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Class - 10

MATHS

Chapter - 7

COORDINATE GEOMETRY

Part - 2

SHUBHAM TIWARI

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Exercise : 7.1

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1. Find the distance between the following pairs of points :

(ii) $(-5, 7)$, $(-1, 3)$

A B

$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y)^2}$$

$$= \sqrt{(-1+5)^2 + (3-7)^2}$$

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

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$$AB = \sqrt{16 + 16} = \sqrt{16 \times 2}$$

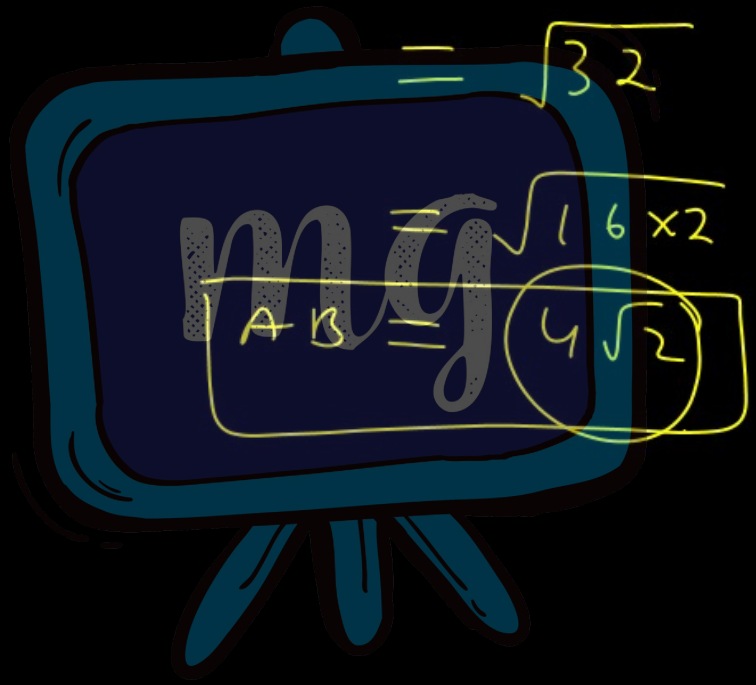
$$= \sqrt{32}$$

$$= 4\sqrt{2}$$

$$= \sqrt{16 \times 2}$$

$$AB = 4\sqrt{2}$$

$\{\sqrt{2} = 1.414\ldots\}$



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(iii) (a, b), (– a, – b)

A B

$$AB = \sqrt{[a-(-a)]^2 + [b-(-b)]^2}$$

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

$$AB = \sqrt{4a^2 + 4b^2}$$

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

$$\boxed{AB = 2\sqrt{a^2+b^2}}$$

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3. Determine if the points (1, 5), (2, 3) and (–2, –11) are collinear.

Solu: A(1, 5), B(2, 3), C(–2, –11)

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

$= \sqrt{1 + 4} = \sqrt{5} = 2.236$

$BC = \sqrt{(2+2)^2 + (3+11)^2}$

$= \sqrt{4^2 + 14^2} = \sqrt{16 + 196}$

$BC = \sqrt{212}$

14.8

2 | 212
2 | 106
53

$2\sqrt{53}$

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$A(1, 5)$

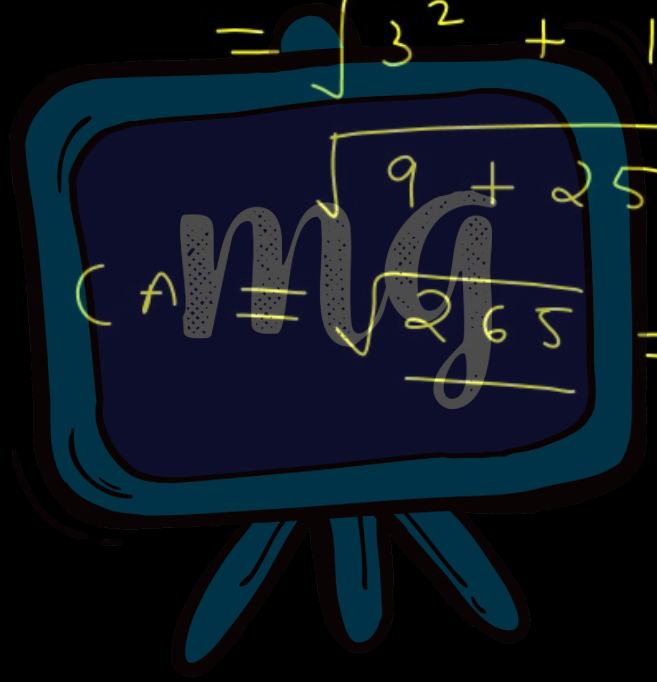
$C(-2, -11)$

$$CA = \sqrt{(1+2)^2 + (5+11)^2}$$

$$= \sqrt{3^2 + 16^2}$$

$$= \sqrt{9 + 256}$$

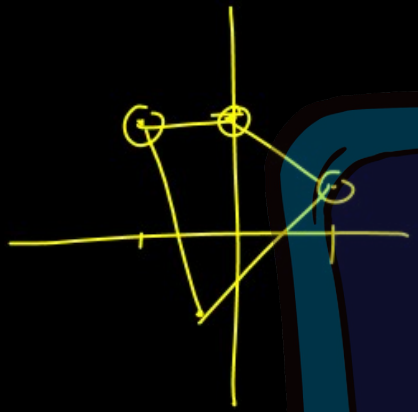
$$CA = \sqrt{265} = 16$$



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6. Name the type of quadrilateral formed, if any, by the following points, and give reasons for your answer:

(ii) (–3, 5), (3, 1), (0, 3), (–1, –4)

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$A(-3, 5)$
$B(3, 1)$
$C(0, 3)$

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

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

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

$$= \sqrt{36 + 16}$$

$$\boxed{AB = \sqrt{52}}$$

$$BC = \sqrt{(3)^2 + (1-3)^2}$$

$$= \sqrt{9 + 4}$$

$$\boxed{BC = \sqrt{13}}$$

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$A(-3,5)$
$C(0,3)$
$D(-1,-4)$

$CD = \sqrt{(1)^2 + (7)^2}$

$= \sqrt{1 + 49} = \sqrt{50}$

$DA = \sqrt{(-3+1)^2 + (5+4)^2}$

$= \sqrt{4 + 81}$

$DA = \sqrt{85}$

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(iii) (4, 5), (7, 6), (4, 3), (1, 2)



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

$PQ = 10$

$\sqrt{(x_2-x_1)^2+(y_2-y_1)^2} = 10$

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

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

taking square both side

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

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

$(y+3)^2 = 36$

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$(y+3)^2 = 36$

$y+3 = \sqrt{36}$

$y+3 = \pm 6$

Now $y+3 = +6$

$y = 6-3$

$y = 3$

Hence the coordinate is $(10, 3)$ or $(10, -9)$

$y+3 = -6$

$y = -6-3$

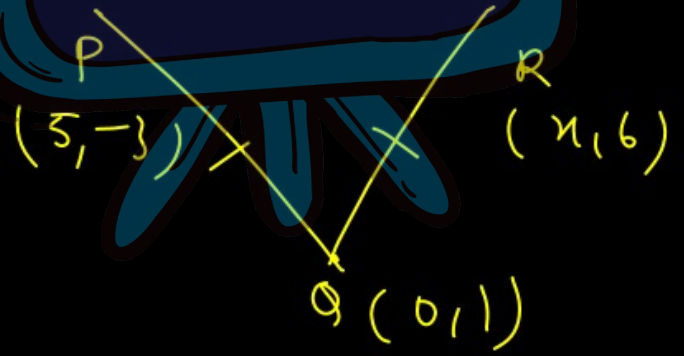
$y = -9$

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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.



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P(5, −3)
Q(0, 1)
R(x, 6)
(4, 6)
(−4, 6)

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

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

$= \sqrt{25 + 16}$

$= \sqrt{41}$

$QR = \sqrt{(x)^2 + (5)^2}$

$QR = \sqrt{x^2 + 25}$

$= 16 + 25$

$QR = \sqrt{41}$

$PR =$

$PQ = QR$

$\sqrt{41} = \sqrt{x^2 + 25}$

$41 = x^2 + 25$

$16 = x^2$

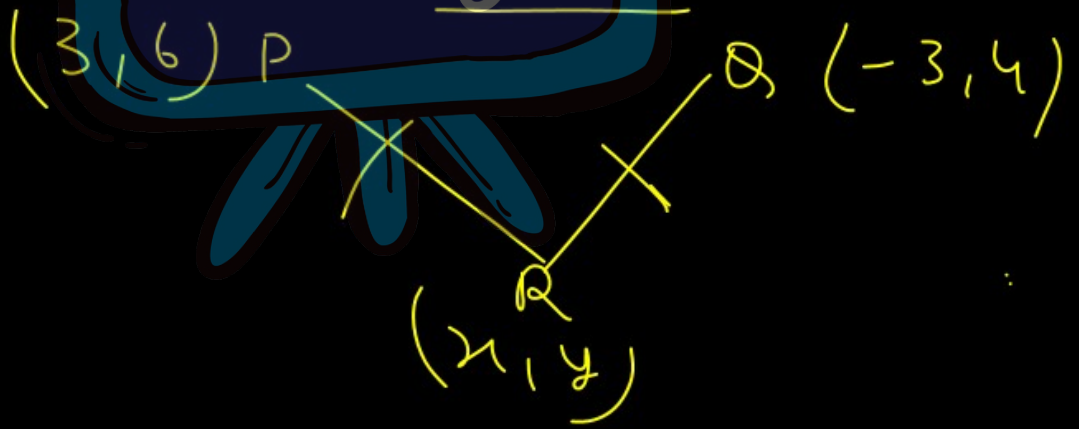
$\pm 4 = x$

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



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P(,)
R(x, y)
Q(-3, 4)

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

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

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

$PR = QR$ {Given}

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

$x^2 + 9 - 6x + y^2 + 36 - 12y = x^2 + 9 + 6x + y^2 + 16 - 8y$

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

$-4y + 20 = 12x$

$0 = 12x + 4y - 20$

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

$3x + y - 5 = 0$

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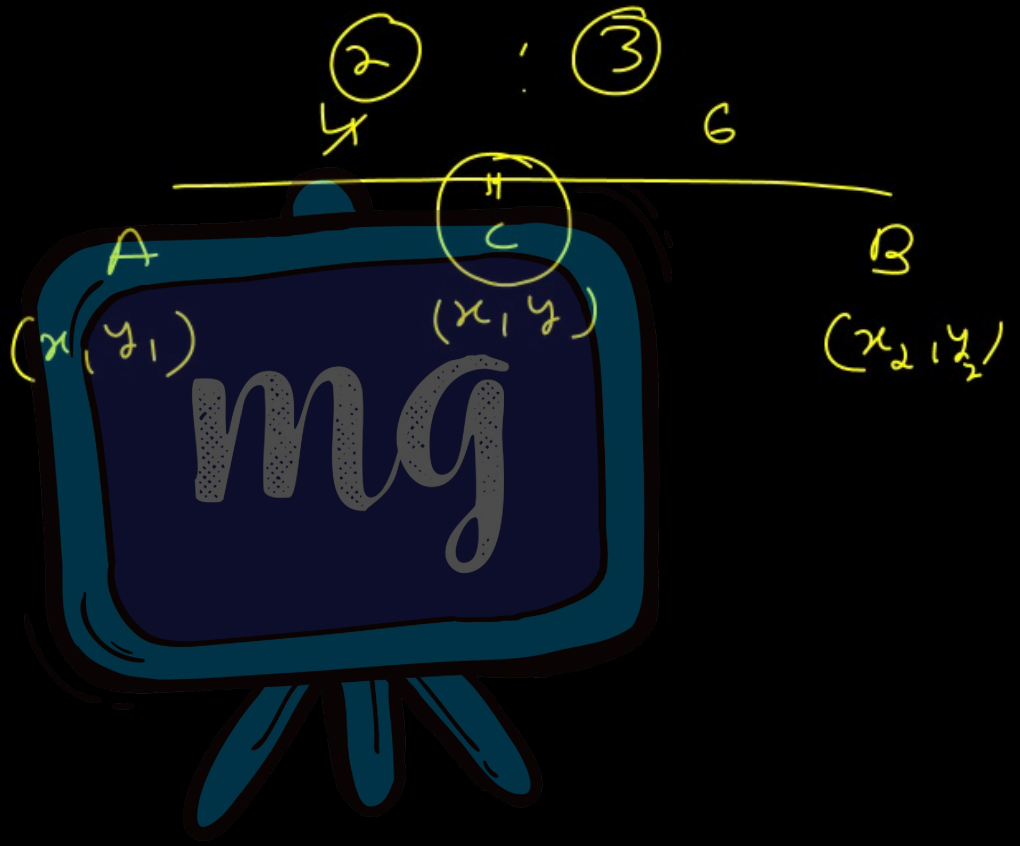
SECTION FORMULA –

❖ Coordinates of the point (x, y) which divide the line segment joining the points (x_1, y_1) and (x_2, y_2) is

$$x = \frac{m_1x_2 + m_2x_1}{m_1 + m_2}, \quad y = \frac{m_1y_2 + m_2y_1}{m_1 + m_2}$$

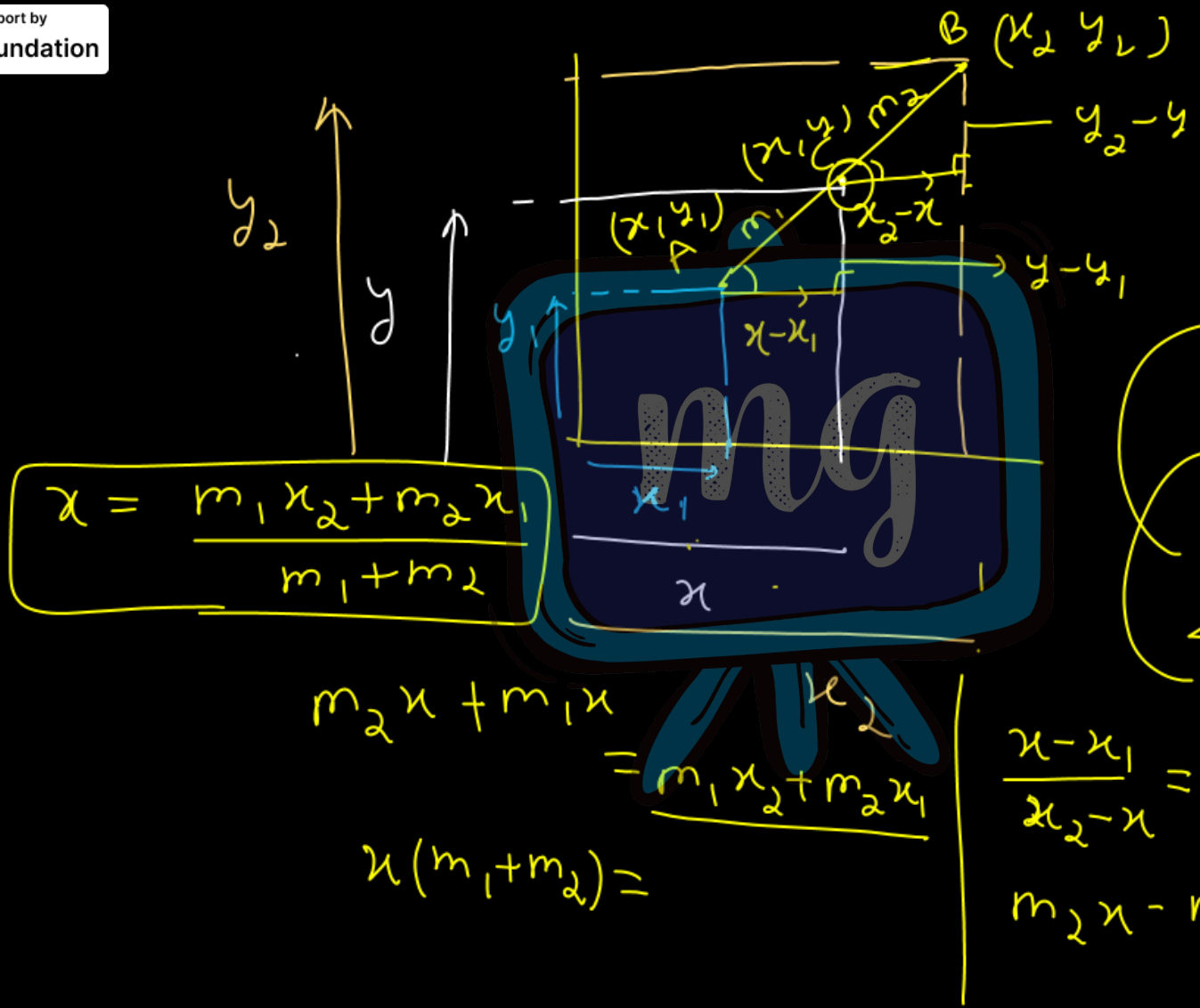
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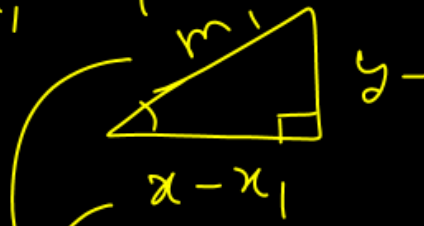
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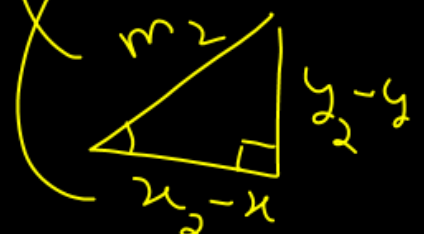
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$$x = \frac{m_1 x_2 + m_2 x_1}{m_1 + m_2}$$

$$y = \frac{m_1 y_2 + m_2 y_1}{m_1 + m_2}$$





$m_2 x + m_1 x$

$= m_1 x_2 + m_2 x_1$

$x(m_1 + m_2) =$

$\frac{x - x_1}{x_2 - x} = \frac{m_1}{m_2}$

$m_2 x - m_2 x_1 = m_1 x_2 - m_1 x$

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