## EE25btech11028 - J.Navya sri

## **Question:**

Do the points (3, 2), (-2, -3), and (2, 3) form a triangle? If so, name the type of triangle formed.

**Solution:** Let the position vectors of the points be:

$$A = (3, 2), B = (-2, -3), C = (2, 3)$$

Step 1: Check if the points are collinear

Calculate area of the triangle using vector cross product magnitude:

Area = 
$$\frac{1}{2} |(\mathbf{B} - \mathbf{A}) \times (\mathbf{C} - \mathbf{A})|$$
 (1)

Compute vectors:

$$\mathbf{B} - \mathbf{A} = (-2 - 3, -3 - 2) = (-5, -5) \tag{2}$$

$$\mathbf{C} - \mathbf{A} = (2 - 3, 3 - 2) = (-1, 1)$$
 (3)

Calculate the 2D cross product magnitude:

$$|(\mathbf{B} - \mathbf{A}) \times (\mathbf{C} - \mathbf{A})| = |(-5)(1) - (-5)(-1)|$$
  
=  $|-5 - 5| = 10$  (4)

Therefore,

Area = 
$$\frac{1}{2} \times 10 = 5 \neq 0$$
 (5)

Since area  $\neq 0$ , points are not collinear and hence form a triangle.

Step 2: Calculate the side lengths

Length of side AB:

$$|\mathbf{B} - \mathbf{A}| = \sqrt{(-5)^2 + (-5)^2} = \sqrt{50}$$
 (6)

Length of side BC:

$$|\mathbf{C} - \mathbf{B}| = \sqrt{(2+2)^2 + (3+3)^2} = \sqrt{16+36} = \sqrt{52}$$
 (7)

Length of side AC:

$$|\mathbf{C} - \mathbf{A}| = \sqrt{(-1)^2 + 1^2} = \sqrt{2}$$
 (8)

Step 3: Determine the type of triangle Since

$$\sqrt{50} \neq \sqrt{52} \neq \sqrt{2}$$

all sides are unequal.

## FINAL ANSWER

Yes, the points form a scalene triangle.

## **Graphical Representation:**

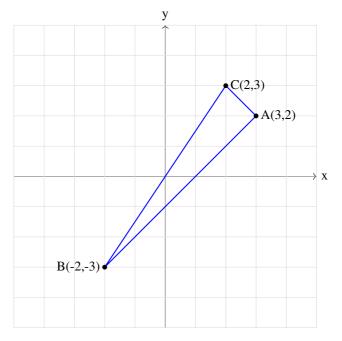


Fig. 0