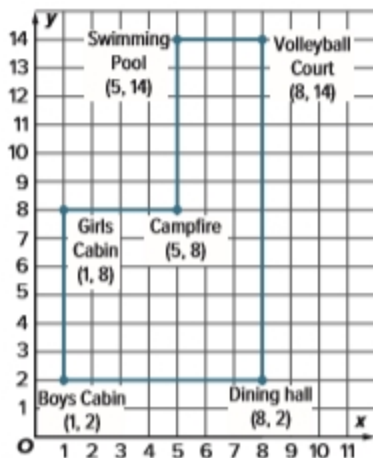


8-5 Polygons on the Coordinate Plane

1. Find the perimeter of the summer camp shown on the coordinate plane.



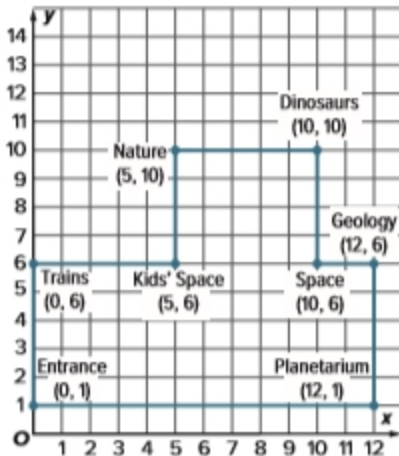
SOLUTION:

Sample method: Count the units around the summer camp. Then add to find the perimeter.

$$7 + 12 + 3 + 6 + 4 + 6 = 38$$

The perimeter is 38 units.

2. Find the perimeter of the science center shown on the coordinate plane.



SOLUTION:

Sample method: Count the units around the science center. Then add to find the perimeter.

$$12 + 5 + 2 + 4 + 5 + 4 + 5 + 5 = 42$$

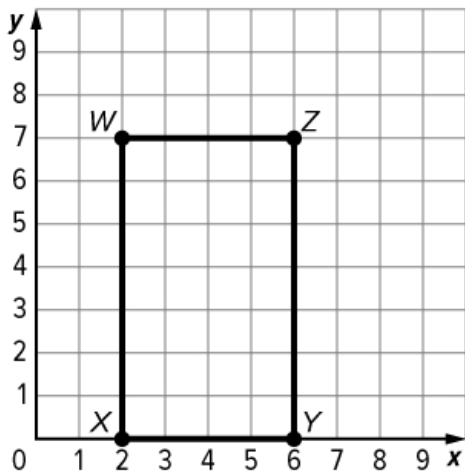
The perimeter is 42 units.

8-5 Polygons on the Coordinate Plane

3. A rectangle has vertices $W(2, 7)$, $X(2, 0)$, $Y(6, 0)$, and $Z(6, 7)$. Use the coordinates to find the perimeter of the rectangle.

SOLUTION:

Graph the vertices. Draw line segments to connect them to form a rectangle. Find the length of each side. Count the units along each side of the rectangle's graph.



Length of segment XY : 4 units
Length of segment YZ : 7 units
Length of segment WZ : 4 units
Length of segment XW : 7 units

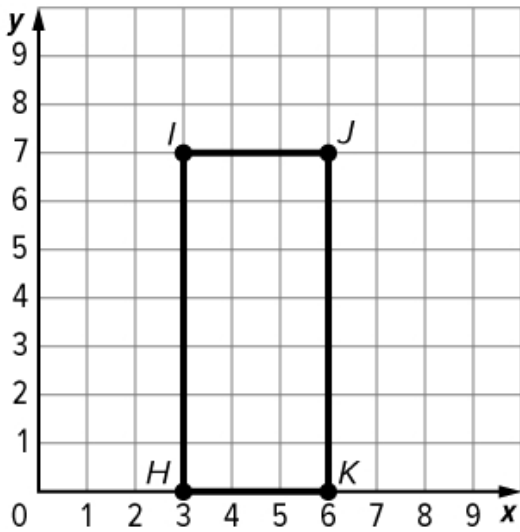
So, the rectangle has a perimeter of $4 + 7 + 4 + 7$, or 22 units.

8-5 Polygons on the Coordinate Plane

4. A rectangle has vertices $H(3, 0)$, $I(3, 7)$, $J(6, 7)$, and $K(6, 0)$. Use the coordinates to find the perimeter of the rectangle.

SOLUTION:

Graph the vertices. Draw line segments to connect them to form a rectangle. Find the length of each side. Count the units along each side of the rectangle's graph.



Length of segment HK : 3 units

Length of segment JK : 7 units

Length of segment JI : 3 units

Length of segment HI : 7 units

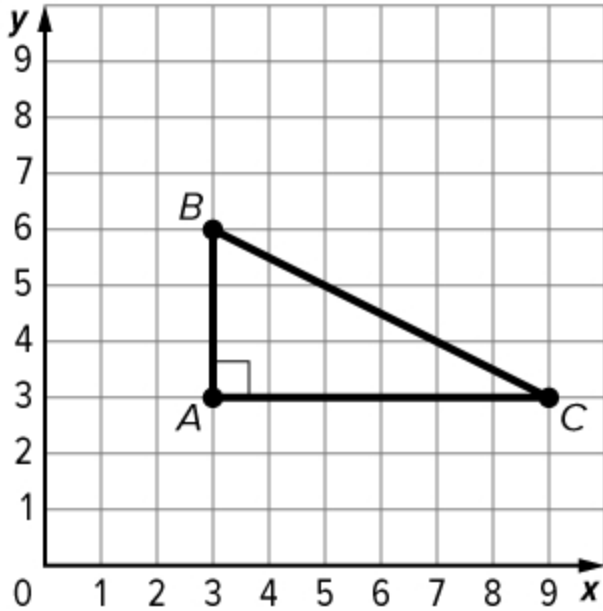
So, the rectangle has a perimeter of $3 + 7 + 3 + 7$, or 20 units.

8-5 Polygons on the Coordinate Plane

5. A polygon has vertices $A(3, 3)$, $B(3, 6)$, and $C(9, 3)$. Find the area of the polygon.

SOLUTION:

Graph the vertices. Draw line segments to connect them. A triangle is formed.



Find the area of the triangle.

The base is side AC , and the height is side AB .

$$A = \frac{1}{2}bh \quad \text{Area of a triangle}$$

$$= \frac{1}{2} (6)(3) \quad \text{Replace } b \text{ with 6 and } h \text{ with 3.}$$

$$= 9 \quad \text{Simplify.}$$

The area of the polygon is 9 square units.

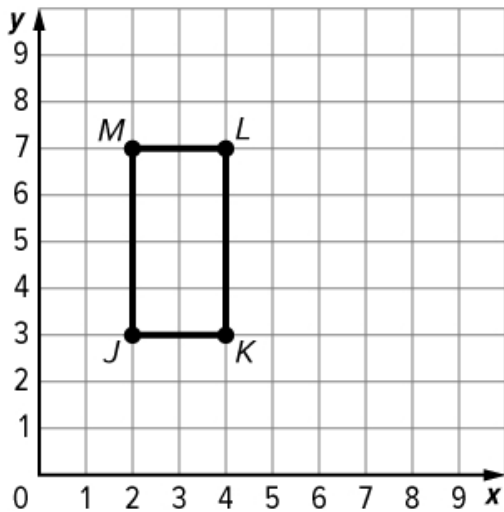
8-5 Polygons on the Coordinate Plane

6. **Multiple Choice** A polygon has vertices $J(2, 3)$, $K(4, 3)$, $L(4, 7)$, and $M(2, 7)$. What is the area of the polygon?

- A 8 square units
- B 10 square units
- C 12 square units
- D 16 square units

SOLUTION:

Graph the vertices. Draw line segments to connect them. A rectangle is formed.



Find the area of the rectangle.

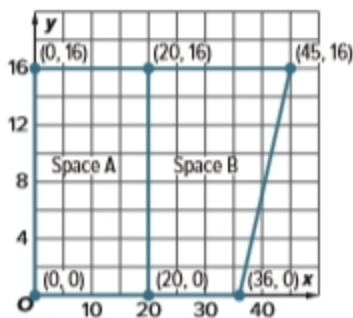
The length is side JM , and the width is side JK .

$$\begin{aligned} A &= lw && \text{Area of a rectangle} \\ &= (4)(2) && \text{Replace } l \text{ with 4 and } w \text{ with 2.} \\ &= 8 && \text{Simplify.} \end{aligned}$$

The area of the polygon is 8 square units.

8-5 Polygons on the Coordinate Plane

7. Ethan wants to open a pet store in a town mall and is considering the two spaces shown. On the map, one unit is equal to one foot. Space A has a monthly rental cost of \$14.75 per square foot. Space B has a monthly rental cost of \$14.50 per square foot. Ethan wants to pay the lower total monthly rental price. Which location should he choose to rent? Write an argument that can be used to justify your solution.



SOLUTION:

Find the area Space A. Space A is a rectangle.

$$\begin{aligned} A &= lw && \text{Area of a rectangle} \\ &= (16)(20) && \text{Replace } l \text{ with 16 and } w \text{ with 20.} \\ &= 320 && \text{Simplify.} \end{aligned}$$

The area of Space A is 320 square feet. The total cost of renting Space A is $\$14.75 \times 320$ or \$4,720.

Find the area Space B. Space B is a trapezoid.

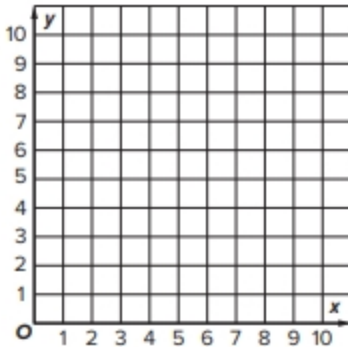
$$\begin{aligned} A &= \frac{1}{2}h(b_1 + b_2) && \text{Area of a trapezoid} \\ &= \frac{1}{2}(16)(16 + 25) && \text{Replace } h, b_1, \text{ and } b_2 \text{ with the known values.} \\ &= \frac{1}{2}(16)(41) && \text{Add.} \\ &= 328 && \text{Multiply.} \end{aligned}$$

The area of Space B is 328 square feet. The total cost of renting Space B is $\$14.50 \times 328$ or \$4,756.

The monthly rental price of Space A is \$4,720. The monthly rental price of Space B is \$4,756. \$4,720 is less than \$4,756.

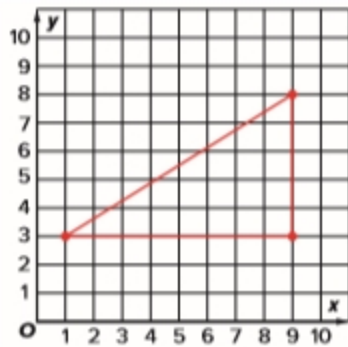
8-5 Polygons on the Coordinate Plane

8. Draw and label a triangle on the coordinate plane that has an area of 20 square units.



SOLUTION:

Sample answer:



$$A = \frac{1}{2}(5)(8) \text{ or } 20 \text{ square units}$$

9. **Reason Inductively** A certain rectangle has a perimeter of 10 units and an area of 6 units. Two of the vertices have coordinates (1, 7) and (1, 4). Find the two missing coordinates.

SOLUTION:

Sample answer: On the coordinate plane, plot the coordinates (1, 7) and (1, 4). Draw line segments to connect them and form a rectangle with a perimeter of 10 units and an area of 6 units. So, the points are (3, 4) and (3, 7).

10. **Persevere with Problems** Mrs. Palmer is placing a retaining wall around a garden. The coordinates of the vertices of the wall are (1, 1), (1, 5), (6, 5), and (6, 1). If each grid square has a length of 2 feet, what is the perimeter of the area? Write an argument that can be used to justify your solution.

SOLUTION:

Sample answer: The perimeter of the figure is $4 + 5 + 4 + 5$ or 18 units. Because each grid square represents 2 feet, then 18×2 feet is 36 feet.

8-5 Polygons on the Coordinate Plane

11. **Find the Error** Rectangle $ABCD$ has vertices $A(2, 1)$, $B(2, 7)$, $C(10, 7)$, and $D(10, 1)$. A classmate states that the perimeter of the rectangle is 16 units. Find the student's mistake and correct it.

SOLUTION:

Sample answer: The student subtracted $10 - 7$ and $7 - 2$ to find lengths 3 and 5. The student should have subtracted $7 - 1$ and $10 - 2$ to find lengths 6 and 8. The perimeter is $6 + 8 + 8 + 6$ or 28 units.