Name_____ Date _____

Essential Question   How can you find the lengths of line segments in a coordinate plane?

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1 **ACTIVITY:** Finding Distances on a Map

Work with a partner. The coordinate grid shows a portion of a city. Each square on the grid represents one square mile.

a. A public library is located at (4, 5). City Hall is located at (7, 5). Plot and label these points.

b. How far is the public library from City Hall?

c. A stadium is located 4 miles from the public library. Give the coordinates of several possible locations of the stadium. Justify your answers by graphing.

d. Connect the three locations of the public library, City Hall, and the stadium using your answers in part (c). What shapes are formed?

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2 **ACTIVITY:** Graphing Polygons

Work with a partner. Plot and label each set of points in the coordinate plane. Then connect each set of points to form a polygon.

Rectangle: $A(2, 3)$, $B(2, 10)$, $C(6, 10)$, $D(6, 3)$
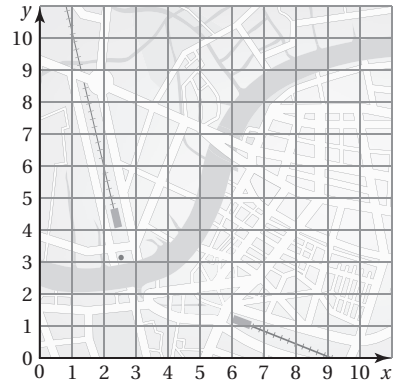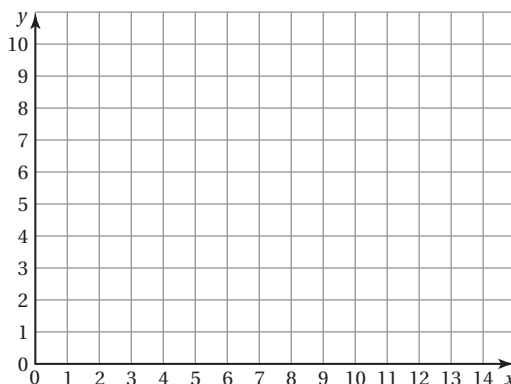
Triangle: $E(8, 3)$, $F(14, 8)$, $G(14, 3)$

4.4 **Polygons in the Coordinate Plane** (continued)

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3 **ACTIVITY:** Finding Distances in a Coordinate Plane

Work with a partner.

  a. Find the length of each horizontal line segment in Activity 2.

  b. **STRUCTURE** What relationship do you notice between the lengths of the line segments in part (a) and the coordinates of their endpoints? Explain.

  c. Find the length of each vertical line segment in Activity 2.

  d. **STRUCTURE** What relationship do you notice between the lengths of the line segments in part (c) and the coordinates of their endpoints? Explain.

  e. Plot and label the points below in the coordinate plane. Then connect each pair of points with a line segment. Use the relationships you discovered in parts (b) and (d) above to find the length of each line segment. Show your work.

$S(3, 1)$ and $T(14, 1)$

$U(9, 8)$ and $V(9, 0)$

$W(0, 7)$ and $X(0, 10)$

$Y(1, 9)$ and $Z(7, 9)$
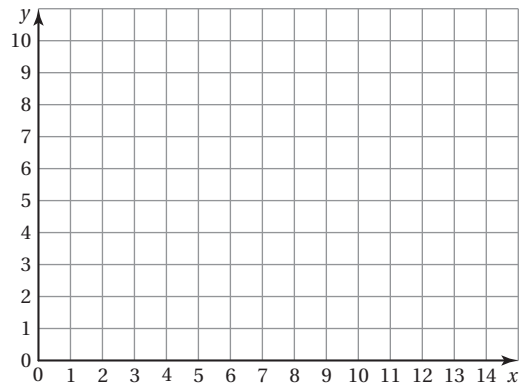
  f. Check your answers in part (e) by counting grid lines.

Name_____ Date _____

What Is Your Answer?

4. **IN YOUR OWN WORDS** How can you find the lengths of line segments in a coordinate plane? Give examples to support your explanation.

5. Do the methods you used in Activity 3 work for diagonal line segments? Explain why or why not.

6. Use the Internet or some other reference to find an example of how "finding distances in a coordinate plane" is helpful in each of the following careers.

   a. Archaeologist

   b. Surveyor

   c. Pilot

Name _____ Date _____

4.4 Practice
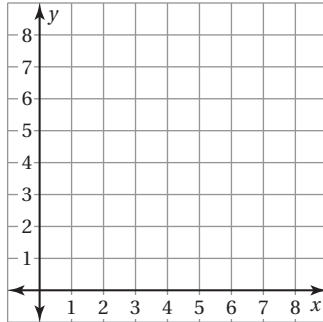**For use after Lesson 4.4**

Plot and label each pair of points in the coordinate plane. Find the area of the polygon.
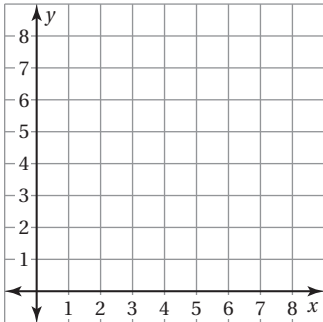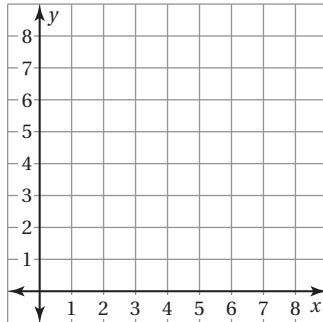
1. $A(2, 2), B(2, 6), C(5, 2)$
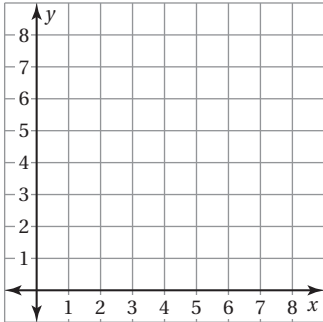
2. $D(3, 2), E(3, 7), F(6, 2), G(6, 7)$

3. $H(3, 3), I(3, 7), J(7, 7), K(7, 3)$

4. $L(1, 2), M(3, 5), N(5, 5), O(7, 2)$

5. The vertices of a sandbox are $P(12, 14), Q(12, 17), R(16, 17),$ and $S(16, 14)$. The coordinates are measured in feet. What is the perimeter of the sandbox?