5.2 First Derivative Test

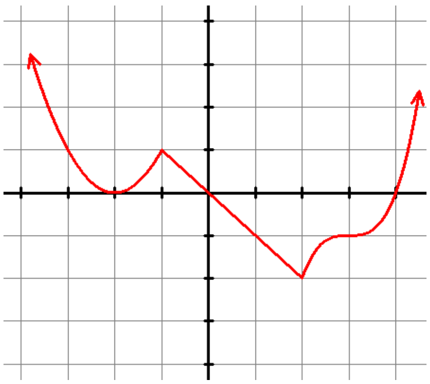
Corrective Assignment #2

NAME:__________________________

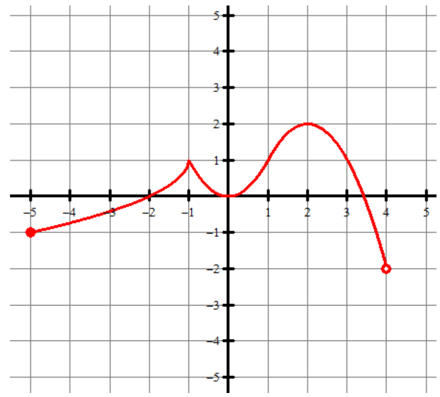
DATE:_______

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

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.

3. $h(x) = x^3 - \frac{3}{2}x^2$

4. $g(x) = xe^x$

Determine where the function is increasing and decreasing. Find the relative extrema.

5. $f(x) = \frac{1}{x} + x$

6. $g(x) = 2 + \sin x$ on the interval $(0, 2\pi)$

ANSWERS TO CORRECTIVE ASSIGNMENT

1. f' does not change signs at $x = -2$ therefore f has neither relative maximum or minimum at $x = -2$

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

   There is a relative minimum at $x = 4$ because f' changes from negative to positive.

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

   f' does not change signs at $x = 0$ therefore f has neither relative maximum or minimum at $x = 0$

   There is a relative maximum at $x = 3.5$ because f' changes from positive to negative.

3.

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

4.

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

5.

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

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

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

NOTE: $x \neq 0$

6.

$\left(0, \frac{\pi}{2}\right)$	$\left(\frac{\pi}{2}, \frac{3\pi}{2}\right)$	$\left(\frac{3\pi}{2}, 2\pi\right)$
$g'(x) > 0$ Increasing	$g'(x) < 0$ Decreasing	$g'(x) > 0$ Increasing

There is a relative maximum at $x = \frac{\pi}{2}$ because g' changes from positive to negative.

There is a relative minimum at $x = \frac{3\pi}{2}$ because g' changes from negative to positive.