EXERCISE 7.1

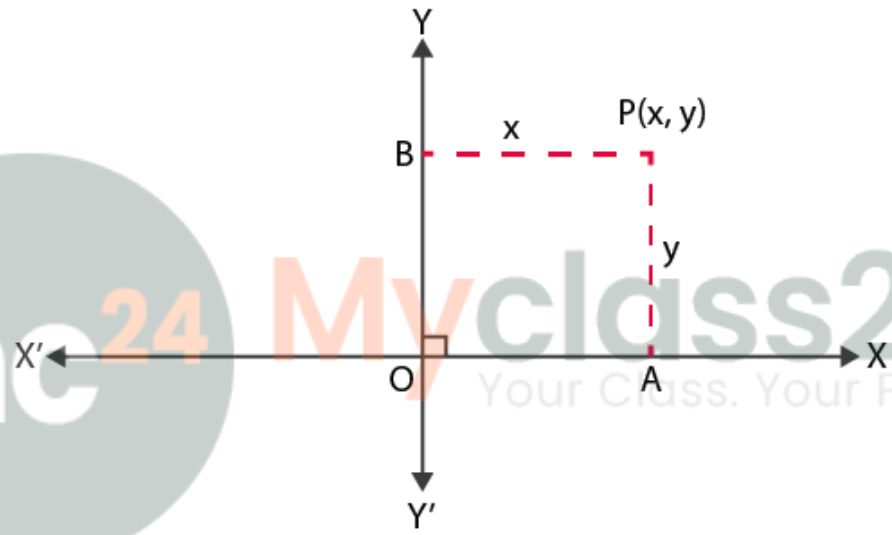
Choose the correct answer from the given four options in the following questions:

1. The distance of the point P (2, 3) from the x-axis is

(A) 2 (B) 3 (C) 1 (D) 5

Solution:

We know that,
(x, y) is a point on the Cartesian plane in first quadrant.
Then,
x = Perpendicular distance from Y - axis and
y = Perpendicular distance from X – axis
Therefore, the perpendicular distance from X-axis = y coordinate = 3



2. The distance between the points A (0, 6) and B (0, –2) is

(A) 6 (B) 8 (C) 4 (D) 2

Solution:

Distance formula: $d^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$
According to the question,
We have,
$x_1 = 0, x_2 = 0$
$y_1 = 6, y_2 = -2$
$d^2 = (0 - 0)^2 + (-2 - 6)^2$
$d = \sqrt{((0)^2 + (-8)^2)}$
$d = \sqrt{64}$
$d = 8$ units
Therefore, the distance between A (0, 6) and B (0, 2) is 8

3. The distance of the point P (–6, 8) from the origin is

(A) 8 (B) 2√7 (C) 10 (D) 6

Solution:

Distance formula: $d^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$

According to the question,

We have;

$x_1 = -6, x_2 = 0$

$y_2 = 8, y_2 = 0$

$d^2 = [0 – (- 6)]^2 + [0 – 8]^2$

$d= \sqrt{((0-(-6))^2+ (0-8)^2}$

$d= \sqrt{((6)^2+ (-8)^2)}$

$d = \sqrt{(36 + 64)}$

$d = \sqrt{100}$

$d = 10$

Therefore, the distance between P (- 6, 8) and origin O (0, 0) is 10

4. The distance between the points (0, 5) and (–5, 0) is

(A) 5 (B) 5√2 (C) 2√5 (D) 10

Solution:

Distance formula: $d^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$

According to the question,

We have;

$x_1 = 0, x_2 = -5$

$y_2 = 5, y_2 = 0$

$d^2 = ((- 5) – 0)^2 + (0 – 5)^2$

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

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

$d = \sqrt{(25 + 25)}$

$d= \sqrt{50}= 5\sqrt{2}$

So the distance between (0, 5) and (- 5, 0) = $5\sqrt{2}$

5. AOBC is a rectangle whose three vertices are vertices A (0, 3), O (0, 0) and B (5, 0). The length of its diagonal is

(A) 5 (B) 3 (C) √34 (D) 4

Solution:

The three vertices are: A = (0, 3), O = (0, 0), B = (5, 0)

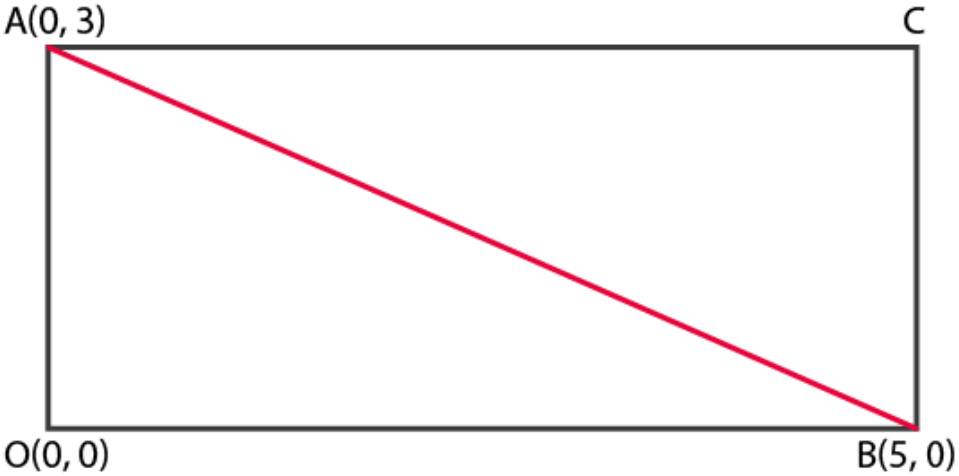
We know that, the diagonals of a rectangle are of equal length,

Length of the diagonal AB = Distance between the points A and B

Distance formula: $d^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$

According to the question,

We have;

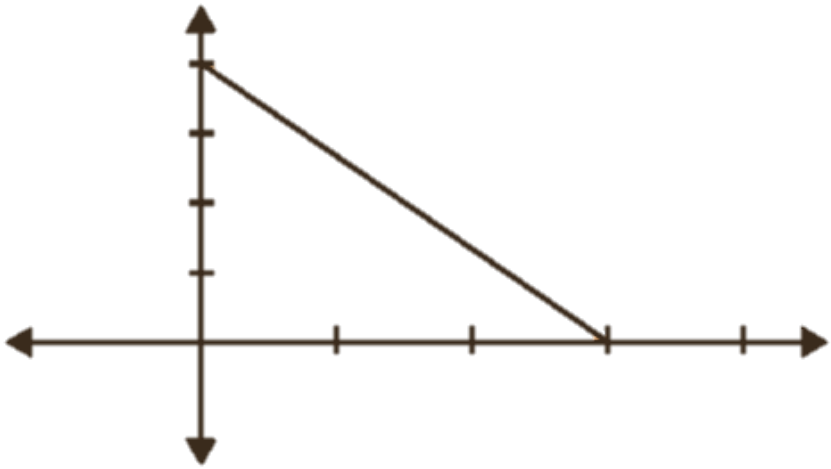


$x_1 = 0, x_2 = 5$
$y_2 = 3, y_2 = 0$
$d^2 = (5 – 0)^2 + (0 – 3)^2$
$d = \sqrt{((5-0)^2 + (0-3)^2)}$
$d = \sqrt{(25 + 9)} = \sqrt{34}$
Distance between A (0, 3) and B (5, 0) is $\sqrt{34}$
Therefore, the length of its diagonal is $\sqrt{34}$

6. The perimeter of a triangle with vertices (0, 4), (0, 0) and (3, 0) is
(A) 5 (B) 12 (C) 11 (D) 7+ √5

Solution:

The vertices of a triangle are (0, 4), (0, 0) and (3, 0).
Now, perimeter of ΔAOB = Sum of the length of all its sides:
= distance between (OA+OB+AB)
Distance between the points (x_1,y_1) and (x_2, y_2) is given by,
$d = \sqrt{((x_2 - x_1)^2 + (y_2 - y_1)^2)}$



To find:

Distance between A(0, 4) and O(0, 0) + Distance between O(0, 0) and B(3, 0) + Distance between A(0, 4) and B(3, 0)

$$= \sqrt{(0-0)^2 + (0-4)^2} + \sqrt{(3-0)^2 + (0-0)^2} + \sqrt{(3-0)^2 + (0-4)^2}$$

$$= \sqrt{0+16} + \sqrt{9+0} + \sqrt{(3)^2 + (4)^2}$$

$$= 4 + 3 + \sqrt{9+16}$$

$$= 7 + \sqrt{25} = 7 + 5 = 12$$

Therefore, the required perimeter of triangle is 12

7. The area of a triangle with vertices A (3, 0), B (7, 0) and C (8, 4) is

(A) 14 (B) 28 (C) 8 (D) 6

Solution:

Vertices of the triangle are,

A $(x_1, y_1) = (3, 0)$

B $(x_2, y_2) = (7, 0)$

C $(x_3, y_3) = (8, 4)$

$$\text{Area of triangle} = \left| \frac{1}{2}[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)] \right|$$

$$= \left| \frac{1}{2}[3(0-4) + 7(4-0) + 8(0-0)] \right|$$

$$= \left| \frac{1}{2}[-12 + 28 + 0] \right|$$

$$= \left| \frac{1}{2}[16] \right|$$

$$= 8$$

Therefore, the area of ΔABC is 8.