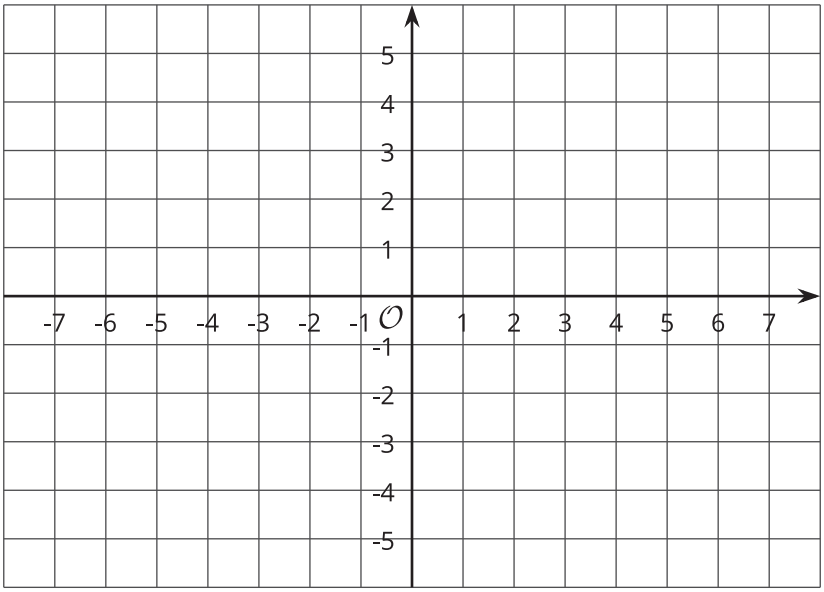
Unit 7, Lesson 13

Distances in the Coordinate Plane

Let's explore distance on the coordinate plane.

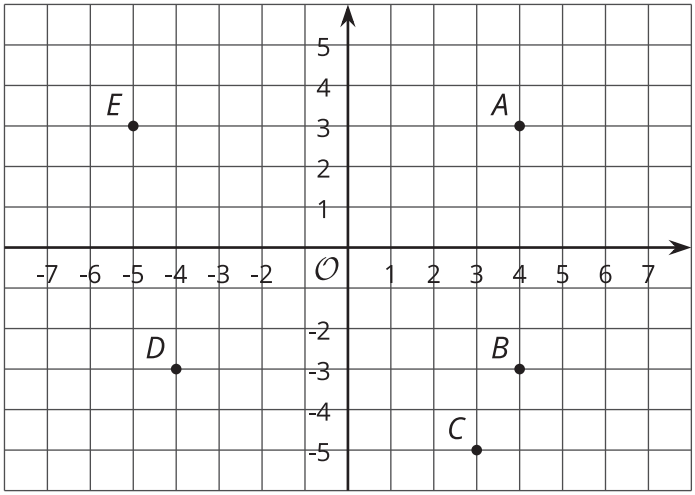
13.1 Coordinate Patterns

Plot at least 3 points in your assigned quadrant, and label them with their coordinates.



13.2 Signs of Numbers in Coordinates

1. Write the coordinates of each point.



A :

B :

C :

D :

E :

2. Answer these questions for each pair of points.
   - How are the coordinates the same? How are they different?
   - How far away are they from the y-axis? To the left or to the right of it?
   - How far away are they from the x-axis? Above or below it?

   a. A and B

   b. B and D

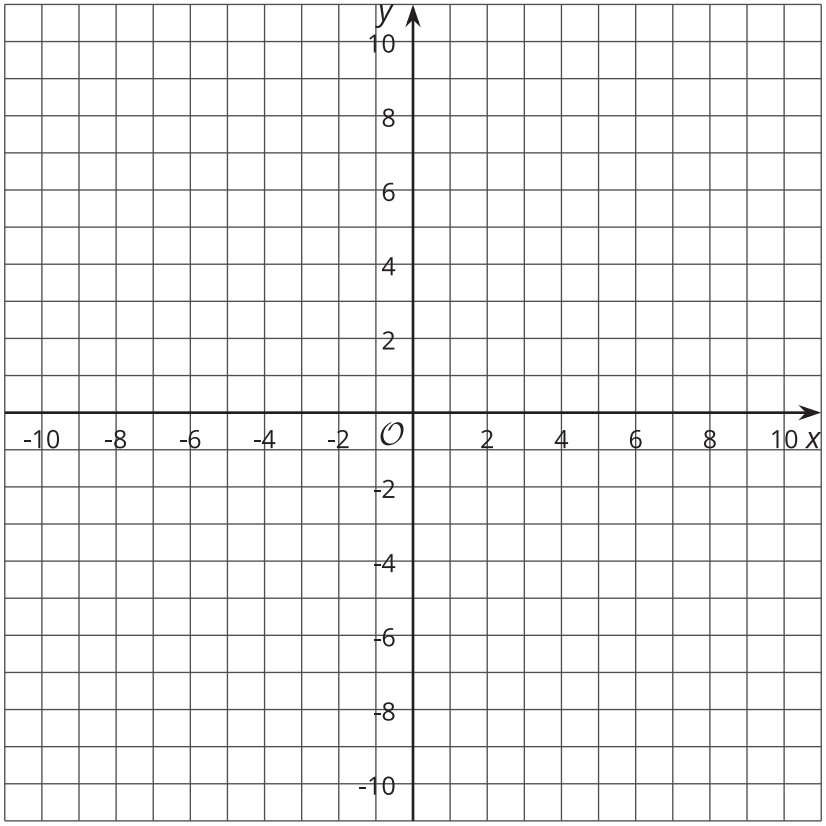
   c. A and D

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3. Point F has the same coordinates as point C, except its y-coordinate has the opposite sign.
   a. Plot point F in the coordinate plane, and label it with its coordinates.
   b. How far away are F and C from the x-axis?
4. Point G has the same coordinates as point E, except its x-coordinate has the opposite sign.
   a. Plot point G in the coordinate plane, and label it with its coordinates.
   b. How far away are G and E from the y-axis?
5. Point H has the same coordinates as point B, except both coordinates have opposite signs. In which quadrant is point H?

13.3 Differences and Distances

Plot and label these points in the coordinate plane: $A(5, 4)$, $B(5, -2)$, $C(-3, -2)$, $D(-3, 4)$.

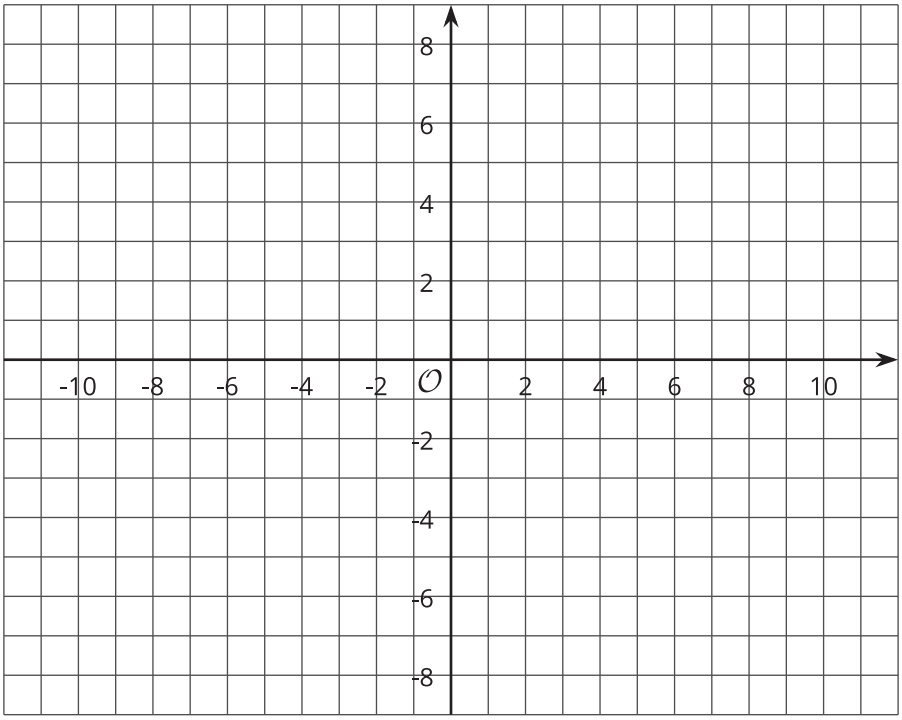


1. Connect the dots in order. What shape is made?
2. What are the side lengths of figure $ABCD$?
3. What is the difference between the x-coordinates of B and C?
4. What is the difference between the x-coordinates of C and B?
5. How do the differences of the coordinates relate to the distances between the points?

13.4 Plotting Polygons

Here are the coordinates for four polygons. Plot them on the coordinate plane, connect the points in the order that they are listed, and label each polygon with its letter name.

1. Polygon A: $(-7, 4), (-8, 5), (-8, 6), (-7, 7), (-5, 7), (-5, 5), (-7, 4)$
2. Polygon B: $(4, 3), (3, 3), (2, 2), (2, 1), (3, 0), (4, 0), (5, 1), (5, 2), (4, 3)$
3. Polygon C: $(-8, -5), (-8, -8), (-5, -8), (-5, -5), (-8, -5)$
4. Polygon D: $(-5, 1), (-3, -3), (-1, -2), (0, 3), (-3, 3), (-5, 1)$

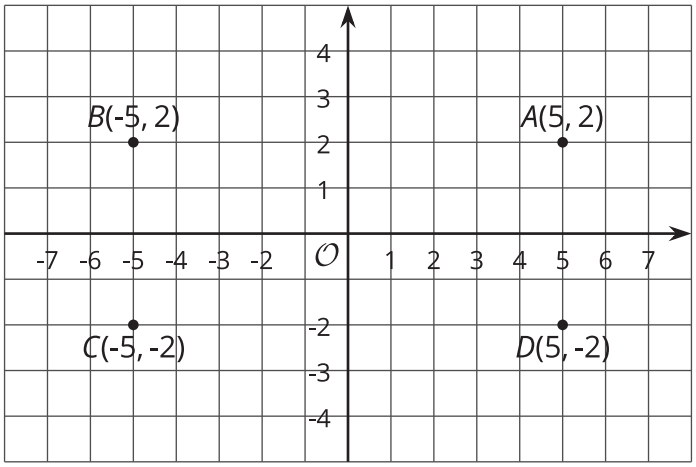


Are you ready for more?

Find the area of Polygon D in this activity.

Lesson 13 Summary

The points $A(5, 2)$, $B(-5, 2)$, $C(-5, -2)$, and $D(5, -2)$ are shown in the coordinate plane. Notice that they all have almost the same coordinates, except the signs are different. They are all the same distance from each axis but are in different quadrants.



Notice that the vertical distance between points A and D is 4 units because point A is 2 units above the horizontal axis and point D is 2 units below the horizontal axis. The horizontal distance between points A and B is 10 units because point B is 5 units to the left of the vertical axis and point A is 5 units to the right of the vertical axis.

We can always tell which quadrant a point is located in by the signs of its coordinates.

x	y	quadrant
positive	positive	I
negative	positive	II
negative	negative	III
positive	negative	IV

