

The Derivatives of a^x and $\log_a x$

Theorem 1.1

$$\frac{d}{dx} e^x =$$

$$\frac{d}{dx} a^x =$$

$$\frac{d}{dx} e^{f(x)} =$$

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

1 / 3

Theorem 1.2

$$\frac{d}{dx} \ln x =$$

$$\frac{d}{dx} \log_a x =$$

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

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

2 / 3

Example 1.3

Differentiate the following:

1 $y = 4^x$

$y = \left(\frac{1}{4}\right)^x$

2 $y = 6^{5x}$

$y = 8^{2x-3}$

3 $y = \log_5 x$

$y = \log(x^2 + 5x)$

4 $y = (\log_{12} x)^5$

$y = 11^{x^2}$

3 / 3

5 $y = 7^x \log_3 x$

$y = \frac{4^{1-x^2}}{\log_4 x}$