

~~5.3~~ Plotting Points on the Cartesian Plane

2.0

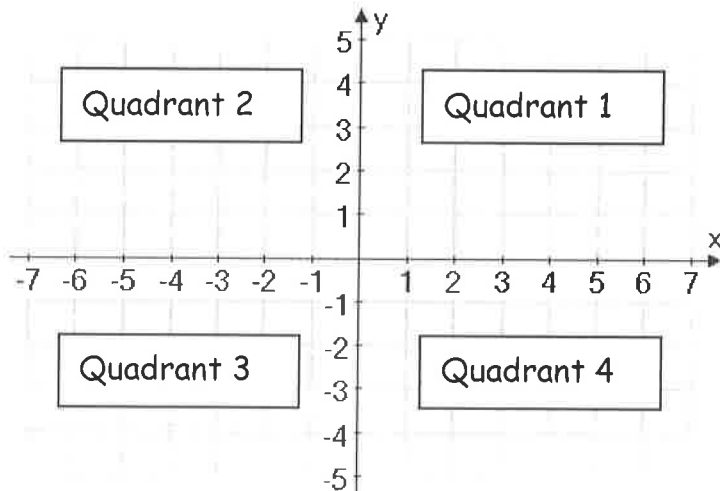
Learning Goals: In this lesson students will be introduced to the Cartesian Coordinate system of graphing and will also be introduced to the concept of linear and non-linear relations

Graphing on the Cartesian Plane



Rene Descartes, a 17th century mathematician, developed a system for graphing ordered pairs on a grid. The system, called the Cartesian Coordinate system in his honour, is made up of two perpendicular number lines that meet at a point O which is called the **origin**. The horizontal line is called the x-axis and the vertical line is called the y-axis.

The coordinate system is drawn as shown in the diagram. The positive side of the x-axis is to the right and the negative side to the left. The positive side of the y-axis is up and the negative side is down. The horizontal line is usually called the x-axis and the vertical is called usually called the y-axis. The plane is divided into quadrants. They are labeled in the counterclockwise as shown below.



READ THIS
CAREFULLY
BEFORE YOU MOVE
ON!!!!!!



The ordered pair $(3, -2)$ represents a point on the Cartesian plane where 3 is the x-coordinate of the point and -2 is the y-coordinate of the point. The x-coordinate determines how far the point is to the left or right of the origin and the y-coordinate determines how far the point is above or below the origin. The point $(3, -2)$ is 3 units to the right of the origin and 2 units below the origin.

Remember, a point such as $(3, -2)$ is called an ordered pair because the order of the numbers is important. Ordered pairs are always written in the form (x-coordinate, y-coordinate).

Example 1: Graph the following points on the given grid.

A (3, 4)

B (-1, 4)

C (4, -2)

D (-5, -4)

E (2, 5)

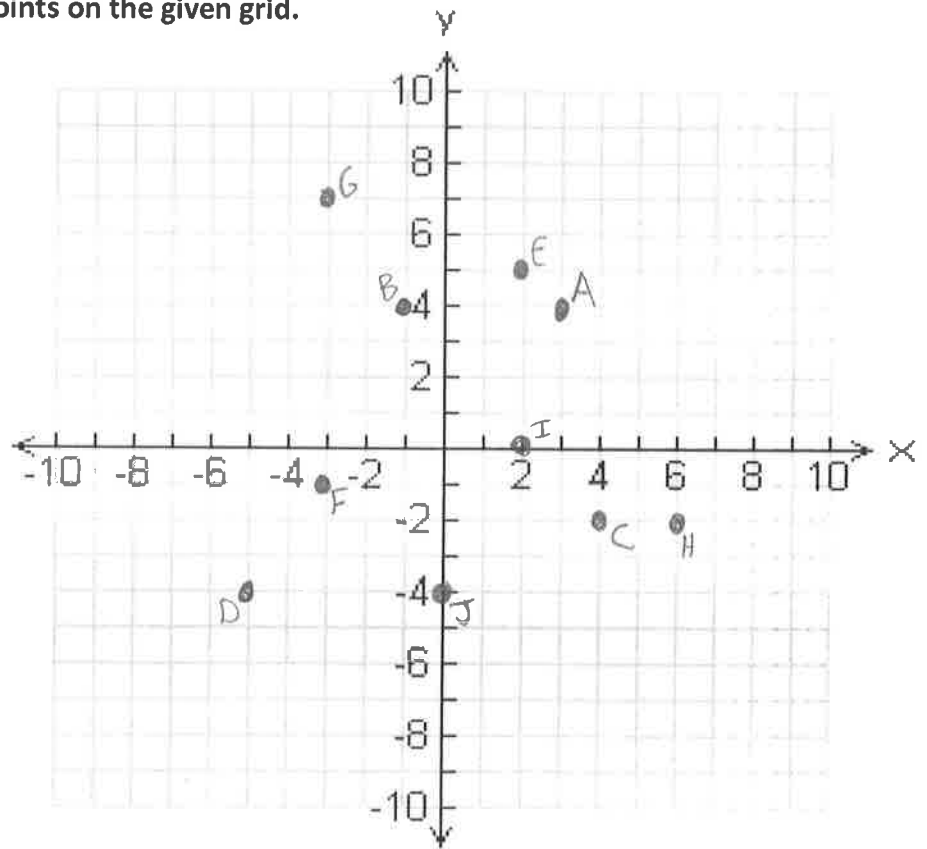
F (-3, -1)

G (-3, 7)

H (6, -2)

I (2, 0)

J (0, -4)



Example 2: On your own, graph the following points on the given grid.

A (1, 1)

B (-8, 3)

C (1, -4)

D (-5, -4)

E (2, 9)

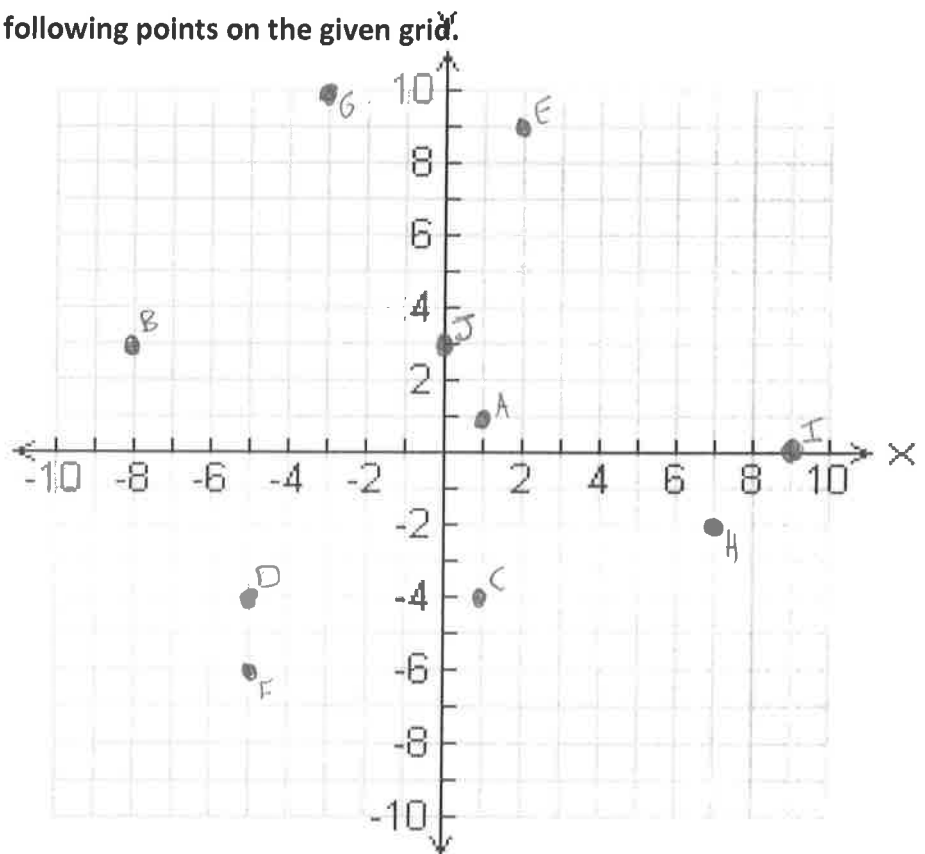
F (-5, -6)

G (-3, 10)

H (7, -2)

I (9, 0)

J (0, 3)



Example 3: Plot and join the set of points in order. Join the last point to the first point to form a closed figure. Identify the figure and calculate its area in square units.

D(1, 1), E(1, -2), F(-5, -2), G(-5, 1)

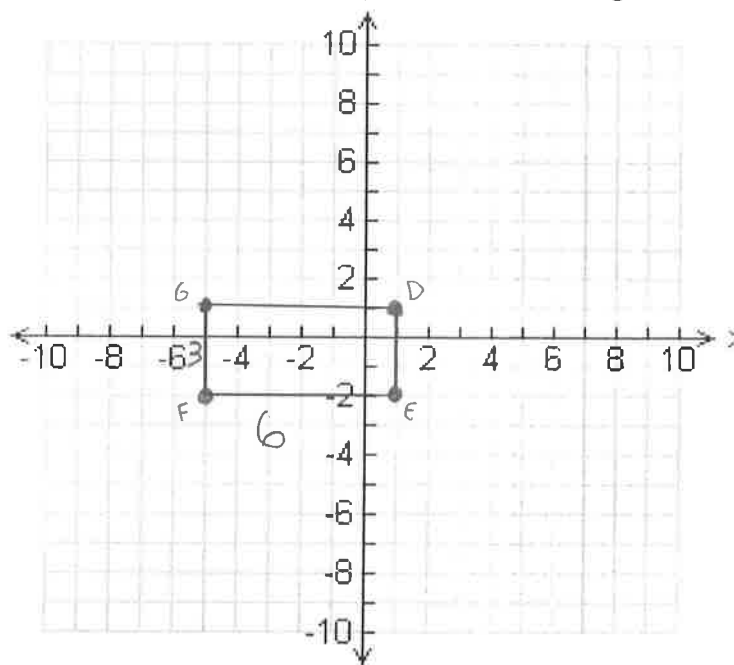
To figure out the length and width you simply need to count how many units are on each side once the figure has been plotted.

$$A = l \times w$$

$$\text{Length} = FE = 6 \text{ units}$$

$$\text{Width} = GF = 3 \text{ units}$$

$$\begin{aligned} A &= l \times w \\ &= (6)(3) \\ &= 18 \text{ units}^2 \end{aligned}$$



Example 4: Calculate the area of a triangle with vertices at A(-5,-3), B(3,-3), and C(3,8)

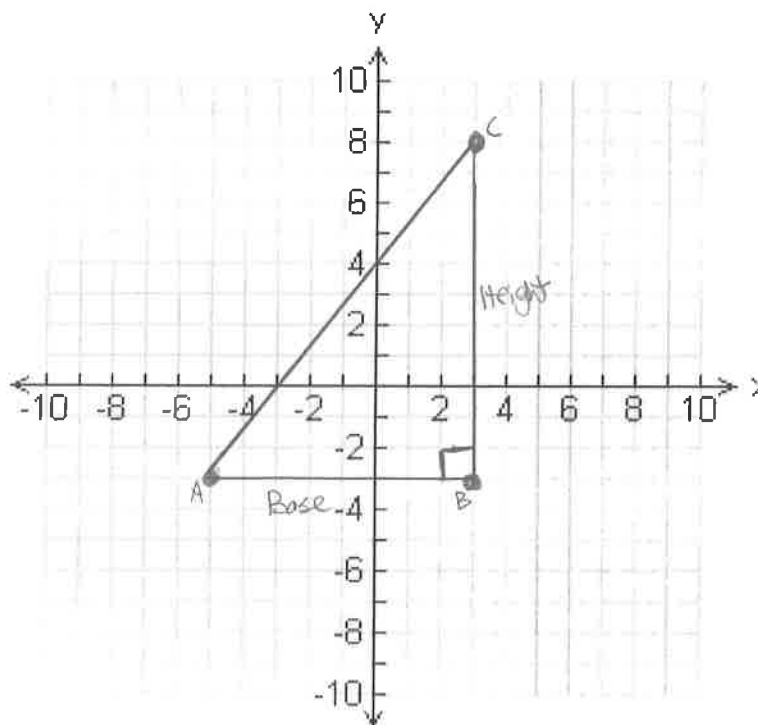
Step 1: Plot the points and connect the points to form a triangle

Step 2: Find the length of the base and height

Remember: The legs of a right triangle are the base and height.

$$\text{Base} = AB = 8 \text{ units}$$

$$\text{Height} = BC = 11 \text{ units}$$



Step 3: Calculate the area

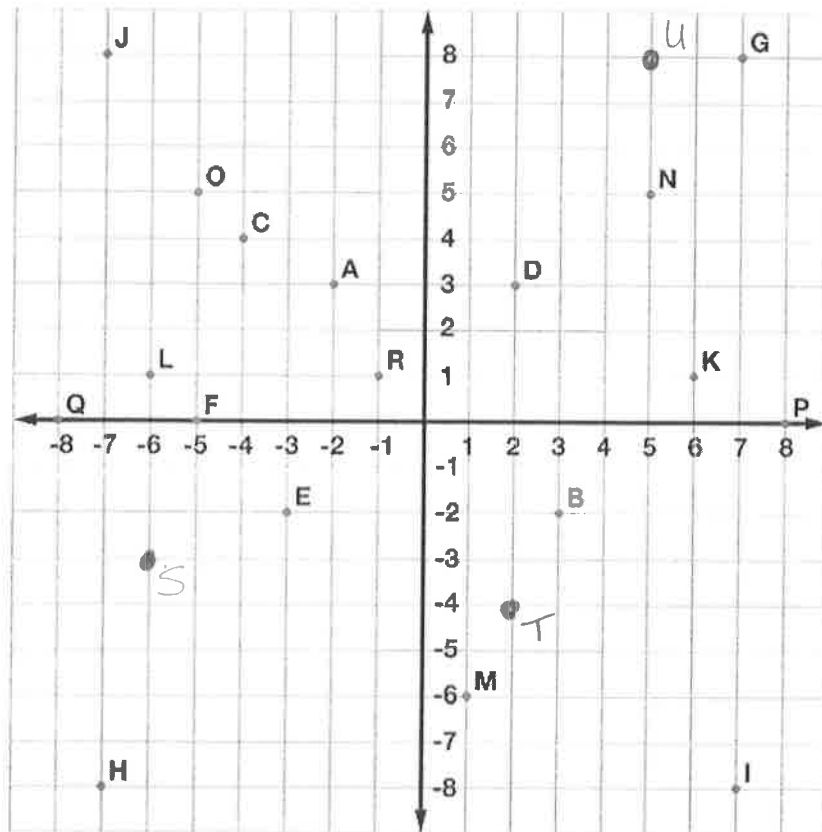
$$\begin{aligned} A &= \frac{bh}{2} \\ &= \frac{(8)(11)}{2} \\ &= 44 \text{ units}^2 \end{aligned}$$

Please complete the following worksheets

Name: _____

Coordinate Plane & Ordered Pairs

Ordered Pairs



Tell what point is located at each ordered pair.

- | | | |
|------------------------|-----------------------|-----------------------|
| 1. $(3, -2)$ <u>B</u> | 2. $(2, 3)$ <u>D</u> | 3. $(-5, 5)$ <u>O</u> |
| 4. $(-7, -8)$ <u>H</u> | 5. $(-4, 4)$ <u>C</u> | 6. $(-5, 0)$ <u>F</u> |

Write the ordered pair for each given point.






















- | | | |
|-----------------------------------|-----------------------------------|----------------------------------|
| 7. E <u>$(-3, -2)$</u> | 8. M <u>$(1, -6)$</u> | 9. P <u>$(8, 0)$</u> |
| 10. G <u>$(7, 8)$</u> | 11. Q <u>$(-8, 0)$</u> | 12. N <u>$(5, 5)$</u> |

Plot the following points on the coordinate grid.

- | | | |
|------------------|-----------------|----------------|
| 13. S $(-6, -3)$ | 14. T $(2, -4)$ | 15. U $(5, 8)$ |
|------------------|-----------------|----------------|

Complete the following by plotting each of the points below on the graph that follows. For each set you will need to plot each point and then connect the points in order to form a line. Stop where you are told to and start a new line for the next set of points.

NOTE: In each section, do NOT connect the last point back to first point.

(X, Y)	(X, Y)	(X, Y)	(X, Y)	(X, Y)
<input type="checkbox"/> (1, -20)	<input type="checkbox"/> (2, -5)	<input type="checkbox"/> (3, 19)	<input type="checkbox"/> (-6, 6)	<input type="checkbox"/> (-6, 1)
<input type="checkbox"/> (1, -19)	<input type="checkbox"/> (5, -2)	<input type="checkbox"/> (-3, 19)	<input type="checkbox"/> (-7, 7)	<input type="checkbox"/> (-6, -1)
<input type="checkbox"/> (3, -18)	<input type="checkbox"/> (6, -2)	<input type="checkbox"/> (-4, 18)	<input type="checkbox"/> (-9, 7)	<input type="checkbox"/> (-7, -1)
<input type="checkbox"/> (5, -18)	<input type="checkbox"/> (6, -8)	<input type="checkbox"/> (-4, 14)	<input type="checkbox"/> (-10, 6)	<input type="checkbox"/> (-7, 0)
<input type="checkbox"/> (7, -19)	<input type="checkbox"/> (5, -9)	<input type="checkbox"/> (-3, 13)	<input type="checkbox"/> (-10, 5)	<input type="checkbox"/> (-8, 1)
<input type="checkbox"/> (7, -20)	<input type="checkbox"/> (3, -9)	<input type="checkbox"/> (3, 13)	<input type="checkbox"/> (-9, 4)	<input type="checkbox"/> (-9, 0)
<input type="checkbox"/> (1, -20)	<input type="checkbox"/> (2, -8)	<input type="checkbox"/> (4, 14)	<input type="checkbox"/> (-7, 4)	<input type="checkbox"/> (-9, -2)
	<input type="checkbox"/> (2, -5)	<input type="checkbox"/> (4, 18)	<input type="checkbox"/> (-6, 5)	<input type="checkbox"/> (-10, -2)
		<input type="checkbox"/> (3, 19)	<input type="checkbox"/> (-6, 6)	<input type="checkbox"/> (-10, 1)
				<input type="checkbox"/> (-9, 2)
<input type="checkbox"/> (-1, -20)	<input type="checkbox"/> (-2, -5)	<input type="checkbox"/> (-6, 11)	<input type="checkbox"/> (6, 6)	<input type="checkbox"/> (-7, 2)
<input type="checkbox"/> (-1, -19)	<input type="checkbox"/> (-5, -2)	<input type="checkbox"/> (-7, 12)	<input type="checkbox"/> (7, 7)	<input type="checkbox"/> (-6, 1)
<input type="checkbox"/> (-3, -18)	<input type="checkbox"/> (-6, -2)	<input type="checkbox"/> (-9, 12)	<input type="checkbox"/> (9, 7)	
<input type="checkbox"/> (-5, -18)	<input type="checkbox"/> (-6, -8)	<input type="checkbox"/> (-10, 11)	<input type="checkbox"/> (10, 6)	<input type="checkbox"/> (1, 16)
<input type="checkbox"/> (-7, -19)	<input type="checkbox"/> (-5, -9)	<input type="checkbox"/> (-10, 9)	<input type="checkbox"/> (10, 5)	<input type="checkbox"/> (3, 16)
<input type="checkbox"/> (-7, -20)	<input type="checkbox"/> (-3, -9)	<input type="checkbox"/> (-9, 8)	<input type="checkbox"/> (9, 4)	<input type="checkbox"/> (3, 18)
<input type="checkbox"/> (-1, -20)	<input type="checkbox"/> (-2, -8)	<input type="checkbox"/> (-7, 8)	<input type="checkbox"/> (7, 4)	<input type="checkbox"/> (1, 18)
	<input type="checkbox"/> (-2, -5)	<input type="checkbox"/> (-6, 9)	<input type="checkbox"/> (6, 5)	<input type="checkbox"/> (1, 16)
		<input type="checkbox"/> (-6, 11)	<input type="checkbox"/> (6, 6)	
<input type="checkbox"/> (3, -14)				<input type="checkbox"/> (-1, 16)
<input type="checkbox"/> (5, -14)	<input type="checkbox"/> (1, -4)	<input type="checkbox"/> (6, 11)	<input type="checkbox"/> (6, 1)	<input type="checkbox"/> (-3, 16)
<input type="checkbox"/> (6, -13)	<input type="checkbox"/> (4, -1)	<input type="checkbox"/> (7, 12)	<input type="checkbox"/> (6, -1)	<input type="checkbox"/> (-3, 18)
<input type="checkbox"/> (6, -12)	<input type="checkbox"/> (4, 1)	<input type="checkbox"/> (9, 12)	<input type="checkbox"/> (7, -1)	<input type="checkbox"/> (-1, 18)
<input type="checkbox"/> (5, -11)	<input type="checkbox"/> (-4, 1)	<input type="checkbox"/> (10, 11)	<input type="checkbox"/> (7, 0)	<input type="checkbox"/> (-1, 16)
<input type="checkbox"/> (3, -11)	<input type="checkbox"/> (-4, -1)	<input type="checkbox"/> (10, 9)	<input type="checkbox"/> (8, 1)	
<input type="checkbox"/> (2, -12)	<input type="checkbox"/> (-1, -4)	<input type="checkbox"/> (9, 8)	<input type="checkbox"/> (9, 0)	<input type="checkbox"/> (-3, 11)
<input type="checkbox"/> (2, -13)	<input type="checkbox"/> (1, -4)	<input type="checkbox"/> (7, 8)	<input type="checkbox"/> (9, -2)	<input type="checkbox"/> (-3, 8)
<input type="checkbox"/> (3, -14)		<input type="checkbox"/> (6, 9)	<input type="checkbox"/> (10, -2)	<input type="checkbox"/> (3, 8)
		<input type="checkbox"/> (6, 11)	<input type="checkbox"/> (10, 1)	<input type="checkbox"/> (3, 11)
	<input type="checkbox"/> (-3, 4)		<input type="checkbox"/> (9, 2)	<input type="checkbox"/> (-3, 11)
<input type="checkbox"/> (-3, -14)	<input type="checkbox"/> (-5, 8)	<input type="checkbox"/> (-2, 19)	<input type="checkbox"/> (7, 2)	
<input type="checkbox"/> (-5, -14)	<input type="checkbox"/> (-5, 12)	<input type="checkbox"/> (-2, 20)	<input type="checkbox"/> (6, 1)	<input type="checkbox"/> (-2, 4)
<input type="checkbox"/> (-6, -13)	<input type="checkbox"/> (5, 12)	<input type="checkbox"/> (2, 20)		<input type="checkbox"/> (-2, 1)
<input type="checkbox"/> (-6, -12)	<input type="checkbox"/> (5, 8)	<input type="checkbox"/> (2, 19)	<input type="checkbox"/> (2, 15)	
<input type="checkbox"/> (5, -11)	<input type="checkbox"/> (3, 4)	<input type="checkbox"/> (2, 19)	<input type="checkbox"/> (2, 14)	<input type="checkbox"/> (2, 15)
<input type="checkbox"/> (-3, -11)	<input type="checkbox"/> (-3, 4)		<input type="checkbox"/> (-2, 14)	
<input type="checkbox"/> (-2, -12)		<input type="checkbox"/> (2, 4)	<input type="checkbox"/> (-2, 15)	
<input type="checkbox"/> (-2, -13)		<input type="checkbox"/> (2, 1)		
<input type="checkbox"/> (-3, -14)				

Now color your picture.

