

Differentiating Log or Exponential Functions

p. 240 - 245 (3.7)

35

1. Exponential functions

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

or
$$\frac{d}{dx} a^u = \ln a (a^u) \left(\frac{du}{dx} \right)$$

2. Log functions

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

or
$$\frac{d}{dx} \log_a u = \frac{1}{(\ln a)} \frac{1}{u} \frac{du}{dx}$$

Find y' .

1. $2^{3x} = y$

2. $y = \log_{10} \cos(x)$

3. $y = 5^{(x^3 + 5x)}$

4. $y = \log_6 \frac{1}{\sqrt{x}}$