5.2 First Derivative Test

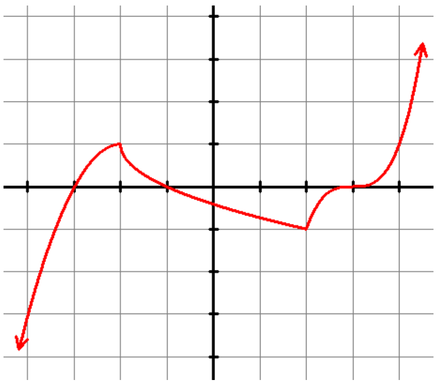
NAME:____________________________

Corrective Assignment #1

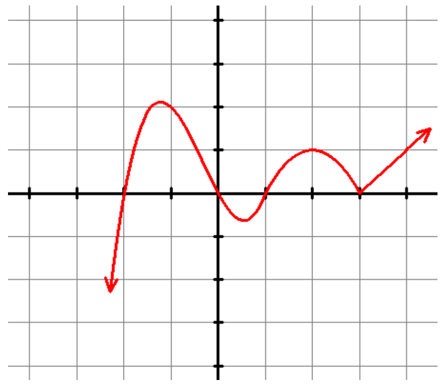
DATE:________

Given the graph of $f'(x)$, find the critical points and locate all relative extrema. ALWAYS JUSTIFY!

1.



2.



A particle moves along the *x*-axis with the position function given below. Find the velocity and use a sign chart to describe the motion of the particle. ALWAYS JUSTIFY!

3. $h(x) = -2x^3 + 6x^2 - 3$

4. $f(x) = xe^{\frac{1}{x}}$

Find the intervals where the function is increasing/decreasing and all relative extrema. ALWAYS JUSTIFY!

5. $f(x) = \frac{9x}{x^2+9}$

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6. $g(x) = \frac{1}{4}x^4 - 2x^2$

ANSWERS TO CORRECTIVE ASSIGNMENT

1. There is a relative minimum at $x = -3$ because f' changes from negative to positive.

   There is a relative maximum at $x = -1$ because f' changes from positive to negative.

   There is a relative minimum at $x = 3$ because f' changes from negative to positive.

2. There is a relative minimum at $x = -2$ because f' changes from negative to positive.

   There is a relative maximum at $x = 0$ because f' changes from positive to negative.

   There is a relative minimum at $x = 1$ because f' changes from negative to positive.

   f' does not change signs at $x = 3$ therefore f has neither relative maximum or minimum at $x = 3$

3.

$(-\infty, 0)$	$(0,2)$	$(2, \infty)$
$h'(x) < 0$ Decreasing Left	$h'(x) > 0$ Increasing Right	$h'(x) < 0$ Decreasing Left

4.

$(-\infty, 0)$	$(0,1)$	$(1, \infty)$
$f'(x) > 0$ Increasing Right	$f'(x) < 0$ Decreasing Left	$f'(x) > 0$ Increasing Right

5.

$(-\infty, -3)$	$(-3,3)$	$(3, \infty)$
$f'(x) < 0$ Decreasing	$f'(x) > 0$ Increasing	$f'(x) < 0$ Decreasing

There is a relative minimum at $x = -3$ because f' changes from negative to positive.

There is a relative maximum at $x = 3$ because f' changes from positive to negative.

6.

$(-\infty, -2)$	$(-2,0)$	$(0,2)$	$(2, \infty)$
$g'(x) < 0$ Decreasing	$g'(x) > 0$ Increasing	$g'(x) < 0$ Decreasing	$g'(x) > 0$ Increasing

There is a relative minimum at $x = -2$ because f' changes from negative to positive.

There is a relative maximum at $x = 0$ because f' changes from positive to negative.

There is a relative minimum at $x = 2$ because f' changes from negative to positive.