## **Cartesian Coordinate Plane – Exploration**

A coordinate plane is formed by the intersection of two number lines, one is horizontal and the other is vertical. The horizontal number line is the x-axis and the vertical number line is the y-axis. These two number lines meet where they are both zero, at a point called the origin. When the two number lines meet they make four quadrants. These quadrants are numbered 1 - 4, moving counter-clock wise starting with the upper left corner. Below is a diagram showing the different parts of a coordinate plane.



In each quadrant there is a grid indicating the units for both the x- and y-axis. This grid helps to identify points or coordinates that have an x- and y- component. We write points as ordered pairs in the form (x, y) where the first number tells you where you are with respect to the x-axis and the second number tells you where you are with respect to the y-axis. There are some rules that are handy to remember for moving on the coordinate plane:

	X-Axis	Y-Axis						
Negative	Left	Down						
Zero	On Axis							
Positive	Right	Up						

For example the point (5, 2) is Right 5, Up 2. The point (-3, 0) is Left 3 and stays on the axis. One important thing to know when plotting individual points is that <u>they should be labeled with a capital letter.</u>

## TRY IT!

Plot the given points on the coordinate plane then describe the location of the point (i.e. which quadrant the point is in or if it is on the axis or the origin).

1) P(5,5)	6) V(1.5, 4)	_
		_
2) Q(-1, 5)	7) W(3, -2.5)	_
		_
		_
2 $(0, 0)$		_
3) 5(0,0)	8) R(-3, U)	_
		x
		-
4) T(-3 -4)	9) 7(6 -6)	_
4) T(-3, -4)	9) Z(6, -6)	_
4) T(-3, -4)	9) Z(6, -6)	_
4) T(-3, -4)	9) Z(6, -6)	_
<ul><li>4) T(-3, -4)</li><li>5) U(0, 6)</li></ul>	9) Z(6, -6) 10) N(-3, 6)	
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Give the coordinates of the point and describe its location.

11) A	16) F								 		
			G				,	۱y		C	
12) B	17) G			D							
						K					
13) C	18) H						- 1-		F		
		-		J				1	1		x
14) D	19) J				H			B	Γ	Ε	
							١	r	A		
15) E	20) К		•								

*Try to answer these questions regarding coordinates.* 

21) Which quadrant would the ordered pair (-3, -2) be in?

22) A point is located eight units down from the origin and five units to the right, what is its coordinates?

23) Amy described the point W(-6, 6) as, "6 units to the left of the origin and 6 units up." What mistake did she make?

24) Write and plot a point with the following characteristics:

a. When x = 0.

- b. When y = 0.
- c. On the y-axis.
- d. On the x-axis.
- e. What do you notice?



- 25) What is true about the ordered pair for any point on the y-axis?
- 26) What is true about the ordered pair for any point on the x-axis?
- 27) Astronauts us a coordinate system to describe the locations of objects they photograph from space. The equator is 0° latitude. The prime meridian is 0° longitude. The names and coordinates of some lakes photographed from space are given. Use the map to determine on which continent each lake is located.



c. Lake Van: (43, 39)

a.

b.

- f. Starnberger Lake: (12, 48)
- g. What would the prime meridian (which is 0° longitude) be on a Cartesian plane?
- h. If the equator is 0° latitude what would it be on a Cartesian plane?

## Now looking at special sets of points.

What if we have a group of points we wish to plot? Is there a special way to list a large grouping of points besides (#, #) over and over again?

Plot these points on the coordinate plane:

;)
5)
)

- a) What do you notice?
- b) Are there any dots you naturally wish to connect?
- c) What do those points you want to connect have in common?
- d) Can you take the groups of points you wish to connect and list them together?

