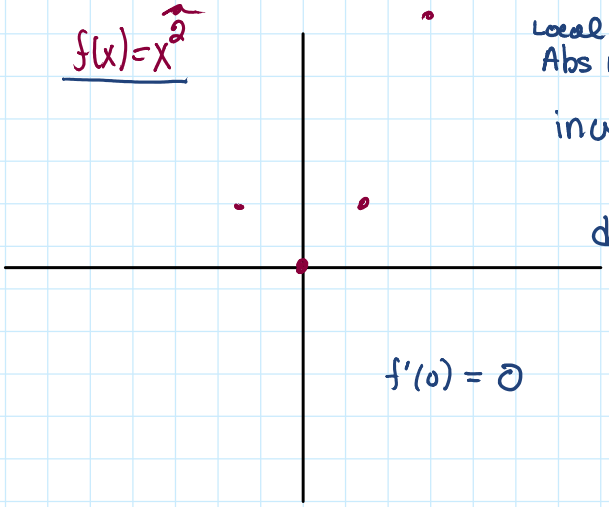
5.2 Day 2
Friday, October 28, 2016 9:13 AM

Increasing / Decreasing Interval.

$f(x)=x^2$



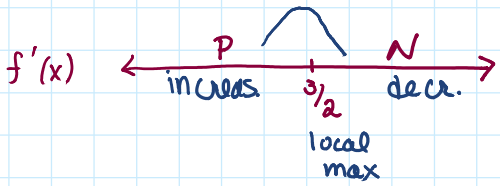
Local Abs min (0,0) $f'(0)=0$

increasing interval: $[0,\infty)$
* $f'(x)>0$ $[0,\infty)$

decreasing interval $(-\infty,0]$
* $f'(x)<0$ $(-\infty,0]$

ex: Find all local extrema, increasing and decreasing intervals on $f(x)$.

a. $f(x)=3x-x^2$ $f'(x)=3-2x$ $3-2x=0$ $-2x=-3$ $x=3/2$



$f(\frac{3}{2})=3(\frac{3}{2})-(\frac{3}{2})^2$
$=\frac{9}{2}-\frac{9}{4}$
$=\frac{18}{4}-\frac{9}{4}=\frac{9}{4}$

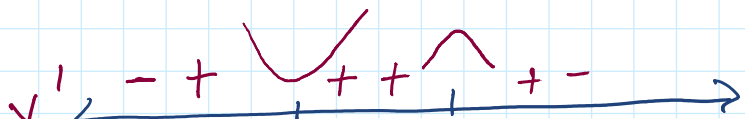
$f(x)$ has a local max value of $9/4$ at $x=3/2$ b/c $f'(x)$ goes from + to −
@ $x=3/2$.

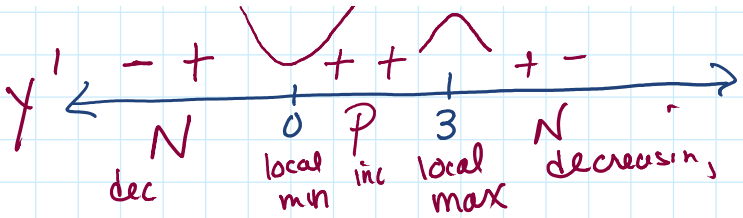
$f(x)$ is increasing $(-\infty,\frac{3}{2}]$ b/c $f'(x)>0$ on the interval.

$f(x)$ is decreasing $[3/2,\infty)$ b/c $f'(x)<0$ on the interval.

you try... $y=-\frac{2}{3}x^3+3x^2+5$

$y'=-2x^2+6x$ $y'=2x(-x+3)$ $x=0$ $x=3$ critical #'s





The function has a local min @ $x=0$ b/c y' goes from − to + @ $x=0$.

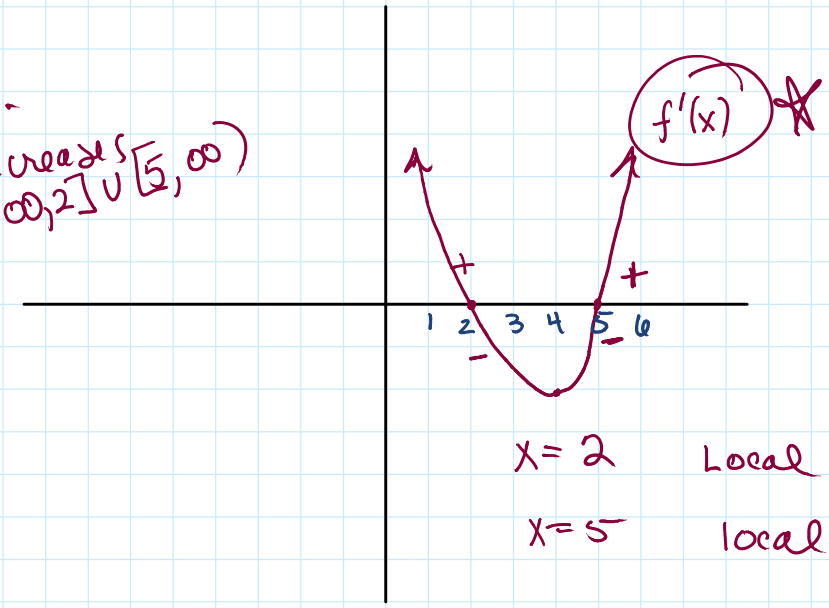
The function has a local max @ $x=3$ b/c y' goes from + to − @ $x=3$.

The function decreases $(-\infty, 0] \cup [3, \infty)$ b/c $y' < 0$ on the interval.

The function increases $[0, 3]$ b/c $y' > 0$ on the interval.

ex:

$f(x)$ increases $(-\infty, 2] \cup [5, \infty)$



★ Does $f(x)$ have extrema? If so, where & what type?

★ State any increasing & decreasing intervals on $f(x)$.

$x = 2$ Local max on $f(x)$

$x = 5$ local min @ on $f(x)$