

Section 3.6: Derivatives of Logarithmic Functions

Derivative Formulas:

$$y = \ln(x)$$

$$y = \log_a(x)$$

Example: Find the derivative of these functions.

A) $y = \ln(5x^2 - 1)$

B) $y = \ln(e^{x^2} + e^{-5x})$

C) $y = \log_4(x^7 + 3x)$

D) $y = e^{\log(x^2+1)}$

$$\text{E) } y = 5x \log(\cot(x^2))$$

$$\text{F) } y = \log_5 [(x + 4)^3(x^4 + 1)^2]$$

$$\text{G) } y = \ln \left(\frac{x^5 + 7}{\sqrt[5]{x^4 + 2}} \right)$$

Logarithmic Differentiation

Example: Find the derivative.

A) $y = x^{\cos(x)}$

B) $y = (x^3 + 7)^{e^{2x}}$

Example: Find the derivative.

$$y = \frac{(x^3 + 1)^4(x^5 + 2)^8}{(6x^5 + 7)^5}$$