

What you'll Learn About

- Two Dimensional Vectors/Vector Operations/Unit Vectors
- Direction Angle/Applications of Vectors

Vector

Direction

Length

(magnitude)

Find the component form and magnitude of the vector where $P = (-3, 4)$, $Q = (-5, 2)$, $R = (-1, 3)$ and $S = (4, 7)$

Initial \leftarrow terminal \rightarrow terminal - Initial

A) \vec{PQ}

$$\langle x_T - x_I, y_T - y_I \rangle$$

$$\langle -5 - (-3), 2 - 4 \rangle$$

$$\langle -2, -2 \rangle$$

$$\text{mag} = \sqrt{x^2 + y^2}$$

$$= \sqrt{(-2)^2 + (-2)^2}$$

$$= \sqrt{8}$$

$(-5, 2)$ $(4, 7)$
C) $3\vec{QS}$

$$3 \langle 4 - (-5), 7 - 2 \rangle$$

$$3 \langle 9, 5 \rangle$$

$$\langle 27, 15 \rangle$$

$$\text{mag} = \sqrt{27^2 + 15^2}$$

$$= \sqrt{954}$$

Initial \leftarrow terminal \rightarrow

B) \vec{RS}

$$\langle 4 - (-1), 7 - 3 \rangle$$

$$\langle 5, 4 \rangle$$

$$\text{mag} = \sqrt{5^2 + 4^2}$$

$$= \sqrt{25 + 16}$$

$$= \sqrt{41}$$

$(-5, 2)$ $(-1, 3)$ $(-3, 4)$
D) $2\vec{QR} + \vec{PS}$ $(5, 7)$

$$2 \langle -1 - (-5), 3 - 2 \rangle$$

$$2 \langle 4, 1 \rangle + \langle 5 - (-3), 7 - 4 \rangle$$

$$\langle 8, 2 \rangle + \langle 8, 3 \rangle$$

$$\langle 16, 5 \rangle$$

$$\text{mag} = \sqrt{16^2 + 5^2}$$

$$= \sqrt{281}$$