Name ______________________________ Date ______________ Class______________

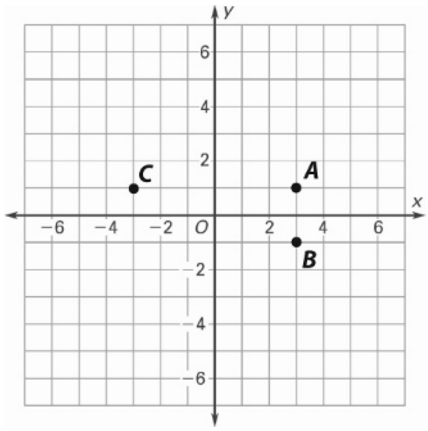
LESSON 14-1

Distance in the Coordinate Plane

Reteach

Reflecting a Point

In this lesson, a point on a coordinate plane is reflected across the axes of the coordinate plane. The points *B* and *C* are reflections of point *A* across the *x*- and *y*-axes.



The coordinates of point *A* are (3, 1).

Point *B* is the reflection of point *A* across the *x*-axis.

Point *C* is the reflection of point *A* across the *y*-axis.

The following rules can help you find the coordinates of a reflected point by looking at the signs of the coordinates.

Reflecting across the *x*-axis

"Reflect across *x*. ⟶ Change the *y*."

In this example, point *A*'s *x*-coordinate, +3, stays the same when point *A* is reflected across the *x*-axis to become point *B*. Point *A*'s *y*-coordinate, +1, switches to –1 to become point *B*.
So, point *B*'s coordinates are (3, –1).

Reflecting across the *y*-axis

"Reflect across *y*. ⟶ Change the *x*."

In this example, point *A*'s *y*-coordinate, +1, stays the same when point *A* is reflected across the *y*-axis to become point *C*. Point *A*'s *x*-coordinate, +3, switches to –3 to become point *C*.
So, point *C*'s coordinates are (–3, 1).

Name the coordinates of each point after it is reflected across the given axis.

1. *A*(1, 3)
   x-axis
   (____, ____)

2. *B*(–4, 5)
   y-axis
   (____, ____)

3. *C*(6, –7)
   y-axis
   (____, ____)

4. *D*(–8, –9)
   x-axis
   (____, ____)

Distance between Points

The distance between two points on a coordinate plane depends on whether their *x*- or *y*-coordinates are different. Look at the points on the grid above to solve the problems.

The distance between points *A* and *B* is the absolute value of the difference of the *y*-coordinates of the points.

The distance between points *A* and *C* is the absolute value of the difference of the *x*-coordinates of the points.

Find the distance between the two points.

5. points *A* and *B*

   _____ units

6. points *A* and *C*

   _____ units

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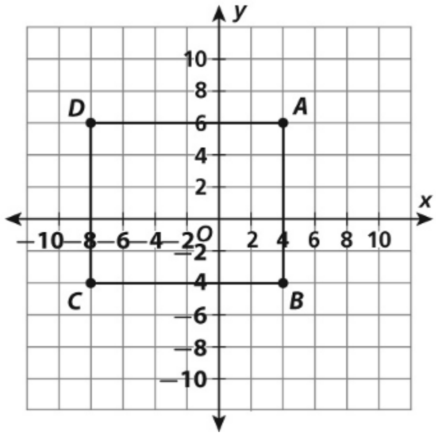
LESSON 14-2

Polygons in the Coordinate Plane

Reteach

Polygons are formed from three or more points, called *vertices*, that are connected by line segments and that enclose an area.

If the lengths of the sides are known, the area and perimeter of a polygon can be found. They can also be found if the coordinates of the vertices are known.



Find the Perimeter

First, identify the coordinates of the points that form the vertices of the polygon.

A: (4, 6); *B*: (4, –4); *C*: (–8, –4); *D*: (–8, 6)

Next, find the lengths of the sides.

AB = 10 units

BC = 12 units

CD = 10 units

DA = 12 units

Finally, add the lengths of the sides.

$10 + 12 + 10 + 12 = 44$

The perimeter of the polygon is 44 units.

Find the Area

First, identify the polygon. The figure is a rectangle, so its area is the product of its length and width.

Next, use the coordinates of the points to find the length and width.

AB = 10 units

BC = 12 units

Finally, multiply the length and width.

$10 \times 12 = 120$

The area of the polygon is 120 square units.

In this case, the area can also be found by counting the squares enclosed by the polygon. There are 30 squares.

How much area is represented by each square? 2×2, or 4 square units.

The area is 30 cubes $\times$ 4, or 120 square units.

Find the perimeter and area of the polygon enclosed by the points.

1. (8, 6), (2, 6), (8, –5), and (2, –5)

   Side lengths: ______________________

   Perimeter: ______________________

   Area: ______________________

2. (0, 0), (0, 7), (7, 7), and (7, 0)

   Side lengths: ______________________

   Perimeter: ______________________

   Area: ______________________