Math 1431

Section 16679

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Questions

Absolute Extreme Values

Let c be a point in the domain of f; c may be an interior point or an endpoint.

We say that f has an absolute minimum at c if $f(x) \geq f(c)$ for all x in the domain of f.

f has an absolute maximum at c if $f(x) \leq f(c)$ for all x in the domain of f.

Section 3.4 - Extreme Values

Finding the absolute minimum and maximum values of a continuous function defined on a closed bounded interval $[a, b]$:

1. Find the critical points for f in the interval (a, b).
2. Evaluate the function at each of these critical points and at the endpoints.
3. The smallest of these computed values is the absolute minimum value, and the largest is the absolute maximum value of f.

Examples: Find the locations of all absolute minima and maxima for

1. $f(x) = x^3 + 3x^2 - 9x + 4$ on $[-6, 3]$

2. $f(x) = \tan(x) - x$ on $\left[-\frac{\pi}{3}, \frac{\pi}{2}\right)$

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1. Let $f(x) = (x+2)^2 - 4$. The point $(-2, -4)$ is

When $f''(x) > 0$ on an open interval, the graph of $f(x)$ is concave up.

When $f''(x) < 0$ on an open interval, the graph of $f(x)$ is concave down.

The point where $f''(c) = 0$ and the sign of f'' changes is a point of inflection.

Determine the intervals of concavity and inflection points for

1. $y = x^3 - 3x^2 + 2x - 1$

2. $f(x) = x^4$

Section 3.5 - Concavity and Points of Inflection

When $f''(x) > 0$ on an open interval, the graph of $f(x)$ is concave up.

When $f''(x) < 0$ on an open interval, the graph of $f(x)$ is concave down.

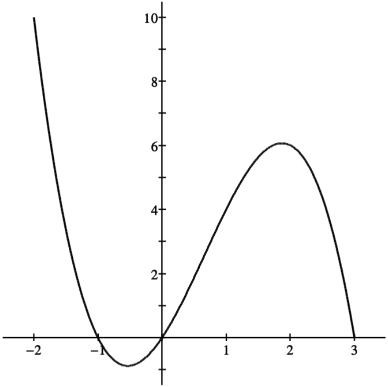
The point where $f''(c) = 0$ and the sign of f'' changes is a point of inflection.

Section 3.5 - Concavity and Points of Inflection

Given $f(x)$, find all extrema and points of inflection and tell where the graph is increasing and decreasing, concave up and concave down.

1. $f(x) = 2x^3 - 5x^2 - 4x + 2$

The graph of $f'(x)$ is shown on the interval $[-2, 3]$. What is the shape of f, given that $f(0) = 0$?



Asymptote review: Find any horizontal and/or vertical asymptotes.

1. $f(x) = \dfrac{1}{x^2+1}$

2. $f(x) = \dfrac{2x^2+x-7}{5x^2-1}$

3. $f(x) = \dfrac{2x-7}{x^2-1}$

Asymptote review: Find any horizontal and/or vertical asymptotes.

4. $f(x) = \dfrac{7x^3 + 2}{6x^2 - 5}$

5. $f(x) = \dfrac{3x^5 + 2x}{4x^5 - 1}$

6. $f(x) = \dfrac{4x}{\sqrt{x^2 + 9}}$

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2. Find the vertical and horizontal asymptotes $f(x) = \frac{2x}{\sqrt{4x^2+1}}$.

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3. Find the vertical and horizontal asymptotes $f(x) = \frac{x}{4x^2-1}$.