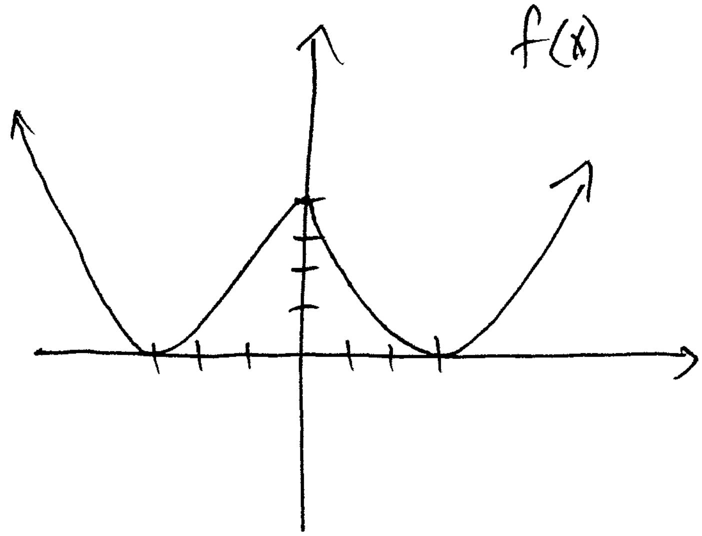
Math 121 C Fall 2009
HW 7

What got graded: §5.1 #8, 12, 24

§5.2 # ~~20~~ 8, 12, 20

5.1 #8



$f \nearrow$ on $(-3,0), (3,\infty)$

$f \searrow$ on $(-\infty,-3), (0,3)$

5.1 #12

this graph is $f'(x)$ instead of $f(x)$.

So $f' > 0$ except at $x=-3$ & $x=3$.

So $f \nearrow$ on $(-\infty,-3), (-3,3), (3,\infty)$ and never decreasing

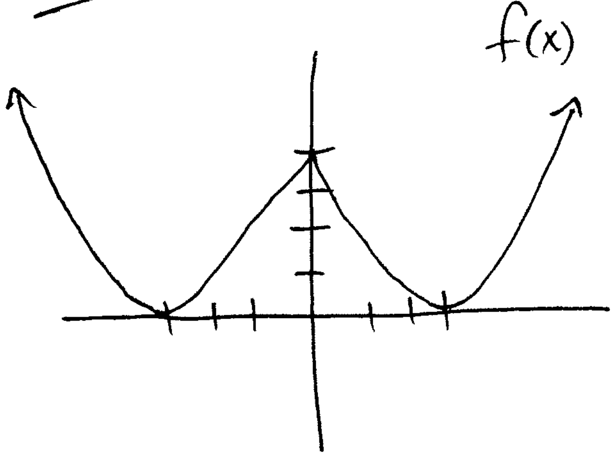
5.1 #24

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

$$f'(x) = \frac{(x-4) - (x+3)}{(x-4)^2} = \frac{-7}{(x-4)^2}$$

Since $f'(x)$ is always negative, except at $x = 4$ where $f(x)$ is not defined, this function has no critical numbers and is decreasing on $(-\infty, 4)$ and $(4, \infty)$.

5.2 #8



f has a local max at $x=0$, $f(0) = 4$.

f has local mins at $x = \pm 3$ where $f = 0$.

#12

this is the graph of $f'(x)$ not $f(x)$.

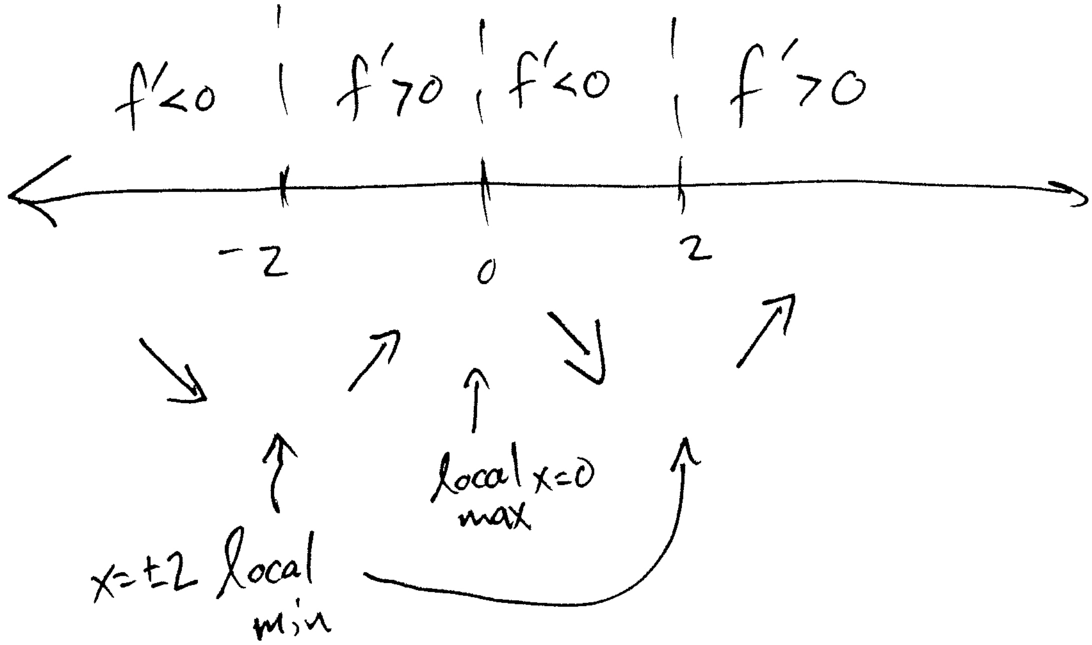
Since $f'(x)$ is positive (or zero) everywhere, f is never decreasing and so there can be no extrema.

5.2 #20 Find the x-values where $f(x) = x^4 - 8x^2 + 9$ has relative extrema, and find the value of f at these points.

$$f'(x) = 4x^3 - 16x = 4x(x^2 - 4)$$

$$\downarrow$$

$f' = 0$ at $x = 0, 2, -2$



$$f(-2) = -7$$

$$f(0) = 9$$

$$f(2) = -7$$