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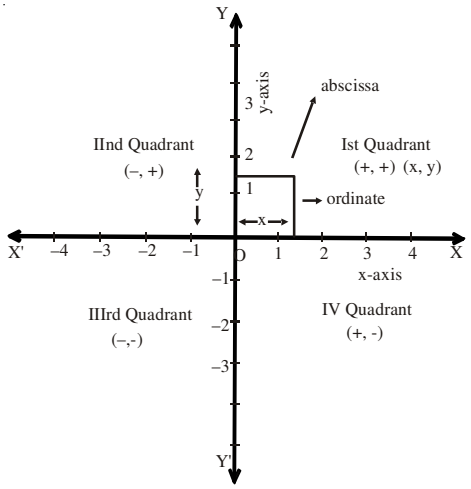
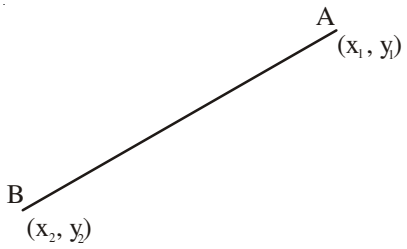
CO-ORDINATE GEOMETRY

- Any point (x, 0) lies on x-axis.
- Any point (0, y) lies on y-axis.
- (x, y) and (y, x) do not represent the same point when $x \neq y$.
- Co- ordinates of origin are (0, 0) .



- Distance between two points A (x_1, y_1) and B (x_2, y_2), $AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$



- Three points A, B and C are collinear, if AB + BC = AC
- A quadrilateral will be a :

  Parallelogram: If length of oposite sides are equal.

  Rectangle: If opposite sides are equal and diagonals are equal.

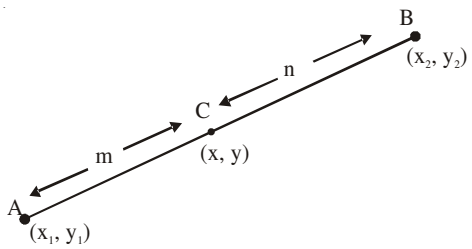
  Square: If all 4 sides are equal, diagonals are also equal.

  Rhombus: If all 4 sides are equal

  Parallelogram but Not rectangle: Opposite sides are equal but diagonals are not equal

  Rhombus but not square: All sides are equal but diagonals are not equal.

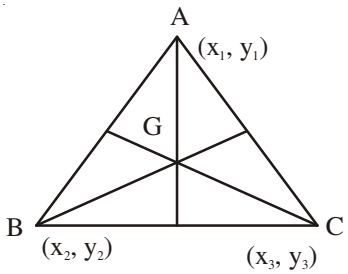
- **<u>Section formula:</u>**



$$(x, y) = \left(\frac{mx_2 + nx_1}{m+n}, \frac{my_2 + ny_1}{m+n}\right)$$

$$\text{Mid-point} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

- **<u>Centroid:</u>**



$$G(x, y) = \left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3}\right)$$

CHECK YOUR PROGRESS:

1. A triangle has vertices (0,8), (0,0) and (6,0). Its perimeter is :

   (A) 10 (B) 24 (C) 12 (D) 14

2. The point which divides the line segment joining the points (–8, –5) and (–2, –10) in the ratio 2:1 internally lies in the :

   (A) Ist quadrant (B) IInd quadrant (C) IIIrd quadrant (D) IVth quadrant

3. If $\left(\frac{a-2}{2}, 5\right)$ is the mid point of the line segment joining the points (1,7) and (–5, 3), the value of a is :

   (A) 2 (B) 0 (C) –4 (D) –3

4. The distance between $(6, x)$ and $(0, 4)$ is 10. The value of x is :

   (A) 4 or 12 (B) 4 or –12 (C) –4 or 12 (D) –4 or –12

5. A point on x-axis which is equidistant from A (5,4) and B (–2, 3) is :

   (A) (–1, 0) (B) (1, 0) (C) (2, 0) (D) (–2, 0)

6. Plot the points (–3, –2), (–1, –2), (–2, 0), (–3, –1) and join them in the order. What figure you get?

7. The length of a line segement is 10 units. If one end is at (2, –3) and abscissa of the other is 10, show that its ordinate is either 3 or –9.

8. If A and B are (1, 4) and (5, 2) respectively, find co-ordinates of the point P on AB so that 4 AP = 3 PB.

9. Show that the points A (3, 3), B (–1, 0) and C (1, 4) form a right triangle whose hypotenuse is AB.

10. Show that the points P (0, –4), Q (6, 2), R (3, 5) and S (–3, –1) are the vertices of the rectangle PQRS.

STRETCH YOURSELF

1. AB is a line segment with co-ordinates as A (9, 2) and B (–5, 12). In what ratio point (3, 2) divides the line segment AB.

2. Find the co-ordinates of the points which divide the line segment joining the points (–4, 0) and (0, 6) in four equal parts.

3. Points A(–5, 0), B(0, 15) and C(–10, 20) are vertices of a triangle ABC. Point P lies on side AB and divides it in the ratio 2 : 3. Similarly point Q lies on the side AC and divides it in the ratio 2 : 3

   (i) Find the co-ordinates of the points P and Q.

   (ii) Show that PQ = $\frac{2}{5}$ BC.

ANSWERS

CHECK YOUR PROGRESS :

1. B 2. B 3. C 4. C

5. C 6. Pentagon 8. $\left(\frac{19}{7}, \frac{22}{7}\right)$

STRETCH YOURSELF :

1. 3 : 4 2. $\left(-3, \frac{3}{2}\right), (-2, 3), \left(-1, \frac{9}{2}\right)$

3. $\left(-5, \frac{45}{2}\right), (-20, 30)$