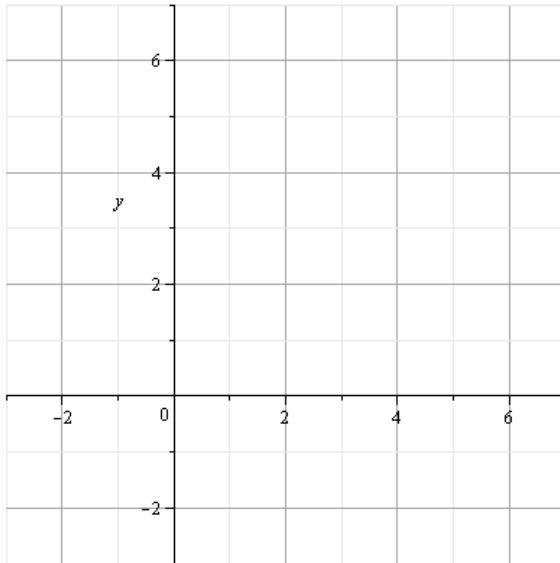


1. Let  $f(x) = -3x + 4$  in the following:
- (5 pts) Determine the slope and y-intercept of  $f$ .

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



- (5 pts) Determine the average rate of change of  $f$ .
- (5 pts) Is  $f$  increasing, decreasing or constant?

2. (5 pts) Suppose  $y$  varies jointly as  $m_1$  and  $m_2$  and inversely as the square of  $r$ .  
If  $y = 2$  when  $m_1 = 3$ ,  $m_2 = 8$ , and  $r = 2$  what is  $y$  when  $m_1 = 15$ ,  $m_2 = 10$ , and  $r = 5$ ?

3. Let  $f(x) = x^2 - 8x - 33$ .

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  $f$  by completing the square.

4. (20 pts) Complete the square for  $f(x) = x^2 - 6x + 1$ , and re-write it in the form  $a(x - h)^2 + k$ . Use your result to answer the questions, below. You don't *have* to graph the function, but you'll be answering questions related to its graph, so a rough sketch wouldn't hurt.

- a. Give the location of the vertex.
- b. State the equation of the axis of symmetry.
- c. Give the location of the  $y$ -intercept.
- d. Give the location of the  $x$ -intercept(s), if any. (Simplify any radicals as appropriate).
- e. State the domain in interval notation.
- f. State the range in interval notation.
- g. State the interval(s) of increase in interval notation.
- h. State the interval(s) of decrease in interval notation.

5. 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. You do not need to solve the equation.

6. (10 pts) Find the complex zeros of  $f(x) = 4x^2 - 8x + 13$

7. (10 pts) Solve  $x^2 - x > 2$ . Express your answer in both set-builder and interval notation.

8. (5 pts) Solve  $|2x + 3| = 3$

9. (5 pts) Solve  $|3x - 5| > 3$