

Exam 2 Review

Limit definition of Derivative

Use the limit definition of the derivative to find $f'(x)$ at $x = 2$:

$$f(x) = \frac{x}{x - 3}$$

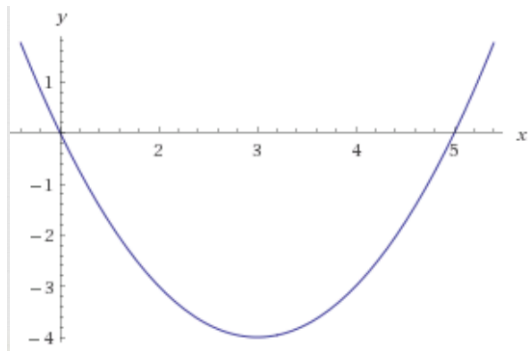
Limit definition of Derivative

Use the limit definition of the derivative to find $f'(x)$ at $x = 3$:

$$f(x) = \sqrt{12 - x}$$

Derivatives and Graphs

Below is the graph of $f'(x)$. Find the x -values where $f(x)$ has an inflection point, max, and min.



Product Rule

Find the derivative.

$$f(x) = x^2 e^x \sin(x)$$

Quotient Rule

Find the derivative.

$$f(x) = \frac{\ln(x)}{x^2 - 1}$$

Chain Rule

Find the derivative.

$$f(x) = \left(e^{\sin(x)} - 3x \right) (\tan(x^2) + 2)$$

Chain Rule

Find the derivative.

$$f(x) = \cot(6 \ln(e^x - 3x))$$

Chain Rule

Find the derivative.

$$f(x) = \ln(5 + \cos(e^x))$$

Log Rule

Find the derivative.

$$f(x) = \ln \left(\frac{\sin(x)}{x^2 + 1} \right)$$

Applications

A ball is pushed down a hill with initial velocity 5 m/s. Its position function is

$$f(t) = 5t + 3t^2.$$

What is the velocity of the ball after 2 seconds?

How long does it take the velocity to reach 35 m/s?

Linearization

Linearization is a fancy word for _____ ?

Linear approximation

Use a linearization to approximate $\sqrt{4.01}$