

Differentiation Formulas from Calculus

$$1. [a]' = 0, (a = \text{constant})$$

$$2. [x^n]' = nx^{n-1}$$

$$3. [f(x) \pm g(x)]' = f'(x) \pm g'(x)$$

$$4. [af(x)]' = af'(x), a = \text{constant}$$

$$5. [f(x) \cdot g(x)]' = f'(x) \cdot g(x) + f(x) \cdot g'(x)$$

$$6. \left[\frac{f(x)}{g(x)} \right]' = \frac{g(x)f'(x) - g'(x)f(x)}{g(x)^2}$$

(#5 is known as the **Product Rule**, and #6 is known as the **Quotient Rule**. #6 can be derived from #5.)

$$7. [f(g(x))]' = f'(g(x)) \cdot g'(x) \quad (\text{Chain Rule})$$

$$8. [f^{-1}(x)]' = 1/[f'(f^{-1}(x))]$$

$$9. [\sin u(x)]' = [\cos u(x)] \cdot u'(x)$$

$$10. [\cos u(x)]' = [-\sin u(x)] \cdot u'(x)$$

$$11. [\tan u(x)]' = [\sec^2 u(x)] \cdot u'(x)$$

$$12. [\cot u(x)]' = [-\csc^2 u(x)] \cdot u'(x)$$

$$13. [\sec u(x)]' = [\sec u(x) \cdot \tan u(x)] \cdot u'(x)$$

$$14. [\csc u(x)]' = [-\cot u(x) \cdot \csc u(x)] \cdot u'(x)$$

$$15. [e^{u(x)}]' = e^{u(x)} \cdot u'(x)$$

$$16. [\ln u(x)]' = [1/u(x)] \cdot u'(x)$$

If you are having difficulty understanding these formulas or any other formulas in mathematics, call Michael Ragusa at (703) 691-2730; send him an E-mail message at mathdepot@hotmail.com; or visit his website: www.mathdepot.com. You'll be glad you did!