Dawson College: Calculus I: 201-NYA-05 15

November 19, 2010

Last Name: SOLUTIONS

First Name: _____

Student ID: _____

Quiz 3 (A)

LET $f(x)=y$

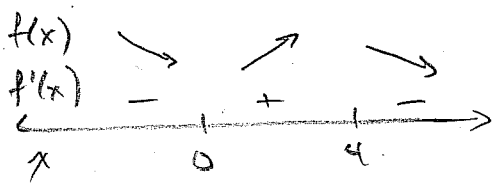
Question 1. *(10 marks)* Use the seven step procedure to sketch the graph of $y = -x^3 + 6x^2 - 6$.

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

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

4. NO V.A.

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



TEST POINTS:

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

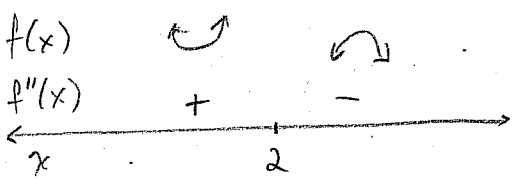
$x=1$: $f(1) = 9 > 0$

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

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

$f(0) = -6$ IS A RELATIVE MIN. $f(4) = 26$ IS A RELATIVE MAX

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



TEST POINTS:

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

$x=3$: $f''(3) = -6 < 0$

f IS CONCAVE UP ON $(-\infty,2)$ AND CONCAVE DOWN ON $(2,\infty)$

$f(2) = 10$

$f'(2) = 24$

$\therefore (2,10)$ IS AN INFLECTION POINT.