

Math Formulas: Common Derivatives

Basic Properties of Derivatives

$$1. \quad (c \cdot f(x))' = c \cdot f'(x)$$

$$2. \quad (f \pm g)' = f' \pm g'$$

Product rule

$$3. \quad (f \cdot g)' = f' \cdot g + f \cdot g'$$

Quotient rule

$$4. \quad \left(\frac{f}{g}\right)' = \frac{f' \cdot g - f \cdot g'}{g^2}$$

Chain rule

$$5. \quad (f(g(x)))' = f'(g(x)) \cdot g'(x)$$

Common Derivatives

$$6. \quad \frac{d}{dx}(C) = 0$$

$$7. \quad \frac{d}{dx}(x) = 1$$

$$8. \quad \frac{d}{dx}(x^n) = n \cdot x^{n-1}$$

$$9. \quad \frac{d}{dx}(\sin x) = \cos x$$

$$10. \quad \frac{d}{dx}(\cos x) = -\sin x$$

$$11. \quad \frac{d}{dx}(\tan x) = \frac{1}{\cos^2 x}$$

$$12. \quad \frac{d}{dx}(\sec x) = \sec x \cdot \tan x$$

$$13. \quad \frac{d}{dx}(\csc x) = -\csc x \cdot \cot x$$

$$14. \quad \frac{d}{dx}(\cot x) = -\frac{1}{\sin^2 x}$$

$$15. \quad \frac{d}{dx}(\arcsin x) = \frac{1}{\sqrt{1-x^2}}$$

$$16. \quad \frac{d}{dx}(\arccos x) = -\frac{1}{\sqrt{1-x^2}}$$

$$17. \quad \frac{d}{dx}(\arctan x) = \frac{1}{1+x^2}$$

$$18. \quad \frac{d}{dx}(a^x) = a^x \cdot \ln a$$

$$19. \quad \frac{d}{dx}(e^x) = e^x$$

20. $\frac{d}{dx}(\ln x) = \frac{1}{x}, x > 0$

21. $\frac{d}{dx}(\ln |x|) = \frac{1}{x}, x \neq 0$

22. $\frac{d}{dx}(\log_a x) = \frac{1}{x \cdot \ln a}, x > 0$