



UD AAN 2024

- FOR CLASS 10th STUDENTS

Lecture No.- 01

- Subject Name- **Mathematics**
- Chapter Name- **Coordinate Geometry**



By- RITIK SIR

Topic to be Covered



✓ **Topic**

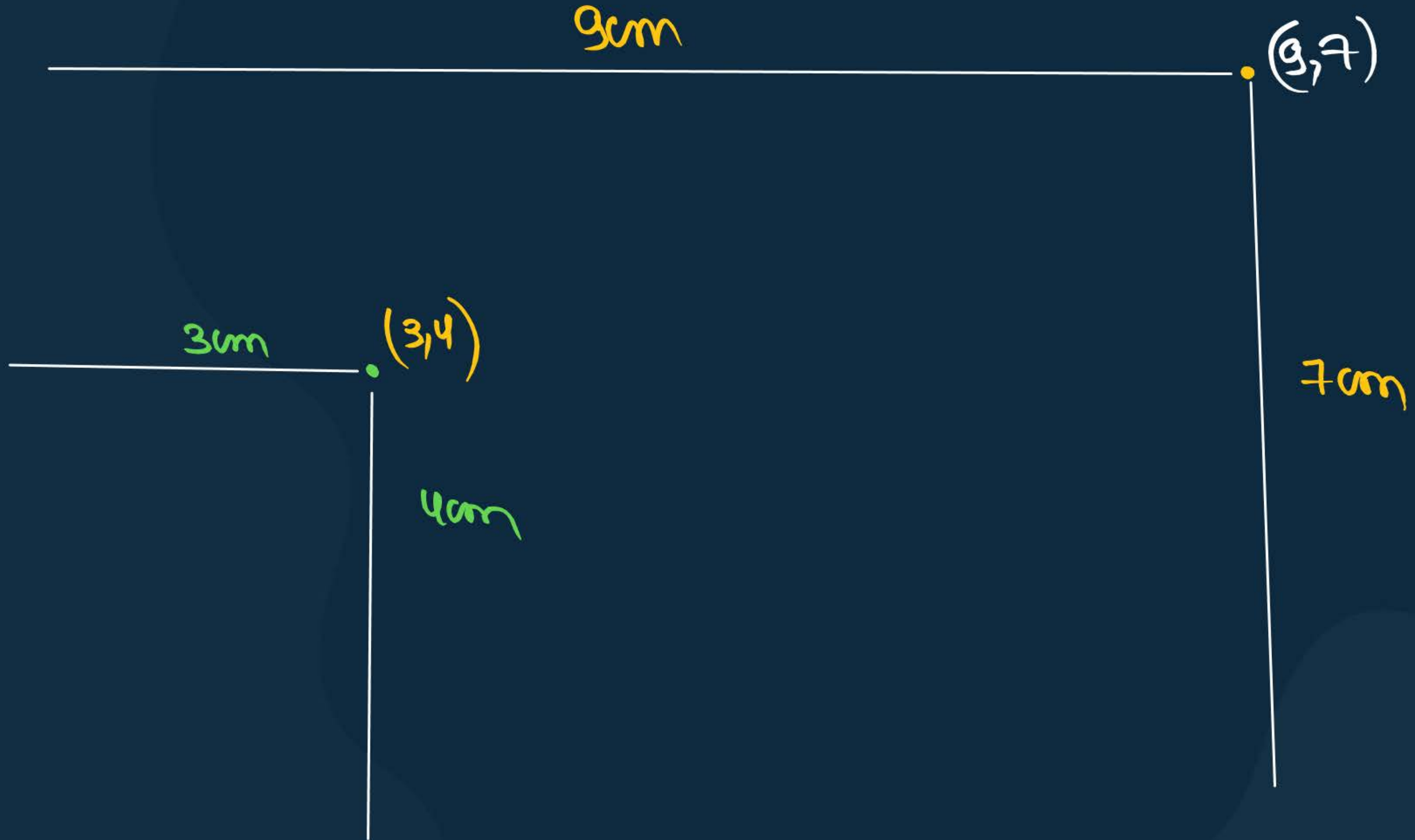
Everything form Basic

✓ **Topic**

Distance formula

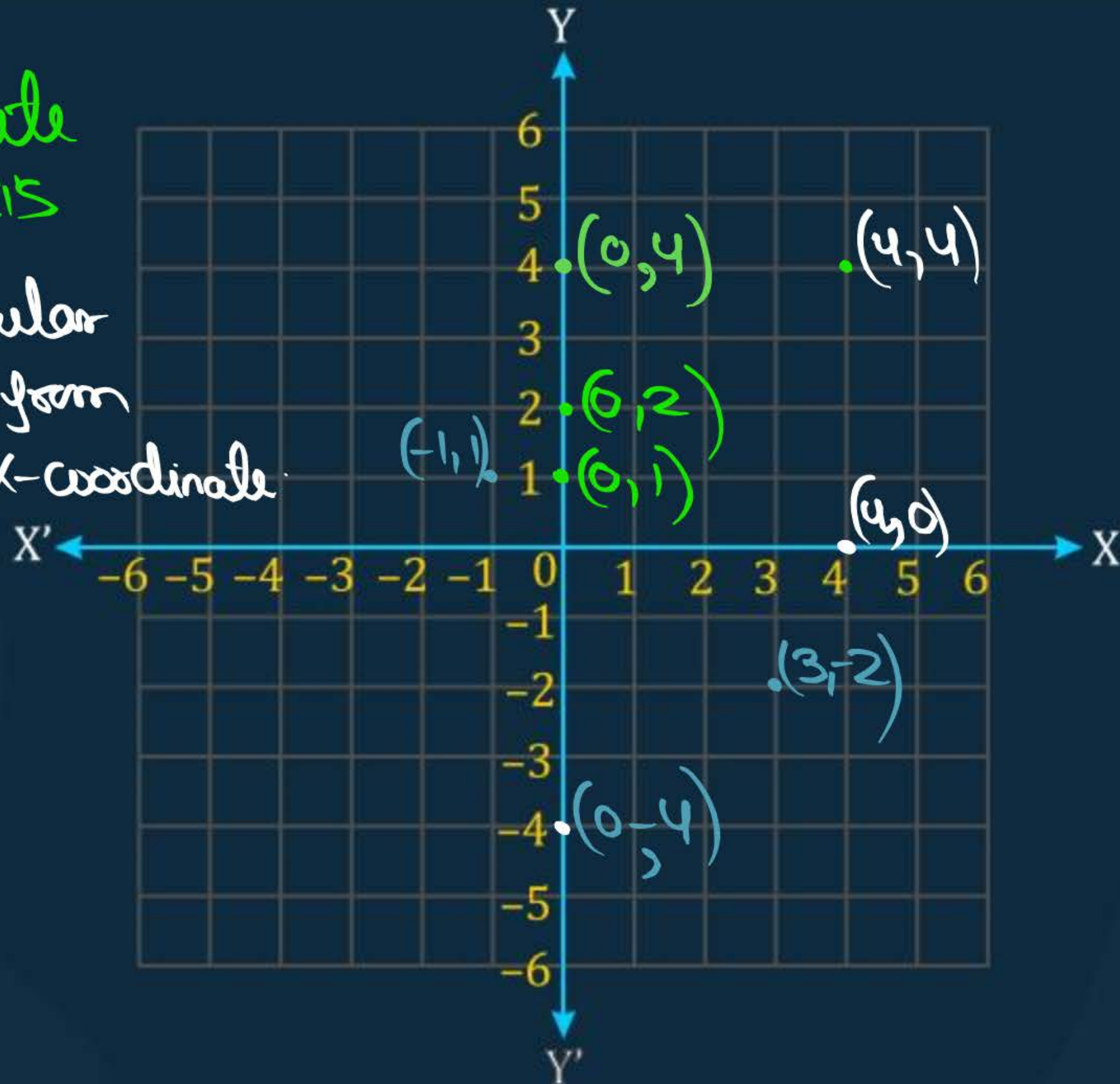
✓ **Topic**

Most Important Questions



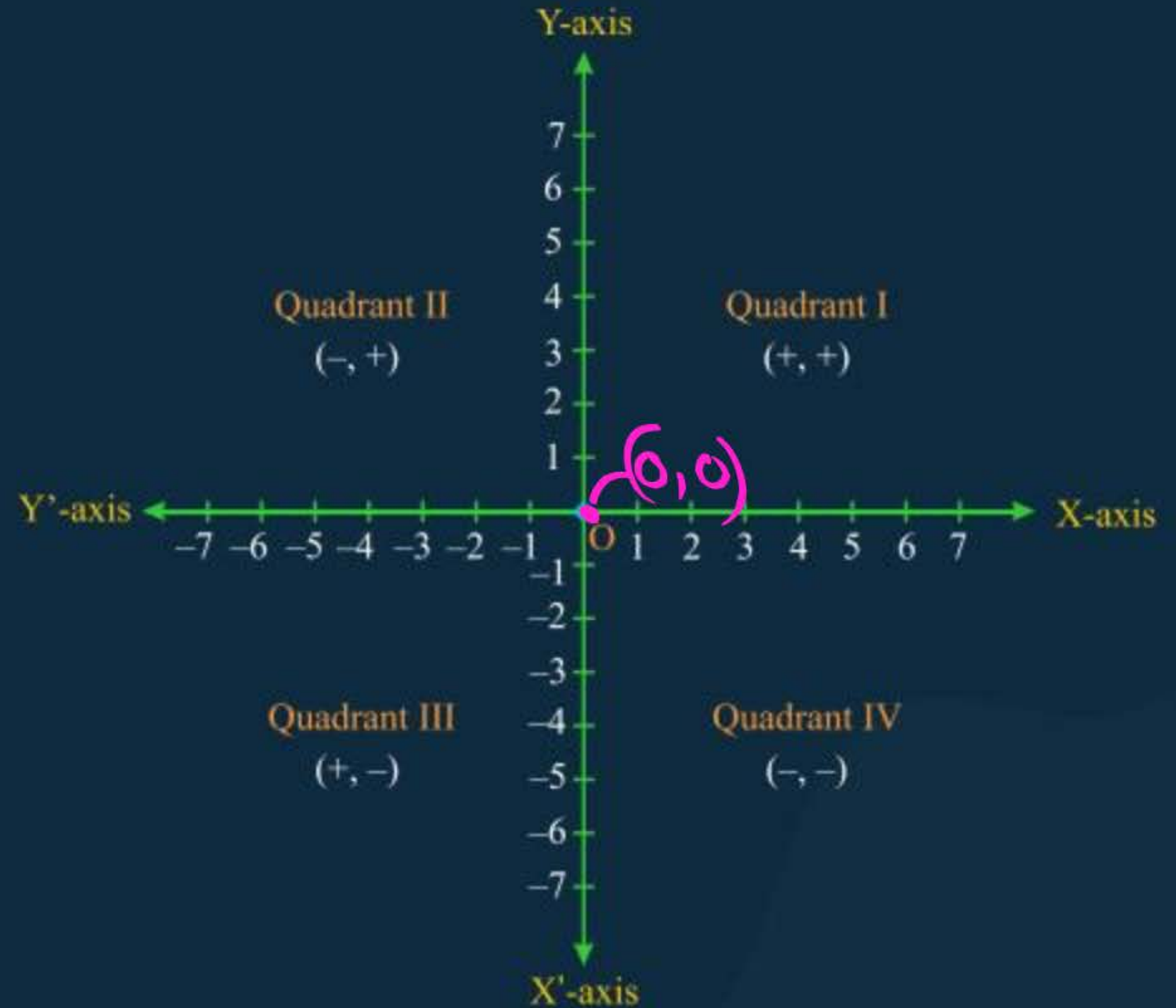
→ coordinate axis

→ perpendicular distance from y-axis = X-coordinate



Two perpendicular number lines intersecting at origin are called co-ordinate axes.

The horizontal line is the X-axis (denoted by $X'OX$) and the vertical line is the Y-axis (denoted by $Y'OY$).

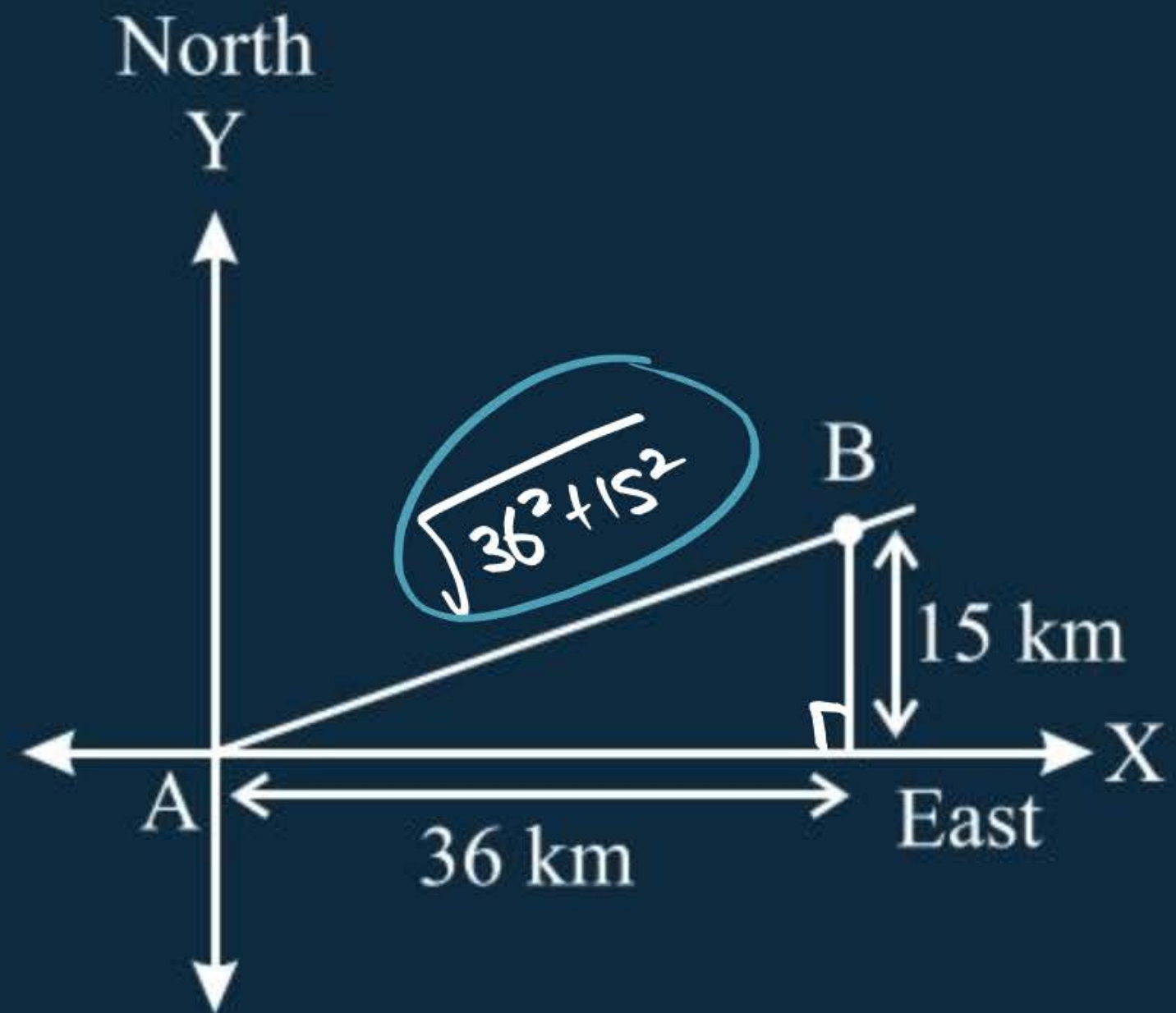


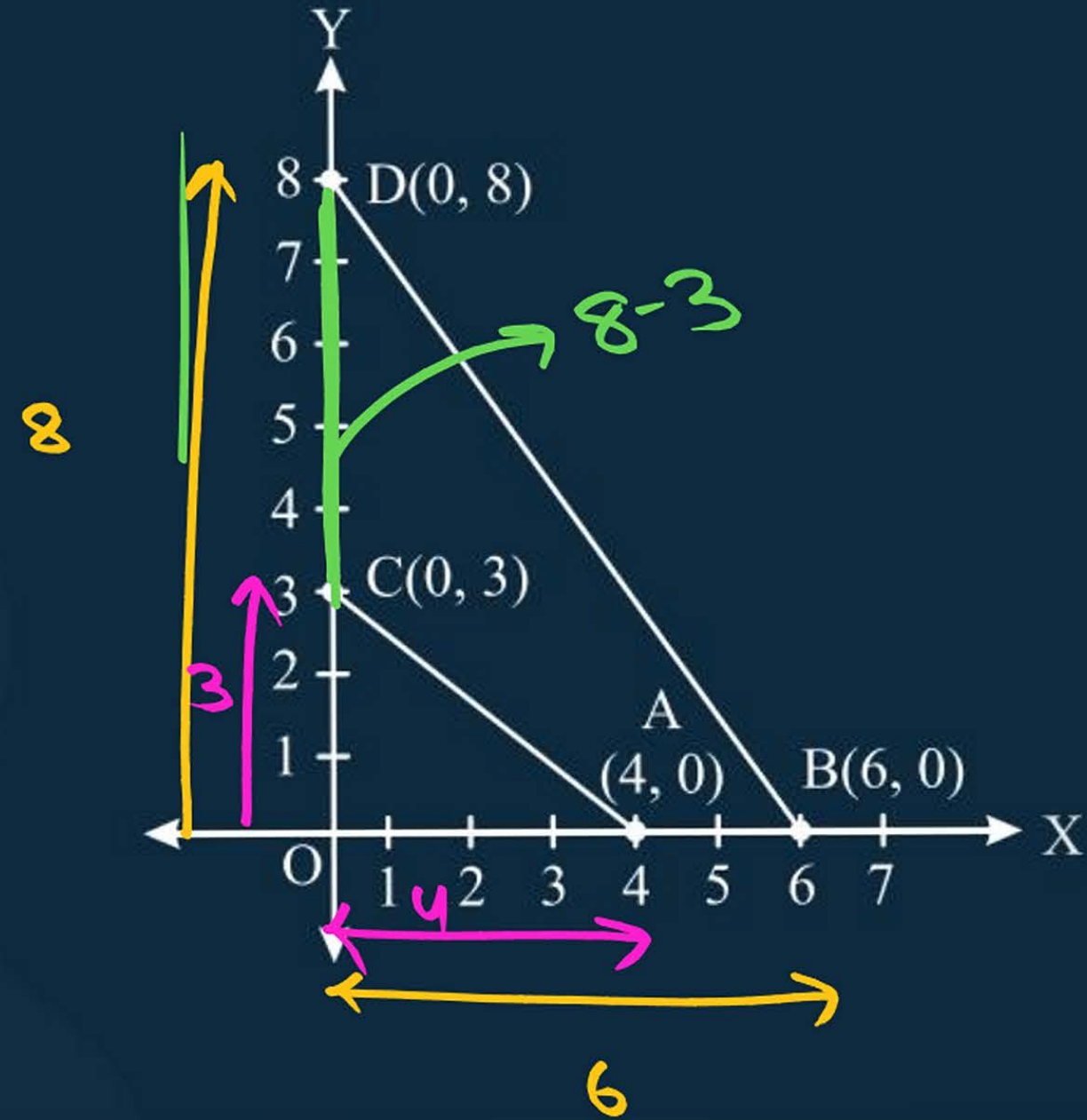
(x, y)

x -coordinate
= abscissa

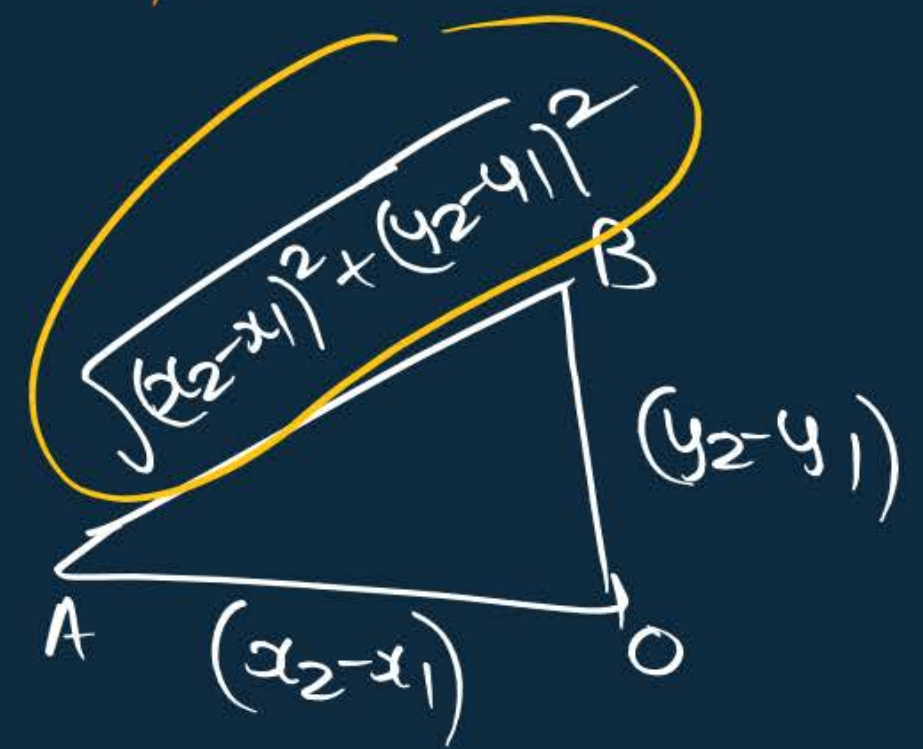
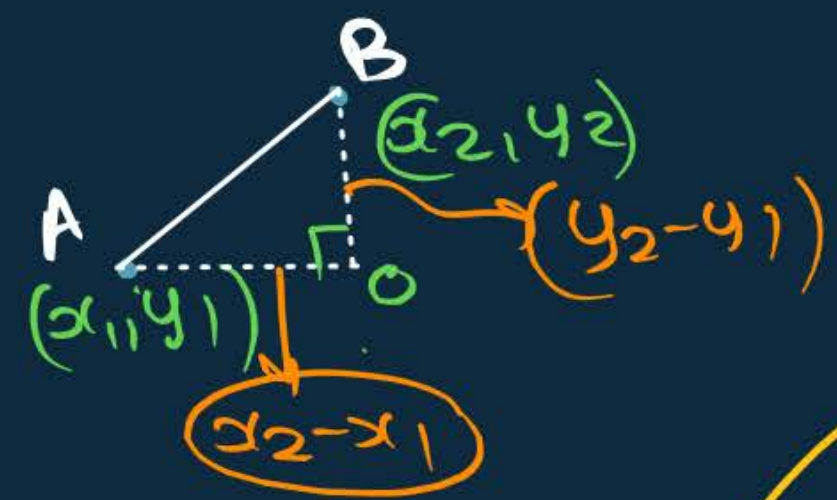
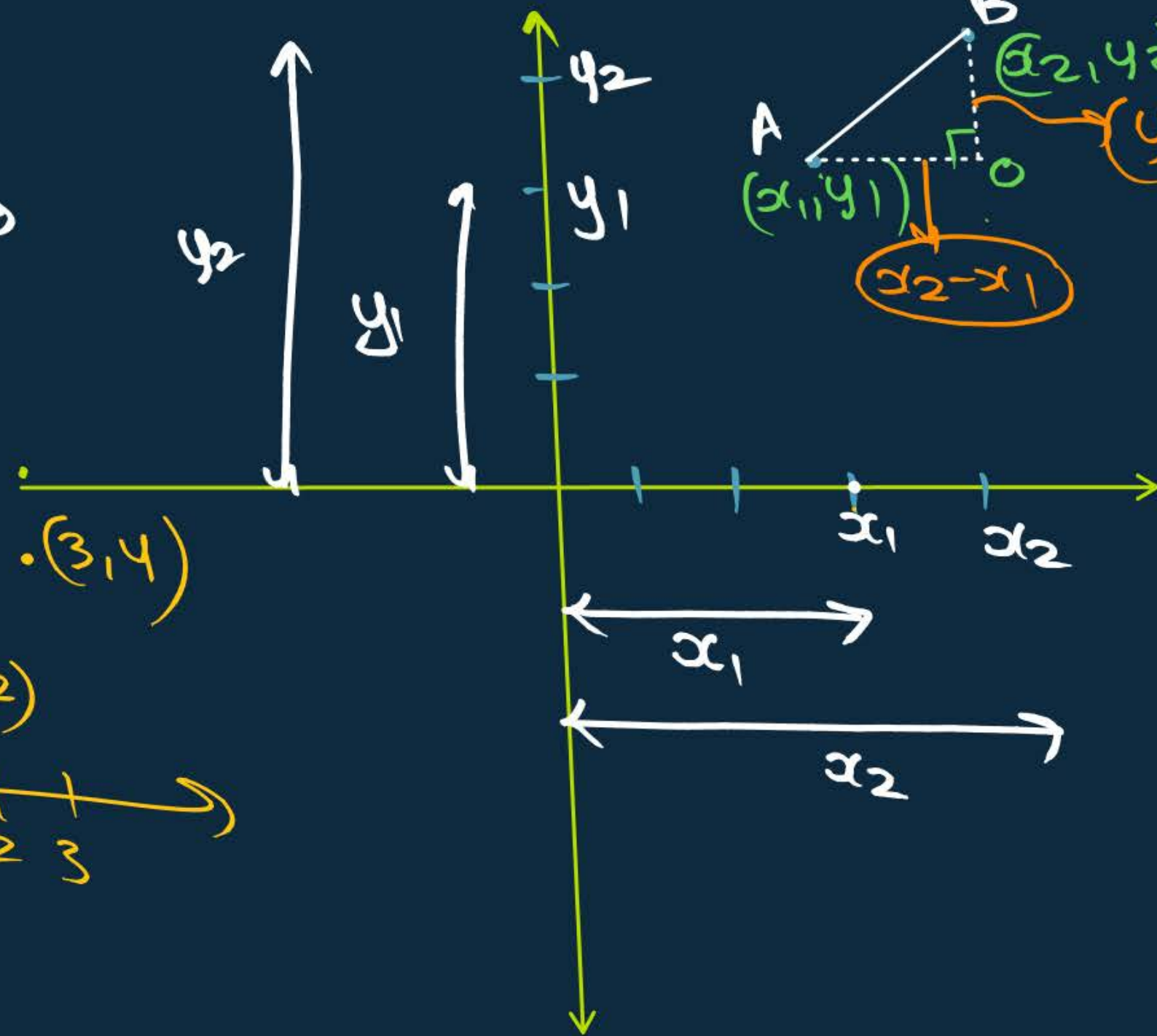
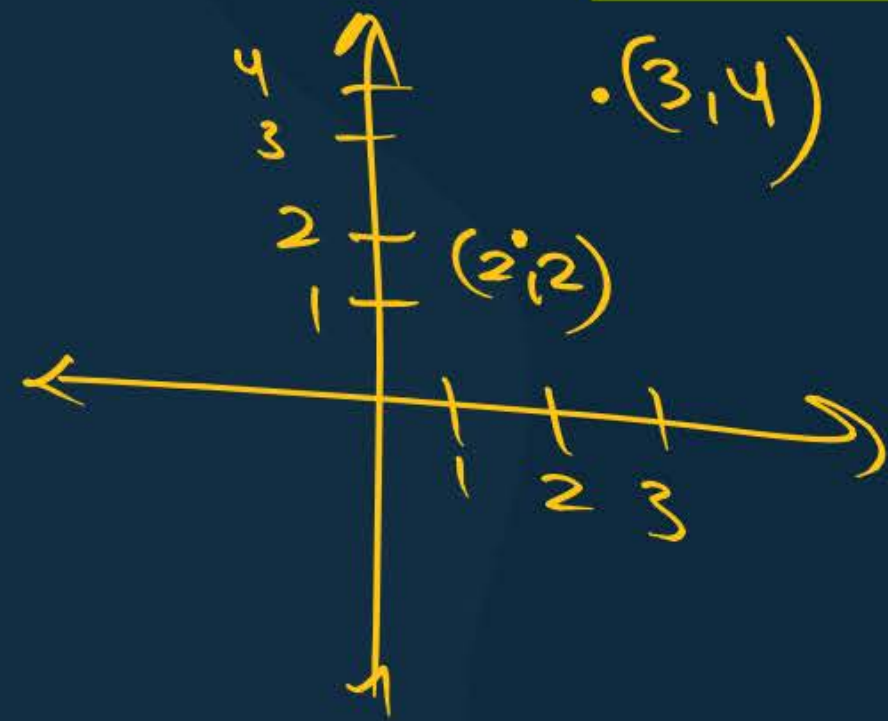
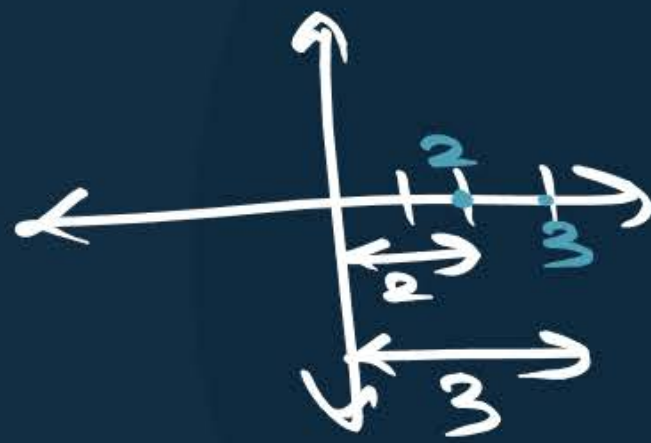
y -coordinate = ordinate







$$AB = OB - OA$$



- ❑ The point of intersection of X-axis and Y-axis is called origin and denoted by O.
- ❑ Cartesian plane is a plane obtained by putting the coordinate axes perpendicular to each other in the plane. It is also called co-ordinate plane or XY plane
- ❑ The X-co-ordinate of a point is its perpendicular distance from Y-axis
- ❑ The y-co-ordinate of a point is its perpendicular distance from X-axis

Distance Formula



(x_1, y_1)
 $(3, 4)$
B

(x_2, y_2)
 $(5, 6)$
F

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

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

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

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

Q

(x_1, y_1)
A. $(0, 5)$

B
 $(7, 2)$
 (x_2, y_2)

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

$$AB = \sqrt{(7 - 0)^2 + [2 - (5)]^2}$$

$$AB = \sqrt{49 + 49}$$

$$AB = \sqrt{98}$$

$= 7\sqrt{2} \text{ units}$

#Q. Find the distance between the following pairs of points:

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

(ii) $(a, b), (-a, -b)$

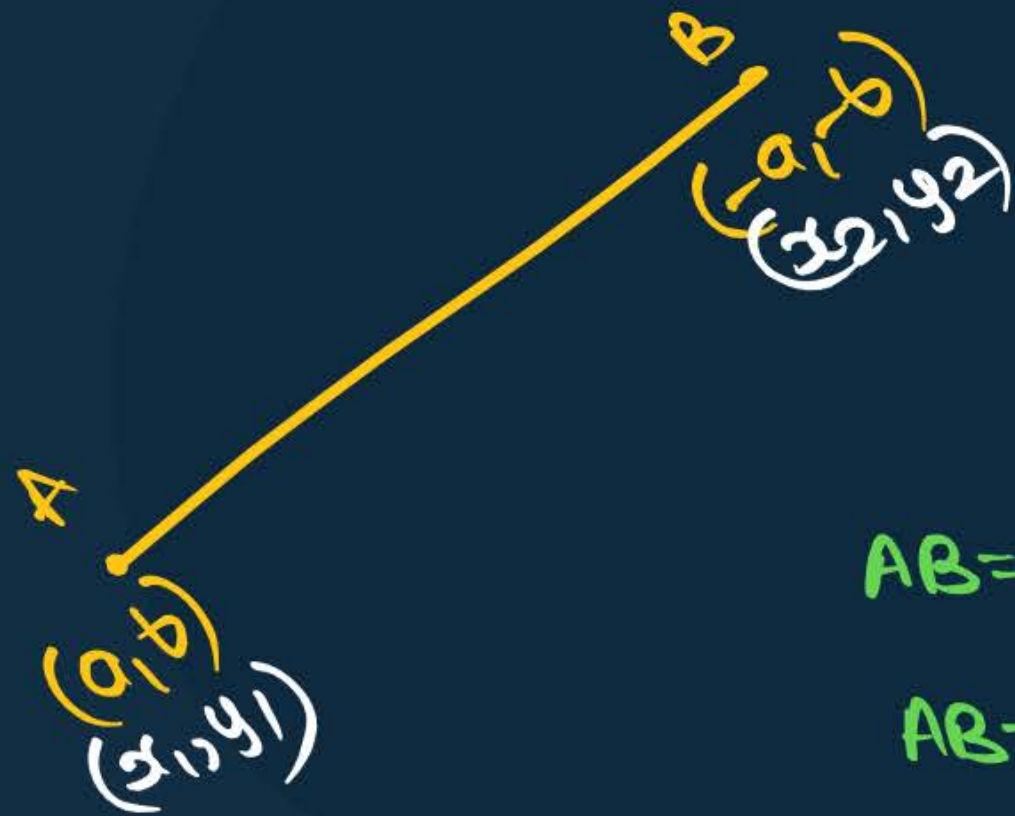


$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

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

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

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



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

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

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

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

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

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

Topic : Distance Formula



#Q. Find the value of y for which the distance between the points $P(2, -3)$ and $Q(10, y)$ is 10 units.



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

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

$$10^2 = 64 + y^2 + 9 + 6y$$

$$100 = 73 + y^2 + 6y$$

$$27 = y^2 + 6y$$

$$0 = y^2 + 6y - 27$$

$$P = -27, S = 6$$

$$9, -3$$

$$y^2 + 9y - 3y - 27 = 0$$

$$y(y + 9) - 3(y + 9) = 0$$

$$y + 9 = 0, y - 3 = 0$$

$$y = -9, 3$$

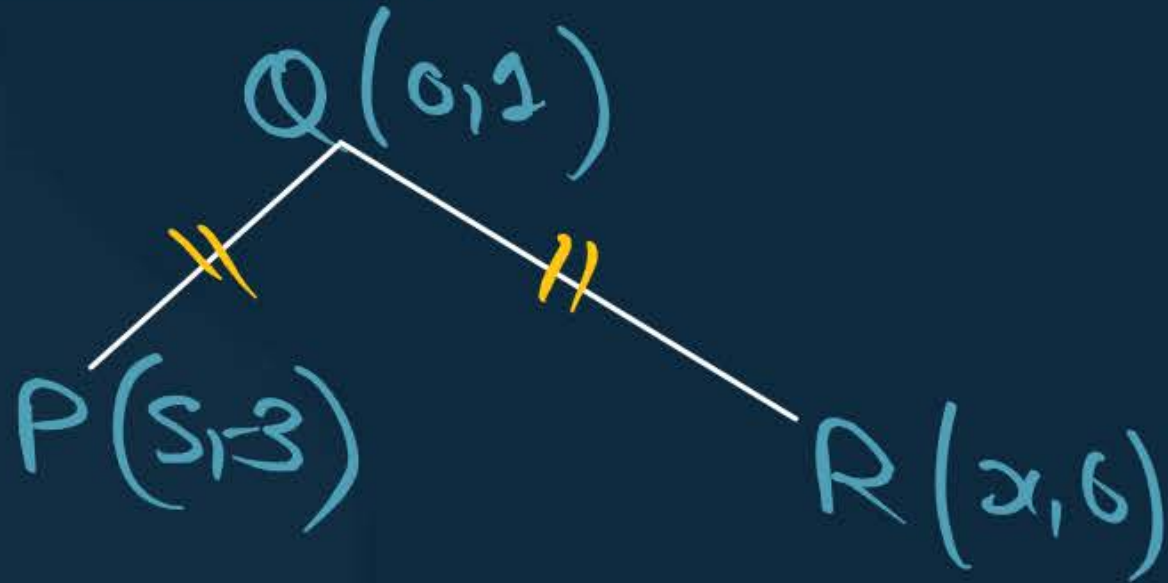
Topic : Distance Formula



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

equal distance.

$$QP = QR$$



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

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

$$QP = \sqrt{25+16}$$

$$QP = \sqrt{41}$$

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

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

$$QP = QR$$

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

Squaring both sides...

$$41 = x^2 + 25$$

$$16 = x^2$$

$$\pm 4 = x$$

Topic : Distance Formula



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

Let the point on x-axis be $(x, 0)$ P

$$\text{Ans} = (-7, 0)$$

$$PQ = PR$$



$$\sqrt{(2-x)^2 + (-5-0)^2} = \sqrt{(-2-x)^2 + (9-0)^2}$$

Squaring both sides...

$$(2-x)^2 + 25 = (-2-x)^2 + 81$$

$$4 + x^2 - 4x + 25 = (-2)^2 + (x)^2 - 2(-2)(x) + 81$$

$$29 + x^2 - 4x = 4 + x^2 + 4x + 81$$

$$25 - 8x = 81$$

$$-8x = 81 - 25$$

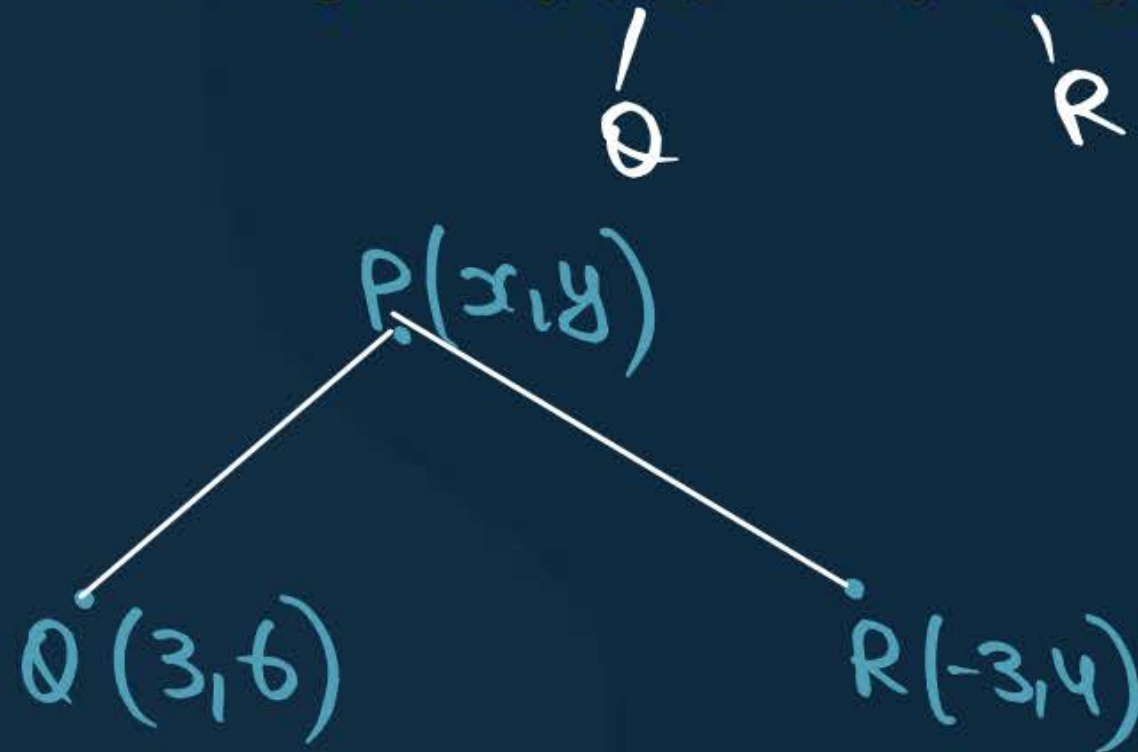
$$-8x = 56$$

$$x = -7$$

Topic : Distance Formula



#Q. Find a relation between x and y such that the point (x, y) is equidistant from the point $(3, 6)$ and $(-3, 4)$.



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

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

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

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

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

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

$$5 = 3x + y$$

#Q. The distance of the point (α, β) from the origin is

A $\alpha + \beta$

B $\alpha^2 + \beta^2$

C $|\alpha| + |\beta|$

D $\sqrt{\alpha^2 + \beta^2}$



(α, β) $(0, 0)$

$$= \sqrt{(\alpha - 0)^2 + (\beta - 0)^2}$$

$$= \boxed{\sqrt{\alpha^2 + \beta^2}}$$

#Q. The distance between point A(5, -3) and B(13, m) is 10 units. Calculate the value of m. [CBSE Delhi Board term, 2019]



$$AB = 10$$

$$\sqrt{(13-5)^2 + (m+3)^2} = 10$$

$$64 + m^2 + 9 + 6m = 100$$

$$m^2 + 6m = 27$$

$$m^2 + 6m - 27 = 0$$

$$m^2 + 9m - 3m - 27 = 0$$

$$m(m+9) - 3(m+9) = 0$$

$$m = -9, 3$$

