Chapter-Coordinate Geometry
Question bank

Q1.

Find the ratio in which the point (-3, k) divides the line-segment joining the points (-5, -4) and (-2,3). Also find the value of k.

Q2.

Show that the points (a,a), (-a,-a) and (-√3a, √3 a) are the vertices of an equilateral triangle.

Q3. If the point A(0, 2) is equidistant from the points B(3, p) and C(p, 5), find p. Also find the length of AB.

Q4.

If the centre and radius of circle is $(3,4)$ and 7 units respectively,, then what it the position of the point $A(5,8)$ with respect to circle?

Q5.

The ordinate of a point A on y-axis is 5 and B has co-ordinates $(-3,1)$. Find the length of AB.

Q6.

Find the coordinates of a point A, where AB is diameter of a circle whose centre is $(2,-3)$ and B is the point $(1,4)$.

Q7.

If the distance between the points $(4,k)$ and $(1,0)$ is 5, then what can be the possible values of k.

Q8.

If the point P(2, 2) is equidistant from the points A(-2, k) and B(-2k, -3), find k.

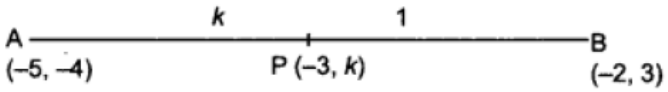
Q9.

The x-coordinate of a point **P** is twice its y-coordinate.
If **P** is equidistant from **Q** (2, −5) and **R** (−3, 6), find the co-ordinates of **P**

Q10.

Find a relation between x and y such that the point $P(x, y)$ is equidistant from the points $A(-5, 3)$ and $B(7, 2)$.

Solution 1.



Let P divides AB in $k : 1$.

Then $-3 = \dfrac{k\times(-2)+1(-5)}{k+1}$ [Using section formula, $(x, y) = \left(\dfrac{mx_2+nx_1}{m+n}, \dfrac{my_2+ny_1}{m+n}\right)$]

$\Rightarrow \quad -3k-3 = -2k-5$

$\Rightarrow \quad -k = -2$

$\Rightarrow \quad k = 2$

Hence the required ratio is 2 : 1

Solution 2.

Let P(a, a), Q$(-a, -a)$, R$(-\sqrt{3}a, \sqrt{3}a)$. Using distance formula,

$$PQ = \sqrt{(a+a)^2+(a+a)^2} = \sqrt{4a^2+4a^2} = 2\sqrt{2}a$$

$$QR = \sqrt{(-a+\sqrt{3}a)^2+(-a-\sqrt{3}a)^2}$$

$$= \sqrt{a^2+3a^2-2\sqrt{3}a^2+a^2+3a^2+2\sqrt{3}a^2} = \sqrt{8a^2} = 2\sqrt{2}a$$

$$RP = \sqrt{(a+\sqrt{3}a)^2+(a-\sqrt{3}a)^2}$$

$$= \sqrt{a^2+3a^2+2\sqrt{3}a^2+a^2+3a^2-2\sqrt{3}a^2} = \sqrt{8a^2} = 2\sqrt{2}a$$

$\Rightarrow$ Here, PQ = QR = RP

$\therefore$ P, Q, R are vertices of an equilateral triangle.

Solution 3.

Here, $AB = AC$ [Given]

$\Rightarrow \quad AB^2 = AC^2$

Using distance formula,

$\Rightarrow \quad (3-0)^2 + (p-2)^2 = (p-0)^2 + (5-2)^2$

$\Rightarrow \quad 9 + p^2 - 4p + 4 = p^2 + 9$

$\Rightarrow \quad -4p + 4 = 0$

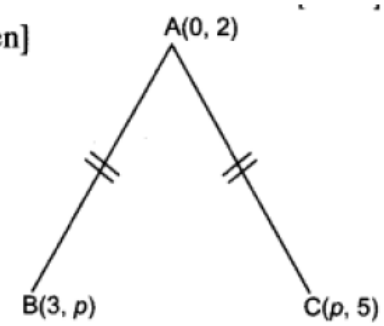
$\Rightarrow \quad 4p = 4$

$\Rightarrow \quad p = 1$

So, point B is (3, 1); point C is (1, 5)

Now, length of $AB = \sqrt{(3-0)^2+(1-2)^2}$ [$\because$ use distance formula]

$= \sqrt{9+1} = \sqrt{10}$ units



Solution 4.

Distance of the point, from the centre,

$$d = \sqrt{(5-3)^2+(8-4)^2}$$
$$= \sqrt{4+16} = \sqrt{20} = 2\sqrt{5}$$

Since $2\sqrt{5}$ is less than 7, the point lies inside the circle.

Solution 5.

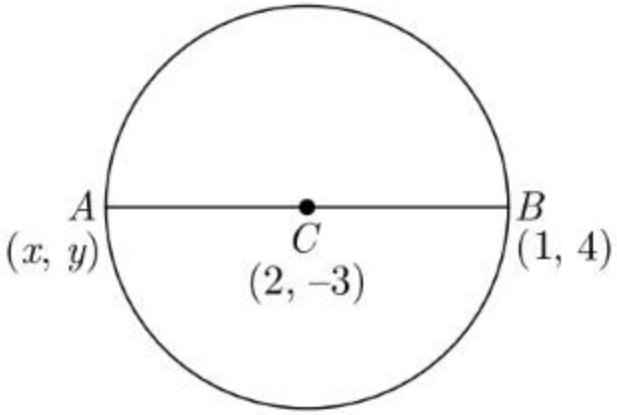
We have $A(0,5)$ and $B(-3,1)$.

Distance between A and B,

$$AB = \sqrt{(x_2-x_1)^2+(y_2-y_1{}^2}$$
$$= \sqrt{(-3-0)^2+(1-5)^2}$$
$$= \sqrt{9+16}$$
$$= \sqrt{25} = 5$$

Solution 6.

As per question we have shown the figure below. Since, AB is the diameter, centre C must be the mid point of the diameter of AB.



Let the co-ordinates of point A be (x, y).

x-coordinate of C,

$$\frac{x+1}{2} = 2$$

$$x+1 = 4 \Rightarrow x = 3$$

and y-coordinate of C,

$$\frac{y+4}{2} = -3$$

$$y+4 = -6 \Rightarrow y = -10$$

Hence, coordinates of point A are $(3, -10)$.

Solution 7.

Using distance formula we have

$$\sqrt{(4-1)^2+(k-0)^2} = 5$$

$$3^2 + k^2 = 25$$

$$k^2 = 25 - 9 = 16$$

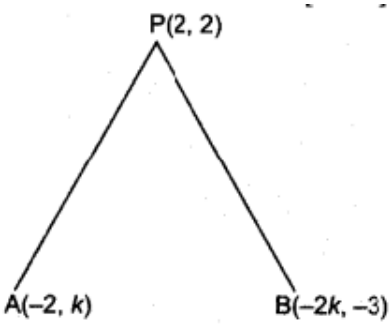
$$k = \pm 4$$

Solution 8.

Since, given that $PA = PB \Rightarrow PA^2 = PB^2$

Using distance formula,

$$\Rightarrow (+2+2)^2 + (2-k)^2 = (2+2k)^2 + (2+3)^2$$
$$\Rightarrow 16 + 4 - 4k + k^2 = 4 + 8k + 4k^2 + 25$$
$$\Rightarrow 16 - 4k + k^2 = 8k + 4k^2 + 25$$
$$\Rightarrow 3k^2 + 12k + 9 = 0$$
$$\Rightarrow k^2 + 4k + 3 = 0$$
$$\Rightarrow (k+3)(k+1) = 0$$
$$\Rightarrow k = -1 \text{ or } -3$$



When $k = -1$, then point A is $(-2, -1)$

$$AP = \sqrt{(2+2)^2+(2+1)^2} = \sqrt{16+9} = 5 \text{ units}$$

When $k = -3$, then point A is $(-2, -3)$

$$AP = \sqrt{(2+2)^2+(2+3)^2} = \sqrt{16+25} = \sqrt{41} \text{ units}$$

Solution 9.

Let the point P be $(2y, y)$. Since $PQ = PR$, we have

$$\sqrt{(2y-2)^2+(y+5)^2} = \sqrt{(2y+3)^2+(y-6)^2}$$

$$(2y-2)^2+(y+5)^2 = (2y+3)^2+(y-6)^2$$

$$-8y+4+10y+25 = 12y+9-12y+36$$

$$2y+29 = 45$$

$$y = 8$$

Hence, coordinates of point P are $(16, 8)$

Solution 10.

Let $P(x, y)$ is equidistant from $A(-5, 3)$ and $B(7, 2)$, then we have

$$\begin{aligned} AP &= BP \\ \sqrt{(x+5)^2+(y-3)^2} &= \sqrt{(x-7)^2+(y-2)^2} \\ (x+5)^2+(y-3)^2 &= (x-7)^2+(y-2)^2 \\ 10x+25-6y+9 &= -14x+49-4y+4 \\ 24x+34 &= 2y+53 \\ 24x-2y &= 19 \end{aligned}$$

Thus $24x-2y-19 = 0$ is the required relation.