Name_____ Date _____

1.4 Perimeter and Area in the Coordinate Plane

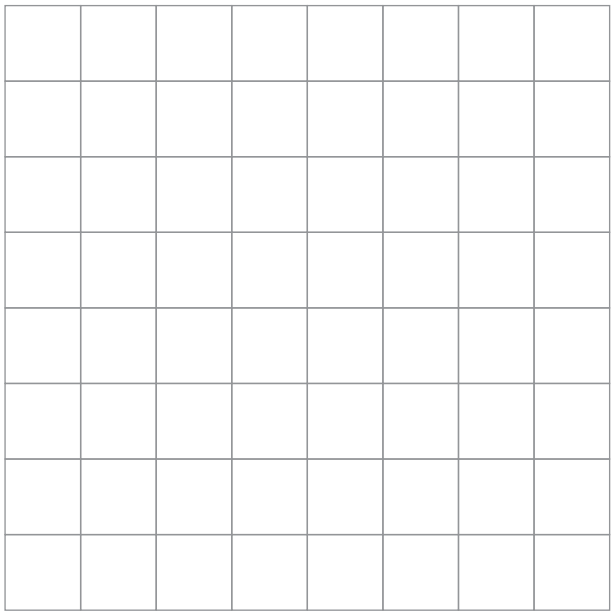
For use with Exploration 1.4

Essential Question How can you find the perimeter and area of a polygon in a coordinate plane?

1 EXPLORATION: Finding the Perimeter and Area of a Quadrilateral

Work with a partner.

a. On the centimeter graph paper, draw quadrilateral $ABCD$ in a coordinate plane. Label the points $A(1, 4)$, $B(-3, 1)$, $C(0, -3)$, and $D(4, 0)$.



b. Find the perimeter of quadrilateral $ABCD$.

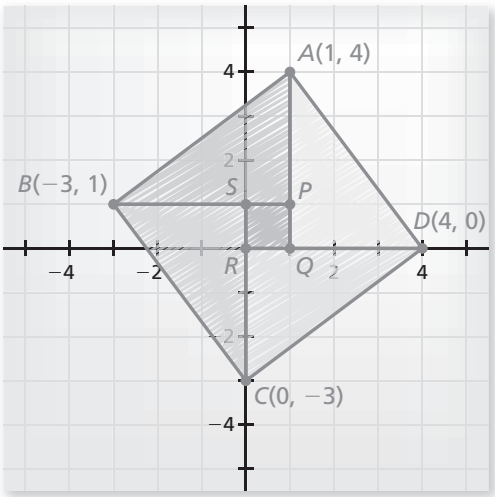
c. Are adjacent sides of quadrilateral $ABCD$ perpendicular to each other? How can you tell?

d. What is the definition of a square? Is quadrilateral $ABCD$ a square? Justify your answer. Find the area of quadrilateral $ABCD$.

2 EXPLORATION: Finding the Area of a Polygon

Work with a partner.

a. Quadrilateral *ABCD* is partitioned into four right triangles and one square, as shown. Find the coordinates of the vertices for the five smaller polygons.



b. Find the areas of the five smaller polygons.

Area of Triangle *BPA*:

Area of Triangle *AQD*:

Area of Triangle *DRC*:

Area of Triangle *CSB*:

Area of Square *PQRS*:

c. Is the sum of the areas of the five smaller polygons equal to the area of quadrilateral *ABCD*? Justify your answer.

Communicate Your Answer

3. How can you find the perimeter and area of a polygon in a coordinate plane?

4. Repeat Exploration 1 for quadrilateral *EFGH*, where the coordinates of the vertices are $E(-3, 6)$, $F(-7, 3)$, $G(-1, -5)$, and $H(3, -2)$.

Name_____ Date _____

1.4 Notetaking with Vocabulary

For use after Lesson 1.4

In your own words, write the meaning of each vocabulary term.

polygon

side

vertex

n-gon

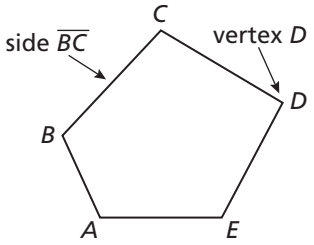
convex

concave

Core Concepts

Polygons

In geometry, a figure that lies in a plane is called a plane figure. Recall that a *polygon* is a closed plane figure formed by three or more line segments called *sides*. Each side intersects exactly two sides, one at each *vertex*, so that no two sides with a common vertex are collinear. You can name a polygon by listing the vertices in consecutive order.



polygon *ABCDE*

Notes:

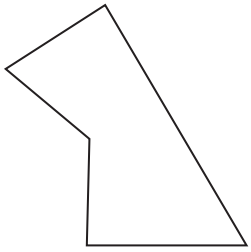
Name _____ Date _____

1.4 Notetaking with Vocabulary (continued)

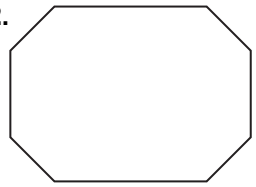
Extra Practice

In Exercises 1–4, classify the polygon by the number of sides. Tell whether it is *convex* or *concave*.

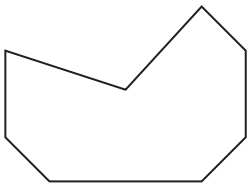
1.



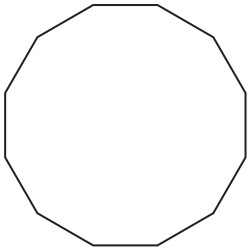
2.



3.

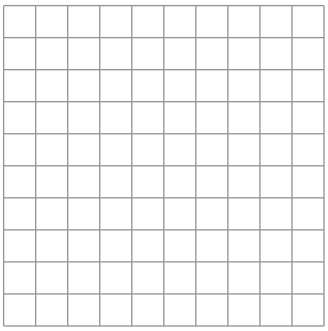


4.

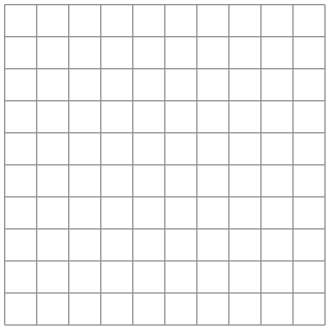


In Exercises 5–8, find the perimeter and area of the polygon with the given vertices.

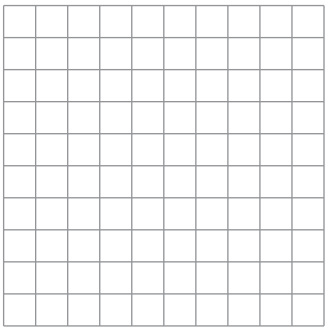
5. $X(2, 4), Y(0, -2), Z(2, -2)$



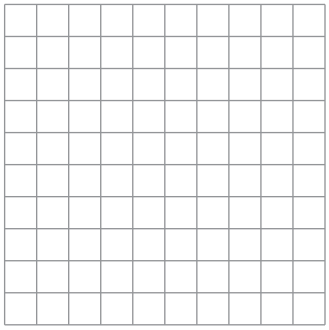
6. $P(1, 3), Q(1, 1), R(-4, 2)$



7. $J(-4, 1), K(-4, -2), L(6, -2), M(6, 1)$



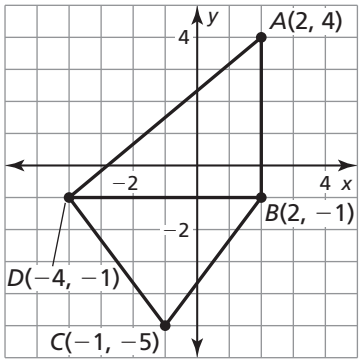
8. $D(5, -3), E(5, -6), F(2, -6), G(2, -3)$



Name_____ Date _____

1.4 Notetaking with Vocabulary (continued)

In Exercises 9–14, use the diagram.



9. Find the perimeter of $\triangle ABD$.

10. Find the perimeter of $\triangle BCD$.

11. Find the perimeter of quadrilateral $ABCD$.

12. Find the area of $\triangle ABD$.

13. Find the area of $\triangle BCD$.

14. Find the area of quadrilateral $ABCD$.