2} dx$$

$$16. \int \cos^2 x dx = \int \frac{1 + \cos 2x}{2} dx$$

$$17. \int \tan^2 x dx = \int (\sec^2 x - 1) dx$$

$$18. \int \sec^2 x dx = \tan x$$

$$19. \int \operatorname{cosec}^2 x dx = -\cot x$$

$$20. \int \cot^2 x dx = \int (\operatorname{cosec}^2 x - 1) dx$$

$$21. \int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1} \frac{x}{a}$$

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

$$23. \int \frac{dx}{\sqrt{x^2 - a^2}} = \cosh^{-1} \frac{x}{a} = \ln \left| \frac{\sqrt{x^2 - a^2} + x}{a} \right|$$

$$24. \int \sqrt{a^2 - x^2} dx = \frac{x}{2} \sqrt{a^2 - x^2} + \frac{a^2}{2} \sin^{-1} \left(\frac{x}{a} \right)$$

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

$$26. \int \sqrt{x^2 - a^2} dx = \frac{x}{2} \sqrt{x^2 - a^2} - \frac{a^2}{2} \cosh^{-1} \left(\frac{x}{a} \right)$$

$$27. \int \frac{dx}{a^2 + x^2} = \frac{1}{a} \tan^{-1} \frac{x}{a}$$

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

$$29. \int \frac{dx}{x^2 - a^2} = \frac{1}{2a} \ln \left(\frac{x-a}{x+a} \right)$$