

## Lesson 2.4 Represent Rational Numbers on the Coordinate Plane



### Lesson 2-4: Represent Rational Numbers on the Coordinate Plane

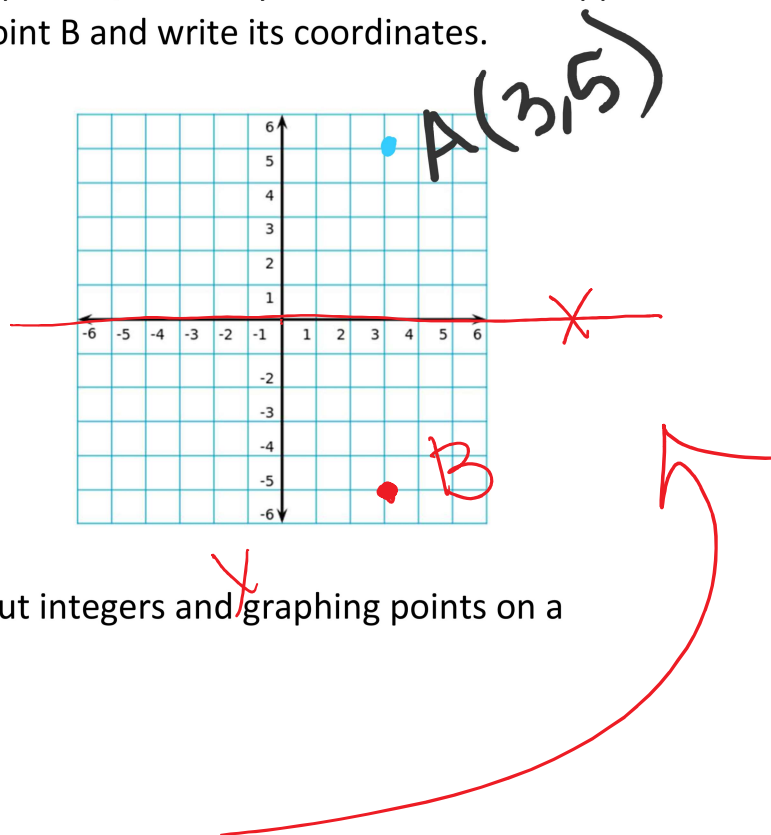
Lesson 2.4

I can...graph points with rational coordinates on a coordinate plane.

#### Solve & Discuss it!

Point B has the same x-coordinate as point A, but its y-coordinate is the opposite of the y-coordinate of point A. Plot point B and write its coordinates.

$(x, y)$   
↔ ↑  
B (3, -5)



How can you use what you know about integers and graphing points on a coordinate plane to plot point B?

Two points have the same x-coordinate by opposite y-coordinates. Across which axis do they form a mirror image of each other?

x-axis

**Example 1:** Graph points with Integer coordinates.

**Vocabulary:**

Coordinate plane: a grid containing two number lines that intersect in a right angle at 0.

x-axis:

a horizontal number line

y-axis:

a vertical number line

Quadrants:

The four planes of a coordinate plane

Ordered pair:

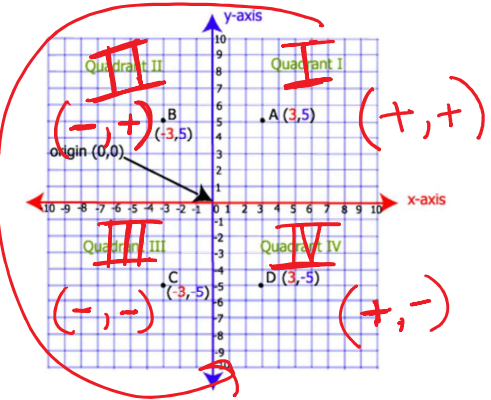
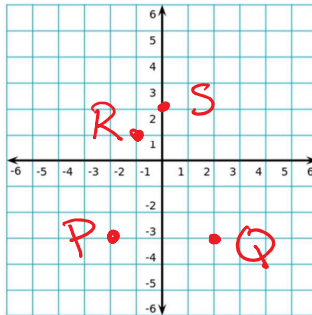
the numbers that give the locations of a point (x,y)

Origin:

(0,0)

Graph the points Q(2, -3), R (-1, 1), and S(0, 2) on a coordinate plane.

(2, -3)  
→ ↓  
(-1, 1)  
← ↑  
(0, 2)  
↑



(x,y)  
↔ ↑  
↔ ↓  
Pos # → R Pos # → up  
Neg # → L Neg # → down  
x y

**Try it!**

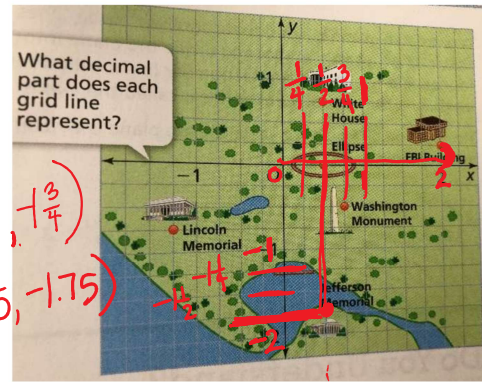
Graph the point P(-2, -3) on the coordinate plane. Use the graph above.

**Convince me!** How do the signs of the coordinates relate to the quadrants in which a point is located? Explain for each of the four quadrants.

<u>QI</u>	<u>QII</u>	<u>QIII</u>	<u>QIV</u>
(+,+)	(-,+)	(-,-)	(+,-)
(1,2)	(-1,2)	(-1,-2)	(1,-2)

**Example 2: Locate and Identify points with Rational Coordinates**

A grid map of Washington, D.C., is shown at the right. What are the coordinates of the location of the Jefferson Memorial?



**Try it!**

What landmark is located on the map at  $(2, \frac{1}{4})$ ? Use the map above.

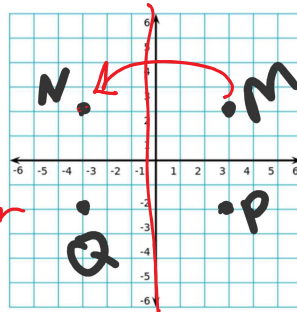
*FBI Building*

**Example 3: Reflect points across the axes**

How are points  $N(-3, 2)$ ,  $P(3, -2)$ , and  $Q(-3, -2)$  related to point  $M(3, 2)$ ?

$M(3, 2)$   
 $N(-3, 2)$

Reflected over the y-axis  
x-coordinate is opposite.



$M(3, 2)$  Reflected over the x-axis  
 $P(3, -2)$  y-coordinates are opposite.

$M(3, 2)$  Reflect over both x-and-y-axis  
 $Q(-3, -2)$  x-and-y-coordinates are opposites.

**Try it!**

The coordinates of point A are  $(-3, 5)$ . What are the coordinates of point B, which is a reflection of a point A across the x-axis?

**Do you understand?**

1.) How can you graph a point with rational coordinates on a coordinate plane?

Scale! Follow coordinate directions.  $(x, y)$

2.) What is the y-coordinate of any point that lies on the x-axis?



3.) How are the points  $(4, 5)$  and  $(-4, 5)$  related?

$x = opp$

reflected over y-axis.

Rate your understanding. 1-Do not understand...4-can teach someone else

<b>Learning Target:</b> Plot and reflect ordered pairs in all four quadrants of a coordinate plane.	1	2	3	4
I can plot ordered pairs in a coordinate plane and describe their locations.				
I can reflect points in the x-axis, the y-axis or both axes.				