Section 3.1: GRAPHING LINEAR EQUATIONS IN TWO VARIABLES

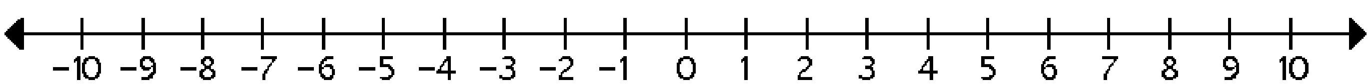
When you are done with your homework you should be able to…

- π Plot ordered pairs in the rectangular coordinate system
- π Find coordinates of points in the rectangular coordinate system
- π Determine whether an ordered pair is a solution of an equation
- π Find solutions of an equation in two variables
- π Use point plotting to graph linear equations
- π Use graphs of linear equations to solve problems

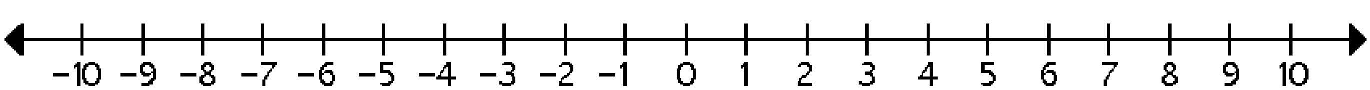
WARM-UP:

1. Find the volume of a box with dimensions $\frac{1}{2}$ ft by 3 ft by 8 ft.

2. Solve the following inequalities and graph the solution sets.
   a. $x \le 6(3x-5)$

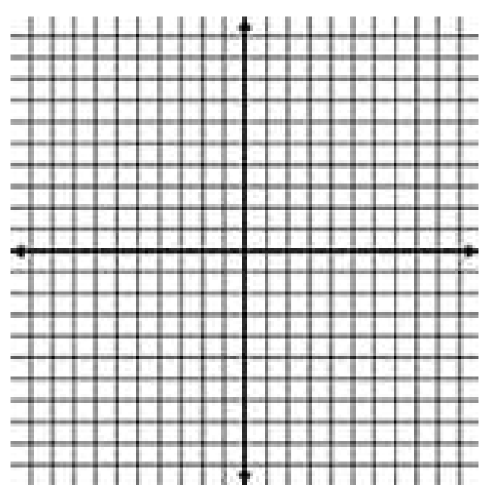


   b. $2x-1 \le 2x$



POINTS AND ORDERED PAIRS

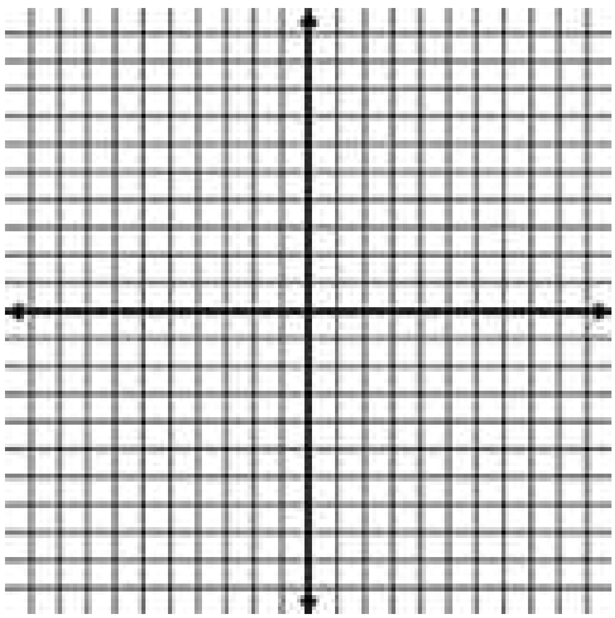
The idea of visualizing equations as geometric figures was developed by the French philosopher and mathematician ____________ ________________. This idea is the _________________ __________________ system or the _____________________ coordinate system. The rectangular coordinate system consists of _______ ______________ lines that _______________ at right ____________ at their ____________ points. The horizontal number line is the ______________ and the vertical number line is the _____________. The point of intersection is a ________________ called the ______________. Positive numbers are to the ______________ and _______________ the origin. Negative numbers are to the _____________ and _____________ the origin. The _______ divide the ___________ into ___________ regions, called ________________. The points located on the ______________ are __________ in any quadrant. Each ______________ in the rectangular coordinate system ________________ to an ______________ ___________ of real numbers, __________. The _______ number in each pair, called the ________________, denotes the _____________ and _______________ from the _____________ along the ______________. The second number, called the ___________________, denoted the ______________ distance along a _______ __________________ to the _______________ or along the ________________ itself.



Example 1: Plot the following ordered pairs.

$(2,5)$, $(-3,7)$, $(-2,-4)$

(2,5)	
(-3,7)	
(-2,-4)	



SOLUTIONS OF EQUATIONS IN TWO VARIABLES

A ____________________ of an __________________ in __________ variables, ____ and ____, is an _______________ __________ of real numbers with the following property: When the __________________ is substituted for _____ and the __________________ is substituted for _____ in the equation, we obtain a __________ statement.

Example 2: Determine whether each of the given points is a solution of the equation $8x+y=1$.

a. $(0,1)$ b. $(-1,3)$ c. $(2,-15)$

Example 3: Find three solutions of $2y = -x - 1$.

GRAPHING LINEAR EQUATIONS IN THE FORM $y = mx + b$

The ____________ of the ________________ is the ________ of all _____________ whose __________________ satisfy the equation.

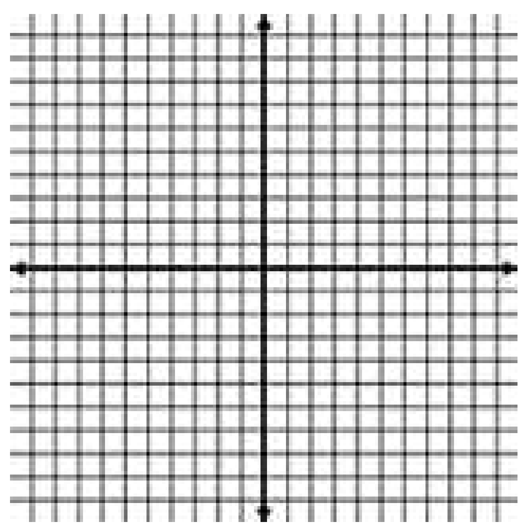
STEPS FOR USING THE POINT-PLOTTING METHOD FOR GRAPHING AN EQUATION IN TWO VARIABLES

1. Find several _______________ ___________ that are _________________ of the equation.
2. Plot these ordered pairs as ________________ in the ____________________ coordinate system.
3. __________________ the points with a _________________ curve or ________, depending on the type of equation.

Example 3: Graph the following equations by plotting points.

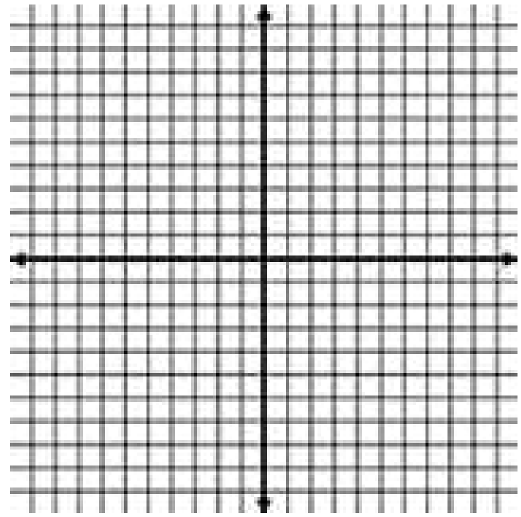
a. $y = 2x$

x	$y = 2x$	(x, y)



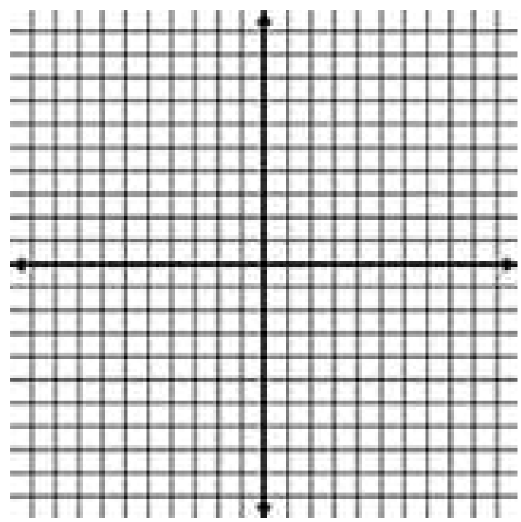
b. $y=-3x+9$

x	$y=-3x+9$	(x, y)



c. $y=\frac{2}{5}x+3$

x	$y=\frac{2}{5}x+3$	(x, y)



COMPARING GRAPHS OF LINEAR EQUATIONS

If the value of ______ does not change,

- The graph of ________________ is the graph of __________ shifted ____ units ____ when ____ is a positive number.
- The graph of ________________ is the graph of __________ shifted ____ units ____ when ____ is a positive number.

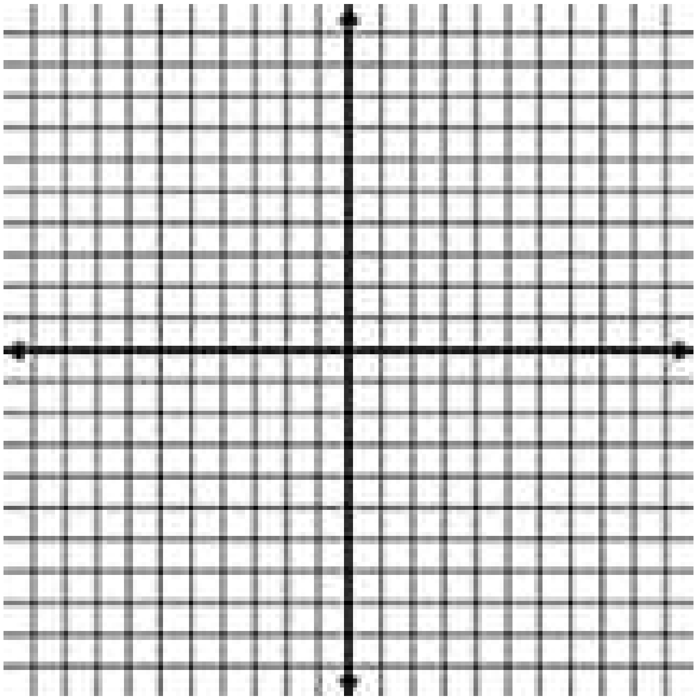
APPLICATION

In 1960, per capita fish consumption was 10 pounds. This increased by approximately 0.15 pound per year from 1960 through 2005. These conditions can be described by the mathematical model $F = 0.15n + 10$, where F is per capita fish consumption n years after 1960.

a. Let n = 0, 10, 20, 30, and 40. Make a table of values showing five solutions of the equation.

n	$F = 0.15n + 10$	(n, F)

b. Graph the formula in a rectangular coordinate system.



c. Use the graph to estimate per capita fish consumption in 2020.

d. Use the formula to project per capita fish consumption in 2020.