

Exercise 16A

Question 3:

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

Now,
$$AB = 5 \Rightarrow AB^2 = 25$$

 $\Rightarrow (5-a)^2 + (3+1)^2 = 25$
 $\Rightarrow 25 + a^2 - 10a + 16 = 25$
 $\Rightarrow a^2 - 10a + 16 = 0$
 $\Rightarrow a^2 - 8a - 2a + 16 = 0$
 $\Rightarrow a(a-8) - 2(a-8) = 0$
 $\Rightarrow a(a-8)(a-2) = 0$
 $\Rightarrow (a-8)(a-2) = 0$
 $\Rightarrow a-8 = 0 \text{ or } a-2 = 0$
 $\Rightarrow a=8 \text{ or } a=2$
Hence $a=8$, or $a=2$

Question 4

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

Then,
$$PR^2 = (10-2)^2 + (y+3)^2 = (10)^2$$

 $8^2 + (y+3)^2 = 100$
 $64 + y^2 + 9 + 6y = 100$
 $y^2 + 6y - 27 = 0$
 $y^2 + 9y - 3y - 27 = 0$
 $y(y+9) - 3(y+9) = 0$
 $(y+9)(y-3) = 0$
 $\Rightarrow y = -9 \text{ or } y = 3$

Question 5:

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

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

= $\sqrt{41}$ 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

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

 $k^{2}-2k+26-41 = 0$
 $k^{2}-2k-15 = 0$
 $k^{2}-5k+3k-15 = 0$
 $k(k-5)+3(k-5) = 0$
 $(k-5)(k+3) = 0$
 $\therefore k=5 \text{ or } k=-3$

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