

# NCERT SOLUTIONS

## CLASS 10 MATHS

### CHAPTER 7- COORDINATE GEOMETRY

1. If the point A (x, y) is equidistant from B (4, 2) and C (-2, 4). Find the relation between x and y.

$$|AB| = \sqrt{(x-4)^2 + (y-2)^2}$$

$$= \sqrt{x^2 + 16 - 8x + y^2 + 4 - 4y}$$

$$|AC| = \sqrt{(x+2)^2 + (y-4)^2}$$

$$= \sqrt{x^2 + 4 + 4x + y^2 + 16 - 8y}$$

Since,  $|AB| = |AC|$

$$\Rightarrow x^2 + y^2 - 8x - 4y + 20 = x^2 + y^2 + 4x - 8y + 20$$

$$\Rightarrow 8y - 4y = 4x + 8x$$

$$\Rightarrow y = 3x$$

2. Find the perimeter of a triangle with vertices (0, 8), (0, 0) and (6, 0)

Let the vertices of the  $\triangle$  be P(0, 8), Q(0, 0) and R(6, 0)

$$\therefore PQ = \sqrt{(0)^2 + (-8)^2} = \sqrt{64} = 8$$

$$\therefore QR = \sqrt{(6)^2 + (0)^2} = \sqrt{36} = 6$$

$$\therefore RP = \sqrt{(-6)^2 + (8)^2} = \sqrt{100} = 10$$

$$\therefore \text{Perimeter of } \triangle = 8 + 6 + 10 = 24 \text{ units}$$

3. Find the coordinates of the perpendicular bisector of the line segment joining the points P (1, 4) and Q (2, 3), cuts the y-axis.

Here, O (0, y), P (1, 4) and Q (2, 3)

$$AO = BO$$

$$\Rightarrow \sqrt{(0-1)^2 + (y-4)^2} = \sqrt{(0-2)^2 + (y-3)^2}$$

$$\Rightarrow 1 + y^2 + 16 - 8y = 4 + y^2 + 9 - 6y$$

$$\Rightarrow 8y - 6y = 17 - 13$$

$$\Rightarrow 2y = 4$$

$$y = 2$$

$\therefore$  The required point is (0, 2)

4. The points which divides the line segment joining the points (5, 8) and (1, 2) in ratio 1:2 internally lies in which quadrant?

$$\text{Now } C \left( \frac{1+10}{3}, \frac{2+16}{3} \right)$$

$$\therefore C \left( \frac{11}{3}, 6 \right)$$



Since,  $C \left( \frac{11}{3}, 6 \right)$  lies in IV quadrant.

5. If  $A\left(\frac{x}{2}, 3\right)$  is the mid-point of the line segment joining the points  $B(4,1)$  and  $C(8,7)$ . Find the value of  $x$ .

$$\therefore \frac{4+8}{2} = \frac{a}{2}$$

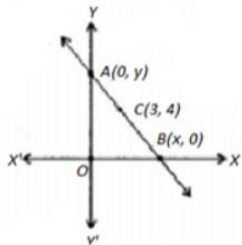
$$\Rightarrow 24 = 2a$$

$$\Rightarrow a = 12$$

6. A line intersects the y-axis at point A and B respectively. If  $(3, 4)$  is the mid-point of AB. Find the coordinates of A and B.

$$\text{Here, } \frac{x+0}{2} = 3 \Rightarrow x = 6$$

$$\frac{0+y}{2} = 4 \Rightarrow y = 8$$



$\therefore$  The coordinates of A and B are  $(0, 8)$  and  $(6, 0)$ .

7. Find the fourth vertex S of a parallelogram PQRS whose three vertices are  $P(-3, 8)$ ,  $Q(5, 4)$  and  $R(6, 2)$ .

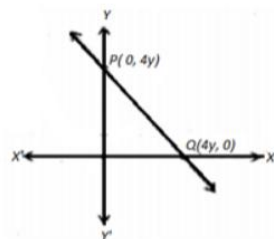
$$\text{Here, } \frac{-3+6}{2} = \frac{5+x}{2} \Rightarrow x = -1$$

$$\frac{8+2}{2} = \frac{4+y}{2} \Rightarrow y = 3$$

$\therefore$  The fourth vertex S of a parallelogram PQRS is  $S(-1, 3)$

8. Find the coordinates of the point which is equidistant from the three vertices of the

$\triangle POQ$ .



Point equidistant from the three vertices of a right angle triangle is the mid-point of hypotenuse.

$$\Rightarrow \left(\frac{4x+0}{2}, \frac{0+4y}{2}\right) \Rightarrow (2x, 2y)$$

9. Find the area of a triangle with vertices  $(x, y + z)$ ,  $(y, z + x)$  and  $(z, x + y)$ .

Area of the required

$$\Delta = \frac{1}{2} |x(z + x - x - y) + y(x + y - y - z) + (y + z - z - x)|$$

$$= \frac{1}{2} |x(z - y) + y(x - z) + z(y - x)|$$

$$= \frac{1}{2}|0| = 0.$$

10. Find the area of a triangle with vertices P (2, 0), Q (6, 0) and R (5, 4)

Area of the required  $\triangle PQR$

$$= \frac{1}{2}|2(0-2) + 6(4-0) + 5(0-0)|$$

$$= \frac{1}{2}|24 - 4| = 10 \text{ Sq. units.}$$

11. If the points O (0, 0), P (3, 4), Q (x, y) are collinear, then write the relation between x and y.

Since, O (0, 0), P (3, 4), Q (x, y) are collinear.

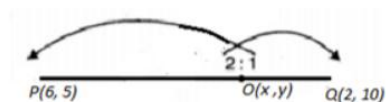
$\Rightarrow$  Area of a triangle formed by these points vanishes

$$\therefore \frac{1}{2}|0(4-y) + 3(y-0) + x(0-4)| = 0$$

$$\Rightarrow y - 2x = 0 \Rightarrow 2x = y$$

12. Find the coordinates of the point O dividing the line segment joining the point P (6, 5)

and Q(2, 10) in the ratio 2:1.



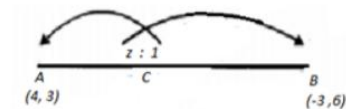
$$x = \frac{2(2)+1(6)}{5} = \frac{4+6}{5} = 2$$

$$\text{and } y = \frac{2(10)+1(5)}{5} = \frac{20+5}{5} = 5$$

$$\therefore O(2, 5)$$

13. The line joining A(4, 3) and B(-3, 6) meets y-axis at C. At what ratio does C divide the line segment AB?

Since, C lies on y-axis, let C be (0, y)



Suppose that the required ratio be z:1

$$\therefore x = \frac{-3z+4}{z+1} \Rightarrow 0 = -3z + 4 \Rightarrow z = \frac{4}{3}$$

$\therefore$  The required ratio is 4 : 3.