



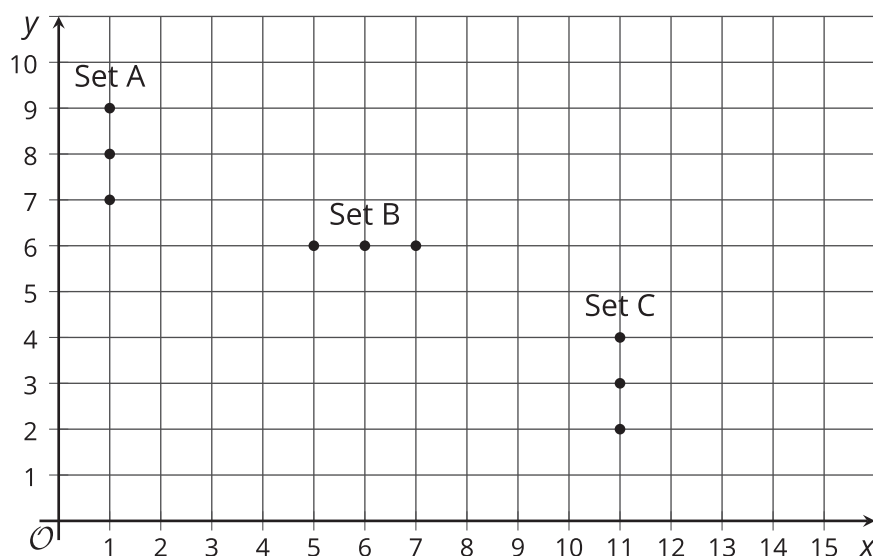
# Points in the Coordinate Plane

Let's explore the coordinate plane.

## 11.1

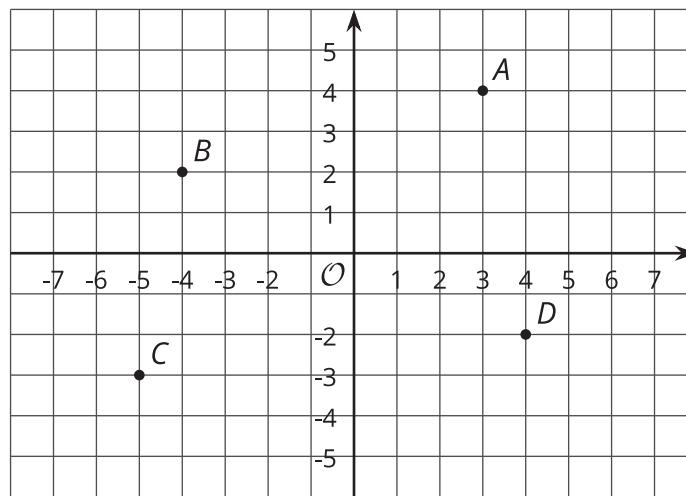
## Guess My Line

Choose 1 set of points, and write the coordinates of each of the 3 points in the set. What do you notice about the coordinates?



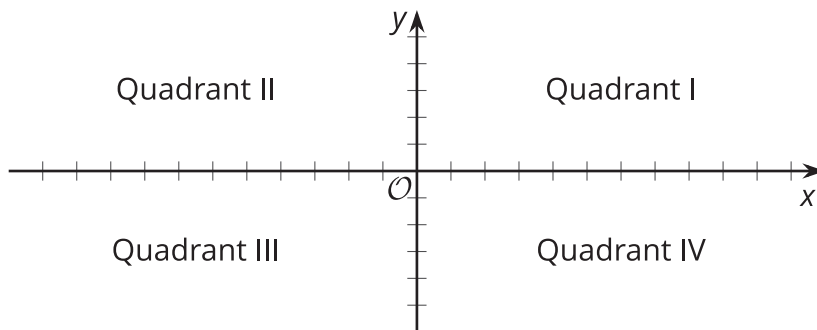
## 11.2 The Coordinate Plane

- Write the coordinates of each labeled point.



- Plot a point at  $(-2, 5)$ . Label it  $E$ .
- Plot another point at  $(3, -4.5)$ . Label it  $F$ .
- The **coordinate plane** is divided into four **quadrants**: I, II, III, and IV, as shown here.

In which quadrant is point  $G$  located? Point  $H$ ? Point  $I$ ?



$G (5, 2)$

$H (-1, -5)$

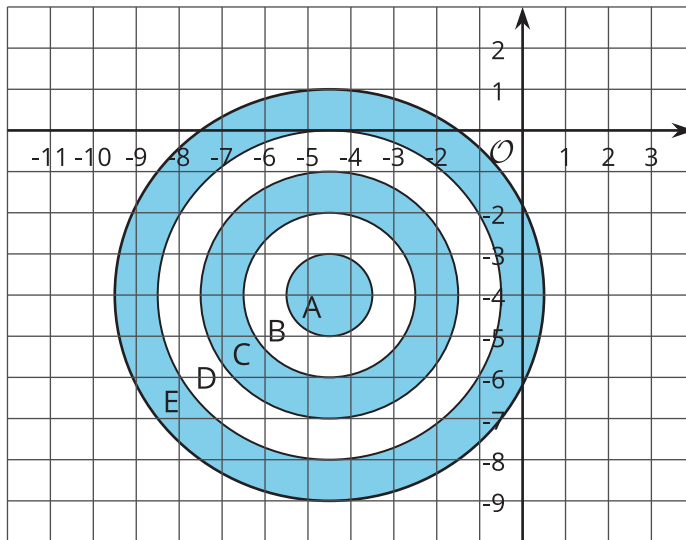
$I (7, -4)$

- If a point has a positive  $y$ -coordinate, in which quadrants could it be?

## 11.3

## Coordinated Archery

Here is an image of an archery target on a coordinate grid. The scores for landing an arrow in each of the regions are shown.



- A: 10 points
- B: 8 points
- C: 6 points
- D: 4 points
- E: 2 points

Name the possible coordinates of where one arrow could land to earn each of the following scores:

1. 6 points
2. 10 points
3. 2 points
4. no points
5. 4 points
6. 8 points

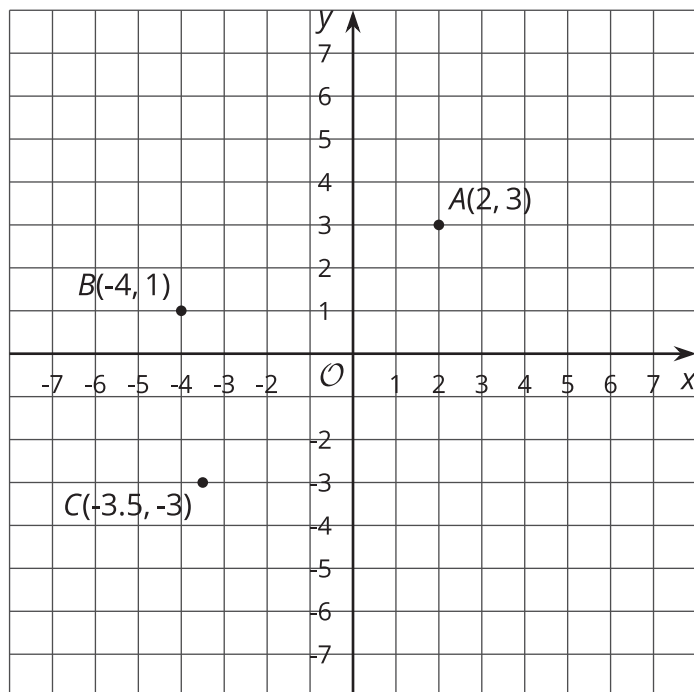
## Are you ready for more?

Pretend you are stuck in a coordinate plane. You can only take vertical and horizontal steps that are one unit long.

1. How many ways are there to get from the point  $(-3, 2)$  to  $(-1, -1)$  if you will only step down and to the right?
2. How many ways are there to get from the point  $(-1, -2)$  to  $(4, 0)$  if you can only step up and to the right?
3. Make up some more problems like this and see what patterns you notice.

## Lesson 11 Summary

Just as the number line can be extended to the left to include negative numbers, the  $x$ - and  $y$ -axes can also be extended to include negative values. This creates the **coordinate plane**, a system that can be used to describe the locations of points.



For example, point  $B$  can be described by the ordered pair  $(-4, 1)$ . The  $x$ -value of  $-4$  tells us that the point is 4 units to the left of the  $y$ -axis. The  $y$ -value of  $1$  tells us that the point is 1 unit above the  $x$ -axis. Point  $B$  is located in Quadrant II.

The same reasoning applies to the points  $A$  and  $C$ . The  $x$ - and  $y$ -coordinates for point  $A$  are positive, so  $A$  is to the right of the  $y$ -axis and above the  $x$ -axis. Point  $A$  is located in Quadrant I.

The  $x$ - and  $y$ -coordinates for point  $C$  are negative, so  $C$  is to the left of the  $y$ -axis and below the  $x$ -axis. Point  $C$  is located in Quadrant III.

Quadrant IV contains points whose  $x$ -coordinates are positive and whose  $y$ -coordinates are negative.