Notes: Critical Numbers, Intervals of Increasing/Decreasing, Intervals of Concavity, & POI (2) Curve Sketching Day 3

Example One: $y = \frac{lnx}{x}$

Critical Numbers:
Intervals of
Increasing:
Decreasing:
Maximum Value:
Minimum Value:
Possible Points of Inflection:
Intervals of
Concave Upward:
Concave Downward:
Point(s) of Inflection:

The first derivative test: Assume that $f(x)$ is differentiable and let c be a critical point.
If $f(c)$ changes from positive to negative ,
Then $x = c$ is a local _____
If $f(c)$ changes from negative to positive,
Then $x = c$ is a local _____

AD

What is the 1st derivative test?

The second derivative test: Assume that $f(x)$ is differentiable and let c be a critical point. If $f''(c)$ exists and
If $f''(c) > 0$, Then $x = c$ is a local _____
If $f''(c) < 0$, Then $x = c$ is a local _____
If $f''(c) = 0$, Then $x = c$ is _____

AD

What is the 2nd derivative test?

Example Twor:
Use the 1st derivative test to find the extrema for $f(x) = x^4 - 8x^2 + 1$.

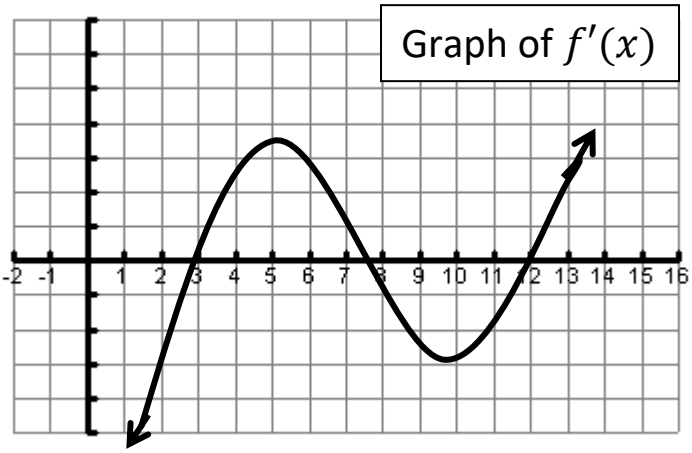
Notes: Critical Numbers, Intervals of Increasing/Decreasing, Intervals of Concavity, & POI (2)

Curve Sketching Day 3

x	$f'(x)$	$f''(x)$
0	10	0
5	-5	10
10	0	15
15	0	-5
20	12	12
25	0	18

Example Three: Use the 2nd derivative test to determine extrema

Example Four:



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?

Notes: Critical Numbers, Intervals of Increasing/Decreasing, Intervals of Concavity, & POI (2) Curve Sketching Day 3

Example Five: $f(x) = cos^2x + sinx$ on the interval $[0, \pi]$
Do everything dealing with f'(x) by hand
Do everything dealing with f''(x) on calculator
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 Six: $y = \frac{1}{x^2+1}$

Critical Numbers:
Intervals of
Increasing:
Decreasing:
Maximum Value:
Minimum Value:
Possible Points of Inflection:
Intervals of
Concave Upward:
Concave Downward:
Point(s) of Inflection: