

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 $y = -x^3 + 3x^2 - 5$.

DOMAIN: \mathbb{R} 2. y-int: $(0, -5)$ 3. $\lim_{x \rightarrow \infty} -x^3 + 3x^2 - 5 = -\infty$ NO H.A.
 $\lim_{x \rightarrow -\infty} -x^3 + 3x^2 - 5 = \infty$

4. NO V.A.

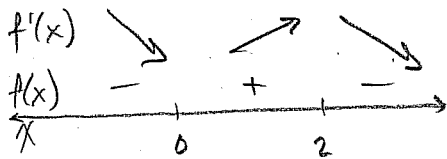
5. $f'(x) = -3x^2 + 6x = 0 \iff -3x(x-2) \iff x=0, 2$

TEST POINTS

$x = -1 \quad f'(-1) = -9 < 0$

$x = 1 \quad f'(1) = 3 > 0$

$x = 3 \quad f'(3) = -9 < 0$



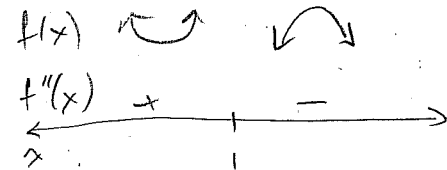
f IS INCREASING ON $(0, 2)$ AND DECREASING ON $(-\infty, 0)$ AND $(2, \infty)$
 $f(0) = -5$ IS A RELATIVE MINIMUM. $f(2) = -1$ IS A RELATIVE MAXIMUM.

6. $f''(x) = -6x + 6 = 0 \iff x = 1$

TEST POINTS

$x = 0 : f''(0) = 6 > 0$

$x = 2 : f''(2) = -6(2) + 6 = -6 < 0$



f IS CONCAVE UPWARD ON $(-\infty, 1)$ AND CONCAVE DOWNWARD ON $(1, \infty)$
 $f(1) = -3, f'(1) = 3 \therefore (1, -3)$ IS AN INFLECTION POINT.

7.

