

Math 157 - Quiz 8

October 28, 2015

Name key

Score _____

Show all work. Supply explanations when necessary.

1. (4 points) Find the critical points of the function $f(x) = \sqrt[3]{x} - x = x^{1/3} - x$

$$f'(x) = \frac{1}{3}x^{-2/3} - 1 = \frac{1}{3 \sqrt[3]{x^2}} - 1$$

$$f'(x) = 0 \Rightarrow \frac{1}{3}x^{-2/3} = 1 \Rightarrow x^{-2/3} = 3 \Rightarrow x^{2/3} = \frac{1}{3}$$

$$\Rightarrow x^2 = \frac{1}{27}$$

$$f'(x) \text{ DNE WHEN } \boxed{x = 0}$$

$$\Rightarrow \boxed{x = \pm \sqrt{\frac{1}{27}}}$$

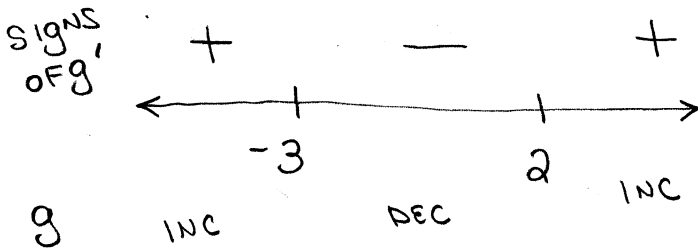
2. (6 points) Consider the function $g(x) = 2x^3 + 3x^2 - 36x + 8$. Find open intervals on which g is increasing/decreasing. Then identify all relative extreme values.

$$g'(x) = 6x^2 + 6x - 36$$

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

$$g'(x) = 0 \Rightarrow x = -3, x = 2$$

$$g'(x) \text{ DNE NOWHERE}$$



g IS INCREASING ON $(-\infty, -3) \cup (2, \infty)$

g IS DECREASING ON $(-3, 2)$

$g(-3) = 89$ IS A REL (LOCAL) MAX

$g(2) = -36$ IS A REL (LOCAL) MIN