Exercise 16A

Question 3:
The given points are A(a, -1) and B(5,3).

$$\text{Now, } AB = 5 \Rightarrow AB^2 = 25$$

$$\Rightarrow (5-a)^2 + (3+1)^2 = 25$$

$$\Rightarrow 25 + a^2 - 10a + 16 = 25$$

$$\Rightarrow a^2 - 10a + 16 = 0$$

$$\Rightarrow a^2 - 8a - 2a + 16 = 0$$

$$\Rightarrow a(a-8) - 2(a-8) = 0$$

$$\Rightarrow (a-8)(a-2) = 0$$

$$\Rightarrow a - 8 = 0 \text{ or } a - 2 = 0$$

$$\Rightarrow a = 8 \text{ or } a = 2$$

$$\text{Hence } a = 8, \text{ or } a = 2$$

Question 4:
Let R(10,y) be the point at a distance of 10 units from P(2, -3).

$$\text{Then, } PR^2 = (10-2)^2 + (y+3)^2 = (10)^2$$

$$8^2 + (y+3)^2 = 100$$

$$64 + y^2 + 9 + 6y = 100$$

$$y^2 + 6y - 27 = 0$$

$$y^2 + 9y - 3y - 27 = 0$$

$$y(y+9) - 3(y+9) = 0$$

$$(y+9)(y-3) = 0$$

$$\Rightarrow \quad y = -9 \text{ or } y = 3$$

Question 5:

Let A(6, -1), B(1,3) and C(k,8) are the given points.

$$AB = \sqrt{(1-6)^2 + (3+1)^2} = \sqrt{(-5)^2 + (4)^2} = \sqrt{25+16}$$

$$= \sqrt{41} \text{ units}$$

$$BC = \sqrt{(k-1)^2 + (8-3)^2} = \sqrt{k^2 + 1 - 2k + 25} = \sqrt{k^2 - 2k + 26}$$

we know that, $\therefore AB = BC$

$$\sqrt{41} = \sqrt{k^2 - 2k + 26}$$

[on squaring both sides, we get]

$$k^2 - 2k + 26 = 41$$

$$k^2 - 2k + 26 - 41 = 0$$

$$k^2 - 2k - 15 = 0$$

$$k^2 - 5k + 3k - 15 = 0$$

$$k(k-5) + 3(k-5) = 0$$

$$(k-5)(k+3) = 0$$

$$\therefore k = 5 \text{ or } k = -3$$

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