MAT 121 Test 2

100 Points Name (5 pts) _____

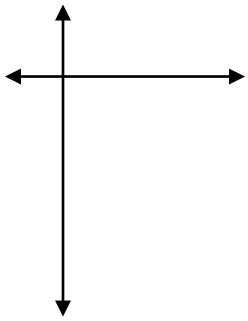
1. (5 pts) Determine whether the given function is linear or nonlinear. If it is linear, determine the slope.

x	$y = f(x)$
-2	1
0	7
1	10

2. Let $f(x) = 4x - 5$ in the following:

   a. (5 pts) Determine the slope and y-intercept of f.

   b. (5 pts) Use the slope and y-intercept to graph f here:



   c. (5 pts) Determine the average rate of change of f.

   d. (5 pts) Is f increasing, decreasing or constant?

3. (5 pts) Suppose y varies jointly as the square of x and the cube of z. If $y = 27$ when $x = 2$ and $z = 3$, what is y when $x = 3$ and $z = -1$?

4. Let $f(x) = 12x^2 - 7x - 10$.

   a. (5 pts) Find the zeros of f by factoring.

   b. (5 pts) Find the zeros of f by quadratic formula.

   c. (5 pts) Find the zeros of $f(x) = 2x^2 - 3x - 5$ by completing the square.

5. $f(x) = (x-3)^2 - 7$

a. (5 pts) Find the zeros of $f(x)$ using the Square Root Method.

b. (5 pts) What are the x-intercepts of the graph of $f(x)$?

6. (10 pts) Graph $f(x) = x^2 - 6x - 11$. I expect to see all of the following information on (or next to) your graph. You may use completing the square or the $-\frac{b}{2a}$ method.:

i. vertex
ii. axis of symmetry
iii. y-intercept
iv. x-intercept(s), if any
v. domain
vi. range
vii. interval(s) of increase
viii. interval(s) of decrease

7. Consider the quadratic function $h(x) = 5x^2 - 6x + 3$.

   a. (5 pts) Compute the discriminant for h.

   b. (5 pts) Based on your answer to part a., describe the nature of the zeros of h. In other words, state how many zeros h has, and whether they're real or nonreal. You do not need to solve the equation.

8. (10 pts) Find the complex zeros of $f(x) = x^2 - 5x + 11$

9. (10 pts) Solve $x^2 < 14 - 5x$. Express your answer in both set-builder and interval notation.