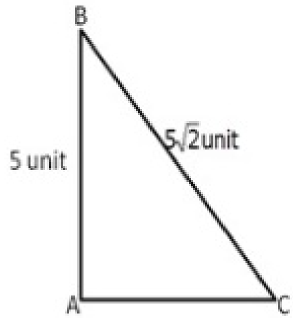
Exercise 16A

Question 15:
Let A(3,0), B(6,4) and C(-1,3) are the given points. Then



$$AB = \sqrt{(6-3)^2 + (4-0)^2} = \sqrt{(3)^2 + (4)^2} = \sqrt{25} = 5\text{units}$$

$$BC = \sqrt{(-1-6)^2 + (3-4)^2} = \sqrt{(-7)^2 + (-1)^2} = \sqrt{50} = 5\sqrt{2} \text{ units}$$

$$AC = \sqrt{(-1-3)^2 + (3-0)^2} = \sqrt{(-4)^2 + (3)^2} = \sqrt{25} = 5 \text{ units}$$

Thus, $AB = AC = 5$ units

$\therefore$ ΔABC is isosceles

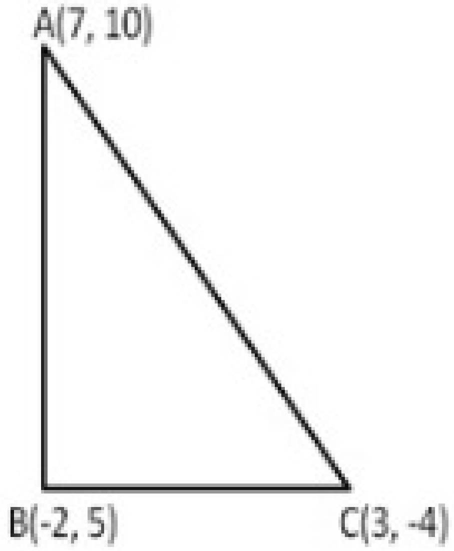
Also, $AB^2 + AC^2 = \left(5^2 + 5^2\right) = 50$

and $BC^2 = \left(5\sqrt{2}\right)^2 = 50$

Thus, $AB^2 + AC^2 = BC^2$

$\therefore$ Δ ABC is an isosceles right - angled triangle.
This shows that Δ ABC is right angled at A.

Question 16:
Vertices of triangle ABC are A(7, 10), B(-2, 5) and C(3, -4)



$$AB^2 = (-2-7)^2 + (5-10)^2$$
$$= 81 + 25 = 106$$
$$BC^2 = (3+2)^2 + (-4-5)^2$$
$$= 25 + 81 = 106$$
$$AC^2 = (3-7)^2 + (-4-10)^2$$
$$= 16 + 196 = 212$$

Now, $AB^2 = 106, BC^2 = 106,$

$\Rightarrow AB = BC$

$\therefore$ ΔABC is an isosceles triangle

Also $AB^2 + BC^2 = 106 + 106 = 212$

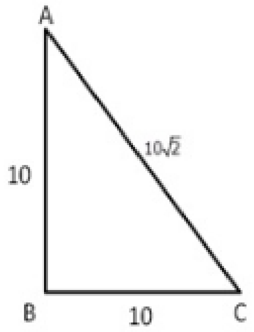
and $AC^2 = 212$

$\therefore$ $AB^2 + BC^2 = AC^2$

$\Rightarrow \angle B = 90^\circ$

$\therefore$ Δ ABC is a right angled triangle.
Hence Δ ABC is an isosceles right triangle.

Question 17:
Let A(-5,6), B(3,0) and C(9,8) be the given points. Then



$$AB = \sqrt{(3+5)^2 + (0-6)^2} = \sqrt{(8)^2 + (-6)^2} = \sqrt{100} = 10 \text{ units}$$

$$BC = \sqrt{(9-3)^2 + (8-0)^2} = \sqrt{(6)^2 + (8)^2} = \sqrt{100} = 10 \text{ units}$$

$$AC = \sqrt{(9+5)^2 + (8-6)^2} = \sqrt{(14)^2 + (2)^2} = \sqrt{200} = 10\sqrt{2} \text{ units}$$

Thus, $AB = BC = 10$ units

$\therefore$ ΔABC is isosceles

this show that ΔABC is a right angled at B

In ΔABC, we have

$$\text{Area of } \Delta ABC = \left(\frac{1}{2} \times \text{base} \times \text{height}\right)$$

$$= \left(\frac{1}{2} \times 10 \times 10\right) \text{sq.unit}$$

$$= 50 \text{ sq.unit}$$

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