

6.3 - Logarithmic Functions

Preparation (Watch at Home)

6.3b

Properties of logarithms

$$\log_b b^x = x$$

$$b^{\log_b x} = x$$

$$\log_b MN = \log_b M + \log_b N$$

$$\log_b \frac{M}{N} = \log_b M - \log_b N$$

$$\log_b M^r = r \log_b M$$

Change-of-base formula

$$\log_b x = \frac{\log_a x}{\log_a b}$$

In-Class Discussion

6.3a

Graphs and limits of logarithmic functions

6.3c

Exercises:

Find the limit

$$\lim_{x \rightarrow 2^-} \log_5 (8x - x^4)$$

$$\lim_{x \rightarrow \infty} [\ln(2 + x) - \ln(1 + x)]$$

Exercise:

On what interval is the curve $y = 2e^x - e^{-3x}$ concave downward?

[illegible]

In-Class Practice

Use the properties of logarithms to expand the quantity.

1. $\log_{10} \sqrt{\frac{x-1}{x+1}}$

2. $\ln \left(s^4 \sqrt{t \sqrt{u}} \right)$

3. Find the limit: $\lim_{x \rightarrow 0^+} \ln(\sin x)$

4. Find the domain of the function: $g(x) = \log_2(x^2 + 3x)$

5. Find the inverse function.

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

6. Find an equation of the tangent to the curve $y = e^{-x}$ that is perpendicular to the line $2x - y = 8$.