MAT 121 Test 2

100 Points Name (5 pts) _____

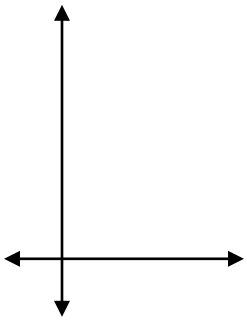
1. (5 pts) Determine whether the given function is linear or nonlinear. If it is linear, determine the slope.

x	$y = f(x)$
-2	1
-1	3
0	5
1	7
2	9

2. Let $f(x) = 7x + 2$ 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) The velocity *v* of a falling object on the moon is directly proportional to the time *t* of the fall. If, after 2 seconds, the velocity of the object is 8 feet per second, what will its velocity be after 3 seconds? .

4. Let $f(x) = 6x^2 + 5x - 6$.

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

   b. (5 pts) Find the zeros of f by completing the square.

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

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 $f(x) = x^2 - 4x - 2$. 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*-intercep(s), if any
v. domain
vi. range
vii. interval(s) of increase
viii. interval(s) of decrease

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

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.

8. (5 pts) Solve $2x^2 < 5x + 3$. Express your answer in both set-builder and interval notation.

9. (5 pts) Solve $2x^2 - 17x \geq -21$. Express your answer in both set-builder and interval notation.

10. Find the complex zeros of $f(x) = x^2 - 6x + 10$

11. Without solving, determine the character of the solutions of each equation in the complex number system.

a. (2 pts) $x^2 + 2x + 6$

b. (2 pts) $4x^2 - 12x + 9$

c. (2 pts) $2x^2 - 4x + 1$

13. Solve each of the following absolute value equations:

a. (2 pts) $|2x - 1| = 3$

b. (2 pts) $|2x - 1| = -3$

14. Solve each of the following absolute value inequalities. Give your answer in set-builder *and* interval notation.

a. (3 pts) $|3x - 5| > -2$

b. (3 pts) $|3x - 5| \leq -2$

c. (3 pts) $|x - 3| < 2$

d. (3 pts) $|2x + 1| \geq 3$