

Objective: Determine the perimeter of triangles and quadrilaterals given coordinates.

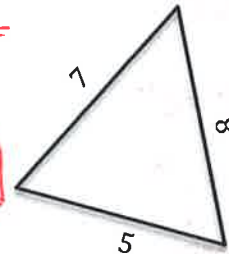
Warm Up:

1. Define "perimeter" in your own words.

- adding up all the side lengths around a shape
- the total length of all sides

2. Determine the perimeter of the following triangle.

Perimeter =
 $5 + 7 + 8$
= 20 units



Example 1: Determine the perimeter for quadrilateral ABCD with vertices at the coordinates:

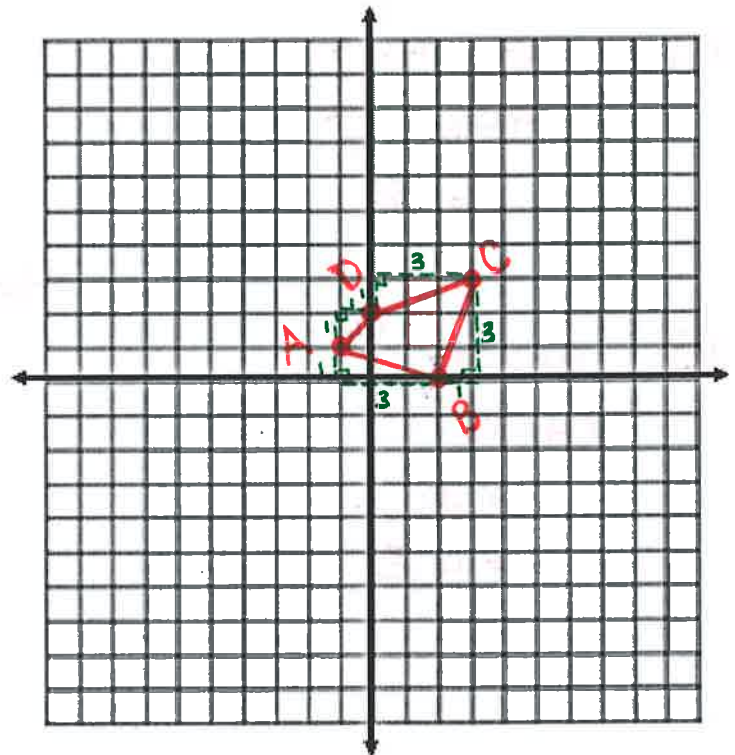
$A(-1, 1)$, $B(2, 0)$, $C(3, 3)$, and $D(0, 2)$

\overline{AD} :
 $1^2 + 1^2 = c^2$
 $1 + 1 = c^2$
 $c = \sqrt{2}$

\overline{DC} :
 $1^2 + 3^2 = c^2$
 $1 + 9 = c^2$
 $c = \sqrt{10}$

\overline{CB} :
 $3^2 + 1^2 = c^2$
 $9 + 1 = c^2$
 $c = \sqrt{10}$

\overline{AB} :
 $1^2 + 3^2 = c^2$
 $1 + 9 = c^2$
 $c = \sqrt{10}$



Perimeter = $\sqrt{2} + \sqrt{10} + \sqrt{10} + \sqrt{10}$
= $\sqrt{2} + 3\sqrt{10}$

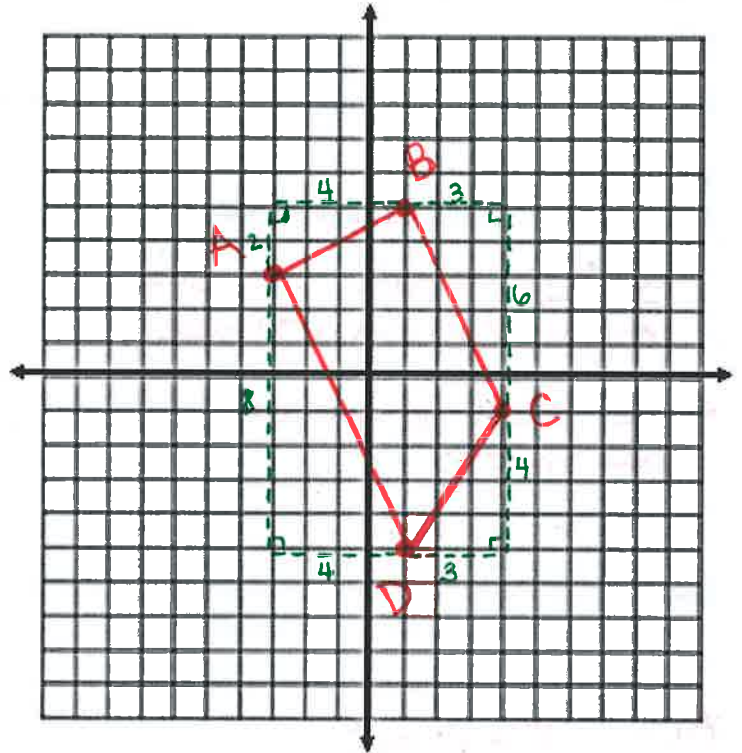
Example 2: Determine the perimeter for quadrilateral ABCD with vertices at the coordinates:
 $A(-3, 3)$, $B(1, 5)$, $C(4, -1)$, and $D(1, -5)$

$$\begin{aligned}\overline{AB}: & 2^2 + 4^2 = c^2 \\ & 4 + 16 = c^2 \\ & c = \sqrt{20} \\ & = 2\sqrt{5}\end{aligned}$$

$$\begin{aligned}\overline{BC}: & 3^2 + 6^2 = c^2 \\ & 9 + 36 = c^2 \\ & c = \sqrt{45} \\ & = 3\sqrt{5}\end{aligned}$$

$$\begin{aligned}\overline{CD}: & 3^2 + 4^2 = c^2 \\ & 9 + 16 = c^2 \\ & c = \sqrt{25} \\ & = 5\end{aligned}$$

$$\begin{aligned}\overline{AD}: & 8^2 + 4^2 = c^2 \\ & 64 + 16 = c^2 \\ & c = \sqrt{80} \\ & = 4\sqrt{5}\end{aligned}$$



$$\begin{aligned}\text{Perimeter} &= 2\sqrt{5} + 3\sqrt{5} + 5 + 4\sqrt{5} \\ &= 5 + 9\sqrt{5}\end{aligned}$$