

6.2 - Exponential Functions and Their Derivatives

Preparation (Watch at Home)

6.2a

The derivative of an exponential function using the definition of a derivative

[illegible]

The derivative of the natural exponential function



Exercise:

Find y' and y'' for $y = e^{x^2}$.

A derivation of the value of Euler's number, e

The integral of the natural exponential function

6.2b

Exercises:

Differentiate the function.

$$y = \frac{e^x}{1 - e^x}$$

Evaluate the integral.

$$\int x^2 e^{x^3} dx$$

Find the limit.

$$\lim_{x \rightarrow -\infty} (1.001)^x$$

$$\lim_{x \rightarrow (\pi/2)^+} e^{\tan x}$$

In-Class Discussion

6.2c

Exercise:

Find the absolute maximum and absolute minimum values of f on the given interval.

$$f(x) = xe^{\pi/2}, [-3, 1]$$

In-Class Practice

Find the limit.

1. $\lim_{x \rightarrow \infty} e^{-x^2}$

Differentiate the function.

2. $g(x) = e^{x^2-x}$

3. $V(t) = \frac{4+t}{te^t}$

4. $y = e^{\sin 2x} + \sin(e^{2x})$

Evaluate the integral.

5. $\int e^{\sin \theta} \cos \theta d\theta$

6. $\int_0^1 \frac{\sqrt{1 + e^{-x}}}{e^x} dx$
