Math 1010 – 2.1 Notes

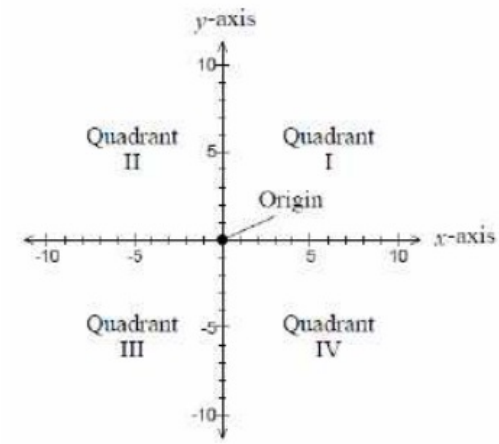
Graphs

To identify the location of a point on a plane, we use the **Cartesian coordinate system,** named for French mathematician René Descartes.

Two perpendicular number lines called **axes** (singular **axis**) split the plane into four **quadrants,** which are labeled using Roman numerals. The point at which the axes intersect is called the **origin**.

We describe the location of points by using **ordered pairs** of numbers in the form (x, y).

***x*-coordinate:** Horizontal distance from y-axis (right for +, left for –).
***y*-coordinate:** Vertical distance from x-axis (up for +, down for –).



Example: Plot the following points and state the quadrant in which each point is located.

$A(2,6)$ I

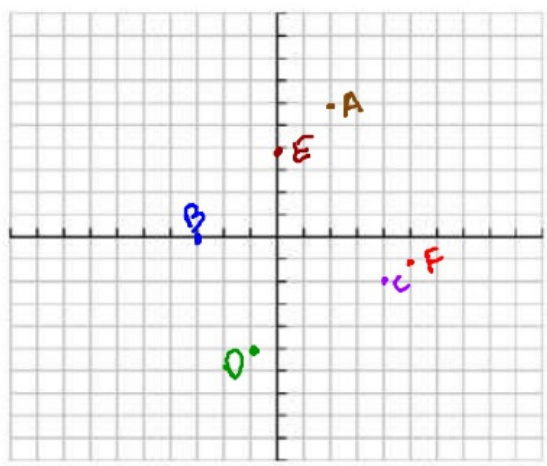
$B(-3,0)$ x-axis

$C(4,-2)$ IV

$D(-1,-5)$ III

$E(0,4)$ y-axis

$F(5,-1)$ IV



The **solutions** of an equation with two variables are pairs of numbers that make the equation true when they are substituted in.

-2^2 $(-2)^2$
-4 4

Examples: Determine whether each ordered pair is a solution of the given equation.

a) $(1,4); y = 5x - 1$

$4 = 5(1) - 1$
$4 = 4$ yes

b) $(5,5); 3x - y = 10$

$3(5) - 5 = 10$
$15 - 5 = 10$
$10 = 10$ yes

c) $(-2,-1); r^2 - s = 5$

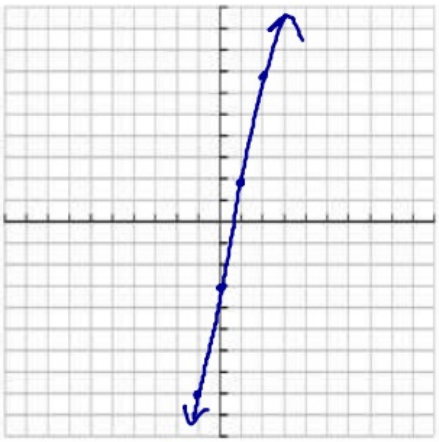
$(-2)^2 - (-1) = 5$
$4 + 1 = 5$
$5 = 5$ yes

Graph of an Equation: A drawing that represents all the solutions of an equation. Any ordered pair on the graph is a solution to the equation.

Examples: Graph the following equations.

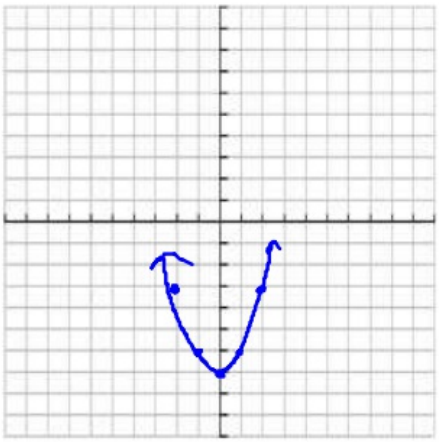
a) $y = 5x - 3$

x	y
-2	-13
-1	-8
0	-3
1	2
2	7



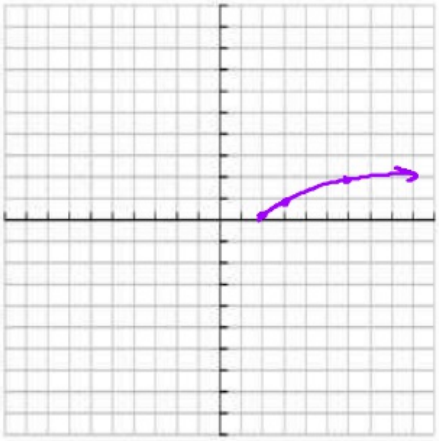
b) $y = x^2 - 7$

x	y
-2	-3
-1	-6
0	-7
1	-6
2	-3



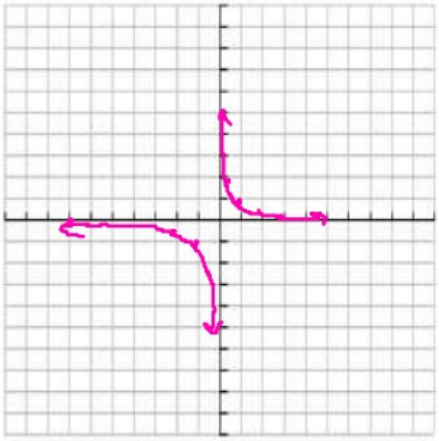
c) $y = \sqrt{x-2}$

x	y
-2	∅
-1	∅
0	∅
1	∅
2	0
3	1
6	$\sqrt{4} = 2$



d) $y = \frac{1}{x}$

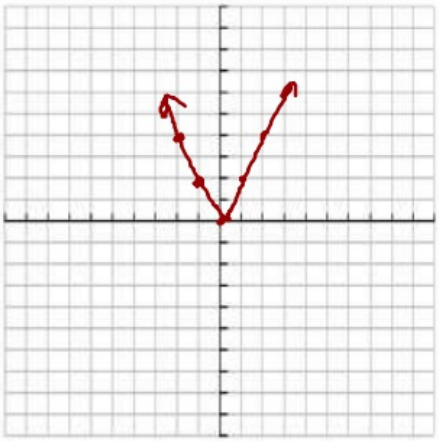
x	y
-2	$-\frac{1}{2}$
-1	-1
0	∅
1	1
2	$\frac{1}{2}$
3	$\frac{1}{3}$
$\frac{1}{2}$	2



$\frac{1}{\frac{1}{2}} = 1 \cdot 2$

e) $y = 2|x|$

x	y
-2	4
-1	2
0	0
1	2
2	4



Homework Section 2.1

1,2,3,4,11,12,17,19,21,23,27,31,37,41,47,51,
55,61,63,65,73,77,79,85,86,87,~~91~~