LESSON MAKER PRO

Coordinate Shape Quest

Use coordinates to find perimeter and area.

HIGH SCHOOL · HSG-GPE.B.7

CCSS.Math.Content.HSG-GPE.B.7 "Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula. *"

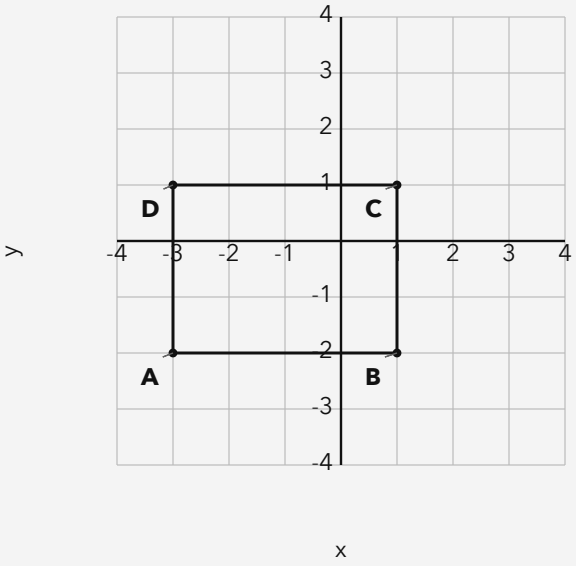
NAME _____ DATE _____

MEASURE ON THE PLANE

For perimeter, find the length of every side and add the lengths. Horizontal and vertical side lengths come from subtraction. For a slanted side, use d = sqrt($(x_2 - x_1)^2 + (y_2 - y_1)^2$). For area, use A = bh/2 for a triangle and A = lw for a rectangle.

WORKED EXAMPLE

Find the perimeter and area of rectangle ABCD shown on the coordinate plane.



1. AB = 1 - (-3) = 4 units.
2. BC = 1 - (-2) = 3 units.
3. Perimeter = 2(4 + 3) = 14 units.
4. Area = 4 × 3 = 12 square units.

Answer: Perimeter = 14 units; area = 12 square units.

PRACTICE 6 problems

1 A rectangle has vertices (0, 0), (5, 0), (5, 6), and (0, 6). Find its perimeter and area.

ANSWER _____

2 A right triangle has vertices (0, 0), (0, 8), and (6, 0). Find its area.

ANSWER _____

3 Triangle PQR has vertices P(0, 0), Q(9, 0), and R(0, 12). Find its perimeter and area.

ANSWER _____

4 A rectangle has vertices (-6, 0), (5, 0), (5, 7), and (-6, 7). Find its perimeter and area.

ANSWER _____

5 Triangle ABC has vertices A(0, 0), B(6, 8), and C(12, 0). Use the distance formula to find its perimeter.

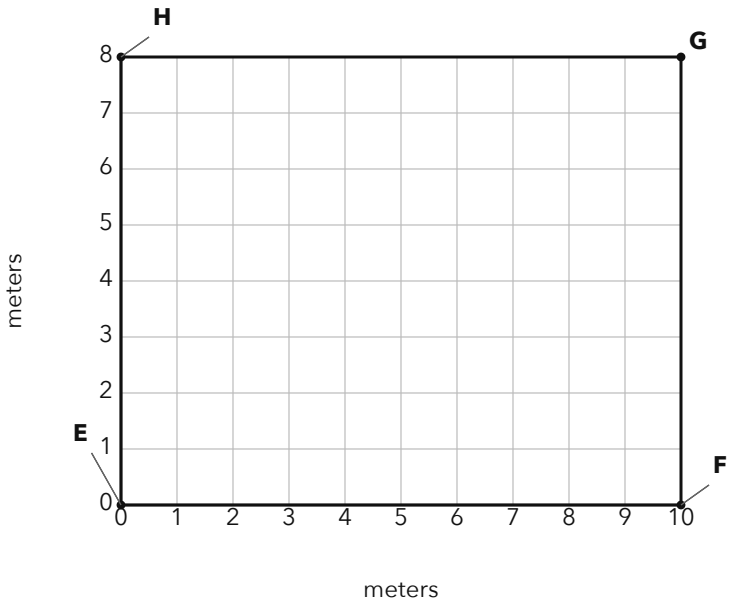
ANSWER _____

6 Parallelogram WXYZ has vertices W(0, 0), X(8, 0), Y(13, 5), and Z(5, 5). Find its perimeter and area.

ANSWER _____

APPLY IT Show your work

1 For a school gaming tournament, an LED backdrop is shaped like rectangle EFGH on the coordinate grid. Each grid unit represents 1 meter. How many square meters of backdrop material are needed? How many meters of LED edging are needed around it?



ANSWER _____

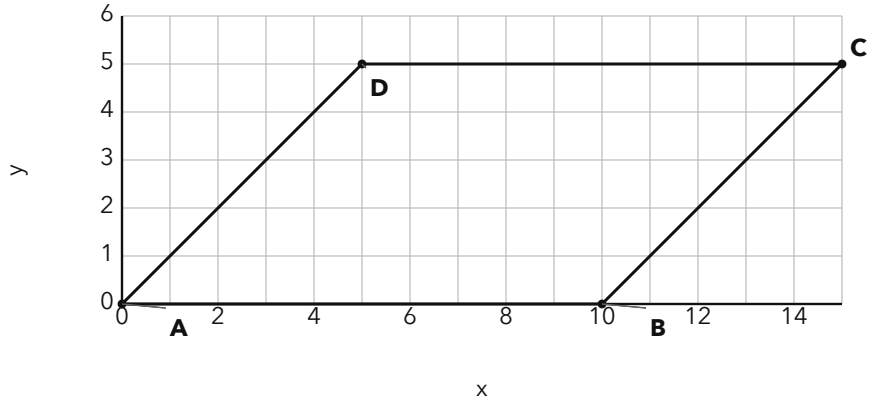
2 The film club is making a triangular projection screen with corner coordinates (0, 0), (10, 0), and (10, 24), measured in feet. Find the screen's area and the length of trim needed around all three sides.

WORK SPACE

ANSWER _____

CHALLENGE One step up

The vertices of parallelogram ABCD are shown. Find the exact perimeter and the area. Explain how you found the length of a slanted side.



WORK SPACE AND ANSWER

ANSWER KEY # Coordinate Shape Quest

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A rectangle has vertices (0, 0), (5, 0), (5, 6), and (0, 6). Find its perimeter and area.	**Perimeter = 22 units; area = 30 square units.**
2	A right triangle has vertices (0, 0), (0, 8), and (6, 0). Find its area.	**24 square units**
3	Triangle PQR has vertices P(0, 0), Q(9, 0), and R(0, 12). Find its perimeter and area.	**Perimeter = 36 units; area = 54 square units.**
4	A rectangle has vertices (-6, 0), (5, 0), (5, 7), and (-6, 7). Find its perimeter and area.	**Perimeter = 36 units; area = 77 square units.**
5	Triangle ABC has vertices A(0, 0), B(6, 8), and C(12, 0). Use the distance formula to find its perimeter.	**32 units**
6	Parallelogram WXYZ has vertices W(0, 0), X(8, 0), Y(13, 5), and Z(5, 5). Find its perimeter and area.	**Perimeter = 16 + 10sqrt(2) units; area = 40 square units.**

PART 2 · APPLY IT

1. **80 square meters of material; 36 meters of LED edging.** The rectangle is 10 meters by 8 meters. Its area is 10 × 8 = 80 square meters, and its perimeter is 2(10 + 8) = 36 meters.
2. **120 square feet; 60 feet of trim.** The legs are 10 feet and 24 feet, so the area is 10 × 24 / 2 = 120 square feet. The third side is 26 feet, so the perimeter is 10 + 24 + 26 = 60 feet.

CHALLENGE

Each horizontal side is 10 units, and each slanted side is sqrt(5^2 + 5^2) = 5sqrt(2) units. Perimeter = 20 + 10sqrt(2) units, and area = 10 × 5 = 50 square units.

Accept equivalent radical forms for the slanted lengths and perimeters, such as 2sqrt(50) instead of 10sqrt(2). Require units for perimeter and square units for area.