MATH 1850 Sec 001

SINGLE VARIABLE CALCULUS I

QUIZ 8

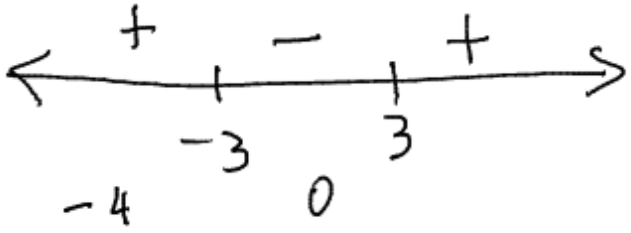
March 28, 2013

Name (Last, First) Key

1. Find the intervals on which the function $f(x) = x^3 - 27x$ is increasing and decreasing. Also identify the function's local extreme values.

$f'(x) = 3x^2 - 27 = 0$

$x^2 - 9 = 0 \Rightarrow x = 3, -3$



$f'(-4) = 21 > 0$

$f'(0) = -27 < 0$

$f'(4) = 21 > 0$

∴ Increasing

$(-\infty, -3] \cup [3, \infty)$

Decreasing.

$[-3, 3]$

Local maxima $= f(-3) = -27 + 81 = 54$

Local minimum $= f(3) = 27 - 81 = -54$

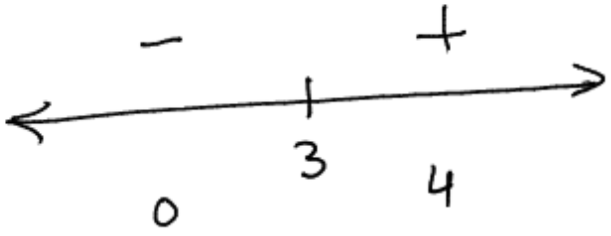
2. Identify the intervals in which the graph of the function is concave up and concave down.

$$y = \frac{x^3}{3} - 3x^2 - 7x$$

$y' = x^2 - 6x - 7$

$y'' = 2x - 6 = 0$

$x = 3$



Concave up

$(3, \infty)$

Concave down

$(-\infty, 3)$

$y''(0) = -6 < 0$

$y''(4) = 2 > 0$