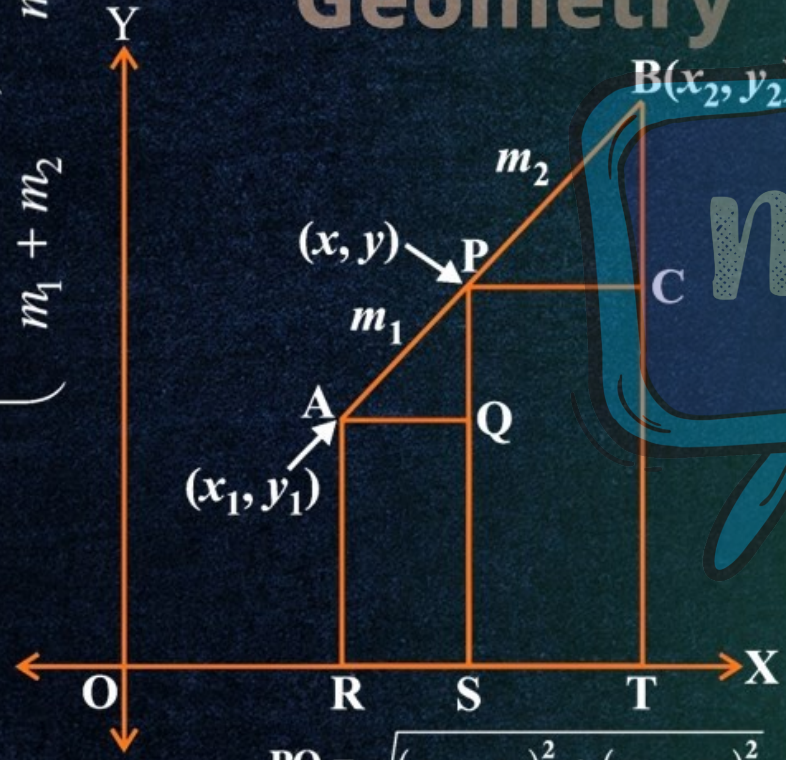
Coordinate Geometry

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



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

CLASS – 10

MATHEMATICS

Chapter – 7

Coordinate Geometry

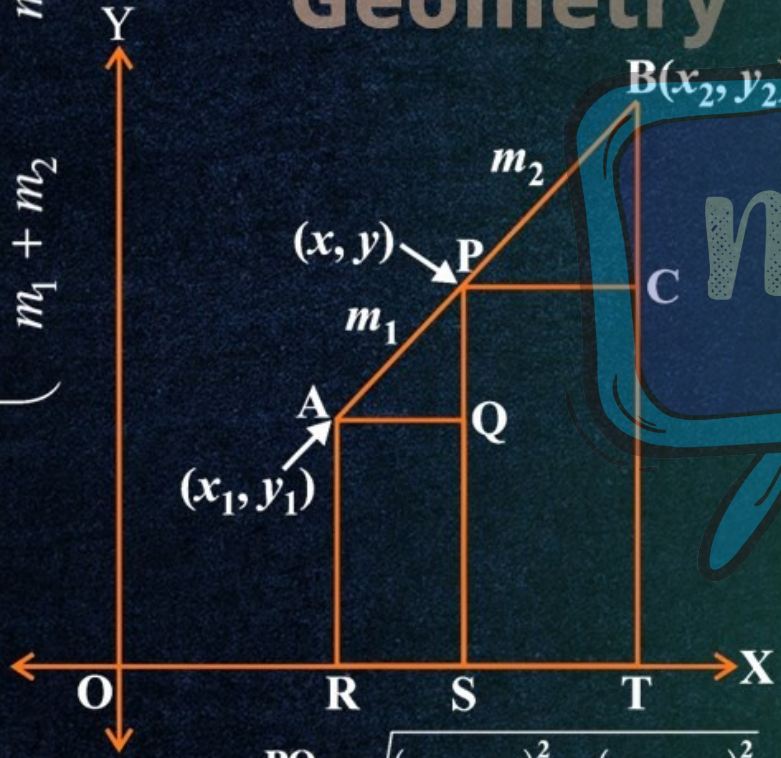
Part – 2

Exercise 7.1 (Q.1–4)

Shubham Tiwari

Coordinate Geometry

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

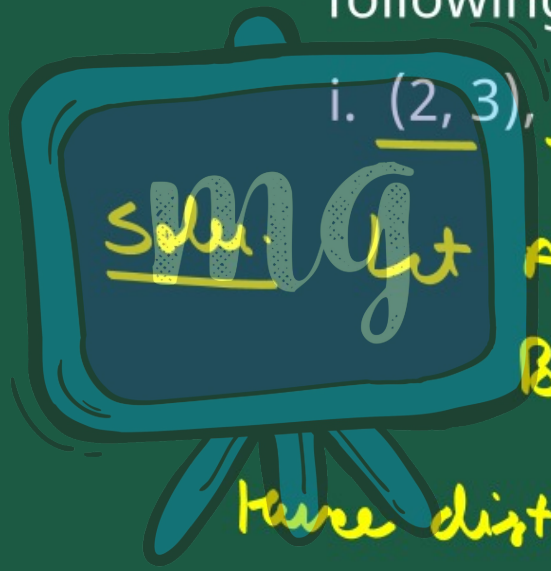


$$PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

EXERCISE 7.1

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

   i. (2, 3), (4, 1)



Sol. Let A be (2, 3)

B be (4, 1)

Here distance AB, by distance formula

$A(2,3)$ $B(4,1)$

(x,y)

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

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

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

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

$$= \sqrt{8} = 2\sqrt{2}$$

$AB = 2\sqrt{2}$ units

ii. $\underbrace{(-5, 7)}_{A}, \underbrace{(-1, 3)}_{B}$

By the distance formula

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

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

$$= \sqrt{[-1 + 5]^2 + (-4)^2}$$

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

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

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

iii. $(a, b), (-a, -b)$

A B

Solu. the distance AB, by distance formula is.

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

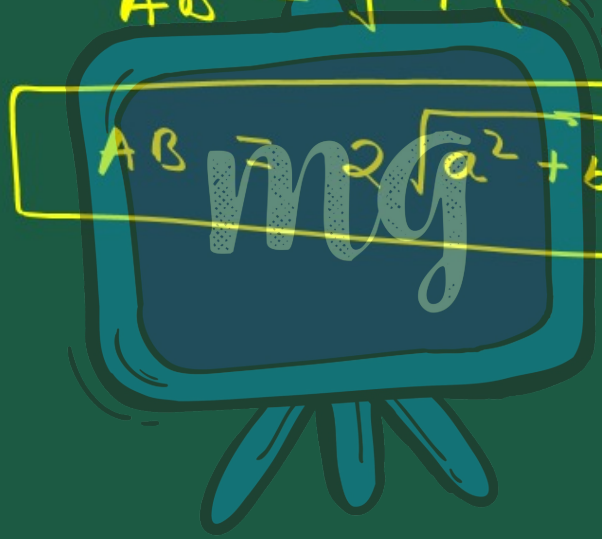
$$= \sqrt{(-a - a)^2 + (-b - b)^2}$$

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

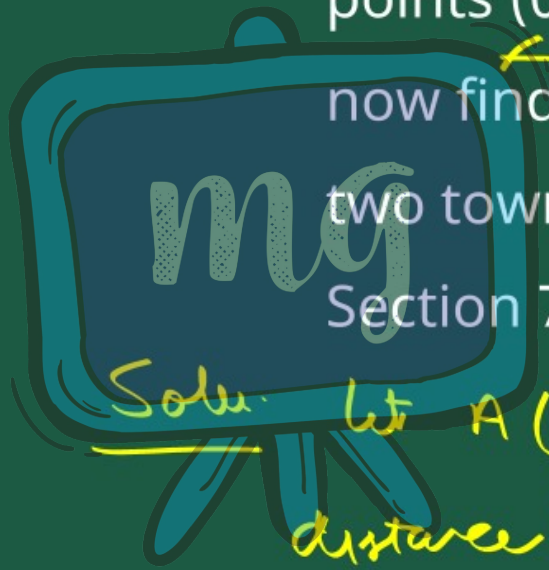
$$AB = \sqrt{4a^2 + 4b^2}$$

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

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



2. Find the distance between the points (0, 0) and (36, 15). Can you now find the distance between the two towns A and B discussed in Section 7.2.



Solu: Let A(0,0) and B(36,15) distance between A and B.

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

$$AB = \sqrt{(36-0)^2 + (15-0)^2}$$

$$= \sqrt{36^2 + 15^2}$$

$$= \sqrt{3^2 \times 12^2 + 3^2 \times 5^2}$$

$$= \sqrt{3^2 (12^2 + 5^2)}$$

$$= 3\sqrt{12^2 + 5^2}$$

$$= 3\sqrt{144 + 25}$$

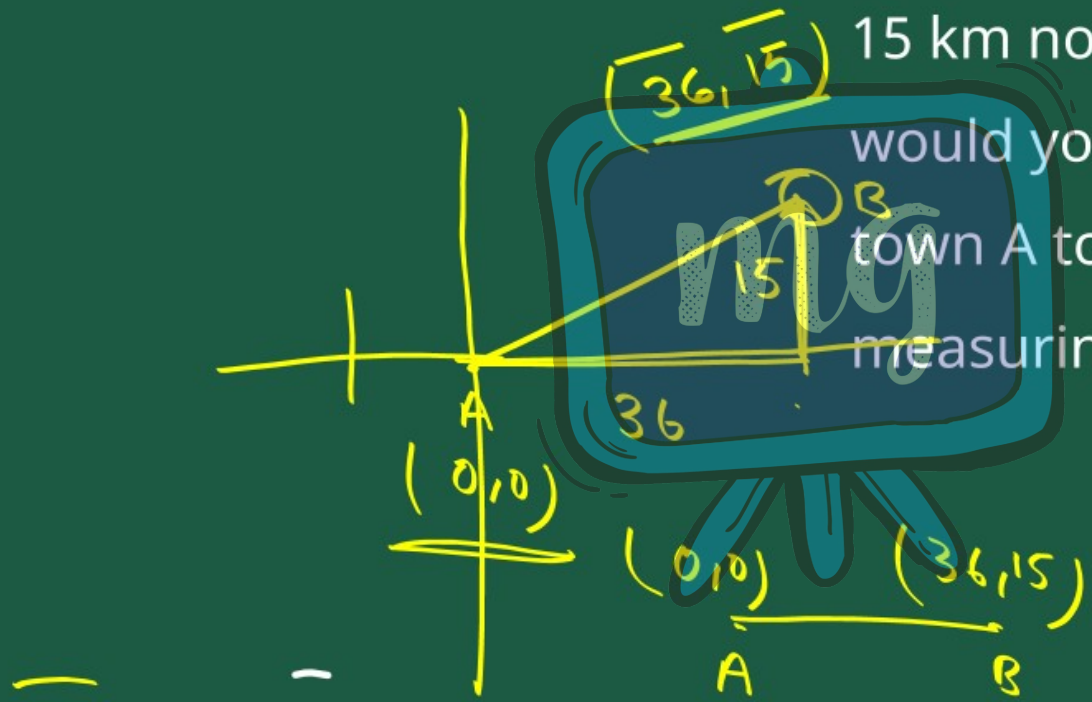
$$= 3\sqrt{169} = 3 \times 13 = 39 \text{ unit}$$

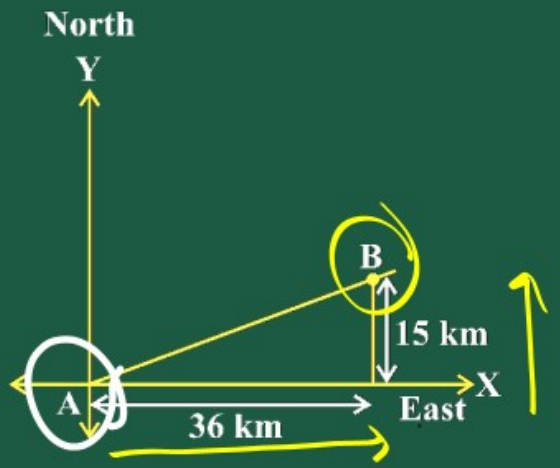
Hence from the same

Co-ordinates the distance

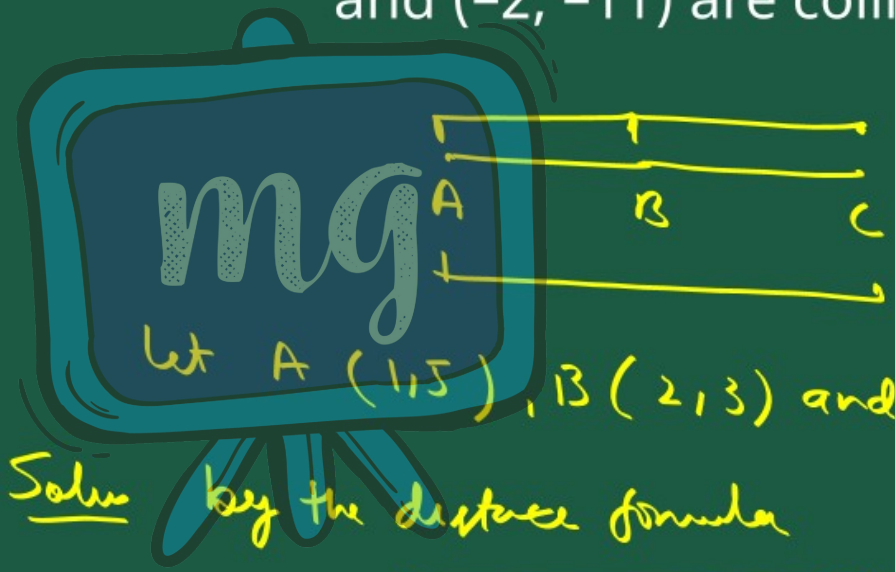
between A and B is 39 km.

A town B is located 36 km east and 15 km north of the town A. How would you find the distance from town A to town B without actually, measuring it





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



Let A (1,5), B (2,3) and C (-2,-11)

Solution by the distance formula

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

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

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

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

$$AB = \sqrt{5} \text{ unit}$$

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

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

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

$$= \sqrt{16 + 196} \quad = \sqrt{212} \text{ unit}$$

$$AC = \sqrt{[1-(-2)]^2+[5-(-11)]^2}$$

$A(1,5)$

$C(-2,-11)$

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

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

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

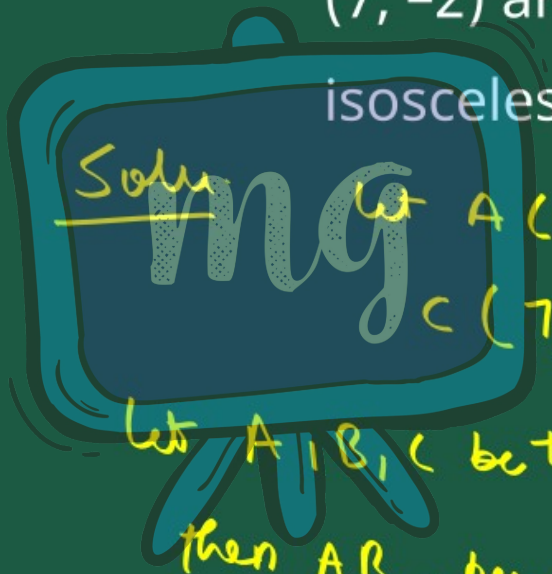
$$AC = \sqrt{265}$$

$$AB+BC = \sqrt{5}+\sqrt{212}$$

$$AB+BC \neq AC$$

Hence they are not collinear.

4. Check whether (5, –2), (6, 4) and (7, –2) are the vertices of an isosceles triangle.



Solu

Let A(5,−2), B(6,4), C(7,−2)

Let A, B, C be the vertices of ΔABC

then AB, by distance formula

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

$A(5,-2)$
$B(6,4)$
$C(7,-2)$

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

$$= \sqrt{(1)^2 + (4+2)^2}$$

$$= \sqrt{1^2 + 6^2}$$

$$AB = \sqrt{1+36} = \sqrt{37} \text{ unit}$$

$$BC = \sqrt{(7-6)^2 + (-2-4)^2}$$

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

$$BC = \sqrt{1+36} = \sqrt{37} \text{ unit}$$

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

$$= \sqrt{2^2 + 0^2}$$

$$= \sqrt{2^2}$$

$$AC = 2 \text{ unit}$$

Hence it shows that $\triangle ABC$ is an isosceles triangle.