

Power Function: $y = x^n$ $y' = nx^{n-1}$

Constant Multiple Function: $y = cf(x)$ $y' = cf'(x)$

Sum of Functions: $y = f(x) \pm g(x)$ $y' = f'(x) \pm g'(x)$

Difference of Functions: $y = f(x) - g(x)$ $y' = f'(x) - g'(x)$

Product of Functions: $y = f(x)g(x)$ $y' = f'(x)g(x) + f(x)g'(x)$

Quotient of Functions: $y = \frac{f(x)}{g(x)}$ $y' = \frac{f'(x)g(x) - f(x)g'(x)}{(g(x))^2}$

Inverse Function: $x = f^{-1}(y)$ $\frac{dx}{dy} = \frac{1}{\frac{dy}{dx}}$

Natural Exponential Function: $y = e^x$ $y' = e^x$

Power of e: $y = e^{ax}$ $y' = ae^{ax}$

Natural Logarithmic Function: $y = \ln(x)$ $y' = \frac{1}{x}$

Power of e: $y = e^{-ax}$ $y' = -ae^{-ax}$

Power of e: $y = e^{kx}$ $y' = ke^{kx}$

Basic Integration Rules ($a > 0$)

$$4. \int e^u du = e^u + C$$

$$5. \int \frac{du}{u} = \ln|u| + C$$

$$13. \int \csc u du = -\ln|\csc u + \cot u| + C$$

$$14. \int \sec^2 u du = \tan u + C$$

$$15. \int \frac{du}{a^2 - u^2} = \frac{1}{a} \operatorname{arctan} \frac{|u|}{a} + C$$

$$19. \int \frac{du}{a^2 + u^2} = \frac{1}{a} \arctan \frac{u}{a} + C$$

$$20. \int \frac{du}{u \sqrt{u^2 - a^2}}$$

References -
[of Rules of Differentiation.](#)

[Summary](#)



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