

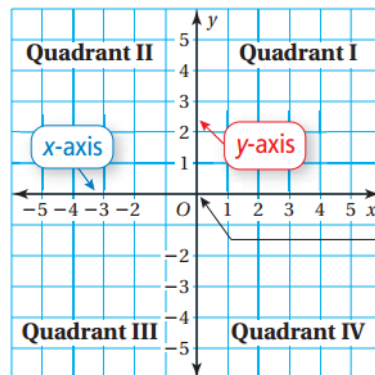
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Math Unit 6: Integers and the Coordinate Plane

6.5-The Coordinate Plane

SWBAT:**Paraphrase:****Essential Question:** How can you graph and locate points that contain negative numbers on the coordinate plane?**Vocabulary**Coordinate Plane:**Vocabulary**Origin:**Vocabulary**Quadrants:

The origin is at (0, 0).

An *ordered pair* is used to locate a point in a coordinate plane.

ordered pair: (4, -2)

x-coordinate

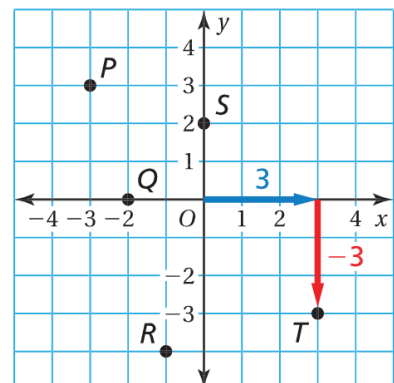
y-coordinate

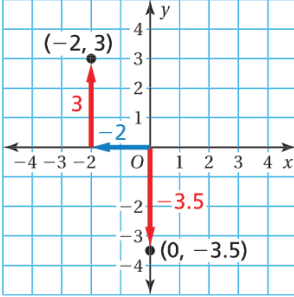
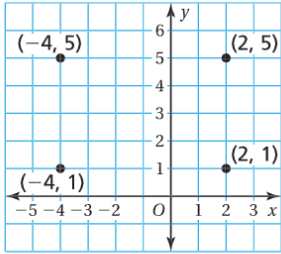
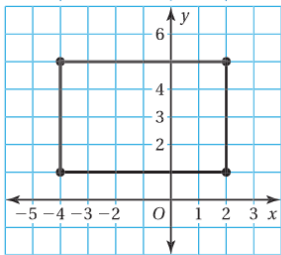
Example 1**Which ordered pair corresponds to point T?**

- (A) (-3, -3) (B) (-3, 3)
 (C) (3, -3) (D) (3, 3)

Point *T* is 3 units to the right of the origin and 3 units down. So, the x-coordinate is 3 and the y-coordinate is -3.

∴ The ordered pair (3, -3) corresponds to point *T*. The correct answer is (C).



Your Turn	<p>Use the graph in Example 1 to write an ordered pair corresponding to the point.</p> <p>1. Point P 2. Point Q 3. Point R 4. Point S</p>
Example 2	 <p>Plot (a) $(-2, 3)$ and (b) $(0, -3.5)$ in a coordinate plane. Describe the location of each point.</p> <p>a. Start at the origin. Move 2 units left and 3 units up. Then plot the point. ❖❖❖ The point is in Quadrant II.</p> <p>b. Start at the origin. Move 3.5 units down. Then plot the point. ❖❖❖ The point is on the y-axis.</p>
Your Turn	<p>Plot the ordered pair in a coordinate plane. Describe the location of the point.</p> <p>5. $(3, -1)$ 6. $(-5, 0)$ 7. $(-2.5, -1)$ 8. $\left(-1\frac{1}{2}, \frac{1}{2}\right)$</p>
Example 3	 <p>An archaeologist divides an area using a coordinate plane in which each unit represents 1 meter. The corners of a secret chamber are shown in the graph. What are the dimensions of the secret chamber?</p> <p>The length of the chamber is the distance between $(-4, 5)$ and $(2, 5)$. The width of the chamber is the distance between $(2, 5)$ and $(2, 1)$.</p> <p>You can use absolute values to find the distances between the points.</p> <div style="text-align: center;"> <p>Add the absolute values. $-4 + 2 = 4 + 2 = 6$</p>  <p>Subtract the absolute values. $5 - 1 = 5 - 1 = 4$</p> </div> <p>❖❖❖ The secret chamber is 6 meters long and 4 meters wide.</p>
Your Turn	<p>In Example 3, the archaeologist finds a gold coin at $(-1, 4)$, a silver coin at $(-4, 2)$, and pottery at $(-4, 4)$. How much closer is the pottery to the silver coin than to the gold coin?</p>

Example 4

A blizzard hits a town at midnight. The table shows the hourly temperatures from midnight to 8:00 A.M.

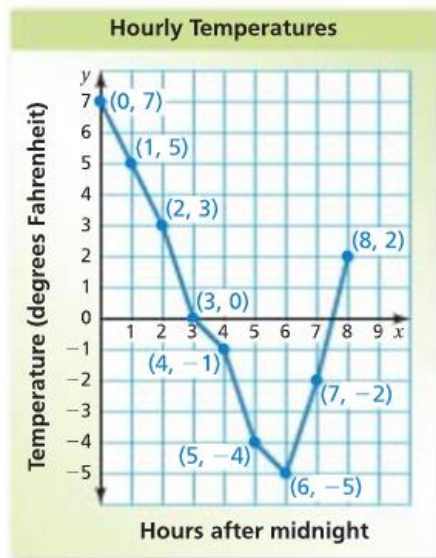
Hours after Midnight, x	0	1	2	3	4	5	6	7	8
Temperature, y	7°F	5°F	3°F	0°F	-1°F	-4°F	-5°F	-2°F	2°F

a. Display the data in a line graph.

Write the ordered pairs.

(0, 7) (1, 5) (2, 3)
 (3, 0) (4, -1) (5, -4)
 (6, -5) (7, -2) (8, 2)

Plot and label the ordered pairs. Then connect the ordered pairs with line segments.



b. Make three observations from the graph.

Three possible observations follow:

- The hourly temperatures decrease from midnight to 6:00 A.M.
- The hourly temperatures increase from 6:00 A.M. to 8:00 A.M.
- The greatest decrease in hourly temperatures from one hour to the next is 3°F. This happens twice: from 2:00 A.M. to 3:00 A.M. and from 4:00 A.M. to 5:00 A.M.

Notes / Questions

Let's Practice

1. An interior designer maps out a room design using a coordinate plane in which each unit represents 1 yard. The corners of the room are located at $(-3,2)$, $(5,2)$, $(5,-3)$, and $(-3,-3)$. What are the dimensions of the room?

2. The table shows the hourly temperatures on a winter morning from 6 a.m. to 11 a.m.

Hours after 6 A.M., x	0	1	2	3	4	5
Temperature, y	-2°C	-5°C	-1°C	2°C	5°C	10°C

- a. Display the data in a line graph.
- b. Make three observations from the graph.