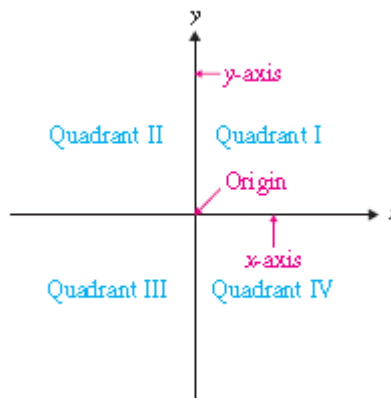


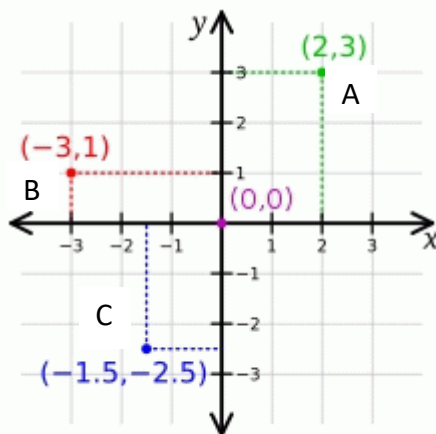
Cartesian Coordinate System - Plotting Ordered Pairs

Vocabulary

Cartesian Coordinate System	System using a set of numbers, or coordinates, to uniquely determine the position of a point
x-axis	Horizontal number line through the center of the coordinate system
y-axis	Vertical number line through the center of the coordinate system
Origin (0,0)	Point of intersection of the x-axis and y-axis
Ordered pair (x,y)	Point on the coordinate system
Quadrants	Four sections of the Cartesian coordinate system



- In Quadrant I, the x-coordinate is positive and the y-coordinate is positive. (+, +)
- In Quadrant II, the x-coordinate is negative and the y-coordinate is positive. (-, +)
- In Quadrant III, the x-coordinate is negative and the y-coordinate is negative. (-, -)
- In Quadrant IV, the x-coordinate is positive and the y-coordinate is negative. (+, -)



A represents point (2,3)

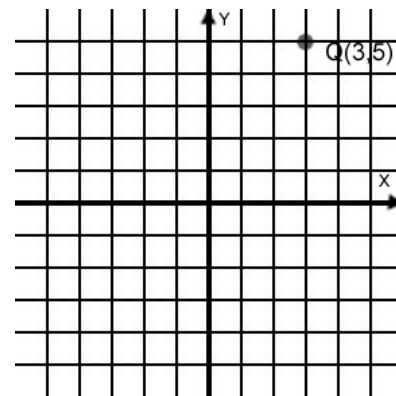
B represents point (-3,1)

C represents point (-1.5, -2.5)

To plot the 'x' value, from the origin, the (0,0) position, move along the horizontal number line or axis, the appropriate number of units going left for a negative number or going right for a positive number.

To plot the 'y' value, from the origin, the (0,0) position, move along the vertical axis, the appropriate number of units going down for a negative number or going up for a positive number.

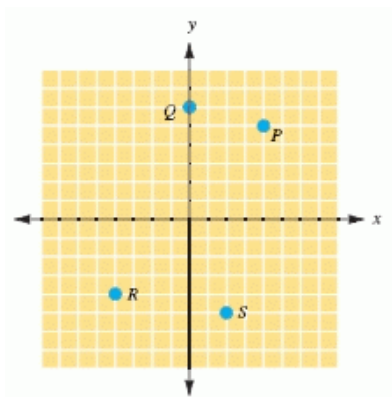
Given the ordered pair, (3, 5), the numbers 3 and 5 are the coordinates of the point. The first coordinate, 3, is the x-coordinate. The second coordinate, 5, is the y-coordinate. Points are usually named by capital letters: Q(3,5) meaning point Q is at (3,5). Points on the axes themselves do not belong to any quadrant.



Where would one plot the following points?

- A(4,2) B(4,-3) C(-5, 5) D(-5,-3)
 E(-4,3) F(0,3) G(-2,0) H(2,4) J(0,-2)

NOTE: The point (4,7) is written the same way as one would write the interval on the number line from 4 to 7. Therefore, the meaning of (4,7) is always taken from the **context** in which it is used.



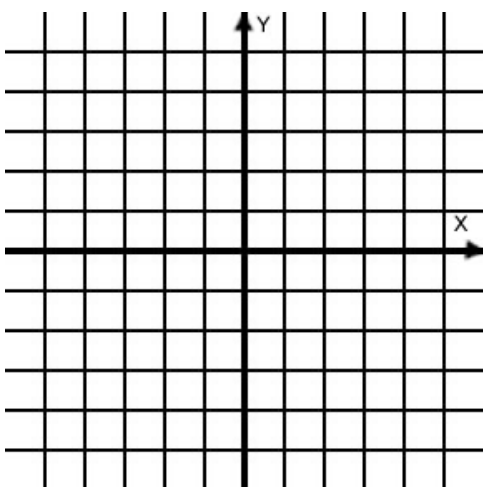
TRY: What are the ordered pairs represented by

P _____ Q _____

R _____ S _____

In what Quadrant is Point R ?

On what axis is Point Q?



TRY:

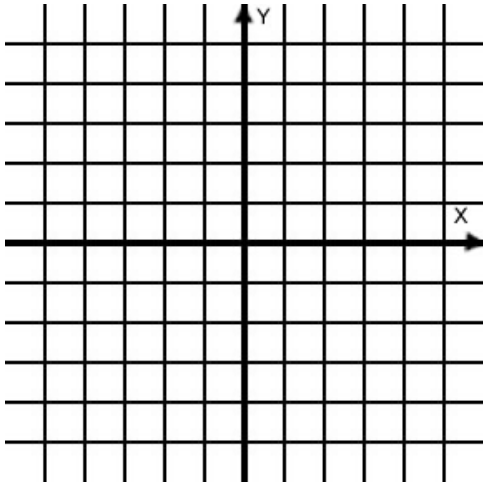
Plot the points

P (-2, 5) Q (-1, 4)

R (0,3) S (1, 2)

Can you give the coordinates of another Point with the same property?

T (,) Plot it.



TRY:

Plot the points

P (-1, 2)

Q (0, 0)

R (1, -2)

Can you give the coordinates of another Point with the same property?

S (,) Plot it.

Ordered pairs can help one graph the values associated with situations involving two variables. Consider the problem:

The Cheap Phone Plan charges a monthly base rate of \$4.50 plus \$0.10 for each minute of long distance calling during the month.

The total monthly long distance charge could be represented by the equation: $L = .10n + 4.50$ where L is the total long distance charge and n is the number of long distance minutes during the month.

What if one wanted to know the following?

If the total long distance charge is \$11.50, find the number of long distance minutes used.

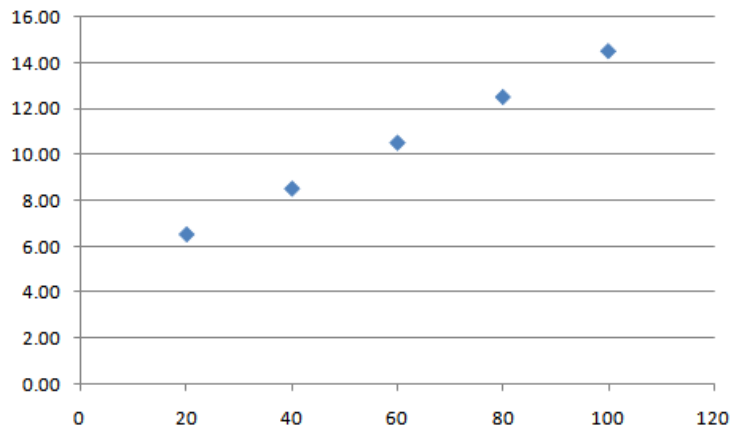
If the total number of long distance minutes is 35, find the total long distance bill.

Plotting some values on a graph can help discover the 'line' that represents all the points (the total charges) for this problem.

N	L
20	6.50
40	8.50
60	10.60

and so on ...

This graph shows the ordered pairs from the table. The y-axis (charges) is marked in \$2 increments. The x-axis (minutes) is marked in 20 minute increments.



a) Find n if the long distance charge is \$11.50.

b) Find L for 35 minutes.

It is always important to label the units represented by each mark on the coordinate system. Typically, each mark represents 1 unit. Sometimes, as in the previous example, one labels the graph with larger units and uses units for the x-axis different than the units for the y-axis.