COLLEGE PREP
SECTION 2.1 ~ Rectangular Coordinates and Graphs of Equations

Objectives:

- Put points in the Rectangular Coordinate System.
- Determine if an ordered pair is a point on the graph of an equation.
- Graph an equation using the point-plotting method.
- Identify intercepts from a graph.
- Interpret graphs.

DEFINITIONS ON THE COORDINATE PLANE:

This is called the ***rectangular*** or ***Cartesian Coordinate system.***

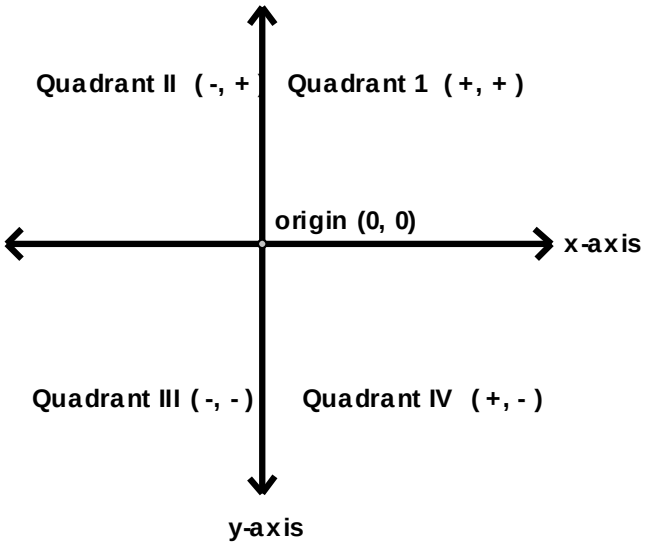
The x-axis and y-axis are called ***coordinate axes***.

The whole system is called the ***xy-plane*** or ***coordinate plane.***

Every point on the graph is represented by an ***ordered pair (x, y)*** of real numbers. The ordered pairs are also called ***coordinates***.

The x-coordinate is the ***abscissa.***

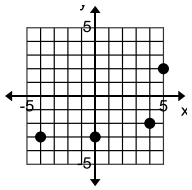
The y-coordinate is the ***ordinate***



PLOTTING POINTS:

To plot a point, we first go left or right along the x-axis to the x value named, then we travel up or down to the y value listed. If x is positive, we go right. If x is negative, we go left. If y is positive, we go up. If y is negative, we go down.

Example: Plot each point on the coordinate plane, and name the quadrant or axis in/on which it lies.



A(5, 2)	B(4,-2)	C(0, -3)	D (-4, -3)
QI	QIV	y-axis	QIII

DETERMINING IF AN ORDERED PAIR IS A POINT ON THE GRAPH OF AN EQUATION: Plug it in!

Vocabulary:

EQUATION IN TWO VARIABLES: An equation containing 2 variables, like $3x + 2 = y$

Any values of the variable that make the equation a true statement are said to ***SATISFY*** the equation.

A ***GRAPH OF AN EQUATION IN TWO VARIABLES***: the set of all ordered pairs (x, y) that satisfy the equation.

A ***COMPLETE GRAPH*** has enough points plotted to make the pattern of solutions clear.

SO: to decide if an ordered pair is a point on the graph of an equation, you substitute the x and y values into the equation and solve. If the result is TRUE, the pair is a point on the graph. If False, it is not.

Example: Are the following points on the graph of ?

A) (1, -3) B) (2, –

–

7=7 TRUE!, so Yes. 11=7 FALSE! So no.

GRAPHING AN EQUATION USING THE POINT-PLOTTING METHOD.

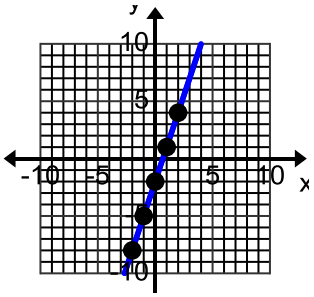
Step – by –step:

Step 1: Choose values of x. Substitute the values into the equation and solve for y. Find (x, y)

Step 2: Plot the points on a graph and the connect the points .

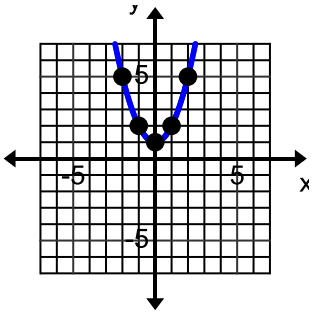
Example: Graph the equation by plotting points.

X	Y = 3x-2	(x, y)
-2	Y=3(-2)-2=-6-2=-8	(-2, -8)
-1	Y=3(-1)-2 = -3-2 = -5	(-1, -5)
0	Y=3(0)-2 = 0 – 2 = -2	(0, -2)
1	Y=3(1)-2 = 3 – 2 = 1	(1,1)
2	Y=3(2) – 2 = 6 – 2 = 4	(2, 4)



Example: Graph the equation

X		(x, y)
-2		(-2, 5)
-1		(-1, 2)
0		(0, 1)
1		(1,2)
2		(2, 5)

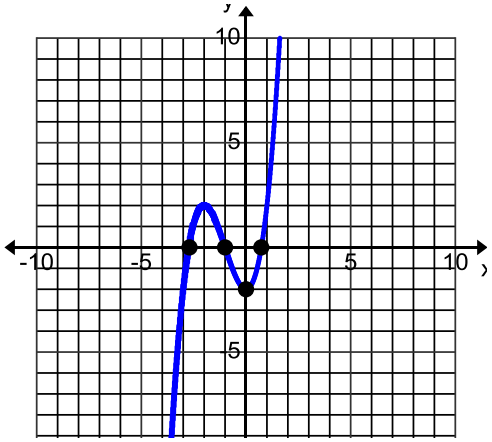


IDENTIFYING INTERCEPTS FROM A GRAPH

Definition: An ***INTERCEPT*** is a point where the graph crosses an axis. An ***x-intercept*** is where it crosses the x-axis (x, 0), the ***y-intercept*** is where it crosses the y-axis (0, y).

Example: Find the intercepts from the graph.

Answer: x-intercepts (-2.7, 0) (-1, 0) (.73, 0)
y-intercept (0,-2)



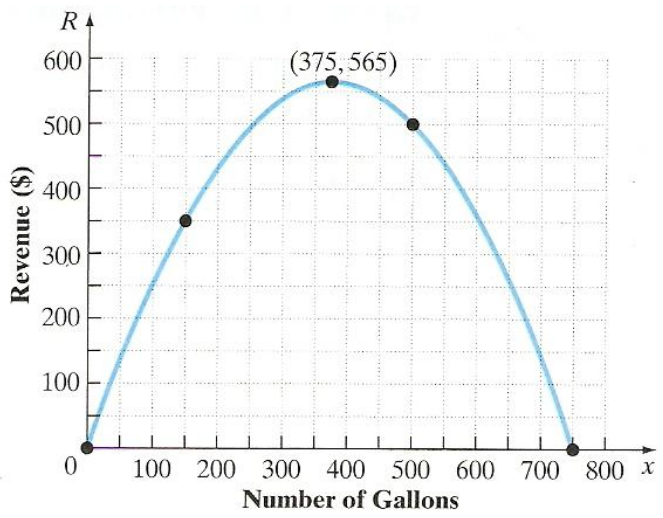
INTERPRETING GRAPHS:

A graph is simply a picture or a model of a relationship between two things.

STEPS FOR INTERPRETING:

1: Identify the value relating to your x-axis, and draw a vertical line on the graph through that point.
2: Identify the value relating to your y-axis, and draw a horizontal line through that point
3: Identify the relationship of your values at the point of intersection.

Example:



The graph above shows the revenue R for selling x gallons of gasoline in an hour at a gas station. The vertical axis represents the revenue (money earned), and the horizontal axis represents the number of gallons of gasoline sold.

A) What is the revenue if 150 gallons of gasoline are sold? ($350)

B) How many gallons of gas are sold when the revenue is highest? What is the highest revenue? (565 gallons / $375)

C) Identify and interpret the intercepts.

(0, 0) No money is made because no gas is sold.

(750, 0) 750 gallons of gas but no revenue -- the gas station has a capacity of 750 gallons of gas, but none is sold, so there isn't any revenue.

Homework: p. 145-148 - # 1-6, 10, 13, 15, 17, 21-27 odd, 33, 34, 37, 39, 41, 45, 57 - 59

Graphs must be neat and clearly labeled!