Matgeo-q.1.8.12

AI25BTECH11036-SNEHAMRUDULA

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Question

The perimeter of a triangle with vertices $(0, 4)$, $(0, 0)$ and $(3, 0)$ is

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Solution

Given:

a) **Given:** Vertices of the triangle are

$$A = \begin{pmatrix} 0 \\ 4 \end{pmatrix}, \quad B = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \quad C = \begin{pmatrix} 3 \\ 0 \end{pmatrix}$$

b) **Lengths of sides:**

$$AB = \|A - B\| = \left\| \begin{pmatrix} 0 \\ 4 \end{pmatrix} - \begin{pmatrix} 0 \\ 0 \end{pmatrix} \right\| = \left\| \begin{pmatrix} 0 \\ 4 \end{pmatrix} \right\| = 4$$

$$BC = \|B - C\| = \left\| \begin{pmatrix} 0 \\ 0 \end{pmatrix} - \begin{pmatrix} 3 \\ 0 \end{pmatrix} \right\| = \left\| \begin{pmatrix} -3 \\ 0 \end{pmatrix} \right\| = 3$$

$$CA = \|C - A\| = \left\| \begin{pmatrix} 3 \\ 0 \end{pmatrix} - \begin{pmatrix} 0 \\ 4 \end{pmatrix} \right\| = \left\| \begin{pmatrix} 3 \\ -4 \end{pmatrix} \right\| = \sqrt{3^2 + (-4)^2} = 5$$

c) **Perimeter:**

$$P = AB + BC + CA = 4 + 3 + 5 = 12$$

d) **Conclusion:** The perimeter of the triangle is

$$\boxed{12}$$

Graphical Representation