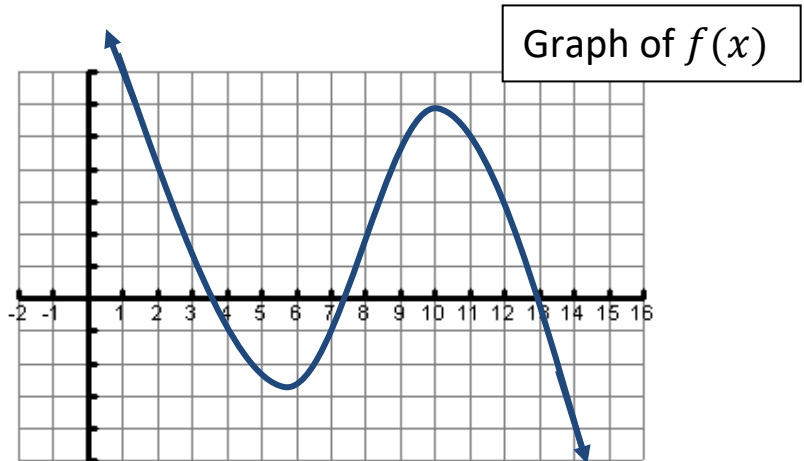


Example One: Use the graph of f to find the following:

- Intervals of Increasing:
- Decreasing:
- Maximum:
- Minimum:
- Intervals of Concave Upward:
- Concave Downward:



Critical points: A number c in the domain of f is called a critical point

if: $f'(c) = 0$ or $f'(c) = \text{does not exist}$

Then: $x = c$ is a critical point.

Increasing/Decreasing Behavior of Function

■ If $f'(x) > 0$, then f is _____

■ If $f'(x) < 0$, then f is _____

Concave Up/Concave Down Behavior of Function

■ If $f''(x) > 0$, then f is _____

■ If $f''(x) < 0$, then f is _____

Points of Inflection: A number c in the domain of f is called a point of inflection

if: $f''(c) = 0$ or $f''(c) = \text{does not exist}$

And: If sign change at c

Then: $x = c$ is a point of inflection

AD

Critical Numbers

AD

How does the sign of the first derivative relate to the original function?

AD

How does the sign of the second derivative relate to the original function?

AD

Points of Inflection

Notes: Critical Numbers, Intervals of Increasing/Decreasing,
Intervals of Concavity, & POI

Curve Sketching Day 2

Example Two: $f(x) = x^3 - 27x - 20$

Critical Numbers:

Intervals of

Increasing:

Decreasing:

Maximum Value:

Minimum Value:

Possible Points of Inflection:

Intervals of

Concave Upward:

Concave Downward:

Point(s) of Inflection:

Example Three: $f(x) = \frac{1}{3}x^3 - x^2 + x$

Critical Numbers:

Intervals of

Increasing:

Decreasing:

Maximum Value:

Minimum Value:

Possible Points of Inflection:

Intervals of

Concave Upward:

Concave Downward:

Point(s) of Inflection:

Notes: Critical Numbers, Intervals of Increasing/Decreasing,
Intervals of Concavity, & POI

Curve Sketching Day 2

Example Four: $f(x) = 3x^5 - 5x^4 + 1$

Critical Numbers:

Intervals of

Increasing:

Decreasing:

Maximum Value:

Minimum Value:

Possible Points of Inflection:

Intervals of

Concave Upward:

Concave Downward:

Point(s) of Inflection:

Example Five:

Where does $f(x)$ have
critical numbers?

Where is $f(x)$ increasing?

Where is $f(x)$ decreasing?

Are the critical values local
minimums, maximums, or
neither?

Where is $f(x)$ concave upward?

Where is $f(x)$ concave downward?

Where does $f(x)$ have points of inflections?

What is the difference between critical numbers and points of inflection?

