Co-Ordinate Geometry Ex 14.2 Q9

Answer :

The distance *d* between two points (x_1, y_1) and (x_2, y_2) is given by the formula

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

In an isosceles triangle there are two sides which are equal in length.

Here the three points are $A(3,0)$, $B(6,4)$ and $C(-1,3)$.

Let us check the length of the three sides of the triangle.

$$AB = \sqrt{(3-6)^2 + (0-4)^2}$$
$$= \sqrt{(-3)^2 + (-4)^2}$$
$$= \sqrt{9+16}$$
$$AB = \sqrt{25}$$
$$BC = \sqrt{(6+1)^2 + (4-3)^2}$$
$$= \sqrt{(7)^2 + (1)^2}$$
$$= \sqrt{49+1}$$
$$BC = \sqrt{50}$$
$$AC = \sqrt{(3+1)^2 + (0-3)^2}$$
$$= \sqrt{(4)^2 + (-3)^2}$$
$$= \sqrt{16+9}$$
$$AC = \sqrt{25}$$

Here, we see that two sides of the triangle are equal. So the triangle formed should be an isosceles triangle.

We can also observe that $BC^2 = AC^2 + AB^2$

Hence proved that the triangle formed by the three given points is an $\boxed{\text{isosceles triangle}}$.

Co-Ordinate Geometry Ex 14.2 Q10

Answer :

The distance *d* between two points (x_1, y_1) and (x_2, y_2) is given by the formula

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

In a right-angled triangle, by Pythagoras theorem, the square of the longest side is equal to the sum of squares of the other two sides in the triangle.

Here the three points are $A(2,-2)$, $B(-2,1)$ and $C(5,2)$.

Let us find out the lengths of all the sides of the triangle.

$$AB = \sqrt{(2+2)^2 + (-2-1)^2}$$
$$= \sqrt{(4)^2 + (-3)^2}$$
$$= \sqrt{16+9}$$
$$AB = \sqrt{25}$$
$$BC = \sqrt{(-2-5)^2 + (1-2)^2}$$
$$= \sqrt{(-7)^2 + (-1)^2}$$
$$= \sqrt{49+1}$$
$$BC = \sqrt{50}$$
$$AC = \sqrt{(2-5)^2 + (-2-2)^2}$$
$$= \sqrt{(-3)^2 + (-4)^2}$$
$$= \sqrt{9+16}$$
$$AC = \sqrt{25}$$

Here we have,

$$BC^2 = AB^2 + AC^2$$
$$50 = 25 + 25$$

Since the square of the longest side is equal to the sum of squares of the other two sides the given triangle is a $\boxed{\text{right-angled triangle}}$.

In a right angled triangle the area of the triangle '*A*' is given by,

$$A = \frac{1}{2}(\text{Product of both the sides containing the right angle})$$

In a right angled triangle the sides containing the right angle will not be the longest side.

Hence the area of the given right angled triangle is,

$$A = \frac{(\sqrt{25})(\sqrt{25})}{2}$$
$$= \frac{25}{2}$$
$$A = 12.5$$

Hence the area of the given right-angled triangle is $\boxed{12.5 \text{ square units}}$.

In a right-angled triangle the hypotenuse will be the longest side. Here the longest side is '*BC*'.

Hence the hypotenuse of the given right-angled triangle is $\boxed{5\sqrt{2} \text{ units}}$

*********** END **********