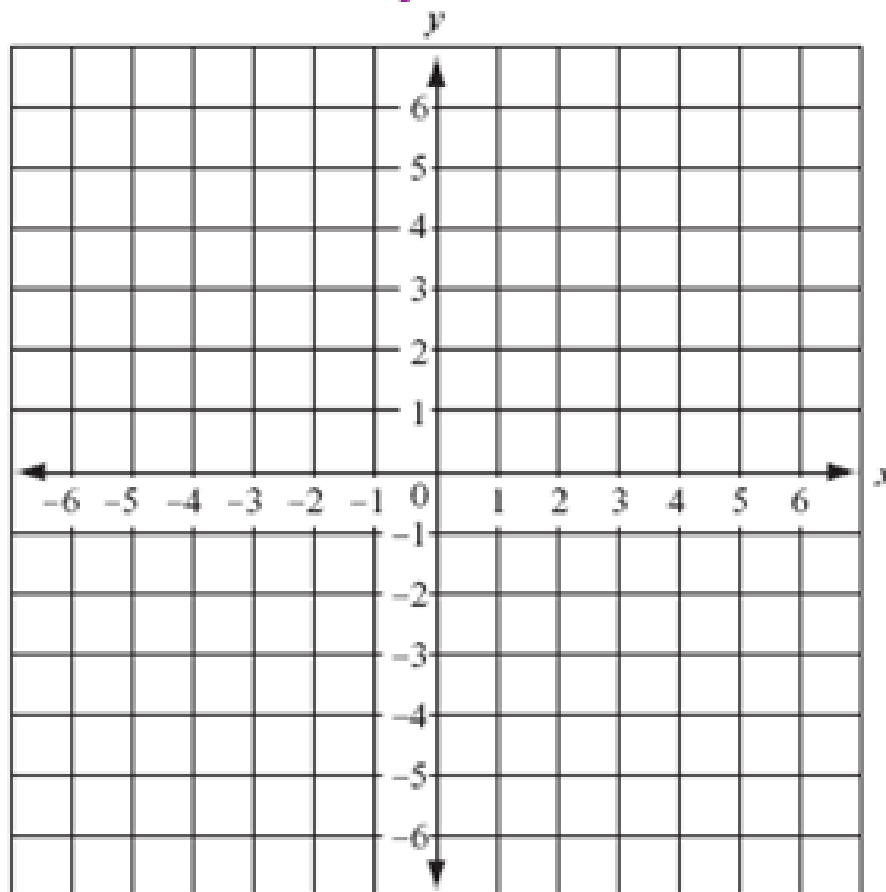## Lesson 2.1: Rectangular Coordinates and Graphs of Equations

By the end of the lesson, you will be able to:

~ Plot points in the rectangular coordinate system
~ Determine whether an ordered pair is a point on the
    graph of an equation
~ Graph and equation using Point-Plotting Method
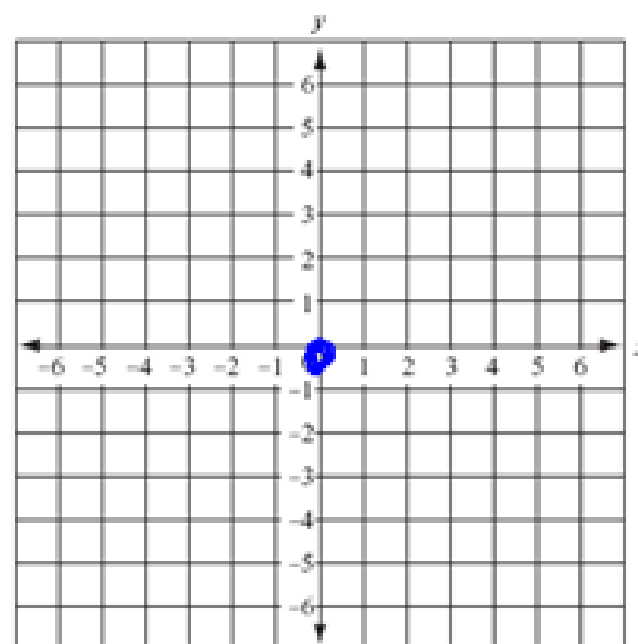~ Identify the intercepts from the graph
~ Interpret Graphs

Lesson 2.1: Rectangular Coordinates and Graphs of Equations

Can you tell me what the origin is?

-Origin is: $(0, 0)$

Quadrants:

x<0, y>0

x>0, y>0

x<0, y<0

x>0, y<0
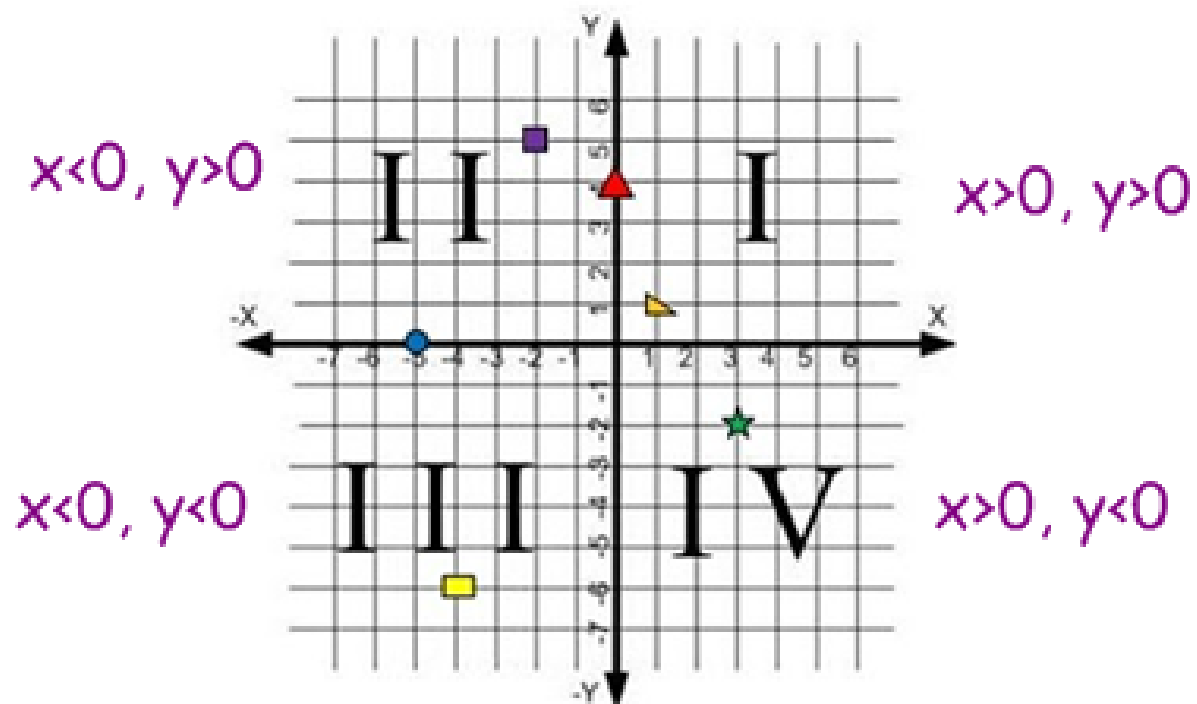
Example 1: Determine which quadrant the points are in.

a.) A(3, 2) I
b.) B(-2, 4) II
c.) C(-1, -3) III
d.) D(3, -4) IV
e.) E (-2, 0) x-axis
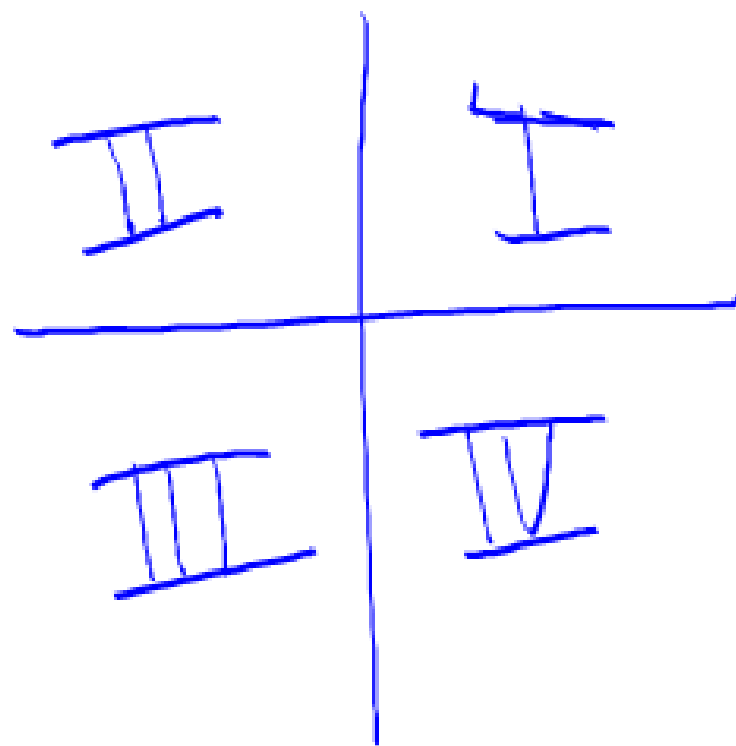
II | I

III | IV

Determine whether an ordered pair is a point on the graph of an equation.

Definition: The graph of an equation in two variables, x and y, is the set of all ordered pairs (x, y) in the xy-plane that satisfy the equation.

So, we need to plug points into the equation to determine whether they are on the graph or not. If the point makes the equation true, then it is on the graph.

Determine whether an ordered pair is a point on the graph of an equation.

Example 2: $3x - y = 6$

a.) $(2, 0)$

$3(2) - 0 \overset{?}{=} 6$

$6 - 0 \overset{?}{=} 6$

$6 = 6$

yes ✓

b.) $(1, -2)$

$3(1) - (-2) \overset{?}{=} 6$

$3 + 2 \overset{?}{=} 6$

$5 \neq 6$

No

c.) $(1/2, -9/2)$

$3\left(\frac{1}{2}\right) - \left(-\frac{9}{2}\right) \overset{?}{=} 6$

$\frac{3}{2} + \frac{9}{2} \overset{?}{=} 6$

$\frac{12}{2} \overset{?}{=} 6$

$6 = 6$

yes

Determine whether an ordered pair is a point on the graph of an equation.

Example 3: $y = x^2 + 3$

a.) (1, 4)

$4 \overset{?}{=} (1)^2 + 3$

$4 \overset{?}{=} 1 + 3$

$4 = 4$

yes

b.) (-2, -1)

$-1 \overset{?}{=} (-2)^2 + 3$

$-1 \overset{?}{=} 4 + 3$

$-1 \neq 7$

No

c.) (-3, 12)

$12 \overset{?}{=} (-3)^2 + 3$

$12 \overset{?}{=} 9 + 3$

$12 = 12$

yes

Graph an equation by plotting points.

~Make a "t chart".

~Pick x's and plug in the equation to get y's. (5)

~Then graph the coordinates on a grid and connect the dots.

~This will give you the graph of the equation.

Usually

x	y
-2	
-1	
0	
1	
2	

x	y

Graph an equation by plotting points.

Example 4: $y = x^2$

x	$y = x^2$	
-2	4	$= (-2)^2$
-1	1	$= (-1)^2$
0	0	$= (0)^2$
1	1	$= (1)^2$
2	4	$= (2)^2$
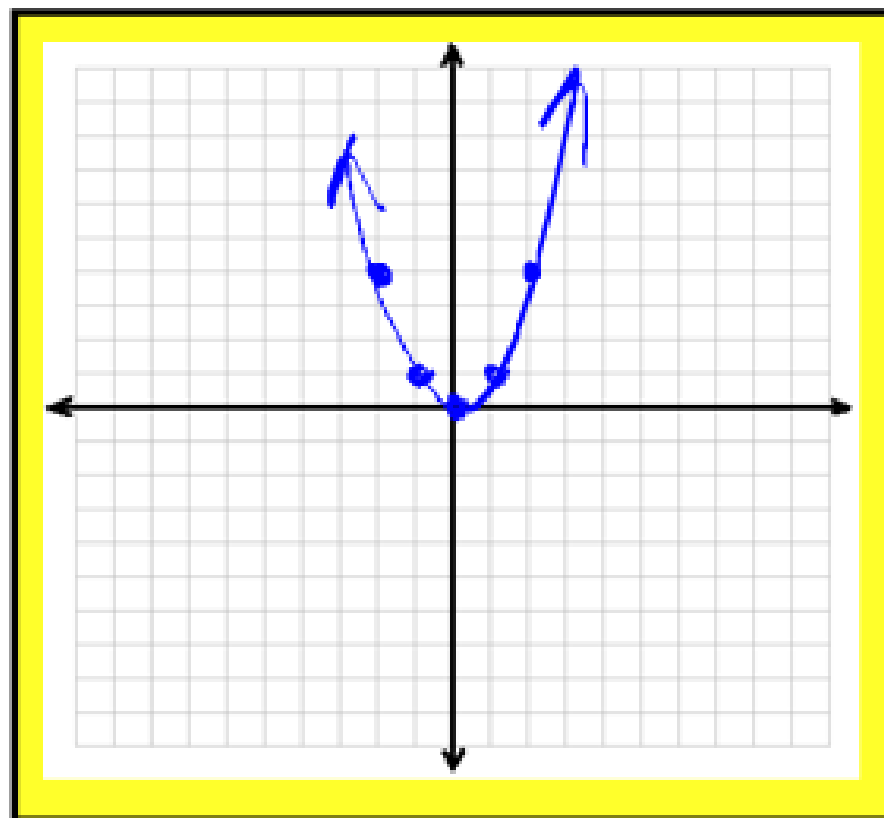
Graph an equation by plotting points.

Example 5: $y = \sqrt{x}$

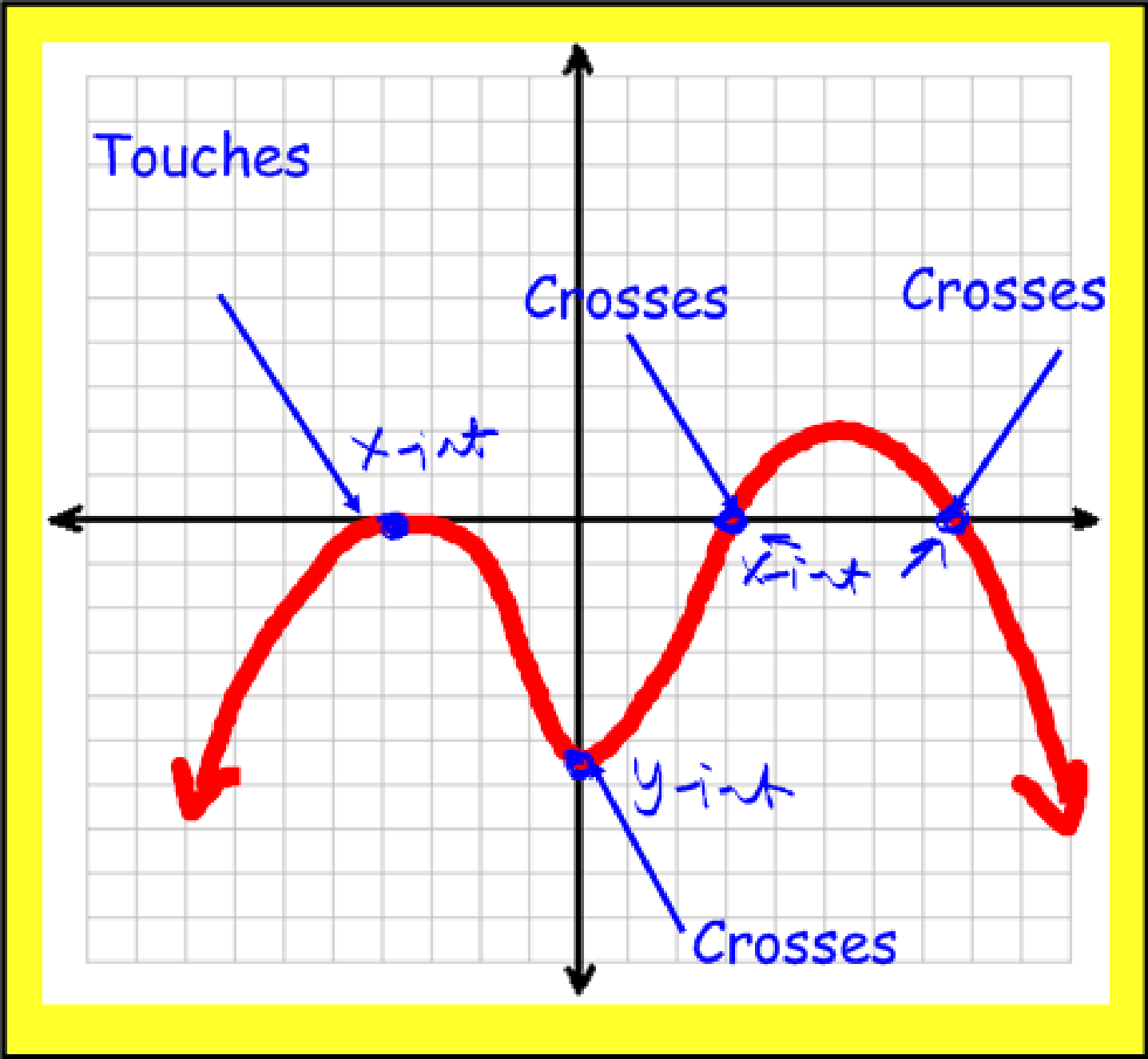| x	y = $\sqrt{x}$	
0	0	$= \sqrt{0}$
4	2	$= \sqrt{4}$
9	3	$= \sqrt{9}$
16	4	$= \sqrt{16}$
25	5	
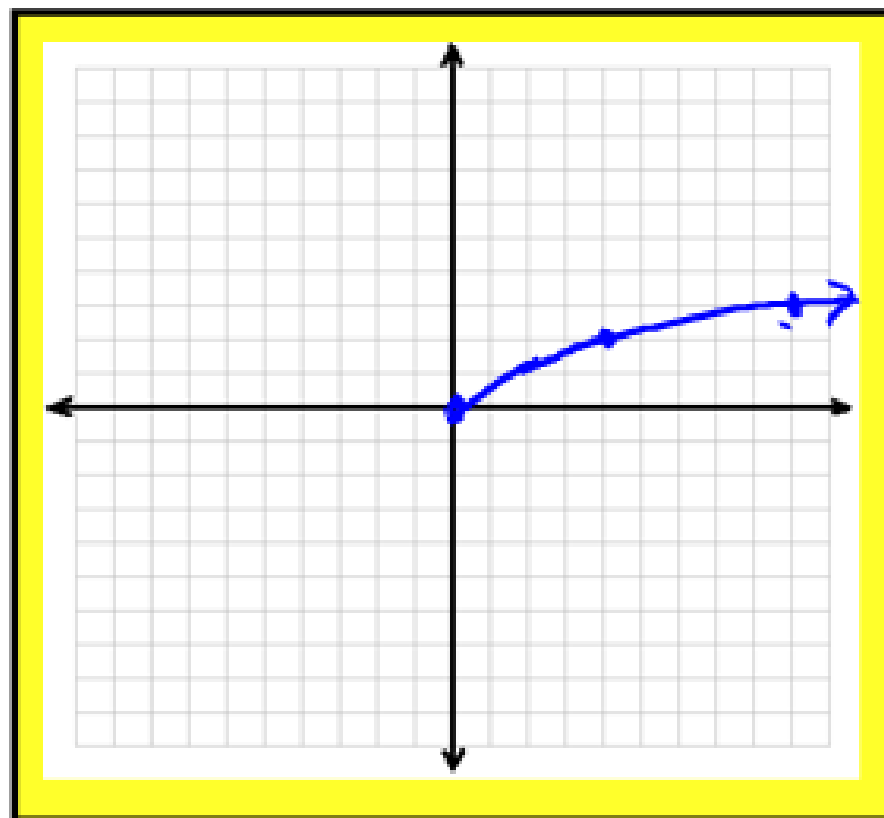
Identifying Intercepts

Intercepts are the points, if any, where a graph crosses or touches the coordinate axes.

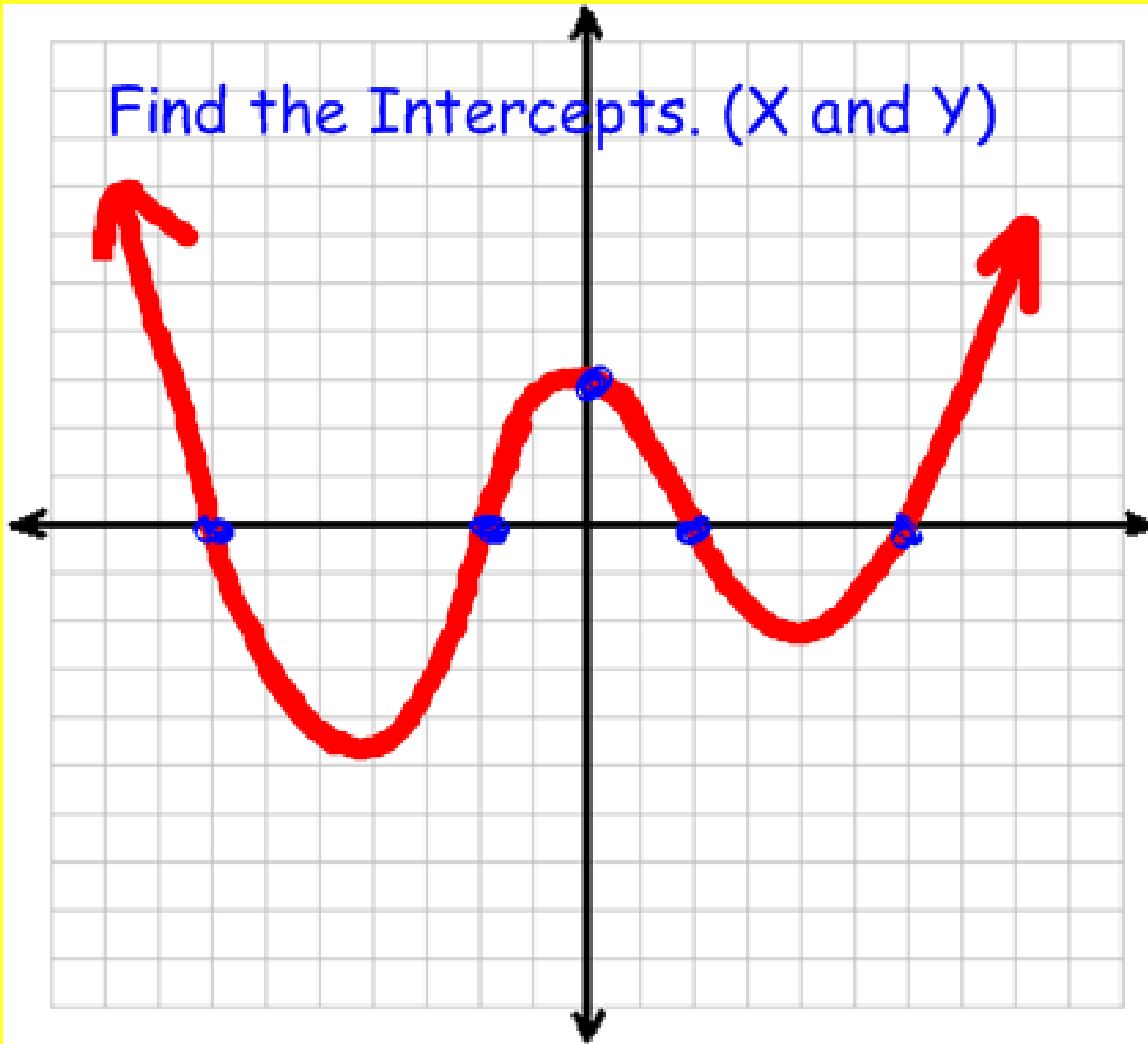~ The X-Intercept is where the graph touches or crosses the x-axis. It's point is (x, 0).

~ The Y-Intercpet is where the graph touches or crosses the y-axis. It's point is (0, y).

Lesson 2.1: Rectangular Coordinates and Graphs of Equations

X-int
(-7,0)
(2,0)
(2,0)
(6,0)
y-int
(0,3)

Find the Intercepts. (X and Y)
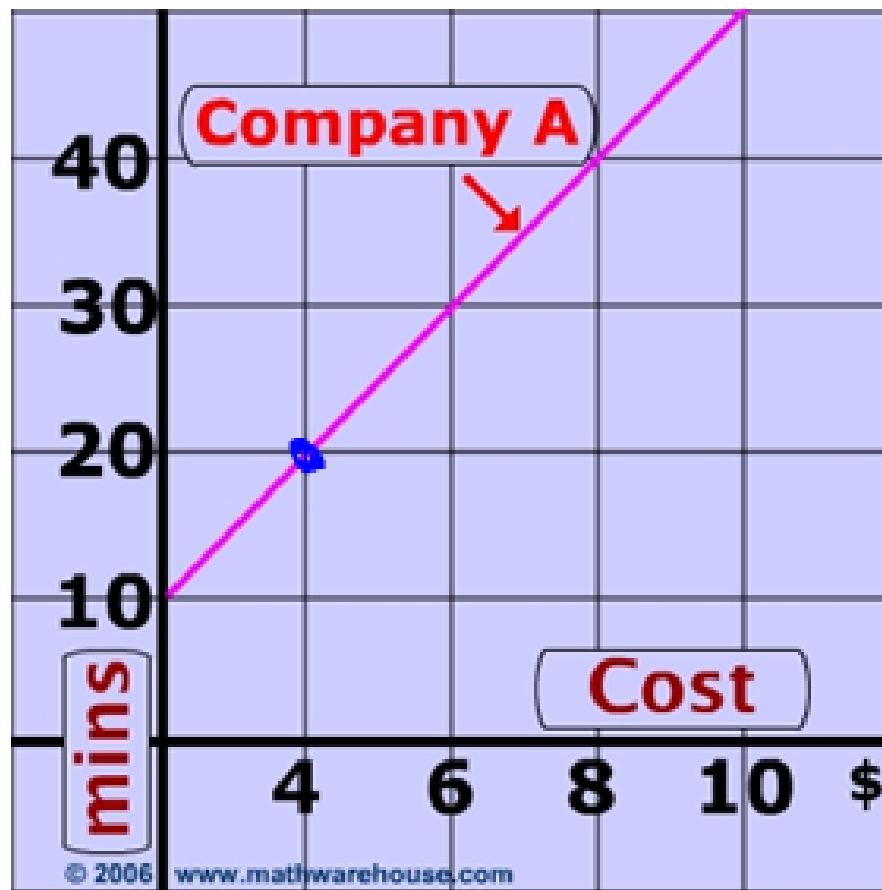
Interpreting Graphs:

Graphs play an important role in helping us to visualize relationships that exist between two variables or quantities.

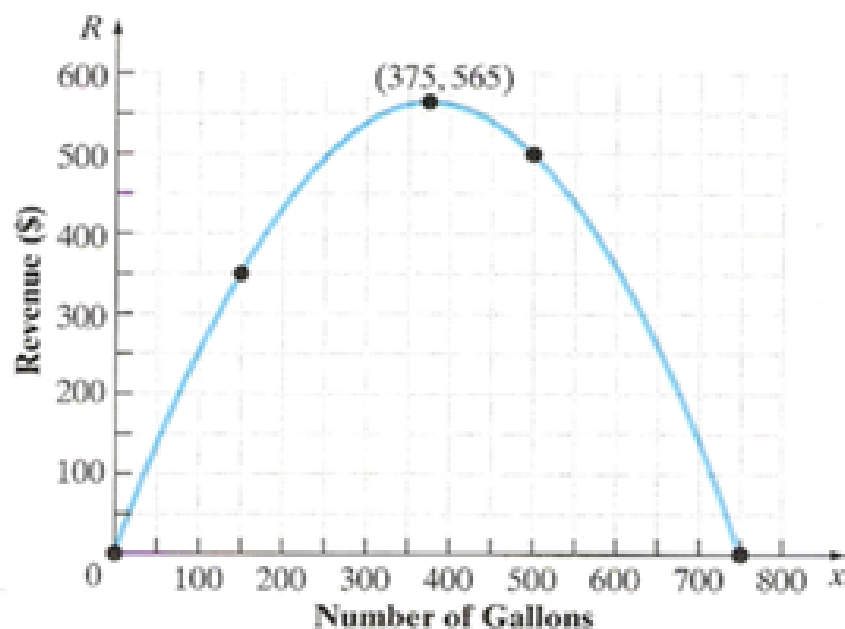A graph is a picture that illustrates the relationship between the variables.

Cell Phone Company A's calling plan is represented by the line on the graph below. How much does Company A charge for 20 minutes of usage?

$4

Lesson 2.1: Rectangular Coordinates and Graphs of Equations

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

$1 350

B) How many gallons of gas are sold when the revenue is highest? What is the highest revenue? 375 gal.

C)   Identify and interpret the intercepts. x-int (0,0), (750,0)

$(0,0)$ If they sell 0 gal. of gas, they make no money

$(750,0)$ If they sell 750 gal. of gas, they make no money.

$(0,0)$ (y) If they make no money, they aren't selling any gas

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Can you?

Homework:

Pg. 145: 1–11 all, 13, 15, 17, 21, 23, 37, 41, 57, 59

&

Trick or Treat Graphing (extra credit)

Lesson 2.1: Rectangular Coordinates and Graphs of Equations