

# Math 157 - Quiz 9

November 2, 2016

Name key

Score \_\_\_\_\_

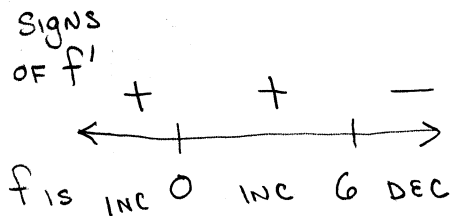
Show all work to receive full credit. Supply explanations when necessary.

1. (8 points) Let  $f(x) = 8x^3 - x^4$ . Find open intervals on which  $f$  is increasing/decreasing. Identify all relative extrema. Find open intervals on which the graph of  $f$  is concave up/down. Identify all inflection points.

$$f'(x) = 24x^2 - 4x^3$$

$$= 4x^2(6-x) = 0$$

$$x=0, x=6$$



$f$  is increasing on  $(-\infty, 0) \cup (0, 6)$

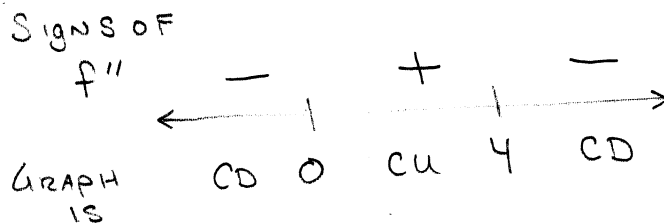
AND DECREASING ON  $(6, \infty)$

$$f(6) = 432 \text{ IS A REL MAX.}$$

$$f''(x) = 48x - 12x^2$$

$$= 12x(4-x) = 0$$

$$x=0, x=4$$



GRAPH IS CONCAVE DOWN ON  $(-\infty, 0) \cup (4, \infty)$  AND CONCAVE UP ON  $(0, 4)$

$$(0, f(0)) = (0, 0) \text{ \&}$$

$$(4, f(4)) = (4, 256)$$

ARE INFLECTION PTS.

2. (2 points) For each part, circle the correct conclusion.

(a) If  $g'$  is increasing, then

i. the graph of  $g$  has positive slope.

ii. the graph of  $g$  is concave up.

$g'' +$

(b) If  $g(c) = 0$ , then

i.  $c$  is a critical point of  $g$ .

ii.  $(c, 0)$  is an  $x$ -intercept of the graph of  $g$ .