Dawson College: Calculus I: 201-NYA-05 13

November 19, 2010

Last Name: SOLUTIONS

First Name: _____

Student ID: _____

Quiz 3 (B)

LET $f(x) = y$

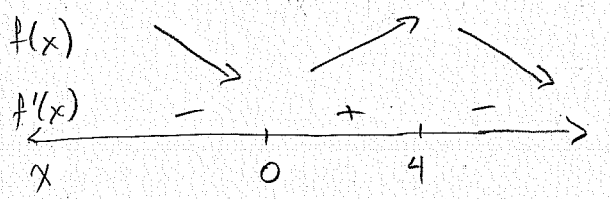
Question 1. *(10 marks)* Use the seven step procedure to sketch the graph of $y = -x^3 + 6x^2 - 4$.

1. DOMAIN: $\mathbb{R}$ 2. y-int: $(0,-4)$ 3. $\lim_{x\to\infty} -x^3+6x^2-4 = -\infty$ NO H.A.

$\lim_{x\to-\infty} -x^3+6x^2-4 = \infty$

4. NO V.A.

5. $f'(x) = -3x^2+12x = 0 \Rightarrow -3x(x-4)=0 \Rightarrow x = 0, 4$



TEST POINTS!

$x = -1$: $f'(-1) = -15 < 0$

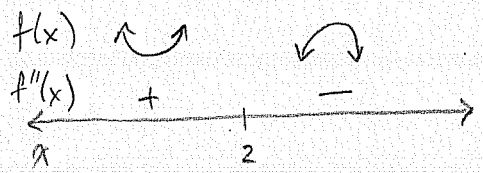
$x = 1$: $f'(1) = 9 > 0$

$x = 5$: $f'(5) = -15 < 0$

f IS INCREASING ON $(0,4)$, f IS DECREASING ON $(-\infty,0)$ AND $(4,\infty)$

$f(0) = -4$ IS A RELATIVE MIN. $f(4) = -(4)^3+6(4)^2-4 = 28$

6. $f''(x) = -6x+12 = 0 \Rightarrow -6(x-2)=0 \Rightarrow x = 2$



TEST POINTS!

$x = 0$: $f''(0) = 12$

$x = 3$: $f''(3) = -6(3)+12 = -6$

$\therefore f(2) = -(2)^3+6(2)^2-4 = 12$ $\therefore$ $(2,12)$ IS AN INFLECTION POINT.

$f'(2) = -3(-2)^2+12(-2) = -36$