

5.3. CHAIN RULE-GENERAL FORM

Theorem 5.3.1 (Version 1). *The derivative of a composite function, $h \circ g$, is*

Theorem 5.3.2 (Version 2). *If y is a function of u and u is a function of x , then we can find the derivative of y with respect to x by...*

Remark 5.3.1. *When entering the natural logarithm into a free response form on e-grade type $\ln(\dots)$. To enter e^x type $e \wedge x$*

Examples

Example 5.3.1. *Find the derivative and simplify $f(x) = (2x + 3)^5$*

Example 5.3.2. *If $h(x) = \ln x$ and $g(x) = 2x + 3$, find $(h \circ g)(x)$*

Example 5.3.3. Find $\frac{d}{dx} \ln(2x + 3)$.

Example 5.3.4. If $h(x) = e^x$ and $g(x) = 3x - 2x^2$, find $(h \circ g)(x)$

Example 5.3.5. Find $\frac{d}{dx} e^{3x-2x^2}$.

Example 5.3.6. Find $\frac{d}{dx} \sqrt[4]{\ln(2x+3)}$.

General Exponent and Logarithm Formulas

Let $a > 0$ and $a \neq 1$.

$$(1) \frac{d}{dx}(\log_a x) =$$

$$(2) \frac{d}{dx}(a^x) =$$

Examples

Example 5.3.7. Find $\frac{d}{dx} \log_3(5 - 6x^2)$.

(1) $\frac{-12x}{5 - 6x^2}$

(2) $\frac{-12x}{\ln(15 - 18x^2)}$

(3) $\left(\frac{1}{\ln 3}\right) \left(\frac{-12x}{5 - 6x^2}\right)$

(4) $\frac{1}{\ln 3} + \frac{-12x}{5 - 6x^2}$

(5) *none of these*

Example 5.3.8. Find $\frac{d}{dx} 7^{3x-4x^2}$.

Homework: 5.3 p. 342 # 7, 9, 11, 21, 27, 33, 39, 45, 51, 65, 67, work e-grade practice at least 2 times.