

**Linear Functions:
From Graphing Points to Linear Equations and Beyond!!
A Summative Exam**

1. Define the following terms in your own words:

- a. Cartesian coordinate system **A plane created by intersecting two number lines perpendicularly at the origin and used to plot the location of an ordered pair.**
- b. Ordered pair **Two real numbers that give the distance of a point from the origin and represented by the notation (x, y) .**
- c. Solution to an equation **An ordered pair, (x, y) that results in a true statement when replacing the variables x and y in an equation.**

2. Plot the following ordered pairs on the Cartesian coordinate system and name the quadrant or axis where each point is located.

Quadrant

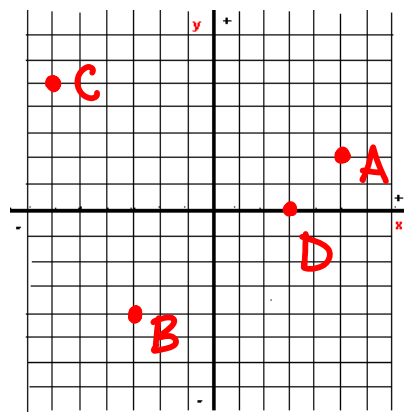
Plot

 I A. $(5, 2)$

 III B. $(-3, -4)$

 II C. $(-6, 5)$

 x-axis D. $(3, 0)$



3. Determine which of the ordered pairs is a solution for the given equation. Show work to support your answers. Place Yes or No in the space provided.

$$3x - y = 12$$

 YES a) $(5, 3)$

 No b) $(-3, -3)$

 Yes c) $(0, -12)$

4. In the following problems, complete the ordered pairs so that each is a solution for the given equation.

$$x + 2y = 8 \quad (2, 3), (8, 0), (14, -3), (-4, 6)$$

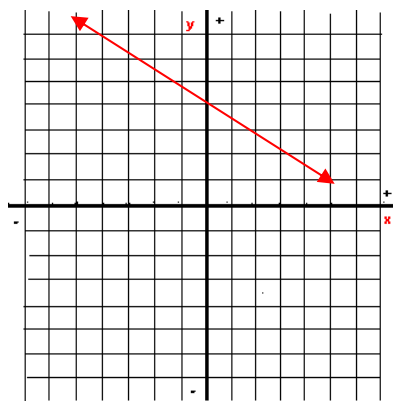
a) $(2, \underline{\quad})$

b) $(\underline{\quad}, 0)$

c) $(\underline{\quad}, -3)$

d) $(-4, \underline{\quad})$

5. Now, graph the equation $x + 2y = 8$ by plotting points. Please make a t-table for the ordered pairs.



6. Define the following terms in your own words:

- Linear equation **An equation where both variables have exponents of one.**
- x-intercept **A point, $(x, 0)$ that crosses the x-axis.**
- y-intercept **A point, $(0, y)$ that crosses the y-axis.**
- Slope **Is a measure of the steepness of a line determined by calculating the difference in the y-coordinates divided by the difference in the x-coordinates.**

7. Determine if the following equations are linear or non-linear. Place L in the space for linear and N for non-linear. Describe why or why not.

___L___ a. $3x + 2y = 5$

Since both variables have an exponent of one.

___N___ b. $\frac{4}{x} + 6y = -2$

Since the variable x is in the denominator.

___L___ c. $y = -7x + 3$

Since both variables have an exponent of one.

___N___ d. $x + y^2 + 2 = -1$

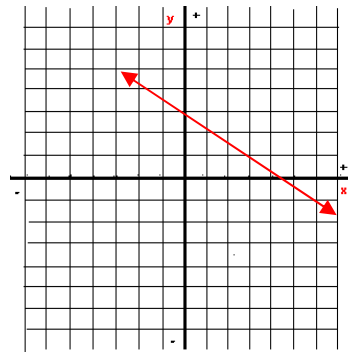
Since the y variable has a power of two.

8. Find the x -intercept and y -intercept and graph the following equations.

a. $3x + 4y = 12$

x -intercept: $(4, 0)$

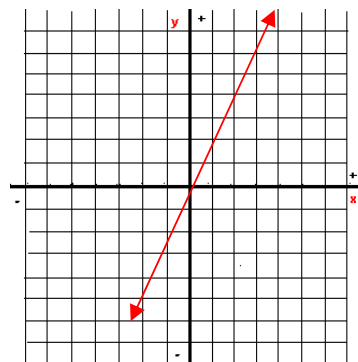
y -intercept: $(0, 3)$



b. $y = 2x$

x -intercept: $(0, 0)$

y -intercept: $(0, 0)$



9. Define the following terms in your own words:

a. Linear function A relation in which each first component in the ordered pairs corresponds to exactly one second component.

b. Domain The set of all first components of the ordered pairs in a given relation.

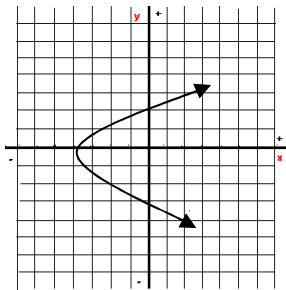
c. Range The set of all second components of the ordered pairs in a given relation.

10. Determine if the following relations are functions by using the method most appropriate: domain and range, vertical line test, or plotting points. Place F in the space provided if the relation is a function, place N if the relation is not a function.

___ **F** ___ a. $3x + 2y = 6$

___ **N** ___ b. $\{(1,3), (6,3), (1,4), (5,7)\}$

___ **N** ___ c.

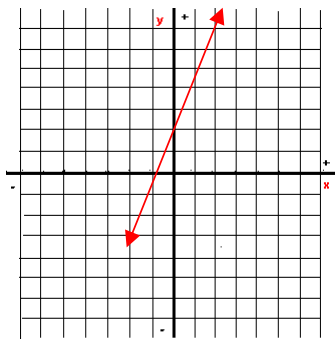


___ **N** ___ d. $x = 2y^2$

11. Graph the following functions using the method described.

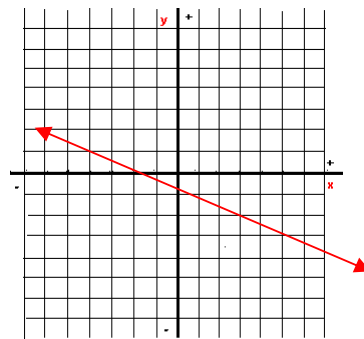
- a) Use ordered pairs to graph the following function.

$$f(x) = 3x + 2$$



- b) Write the following equation in function notation and then find the x-intercept and y-intercept to graph the function.

$$x + 3y = -3$$



12. Find the slope of the line through the given pair of points.

$$(-3, -1) \text{ and } (2, -4)$$

$$m = -\frac{3}{5}$$

13. Find the slope and y-intercept for each of the given equations.

a) $4x - 5y = -10$

$$m = \frac{4}{5}$$

$$b = \text{y-intercept is } (0, 2)$$

b) $y = \frac{7}{3}x + 4$

$$m = \frac{7}{3}$$

$$b = \text{y-intercept is } (0, 4)$$

14. Determine whether the two lines are parallel, perpendicular, or neither.

$$x - 3y = 12$$

$$3x + y = 2$$

Answer: Perpendicular

In the following problems, write the equation of the line in slope-intercept form.

15. Write the equation of the line given the following information:

$$m = \frac{3}{4}, \quad b = -3$$

Equation: $y = \frac{3}{4}x - 3$

16. Write the equation of the line given the following information:

point $(-3, -4)$ with a slope of $-\frac{1}{3}$.

Equation: $y = -\frac{1}{3}x - 5$

17. Write the equation of the line given the following information:

points $(1, -5)$ and $(4, 4)$.

Equation: $y = 3x - 8$

Extra Credit:

Write the equation of the line that is perpendicular to the line $4x - 5y = 8$ through the point $(0, -3)$.

Equation: _____