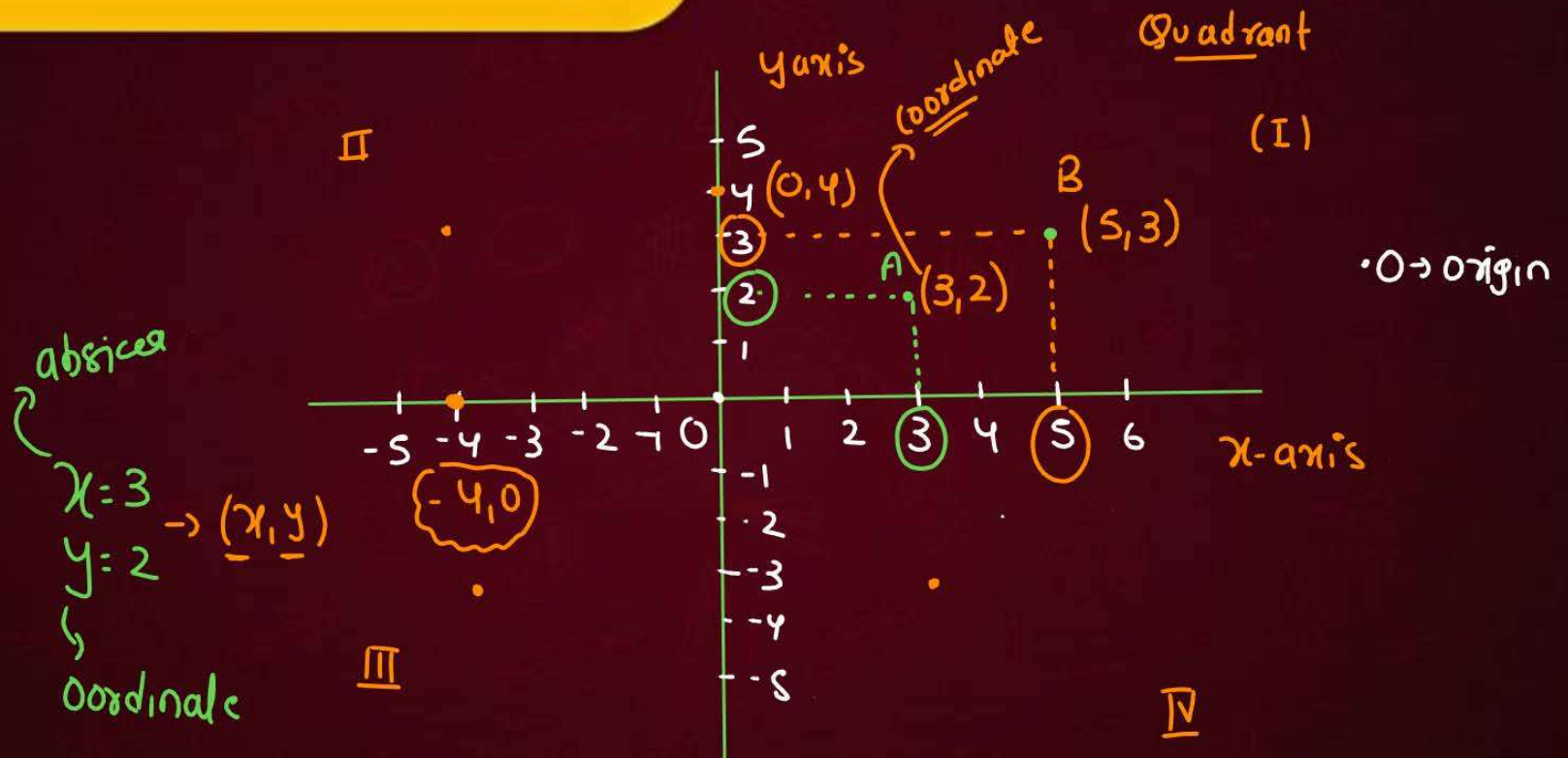




Some Basic Concept

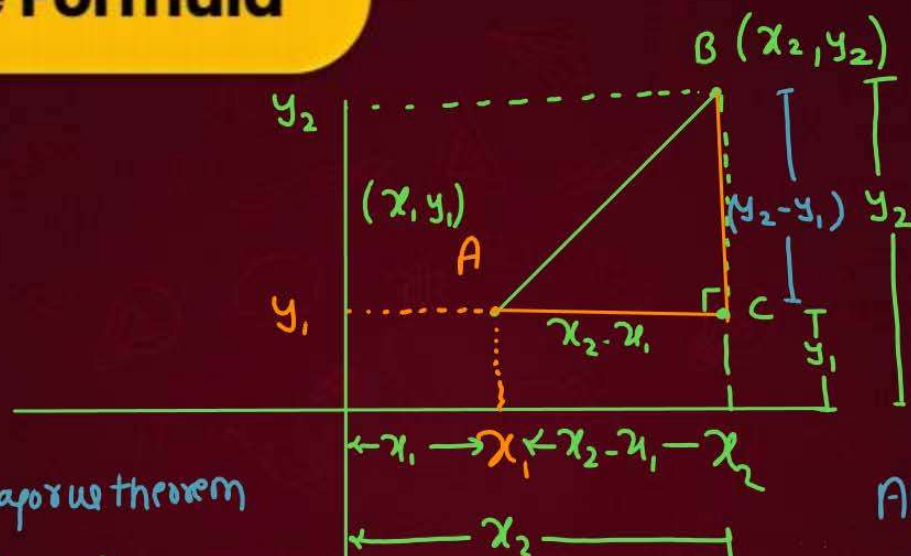




Distance Formula



$A(x_1, y_1)$



using Pythagoras theorem

$$AB^2 = BC^2 + AC^2$$

$$AB^2 = (y_2 - y_1)^2 + (x_2 - x_1)^2$$

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

Collinear points



$$AC = AB + BC$$

$$\begin{array}{r|l} 2 & 40 \\ \hline 2 & 20 \\ \hline 2 & 10 \\ \hline 5 & 5 \\ \hline \end{array}$$

A
(3, 4)
 x_1, y_1

B
(9, 6)
 x_2, y_2

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

$$AB = \sqrt{(6 - 4)^2 + (9 - 3)^2}$$

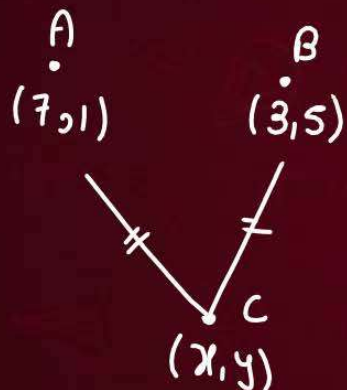
$$= \sqrt{4 + 36}$$

$$= \sqrt{40} \text{ unit} = 2\sqrt{10} \text{ unit}$$

QUESTION



Find a relation between x and y such that the point (x, y) is equidistant from the points $(7, 1)$ and $(3, 5)$



$$AC = BC$$

$$AC^2 = BC^2$$

$$x - y - 2 = 0$$

$$y = x - 2$$

$$(y-1)^2 + (x-7)^2 = (y-5)^2 + (x-3)^2$$

$$\cancel{y^2} + 1 - 2y + \cancel{x^2} + 49 - 14x = \cancel{y^2} + 25 - 10y + \cancel{x^2} + 9 - 6x$$

$$14x - 6x - 10y + 2y + 34 - 50 = 0$$

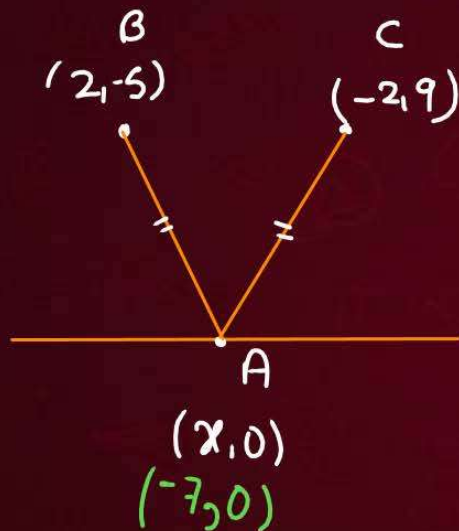
$$8x - 8y - 16 = 0$$

$$8(x - y - 2) = 0$$

QUESTION



Find the point on the x-axis which is equidistant from $(2, -5)$ and $(-2, 9)$



$$AB^2 = AC^2$$

$$(0+5)^2 + (x-2)^2 = (0-9)^2 + (x+2)^2$$

$$25 + \cancel{x^2} + 4 - 4x = 81 + \cancel{x^2} + 4 + 4x$$

$$25 - 81 = 4x + 4x$$

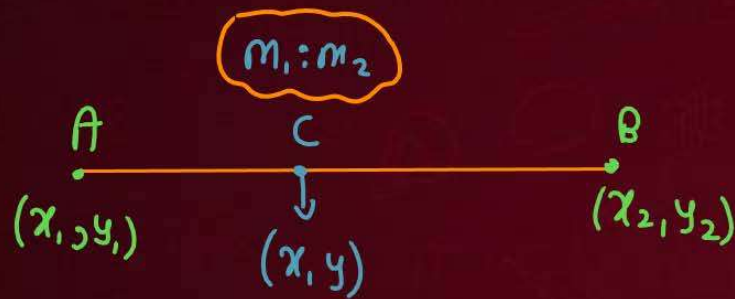
$$-56 = 8x$$

$$x = \frac{-56}{8}$$

$$\boxed{x = -7}$$



Section Formula



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

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

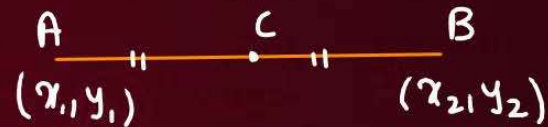
Special case

$$m_1 : m_2 = 1 : 1$$

if $m_1 = m_2$

$$m_1 : m_2 = 1 : 1$$

$$x : y = 1 : 1$$



$$x = \frac{x_1 + x_2}{2} \quad \left| \quad y = \frac{y_1 + y_2}{2}$$

QUESTION



Find the ratio in which the line segment joining the points $(-3, 10)$ and $(6, -8)$ is divided by $(-1, 6)$.

$$K : 1$$

$$m_1 : m_2$$

A	C	B
$(-3, 10)$	$(-1, 6)$	$(6, -8)$
x_1, y_1	(x, y)	x_2, y_2

$$K = \frac{m_1}{m_2}$$

$$m_1 : m_2$$

$$\left(\frac{m_1}{m_2} \right) = 1$$

$$(K : 1)$$

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

$$\frac{-1}{1} = \frac{1(-3) + k(6)}{k+1}$$

$$(-1)(k+1) = -3 + 6k$$

$$-k-1 = -3+6k$$

$$-1+3 = 6k+k$$

$$2 = 7k$$

$$K = \frac{2}{7} = \frac{m_1}{m_2}$$

$$m_1 = 2 \mid m_2 = 7$$

$$m_1 : m_2$$

$$2 : 7$$

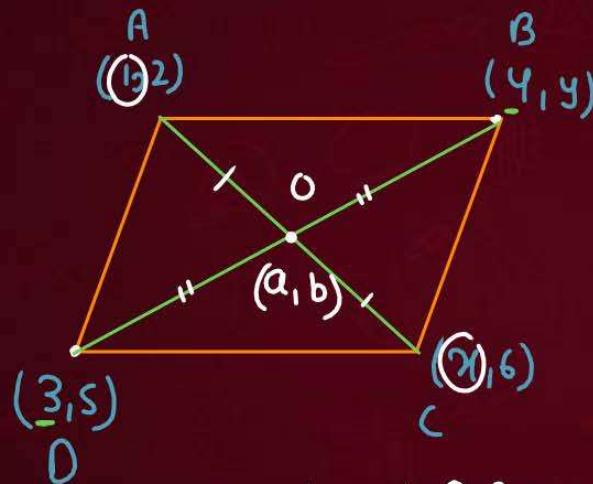
QUESTION



V.V.J.P.



If $(1, 2)$, $(4, y)$, $(x, 6)$ and $(3, 5)$ are the vertices of a parallelogram taken in order, find x and y



O is mid point of AC

$$O(a, b) = \left[\frac{1+x}{2}, \frac{2+6}{2} \right]$$

$$O(a, b) = \left[\frac{1+x}{2}, \frac{8}{2} \right]$$

O is also mid point of BD

$$O(a, b) = \left[\frac{7}{2}, \frac{y+5}{2} \right]$$

$$\frac{1+x}{2} = \frac{7}{2}$$

$$x = 7 - 1$$

$$x = 6$$

$$\frac{8}{2} = \frac{y+5}{2}$$

$$8 - 5 = y$$

$$y = 3$$