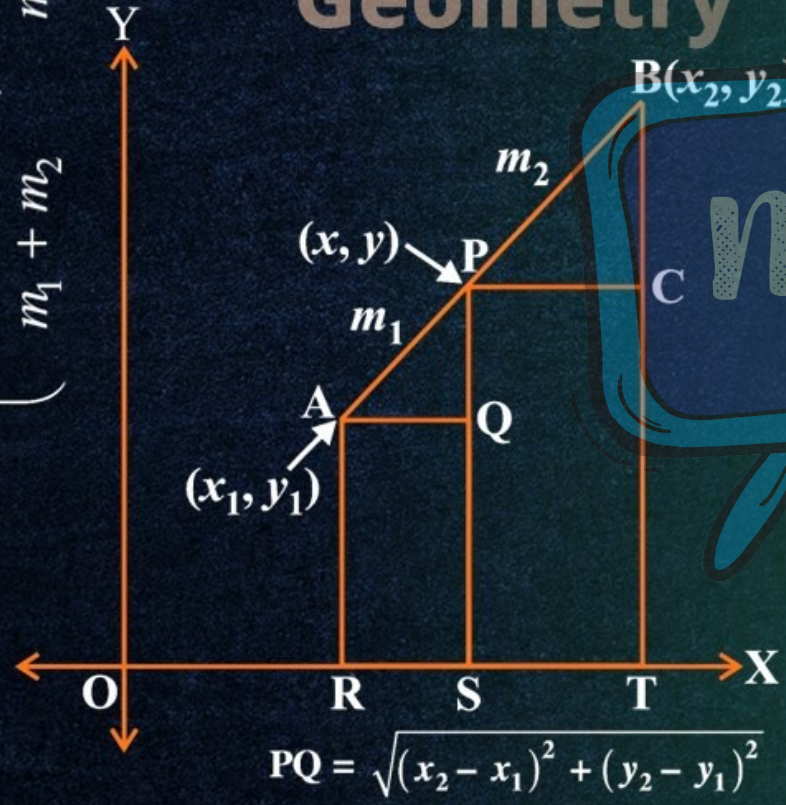
Coordinate Geometry

$$\left(\frac{m_1x_2 + m_2x_1}{m_1 + m_2}, \frac{m_1y_2 + m_2y_1}{m_1 + m_2}\right)$$



$$PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

CLASS – 10

MATHEMATICS

Chapter – 7

Coordinate Geometry

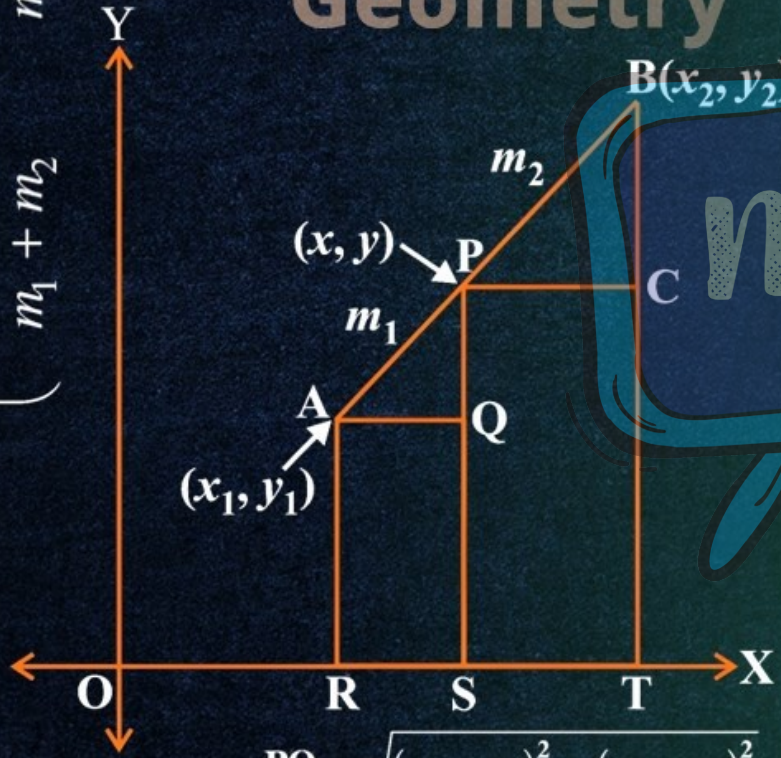
Part – 4

Exercise 7.1 (Q.8–10)

Shubham Tiwari

Coordinate Geometry

$$\left(\frac{m_1x_2 + m_2x_1}{m_1 + m_2}, \frac{m_1y_2 + m_2y_1}{m_1 + m_2}\right)$$



$$PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

EXERCISE 7.1

8. Find the values of y for which the distance between the points P(2, –3) and Q(10, y) is 10 units.

Soln. By the distance Formula

$$PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(10-2)^2 + [y-(-3)]^2}$$

$$10 = \sqrt{8^2 + (y+3)^2}$$

$$10^2 = 8^2 + (y+3)^2$$

$$10^2 - 8^2 = (y+3)^2$$

$$100 - 64 = (y+3)^2$$

$$36 = (y+3)^2$$

$$\sqrt{36} = (y+3)$$

$$\pm 6 = y+3$$

Case - 1

When $+6$

$y + 3 = 6$

$y = 6 - 3$

$y = 3$

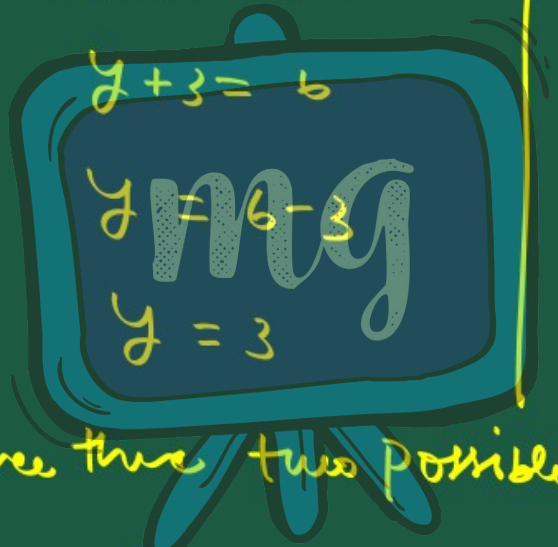
Case - 2

When -6

$y + 3 = -6$

$y = -6 - 3$

$y = -9$

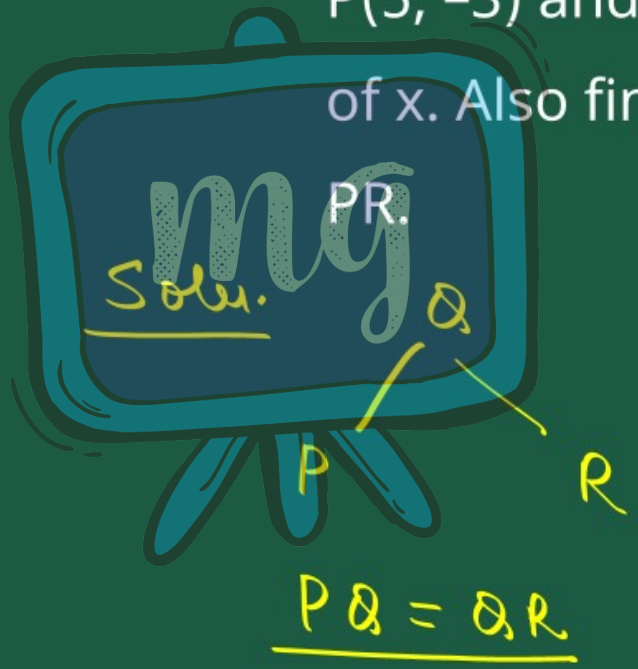


Hence there two possible values of y.

3, and -9.

$\therefore$ Coordinates are $(10, 3)$ and $(10, -9)$

9. If Q(0, 1) is equidistant from P(5, –3) and R(x, 6), find the values of x. Also find the distances QR and PR.



by applying distance formula

$$\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$$

$$PQ = \sqrt{(5-0)^2+(-3-1)^2}$$

$$QR = \sqrt{(x-0)^2+(6-1)^2}$$

$$PQ = QR$$

$$PQ^2 = QR^2$$

$\therefore \quad 5^2 + (4)^2 = x^2 + 5^2$

$4^2 = x^2$

$\pm 4 = x$

for $x = 4$

$P(5, -3) \quad R(4, 6)$

$PR = \sqrt{(5-4)^2 + (-3-6)^2}$

$= \sqrt{1^2 + (-9)^2}$

$\sqrt{1 + 81} = \sqrt{82}$ unit

for $x = -4$

$P(5, -3), \quad R(-4, 6)$

$PR = \sqrt{[5-(-4)]^2 + (-3-6)^2}$

$= \sqrt{(5+4)^2 + (-9)^2}$

$= \sqrt{9^2 + 9^2} = 9\sqrt{2}$ unit

Q(0,1) from $x = 4$

R(4,6)

$QR = \sqrt{(4-0)^2 + (6-1)^2}$

$= \sqrt{4^2 + 5^2}$

$= \sqrt{16 + 25}$

$QR = \sqrt{41}$ unit

$x = -4$

Q(0,1) R(−4,6)

$QR = \sqrt{(0+4)^2 + (1-6)^2}$

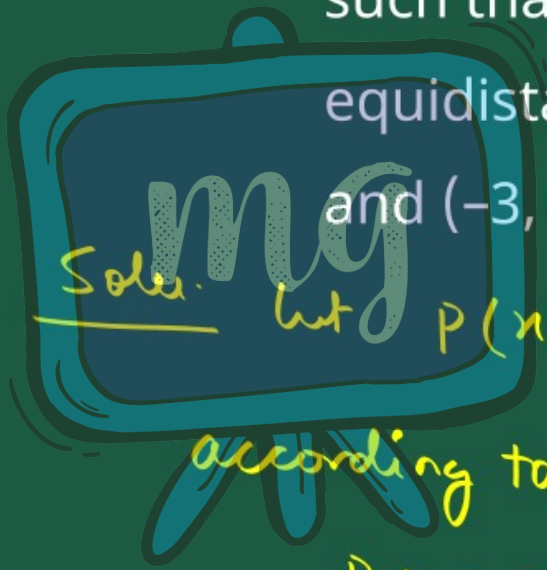
$= \sqrt{4^2 + (-5)^2}$

$= \sqrt{4^2 + 5^2}$

$= \sqrt{16 + 25}$

$QR = \sqrt{41}$ unit

10. Find a relation between x and y such that the point (x, y) is equidistant from the point (3, 6) and (–3, 4).



Soln. Let P(x, y), A(3, 6) and B(–3, 4)

According to the question

$PA = PB$

$PA^2 = PB^2$

By applying distance formula.

$$\sqrt{(x_2-x_1)^2+(y_2-y_1)^2} = \text{distance}.$$

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

$$PB = \sqrt{[x-(-3)]^2+(y-4)^2}$$

Now $PA^2 = PB^2$

$(x-3)^2 + (y-6)^2 = (x+3)^2 + (y-4)^2$

$x^2 + 9 - 6x + y^2 + 36 - 12y$

$= x^2 + 9 + 6x + y^2 + 16 - 8y$

$-6x + 36 - 12y = 6x + 16 - 8y$

$0 = 6x + 16 - 8y + 6x + 12y - 36$

$$0 = 12x + 4y - 20$$

$$0 = 4(3x + y - 5)$$

$$\frac{0}{4} = 3x + y - 5$$

$$0 = 3x + y - 5$$

$$5 - 3x = y$$