

# Co-ordinate geometry Formative assessment

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## Question 1

Calculate the Following

- Distance between the point (1,3) and (2,4)
- Mid-point of line segment AB where A(2,5) and B(-5,5)
- Area of the triangle formed by joining the line segments (0,0), (2,0) and (3,0)
- Distance of point (5,0) from Origin
- Distance of point (5,-5) from Origin
- Coordinate of the point M which divided the line segment A(2,3) and B(5,6) in the ratio 2:3
- Quadrant of the Mid-point of the line segment A(2,3) and B(5,6)
- the coordinates of a point A, where AB is the diameter of circle whose center is (2,-3) and B is (1,4)

## Solution

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

$$b) \text{Mid-point is given by } \left(\frac{2-5}{2}\right), \left(\frac{5+5}{2}\right) \text{ or } (-3/2, 5)$$

$$c) A = \frac{1}{2}[0(0-0) + 2(0-0) + 3(0-0)] = 0$$

Since the three points are collinear, the area is zero

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

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

f) Coordinates of point M is given by

$$x = \frac{2 \times 3 + 3 \times 2}{2 + 3} = \frac{12}{5}$$

$$y = \frac{2 \times 6 + 3 \times 5}{2 + 3} = \frac{27}{5}$$

g) Midpoint is given by  $(7/2, 9/2)$  which lies in First quadrant

h) We know that center is midpoint of AB, So

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

$$-3 = \frac{4 + y}{2}$$

Solving these, we get  $(3, -10)$

## True or False statement

### Question 2

- Point A( 0,0) B( 0,3) ,C( 0,7) and D( 2,0) formed a quadrilateral
- The point P  $(-2, 4)$  lies on a circle of radius 6 and center C  $(3, 5)$
- Triangle PQR with vertices P  $(-2, 0)$ , Q  $(2, 0)$  and R  $(0, 2)$  is similar to  $\Delta XYZ$  with Vertices X  $(-4, 0)$  Y  $(4, 0)$  and Z  $(0, 4)$ .
- Point X  $(2, 2)$  Y  $(0, 0)$  and Z  $(3, 0)$  are not collinear
- The triangle formed by joining the point A  $(-3,0)$  , B  $(0,0)$  and C  $(0,2)$  is a right angle triangle
- A circle has its center at the origin and a point A  $(5, 0)$  lies on it. The point B  $(6, 8)$  lies inside the circle
- The points A  $(-1, -2)$ , B  $(4, 3)$ , C  $(2, 5)$  and D  $(-3, 0)$  in that order form a rectangle

### Solution

- False, As three point are A,B and C are collinear, So no quadrilateral can be formed
- False, As the distance between the point P and C is  $\sqrt{26}$  which is less than 6. So point lies inside the circle
- True. Both the triangle are equilateral triangle with side 4 and 8 respectively
- True. As the Area formed by the triangle XYZ is not zero
- True, If we plot the point on the Coordinate system, it becomes clear that it is right angle at origin
- False. The radius of the circle is 5 and distance of the point B is more than 5, So it lies outside the circle
- True. If we calculate the distance between two points, it becomes clear that opposite side are equal, also the diagonal are equal. So it is a rectangle

## Multiple choice Questions

### Question 3

Find the centroid of the triangle XYZ whose vertices are X  $(3, -5)$  Y  $(-3, 4)$  and Z  $(9, -2)$ .

- $(0, 0)$
- $(3, 1)$
- $(2, 3)$
- $(3, -1)$

**Solution (d)**

Centroid of the triangle is given by

$$x = \frac{x_1 + x_2 + x_3}{3} = \frac{3 - 3 + 9}{3} = 3$$

$$y = \frac{y_1 + y_2 + y_3}{3} = \frac{-5 + 4 - 2}{3} = -1$$

**Question 3**

The area of the triangle ABC with coordinates as A (1, 2) B (2, 5) and C (-2, -5)

- a) -1
- b) .4
- c) 2
- d) 1

**Solution (d)**

$$A = \frac{1}{2} [1(5 + 5) + 2(-5 - 2) - 2(2 - 5)] = 1$$

**Question 4**

Find the value of p for which these point are collinear (7,-2) , (5,1) ,(3,p)?

- a) 2
- b) 4
- c) 3
- d) None of these

**Solution a**

For these points to be collinear

$$A=0$$

Or

$$\frac{1}{2} [7(1 - p) + 5(p + 2) + 3(-2 - 1)] = 0$$

$$7-7p+5p+10-9=0$$

$$P=2$$

**Question 5**

Determine the ratio in which the line  $2x + y - 4 = 0$  divides the line segment joining the points A (2, -2) and B (3, 7).

- a) 2:9
- b) 1:9
- c) 1:2
- d) 2:3

**Solution (a)**

Let the ratio be m: n

Now

Coordinate of the intersection

$$x = \frac{3m + 2n}{m + n}$$

$$y = \frac{7m - 2n}{m + n}$$

Now these points should lie of the line, So

$$2\left(\frac{3m + 2n}{m + n}\right) + \left(\frac{7m - 2n}{m + n}\right) - 4 = 0$$

$$\Rightarrow m:n=2:9$$

### Question 6

If the mid-point of the line segment joining the points A (3, 4) and B (a, 4) is P (x, y) and  $x + y - 20 = 0$ , then find the value of a

- a) 0
- b) 1
- c) 40
- d) 45

**Solution** (d)

Mid point  $(3+a)/2, 4$

Now

$$(3+a)/2 - 4 - 20 = 0$$

$$3+a=48$$

$$A=45$$