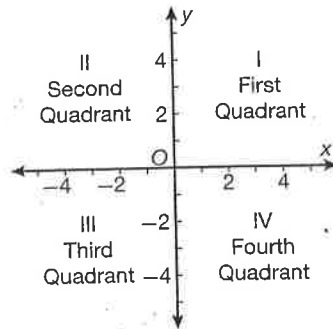


## Lesson 20 Graphing on a Coordinate Plane

A **coordinate plane** is made of two perpendicular number lines, one horizontal and one vertical. The horizontal line is called the **x-axis**, and the vertical line is called the **y-axis**. The number lines divide the plane into four **quadrants**, numbered and named as shown. The intersection of the x- and y-axis is called the **origin**.

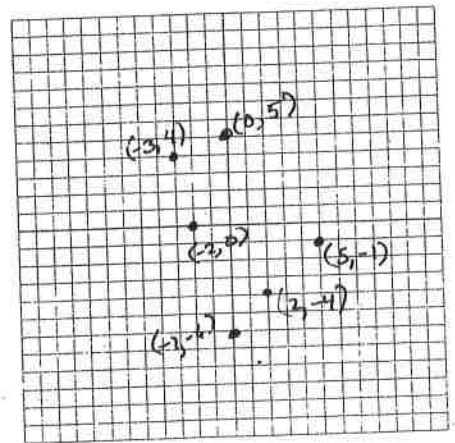


Examples:

Graph each ordered pair on a coordinate plane. Label each point.

(Ex 1)

- |              |               |
|--------------|---------------|
| a. $(0, 5)$  | b. $(-1, -6)$ |
| c. $(-2, 0)$ | d. $(-3, 4)$  |
| e. $(5, -1)$ | f. $(2, -4)$  |



When there is a relationship between two variable quantities, one variable is the independent variable and the other is the dependent variable.

Variables
<b>Independent variable:</b> The variable whose value can be chosen. Also called the input variable.
<b>Dependent variable:</b> The variable whose value is determined by the input value of another variable. Also called the output value.

The dependent variable always depends on what is chosen for the independent variable. In an ordered pair,  $(x, y)$ ,  $x$  is the independent variable and  $y$  is the dependent variable.

Examples: For each pair of variables, identify the independent variable and the dependent variables.

1. Number of traffic violations, cost of auto insurance  
number of traffic violations - independent  
cost of auto insurance - dependent
2. Electric bill total, kilowatts of electricity used  
Electric bill total - dependent  
kilowatts of electricity used - independent
3. The amount paid, the number of toys purchased  
amount paid - dependent  
number of toys purchased - independent
4. The number of hours worked, the number of lawn mowed  
number of hours worked - independent  
number of lawns mowed - dependent

A solution to an equation with two variables is an ordered pair that makes the equation true. There are infinite solutions to the equation  $y = 3x + 2$ . Solutions can be found by substituting values for the independent variable,  $x$ , to find the corresponding value of the dependent variable,  $y$ .

Complete the table for the equation  $y = 3x + 2$ .

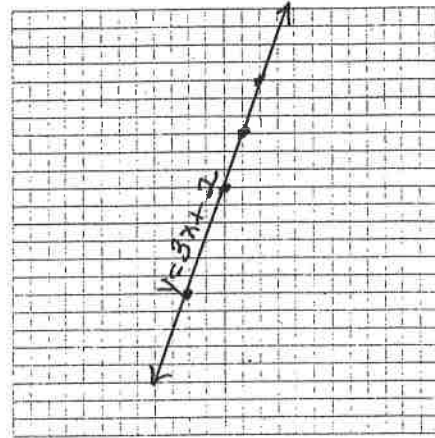
$$\begin{aligned} y &= 3(-2) + 2 \\ &= -6 + 2 \\ &= -4 \end{aligned}$$

$$\begin{aligned} y &= 3(0) + 2 \\ &= 0 + 2 \\ &= 2 \end{aligned}$$

$$\begin{aligned} y &= 3(1) + 2 \\ &= 3 + 2 \\ &= 5 \end{aligned}$$

x	y
-2	-4
0	2
1	5
2	8

$$\begin{aligned} y &= 3(2) + 2 \\ &= 6 + 2 \\ &= 8 \end{aligned}$$



The prom committee raises money for the prom by selling flowers. The money earned for the prom is dependent on the number of flowers sold. Money earned is represented by the equation  $y = 3x - 75$ . Find the amount of money raised when 25, 50, 75, and 100 flowers are sold. Make a graph to represent the equation  $y = 3x - 75$ .

$$y = 3x - 75$$

$$\begin{aligned} y &= 3(25) - 75 \\ &= 75 - 75 \\ &= 0 \end{aligned}$$

$$\begin{aligned} y &= 3(50) - 75 \\ &= 150 - 75 \\ &= 75 \end{aligned}$$

$$\begin{aligned} y &= 3(75) - 75 \\ &= 225 - 75 \\ &= 150 \end{aligned}$$

x	y
25	0
50	75
75	150
100	225

$$\begin{aligned} y &= 3(100) - 75 \\ &= 300 - 75 \\ &= 225 \end{aligned}$$

