

MATH 2200
QUIZ 9

Name: _____ Key _____

Problem: Let $f(x) = 3x^4 + 4x^3 - 12x^2$. Where (that is, on which intervals) is $f(x)$ increasing? Where is $f(x)$ decreasing?

Solution: We have

$$f'(x) = 12x^3 + 12x^2 - 24x = 12x(x^2 + x - 2) = 12x(x + 2)(x - 1).$$

So the critical points are $-2, 0, 1$. Plugging in our favorite points in between, we get

$$f'(-3) = -144$$

$$f'(-1) = 24$$

$$f'(1/2) = -15/2$$

$$f'(2) = 96$$

so f is increasing on $(-2, 0)$ and $(1, \infty)$ and decreasing on $(-\infty, -2)$ and $(0, 1)$.