quiz 20
math1117.07
u new haven
fri 22 nov

name: Solution

1 (8 points). Graph the function $f(x) = 3x - x^3$. Be sure to label all intervals where f is increasing and decreasing, the intervals where f is concave up and down, and list local extrema.

Increasing / Decreasing

$f' = 3 - 3x^2 \Rightarrow$ C.P @ $x = \pm 1$

	-1		1	
	$f'(-2)$	$f'(0)$		$f'(2)$
	$= 3 - 12$	$= 3$		$= 3 - 12$
	< 0	> 0		< 0
	dec.	inc.		dec.

Max @ $x = 1$, $f(1) = 3 - 1 = 2$

Min @ $x = -1$, $f(-1) = -3 + 1 = -2$

Concavity

$f''(x) = -6x \Rightarrow$ C.P @ $x = 0$

	0	
	$f''(-1)$	$f''(1)$
	$= 6$	$= -6$
	> 0	< 0
	conc. up	conc. down