

## The First Derivative Test

## HW 3-6

For each function, determine the intervals where  $f(x)$  is increasing and decreasing, and find all local extrema.

1)  $f(x) = 5 - 6x - 3x^2$

2)  $f(x) = \frac{9}{x^2 - 4x + 7}$

3)  $f(x) = \frac{x^2 + 4}{x^2 - 4}$

4)  $f(x) = 3 - (2x + 5)^{2/3}$

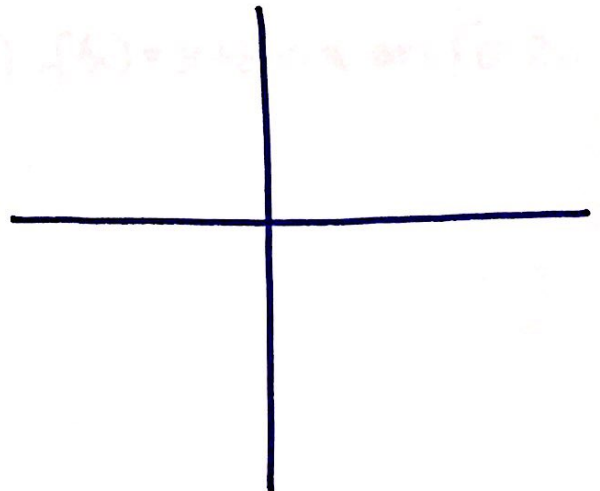
5) Draw the graph of a function that meets the following conditions:

$f(-2) = 6, f(2) = -6$

$f'(-2) = f'(2) = f'(0) = 0$

$f'(x) > 0$  on  $(-\infty, 2) \cup (2, \infty)$

$f'(x) < 0$  on  $(-2, 0) \cup (0, 2)$



Quiz Review! (Quiz includes content on the front also!)

If Rolle's Theorem applies, find the value of  $c$  that satisfies the theorem.

6)  $f(x) = \frac{x^2 - 2x - 3}{x + 2}$  on  $[-1, 3]$

7)  $f(x) = 3x^2 - 12x + 11$  on  $[0, 4]$

If the Mean Value Theorem applies, find the values of  $c$  that satisfy the theorem.

8)  $f(x) = \frac{x+3}{x-2}$  on  $[-2, 3]$

9)  $f(x) = 1 - 3x^{1/3}$  on  $[-8, 1]$

Find the critical values ONLY of each function.

10)  $f(x) = (2x - 5)\sqrt{x^2 - 4}$

11)  $f(x) = \cos^2 x$

Find the absolute extrema of each function on the interval.

12)  $f(x) = \frac{1-x}{x^2+3x}$  on  $[1, 4]$

13)  $f(x) = x + \sin x$  on  $[0, 2\pi]$