

Math 131 - Quiz 9

November 15, 2023

Name key

Score _____

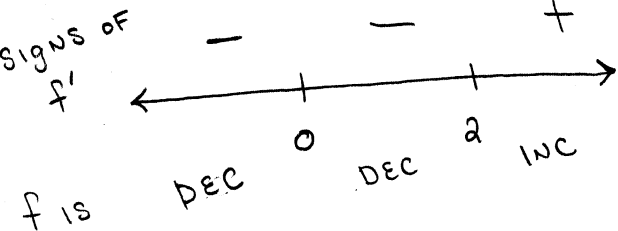
Show all work to receive full credit. Supply explanations when necessary.

1. (10 points) Let $f(x) = 3x^4 - 8x^3$. Use the first derivative test to determine open intervals on which f is increasing/decreasing and to classify the critical numbers of f . Then use the second derivative test to find open intervals on which the graph of f is concave up/down and to determine any inflection points.

$$f'(x) = 12x^3 - 24x^2 \\ = 12x^2(x-2) = 0$$

$$x = 0, x = 2$$

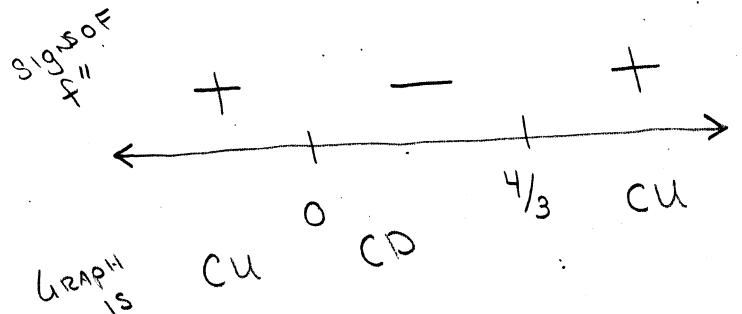
THESE ARE CRIT #'S AND THE ONLY ONES.



$$f''(x) = 36x^2 - 48x \\ = 12x(3x-4) = 0$$

$$x = 0, x = \frac{4}{3}$$

THESE ARE PIP'S AND THE ONLY ONES.



f IS DECREASING ON $(-\infty, 0) \cup (0, 2)$.

f IS INCREASING ON $(2, \infty)$

$f(0) = 0$ IS NEITHER A REL MAX NOR REL MIN.

$f(2) = -16$ IS A REL MIN.

THE GRAPH OF f IS CONCAVE UP ON $(-\infty, 0) \cup (4/3, \infty)$ AND CONCAVE DOWN ON $(0, 4/3)$.

$(0, 0)$ AND $(4/3, -256/27)$

ARE BOTH INFLECTION POINTS.