COORDINATE GEOMETRY

MCQs & A and R WORK SHEET

Test / Exam Name: Coordinate Geometry	**Standard: 10th**	**Subject: Mathematics**
Student Name: ______________	**Section:** ________	**Roll No.:** ____________

Questions: 40	Time: 01:30 hh:mm	Negative Marks: 0	Marks: 40

Instructions

1. MULTIPLE CHOICE QUESTIONS.

Q1. The distance of the point (4, 7) from the x-axis is: **1 Mark**

A 4 **B** 7 **C** 11 **D** $\sqrt{65}$

Ans: B 7

Solution:

The distance of the point A(4, 7) from x-axis is B(x, 0) where x = 4

AB = $\sqrt{(4-4)^2+(0-7)^2}$

$\sqrt{0^2+49}$

$= 7$

Q2. The distance of the point (5, 12) from the y-axis is: **1 Mark**

A 5 units **B** 12 units **C** 13 units **D** -5 units

Ans: A 5 units

Solution:

The distance of any point from y-axis is its abscissa. Therefore, the required distance is 5 units.

Q3. The distance of the point P(x, y) from the origin O(0, 0) is given by: **1 Mark**

A $\sqrt{(x+y)^2}$units **B** $\sqrt{(x-y)^2}$units **C** $\sqrt{(x^2-y^2)}$units **D** $\sqrt{(x^2+y^2)}$units

Ans: D $\sqrt{(x^2+y^2)}$units

Solution:

The distance of the point P(x,y) from the origin o(0,0) is

OP = ? ? ? ? $\sqrt{(x-0)^2+(y-0)^2}$

$= \sqrt{x^2+y^2}$units

Q4. A circle has its centre at the origin and a point P(5, 0) lies on it. Then the point Q(8, 6) lies ________ the circle. **1 Mark**

A out side **B** in side **C** on **D** None of these

Ans: A out side

Solution:

Given Coordinates of centre o(0,0) and Radius is OP.

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

$= \sqrt{25+0}$

$= \sqrt{25} = 5$units

Now, OQ $= \sqrt{(8-0)^2+(6-0)^2}$

$= \sqrt{64+36}$

$= \sqrt{100} = 10$units

Since OQ>OP

Therefore.point Q lies outside the circle.

Q5. If A and B are the points (-6, 7) and (-1, -5) respectively, then the distance 2AB is equal to **1 Mark**

A 20 units **B** 15 units **C** 26 units **D** 13 units

Ans: C 26 units

Solution:

$2AB = 2\sqrt{(-1+6)^2+(-5-7)^2}$

$= 2\sqrt{25 + 144}$

$= 2\sqrt{169}$

=26 units

Q6. The distance between the points (m, - n) and (-m, n) is: **1 Mark**

A $\sqrt{m^2 + n^2}$ **B** $m + n$ **C** $2\sqrt{m^2 + n^2}$ **D** $\sqrt{2m^2 + n^2}$

Ans: C $2\sqrt{m^2 + n^2}$

Solution:

The distance between two points is given by

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

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

$= \sqrt{(-2m)^2 + (2n)^2}$

$= \sqrt{4m^2 + 4n^2}$

$= \sqrt{4(m^2 + n^2)}$

$d = 2\sqrt{m^2 + n^2}$

Q7. If the distance between the points (4, p) and (1, 0) is 5, then p = **1 Mark**

A ± 4 **B** 4 **C** -4 **D** 0

Ans: A ± 4

Solution:

Distance between (4, p) and (1, 0) = 5

$\Rightarrow \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = 5$

$\Rightarrow \sqrt{(1 - 4)^2 + (0 - p)^2} = 5$

$\Rightarrow \sqrt{(-3)^2 + (-p)^2} = 5$

Squaring, both sides

$\Rightarrow (-3)^2 + (-p)^2 = (5)^2$

$\Rightarrow 9 + p^2 = 25$

$\Rightarrow p^2 = 25 - 9 = 16$

$\therefore p = \pm\sqrt{16} = \pm 4$

Q8. The coordinates of a point on x-axis which lies on the perpendicular bisector of the line segment joining the points (7, 6) and (-3, 4) are, **1 Mark**

A (0, 2) **B** (3, 0) **C** (0, 3) **D** (2, 0)

Ans: B (3, 0)

Solution:

The given point P lies on x-axis.

Let the co-ordinates of P be (x, 0).

The point P lies on the perpendicular bisector of of the line segment joining the points A(7, 6), B(-3, 4)

$\therefore$ PA = PB ? $PA^2 = PB^2$

? $(x - 7)^2 + (0 - 6)^2 = (x + 3)^2 + (0 - 4)^2$

? $x^2 - 14x + 49 + 36 = x^2 + 6x + 9 + 16$

? -14x + 85 = 6x + 25

? 6x + 14x = 85 - 25

? 20x = 60

$\Rightarrow x = \frac{60}{20} = 3$

$\therefore$ Co-ordinates of P will be (3, 0).

Q9. A is a point on the x-axis whose abscissa is 5 and B is the point (1, -3), then the distance AB is **1 Mark**

A 8 units **B** 5 units **C** 9 units **D** 25 units

Ans: B 5 units

Solution:

A is a point of the x-axis,therefore coordinates of A are (5,0)

Here.A (5,0) and B (1,-3)

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

$= \sqrt{16+9}$

$= \sqrt{25} = 5$units

Q10. The points (-4, 0), (4, 0), (0, 3) are the vertices of a: **1 Mark**

A Right angled triangle. **B** Sosceles triangle. **C** Equilateral triangle. **D** Scalene triangle.

Ans: B Sosceles triangle.

Solution:

Let A(- 4, 0), B(4, 0), C(0, 3) are the given vertices.
Now, distance between A (-4, 0) and B (4, 0),
$AB = \sqrt{[4-(-4)^2 + (0-0)^2}$

$\left[\ \therefore \text{ distance between two points } (x_1, y_1) \text{ and } (x_2, y_2),\ d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}\right]$

$AB = \sqrt{(4+4)^2} = \sqrt{8^2} = 8$

Distance between B(4, 0) and C(0, 3),
$BC = \sqrt{(0-4)^2 + (3-0)^2} = \sqrt{16+9}$

$BC = \sqrt{25} = 5$

Distance between B(-4, 0) and C(0, 3),
$AC = \sqrt{[0-(-4)^2] + (3-0)^2} = \sqrt{16+9}$

? ? $AC = \sqrt{25} = 5$

$\because BC = AC$

Hence, △ABC is an isosceles triangle because an isosceles triangle has two sides equal.

Q11. ABCD is a rectangle whose three vertices are B(4, 0), C(4, 3) and D(0, 3). The length of one of its diagonals is: **1 Mark**

A 5 **B** 4 **C** 3 **D** 25

Ans: A 5

Solution:

The given vertices are B(4, 0), C(4, 3) and D(0, 3).
Here, BD one of the diagonals.
So,
$BD = \sqrt{(4-0)^2 + (0-3)^2}$

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

$= \sqrt{16+9}$

$= \sqrt{25}$

$= 5$

Hence, the length of the diagonal is 5 units.

Q12. The distance between the points ($a\cos\theta + b\sin\theta$, 0) and (0, $a\sin\theta - b\cos\theta$) is: **1 Mark**

A $a^2 + b^2$ **B** $a + b$ **C** $a^2 - b^2$ **D** $\sqrt{a^2 + b^2}$

Ans: D $\sqrt{a^2 + b^2}$

Solution:

We have to find the distance between A($a\cos\theta + b\sin\theta$, 0) and B(0, $a\sin\theta - b\cos\theta$).
In general, the distance between A(x_1, y_1) and B(x_2, y_2) is given by,
$AB = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$

So,
$= \sqrt{(a\cos\theta + b\sin\theta)^2 + (-a\sin\theta + b\cos\theta)^2}$

$= \sqrt{a^2\cos^2\theta + b^2\sin^2\theta + 2ab\sin\theta\cos\theta + a^2\sin^2\theta + b^2\cos^2\theta - 2ab\sin\theta\cos\theta}$

$AB = \sqrt{(a\cos\theta + b\sin\theta - 0)^2 + (0 - a\sin\theta + b\cos\theta)^2}$

$= \sqrt{a^2(\sin^2\theta + \cos^2\theta) + b^2(\sin^2\theta + \cos^2\theta)}$

But according to the trigonometric identity,
$\sin^2\theta + \cos^2\theta = 1$

Therefore,

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

Q13. The mid-point of segment AB is P(0, 4). If the coordinates of B are (-2, 3), then the coordinates of A are: **1 Mark**

A (2, 5) **B** (-2, -5) **C** (2, 9) **D** (-2, 11)

Ans: A (2, 5)

Solution:

Let the mid-point of A be (x, y).

P(0, 4) is given to be mid-point AB.

Using the mid-point formula, we get

$(0, 4) = \left(\frac{-2+x}{2}, \frac{3+y}{2}\right)$

$\Rightarrow\ 0 = \frac{-2+x}{2}$ and $4 = \frac{3+y}{2}$

? -2 + x = 0 and 3 + y = 8

? x = 2 and y = 5

So, the coordinates of A are (2, 5).

Q14. The coordinates of the midpoint of the line joining the points (3p, 4) and (-2, 4) are (5, p). The value of p is: **1 Mark**

A 1 **B** 3 **C** 4 **D** 2

Ans: C 4

Solution:

Let the coordinates of midpoint O(5, p) is equidistance from the points A(3p, 4) and B(-2, 4) (because O is the mid-point of AB)

$\therefore\ 5p = \frac{3p-2}{2}$

$\Rightarrow 3p - 2 = 10$

$3p = 12$

$\Rightarrow p = 4$

Also $p = \frac{4+4}{2}$

$\Rightarrow p = 4$

Q15. The points A(-1, 0), B(3, 1), C(2, 2) and D(-2, 1) are the vertices of a: **1 Mark**

A Rectangle. **B** Rhombus. **C** Square. **D** Parallelogram.

Ans: D Parallelogram.

Solution:

Given the points A(-1,0)),B(3,1) C(2,2) and D(-2,1)

$\therefore$ AB = $\sqrt{(3+1)^2 + (1-0)^2} = \sqrt{16+1} = \sqrt{17}$ units

BC = $\sqrt{(2-3)^2 + (2-1)^2} = \sqrt{1+1} = \sqrt{2}$ units

CD = $\sqrt{(-2-)^2 + (1-2)^2} = \sqrt{16+1} = \sqrt{17}$ units

AD = $\sqrt{(-2+1)^2 + (1-0)^2} = \sqrt{1+1} = \sqrt{2}$ units

Therefore the opposite sides of the given.fig are equal

The diagonal AC=$\sqrt{(2+1)^2 + (2-0)^2} = \sqrt{9+4} = \sqrt{13}$ units

and diagonal BD=$\sqrt{(2-3)^2 + (1-1)^2} = \sqrt{1+1} = \sqrt{1}$ units

Therefore diagonal AC and BD are not equal.

Since opposite sides of the given fig.are equal and both diagonal are not equal.

Therefore the given figure (Quadrilaterial) is a parallelogram.

Q16. The coordinates of the fourth vertex of the rectangle formed by the points (0, 0), (2, 0), (0, 3) are, **1 Mark**

A (3, 0) **B** (0, 2) **C** (-2, 3) **D** (3, 2)

Ans: C (-2, 3)

Solution:

Three vertices of a rectangle are A(0, 0), B(2, 0), C(0, 3).

Let fourth vertex be D(x, y).

The diagonals of a rectangle bisect eachother at O.

O is the mid-point of AC, then

Coordinates of O will be $\left(\frac{0+0}{2}, \frac{0+3}{2}\right)$

or $\left(0, \frac{3}{2}\right)$

∵ O is also the mid-point of BD

$0 = \frac{2+x}{2} \Rightarrow 2 + x = 0 \Rightarrow x = -2$

and $\frac{3}{2} = \frac{0+y}{2} \Rightarrow y = 3$

∴ Co-ordinates of D are (-2, 3).

Q17. The vertices of a square are (0, -1), (2, 1), (0, 3) and (-2, 1). The side of the square is: **1 Mark**

A $2\sqrt{2}$ units **B** 2 units **C** $\sqrt{2}$ units **D** $2\sqrt{3}$ units

Ans: A $2\sqrt{2}$ units

Solution:

Let the vertics of squre ABCD are A(0,-1),B(2,1),C(0,3) and D(-2,1)

Since all sides of a sqare are equal i,e AB=BC=CD=DA.

$\therefore AB = \sqrt{(2-0)^2 + (1+1)^2}$

$= \sqrt{4+4}$

$= 2\sqrt{2}$ units

Q18. If the coordinates of one end of a diameter of a circle are (2, 3) and the coordinates of its centre are (-2, 5), then the coordinates of the other end of the diameter are: **1 Mark**

A (0, 4) **B** (6, – 7) **C** (– 6, 7) **D** (0, 8)

Ans: C (– 6, 7)

Solution:

Let the coordinates of the other end be B(x_2, y_2). (x_2, y_2).

One end of the diameter is A (2, 3) and the centre is O(-2, 5).(-2, 5).

Since the centre is midpoint of the diameter of the circle.

$\therefore x = \frac{x_1+x\_2}{2}$

$\Rightarrow -2 = \frac{2+x_2}{2}$

$\Rightarrow x_2 = -6$

$\Rightarrow -2 = \frac{2+x_2}{2}$

And $y = \frac{y_1+y\_2}{2}$

$\Rightarrow 5 = \frac{3+y_2}{2}$

$\Rightarrow y_2 = 7$

Therefore,the cordinates of the diameter are (-6, 7).

Q19. Find the value of k, if the point (0, 2) is equidistant from the points (3, k) and (k, 5): **1 Mark**

A -1 **B** 0 **C** 2 **D** 11

Ans: D 11

Solution:

Let point C (0, 2) is equidistant from the points A(3, k) and B(k, 5)

i.e. AC = BC

$\therefore AC^2 = BC^2$

$\Rightarrow (3-0)2 + (k - 2)2 = (k - 0)2 + (5-2)2$

$\Rightarrow 9 + k^2 + 4 - 4k = k^2 + 9$

$\Rightarrow 4k = 4$

$\Rightarrow k = 1$

Q20. The point on the y-axis which is equidistant from the points (6, 5) and (-4, 3) is: **1 Mark**

A (9, 0) **B** (-9, 0) **C** (0, 9) **D** (0, -9)

Ans: C (0, 9)

Solution:

Let one point is A(6, 5) and 2nd point is B(-4, 3)

3rd point on y-axis is C (0, y)

Since C is equidistant from A and B, i.e. AC = BC

$\therefore AC^2 = BC^2$

$\Rightarrow (6-0)2 + (5 - y)^2 = (-4-0)2 + (3 - y)^2$

$?36 + 25 + y^2 - 10y = 16 + 9 + y^2 - 6y^2$

$\Rightarrow \ -4y = \ -36$

$\Rightarrow y = 9$

Therefore, the point on y-axis is (0, 9)

Q21. If the point P(x, y) is equidistant from A(5, 1) and B(-1, 5), then **1 Mark**

A 5x = y **B** x = 5y **C** 3x = 2y **D** 2x = 3y

Ans: C 3x = 2y

Solution:

Points P(x, y) is equidistant from A(5, 1), B(-1, 5) then AP = BP ? $AP^2 = BP^2$

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

? $25 + x^2 - 10x + 1 + y^2 - 2y = 1 + x^2 + 2x + 25 + y^2 - 10y$

? -10x - 2y + 26 = 2x - 10y + 26

? 2x + 10x = -2y + 10y

? 12x = 8y

? 3x = 2y

Q22. The fourth vertex D of a parallelogram ABCD whose three vertices are A(-2, 3), B(6, 7) and C(8, 3) is: **1 Mark**

A (0, 1) **B** (0, -1) **C** (-1, 0) **D** (1, 0)

Ans: B (0, -1)

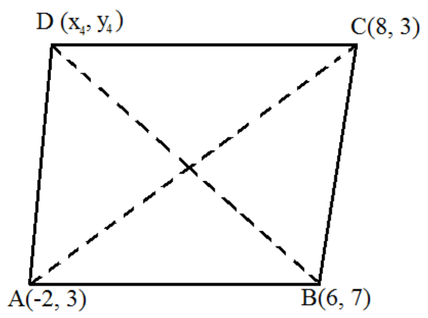
Solution:

Let the fourth vertex of parallelogram, D ≡ $(x_4, \ y_4)$ and L, M be the middle points of AC and BD, respectively,

Then, L ≡ $\left(\frac{-2+8}{2}, \frac{3+3}{2}\right) \equiv (3, 3)$

$\Big[$ Since, mid-point of any line segment which passes throught the points (x_1, y_1) and (x_2, y_2) $= \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)\Big]$

and M = $\left(\frac{6+x_4}{2}, \frac{7+y_4}{2}\right)$



Since, ABCD is a parallelogram, therefore diagonals AC and BD will bisect each other. Hence, L and M are the same points.

$\therefore 3 = \frac{6+x_4}{2}$ and $3 = \frac{7+y_4}{2}$

$\Rightarrow 6 = 6 + x_4$ and $6 = 7 + y_4$

$\Rightarrow x_4 = 0$ and y_4

$\therefore x_4$ and $y_4 = \ -1$

Hence, the fourth vertex of parallelogram is $D(x_4, y_4)$ = D(0, -1).

Q23. In Figure 2, P(5, - 3) and Q(3, y) are the points of trisection of the line segment joining A(7, –2) and B(l, –5). **1 Mark**

Then y equals

Figure 2

A 2 **B** 4 **C** –4 **D** $-\frac{5}{2}$

Ans: C –4

3. -4

Q24. In what ratio does the y-axis divide the join of P(-4, 2) and Q(8, 3)? **1 Mark**

A 3 : 1 **B** 1 : 3 **C** 2 : 1 **D** 1 : 2

Ans: D 1 : 2

Solution:

Let the y-axis cut AB at the point P(0, y) in the ratio k : 1.

Then, using section formula, we get

$\frac{8k-4}{k+1} = 0$

$\Rightarrow \ 8k - 4 = 0$

$\Rightarrow \ k = \frac{1}{2}$

So, the required ratio is $\frac{1}{2}:1$, that is 1 : 2.

Q25. If points (a, 0), (0, b) and (1, 1) are collinear, then $\frac{1}{a}+\frac{1}{b}=$ **1 Mark**

A 1 **B** 2 **C** 0 **D** -1

Ans: A 1

Solution:

The area of triangle whose vertices are (a, 0), (0, b) and (1, 1).

$=\frac{1}{2}[x_1(y_2-y_3)+x_2(y_3-y_1)+x_3(y_1-y_2)]$

$=\frac{1}{2}[a(b-1)+0(1-0)+1(0-b)]$

$=\frac{1}{2}[ab-a+0-b]$

$=\frac{1}{2}(ab-a-b)$

$\because$ The points are collinear

$\therefore\ \frac{1}{2}(ab-a-b)=0$

$\Rightarrow\ ab-a-b=0$

$\Rightarrow\ ab=a+b\Rightarrow\ \frac{a+b}{ab}=1$

$\Rightarrow\ \frac{a}{ab}+\frac{b}{ab}=1$

$\Rightarrow\ \frac{1}{b}+\frac{1}{a}=1$

$\Rightarrow\ \frac{1}{a}+\frac{1}{b}=1$

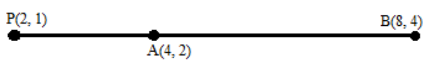
Q26. If the point P(2, 1) lies on the line segment joining points A(4, 2) and B(8, 4), then: **1 Mark**

A $AP=\frac{1}{3}AB$ **B** $AP=PB$ **C** $PB=\frac{1}{3}AB$ **D** $AP=\frac{1}{2}AB$

Ans: D $AP=\frac{1}{2}AB$

Solution:

Given that, the point P(2, 1) lies on the line segment joining the points A(4, 2) and B(8, 4), which shows in the figure below:



Now, distance between A(4, 2) and (2, 1),

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

$\left[\ \therefore\ \text{distance between two points } (x_1, y_1) \text{ and } (x_2, y_2),\ d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}\right]$

$AP=\sqrt{(-2)^2+(-1)^2}$

$AP=\sqrt{4+1}$

$AP=\sqrt{5}$

Distance between A(4, 2) and B(8, 4),

$AB=\sqrt{(8-4)^2+(4-2)^2}$

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

$AB=\sqrt{16+4}$

$AB=\sqrt{20}$

$AB=2\sqrt{5}$

Distance between B(8, 4) and P(2, 1),

$BP=\sqrt{(8-2)^2+(4-1)^2}$

$BP=\sqrt{(6)^2+(3)^2}$

$BP=\sqrt{36+9}$

$BP=\sqrt{45}$

$BP=3\sqrt{5}$

$\therefore AB=2\sqrt{5}=2AP$

$AP=\frac{AB}{2}$

Hence, required condition is AP = $\frac{AB}{2}$.

Q27. If A(2, 2), B(-4, -4) and C(5, -8) are the vertices of a triangle, then the length of the median through vertices C is: **1 Mark**

A $\sqrt{65}$ **B** $\sqrt{117}$ **C** $\sqrt{85}$ **D** $\sqrt{113}$

Ans: C $\sqrt{85}$

Solution:

Let midpoint of A(2, 2), B(-4, -4) be D whose coordinates will be

$= \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right) = \left(\frac{2-4}{2}, \frac{2-4}{2}\right)$

or $\left(\frac{-2}{2}, \frac{-2}{2}\right)$ or (-1, -1)

$\therefore$ Length of median CD

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

$= \sqrt{(5+1)^2+(-8+1)^2}$

$= \sqrt{(6)^2+(-7)^2} = \sqrt{36+49}$

$= \sqrt{85}$ units

Q28. If points A(5, p), B(1, 5), C(2, 1) and D(6, 2) form a square ABCD, then p = **1 Mark**

A 7 **B** 3 **C** 6 **D** 8

Ans: C 6

Solution:

The distance d between two points (x_1, y_1) and (x_2, y_2) is given by the formula,

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

In a square all the sides are equal to each other.

Here the four points are A(5, p), B(1, 5), C(2, 1) and D(6, 2).

The vertex 'A' should be equidistant from 'B' as well as 'D'.

Let us now find out the distance 'AB' and 'AD'.

$AB = \sqrt{(5-1)^2+(p-5)^2}$

$AB = \sqrt{(4)^2+(p-5)^2}$

$\text{AD}=\sqrt{(5-6)^2+(\text{p}-2)^2}$

$\text{AD}=\sqrt{(-1)^2+(\text{p}-2)^2}$

These two need to be equal.

Equating the above two equations we have,

AB = AD

$\sqrt{(4)^2+(\text{p}-5)^2}=\sqrt{(-1)^2+(\text{p}-2)^2}$

Squaring on both sides we have,

$(4)^2 + (p - 5)^2 = (-1)^2 + (p - 2)^2$

$16 + p^2 + 25 - 10p = 1 + p^2 + 4 - 4p$

6p = 36

p = 6

Q29. If the point C(k, 4) divides the join of the points A(2, 6) and B(5, 1) in the ratio 2 : 3 then the value of k is: **1 Mark**

A 16 **B** $\frac{28}{5}$ **C** $\frac{16}{5}$ **D** $\frac{8}{5}$

Ans: C $\frac{16}{5}$

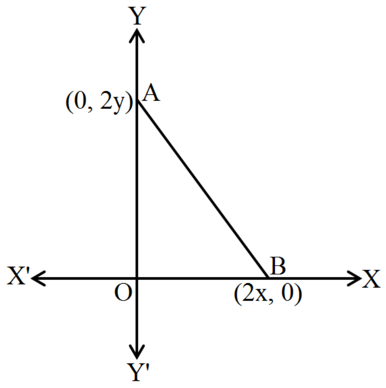
Solution:

By Section Formula,

The x-coordinate of $\text{C}=\frac{2(5)+3(2)}{2+3}$

$\Rightarrow\text{k}=\frac{16}{5}$

Q30. The coordinates of the point which is equidistant from the three vertices of a $\triangle\text{AOB}$ as shown in the figure is: **1 Mark**



A (x, y) **B** (0, 0) **C** (y, x)

D $\Bigg(\frac{\text{x}}{2}=\frac{\text{y}}{2}\Bigg)$

Ans: **A** (x, y)

Solution:

$\text{AB}=\sqrt{(2\text{x}-0)^2+(0-2\text{y}^2)}$

$=\sqrt{4\text{x}^2+4\text{y}^2}=2\sqrt{\text{x}^2+\text{y}^2\text{ units}}$

$\text{BO}=\sqrt{(0-\text{2x}^2)+(0-{0)}^2}$

$=\sqrt{4\text{x}^2}=\text{2x units}$

$\text{AO}=\sqrt{(0-\text{0})^2+(0+\text{2y)}^2}$

$=\text{4y}^2=2\text{y units}$

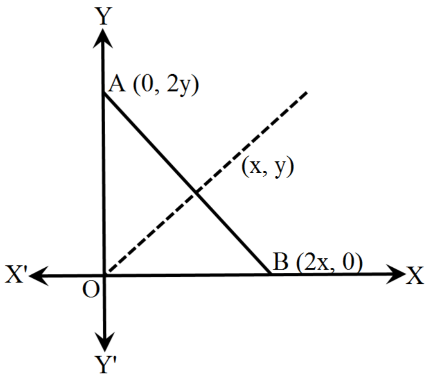
Now $\text{AB}^2=\text{AO}^2+\text{BO}^2\Rightarrow(2\sqrt{\text{x}^2+\text{y}^2})^2=\text{(2x)}^2+\text{(2y)}^2$

$\Rightarrow4(\text{x}^2+\text{y}^2)=4(\text{x}^2+\text{y}^2)$

Therefore, triangle AOB is an isosceles right-angled triangle.

Since the coordinate of the point which is equidistant from the three vertices of a right-angled triangle is the coordinates of mid-point of its hypotenuse.

$\therefore\text{Mid-point of AB}=\Bigg(\frac{0+2\text{x}}{2},\frac{2\text{y+0}}{2}\Bigg)=\text{(X, Y)}$



Q31. The ratio in which (4, 5) divides the join of (2, 3) and (7, 8) is: **1 Mark**

A -2 : 3 **B** -3 : 2 **C** 3 : 2 **D** 2 : 3

Ans: **D** 2 : 3

Solution:

Let the point (4, 5) divides the line segment joining the points (2, 3) and (7, 8) in the ratio m : n

$\therefore\ 4=\frac{\text{mx}_2+\text{nx}_1}{\text{m}+\text{n}}=\frac{\text{m}\times7+\text{n}\times2}{\text{m}+\text{n}}$

? 4(m + n) = 7m + 2n

? 4m + 4n = 7m + 2n

? 4n - 2n = 7m - 4m

? 2n = 3m

$\Rightarrow\ \frac{\text{m}}{\text{n}}=\frac{2}{3}$

$\therefore$ m : n = 2 : 3

Q32. The point where the medians of a triangle meet is called the ________ of the triangle: **1 Mark**

A circumcentre **B** None of these **C** centroid **D** orthocentre

Ans: **C** centroid

Solution:

The point where three medians of a triangle meet is called the centroid of the triangle. It is the centre of gravity of the triangle. It divides the median in the ratio 2 : 1

$\therefore\text{x}=\frac{\text{x}_1+\text{x}_2}{2}=\frac{-2+4}{2}=\frac{2}{2}=1$

$\text{and y}=\frac{\text{y}_1+\text{y}_2}{2}=\frac{3-5}{2}=\frac{-2}{2}=-1$

Therefore the coordinates of mid point C are (1, -1)

Q33. If P(x, y) is any point on the line joining the points A(a, 0) and B(0, b), then **1 Mark**

A $\frac{\text{x}}{\text{a}}+\frac{\text{y}}{\text{b}}=0$ **B** $\frac{\text{x}}{\text{a}}-\frac{\text{y}}{\text{b}}=1$

C $\frac{\text{x}}{\text{a}}+\frac{\text{y}}{\text{b}}=1$ **D** $\frac{\text{x}}{\text{a}}-\frac{\text{y}}{\text{b}}=0$

Ans: **C** $\frac{\text{x}}{\text{a}}+\frac{\text{y}}{\text{b}}=1$

Solution:

Points A(a, 0), P (x, y) and B(0, b) are three points on a line (given)

then $(\text{x}_1 = \text{a, y}_1 = 0), (\text{x}_2 =\text{x, y}_2 =\text{y})\text{and} (\text{x}_3 = 0,\text{y}_3 =\text{b})$

$\therefore\text{x}_1(\text{ y}_2 -\text{ y}_3) + \text{x}_2(\text{y}_3 -\text{y}_1) + \text{x}_3(\text{y}1 -\text{y}_2) = 0$

= a(y - b) + x(b - 0) + 0(0 - y) = 0

= ay - ab + xb -0 + 0 =0 , then dividing by ab

$\frac{\text{xb}}{\text{ab}}+\frac{\text{ay}}{\text{ab}}=1$

$\Rightarrow\frac{\text{x}}{\text{a}}+\frac{y}{b}=1$

Q34. The ares of a triangle with vertices A(3, 0) and B(7, 0) and C(8, 4) is: **1 Mark**

A 14 **B** 28 **C** 8 **D** 6

Ans: C 8

Solution:

Area of $\triangle\text{ABC}$ whose Vertices $\text{A}\equiv(\text{x}_1,\text{ y}_1),\text{B}\equiv(\text{x}_2,\text{ y}_2)$ and $\text{C}\equiv(\text{x}_3,\text{ y}_3)$ are given by

$\begin{vmatrix}\frac{1}{2}[\text{x}_1(\text{y}_2-\text{y}_3)+\text{x}_2(\text{y}_3-\text{y}_1)+\text{x}_3(\text{y}_1-\text{y}_2)] \end{vmatrix}$

Here, $x_1 = 3$, $y_1 = 0$, $y_2 = 0$, $x_3 = 8$ and $y_3 = 4$

$=\begin{vmatrix}\frac{1}{2}[3(0-4)+7(4-0)+8(0-0)] \end{vmatrix}$

$=\begin{vmatrix} \frac{1}{2}(-12+28+0)\end{vmatrix}$

$=\begin{vmatrix}\frac{1}{2}(16) \end{vmatrix}$

=8

Hence, the required area of AABC is 8.

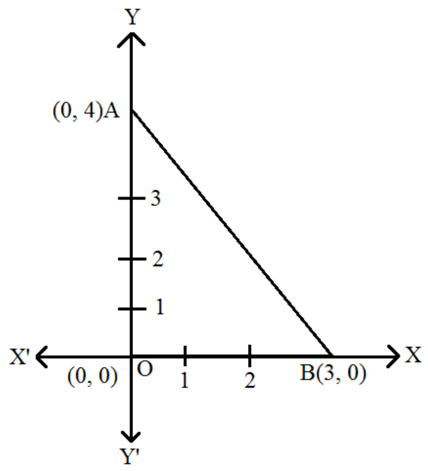
Q35. The perimeter of a triangle with vertices (0, 4), (0, 0) and (3, 0) is: **1 Mark**

A 5 **B** 12 **C** 11 **D** $7+\sqrt{5}$

Ans: B 12

Solution:

We further, adding all the distance of a triangle to get the oerimeter of a triangle. We point the vertices of a triangle i. e., (0, 4), (0, 0) and (3, 0) on the paper shown as given below:



Now, perimeter of $\triangle\text{AOB}$ = Sum of the length of all its sides = d(AO) + d(OB) + d(AB)

$\therefore$ Distance between the points (x_1, y_1) and (x_2, y_2),

$\text{d}=\sqrt{(\text{x}_2-\text{x}_1)^2+(\text{y}_2-\text{y}_1)^2}$

d = 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)

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

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

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

$\text{d}=7+\sqrt{25}$

$\text{d}=7+5$

$\text{d}=12$

Hence, the required perimeter of triangle is 12.

Q36.Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). **1 Mark**

Mark the correct choice as:

Assertion: Points (3, 2), (-2, -3) and (2, 3) form a right triangle.

Reason: If (x, y) is equidistant from (3, 6) and (-3, 4), then 3x + y = 5.

A A is true, R is true; R is a correct explanation for A. **B** A is true, R is true; R is not a correct explanation for A.

C A is true; R is False. **D** A is false; R is true.

Ans: B A is true, R is true; R is not a correct explanation for A.

2. A is true, R is true; R is not a correct explanation for A.

Q37.Assertion: The point (0, 4) lies on y - axis. **1 Mark**

Reason: The x - coordinate on the point on y - axis is zero.

A Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

B Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

C Assertion (A) is true but reason (R) is false.

D Assertion (A) is false but reason (R) is true.

Ans: A Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

1. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

Q38.Assertion: In quadrilateral ABCD, if AB = BC = CD = DA and AC = BD, then ABCD is a square. **1 Mark**

Reason: A quadrilateral is a square if all its sides are equal and the diagonals are equal.

A A is true, R is true; R is a correct explanation for A.

B A is true, R is true; R is not a correct explanation for A.

C A is true; R is False.

D A is false; R is true.

Ans: A A is true, R is true; R is a correct explanation for A.

1. A is true, R is true; R is a correct explanation for A.

Q39.Assertion: The distance of a points P(x, y) from the origin is \sqrt{\text{x}^{2}-\text{y}^{2}}. **1 Mark**

Reason: The distance between two points (x_1, y_1,)and (x_2, y_2) is \sqrt{(\text{x}_{2}-\text{x}_{1})^{2}+(\text{y}_{2}-\text{y}_{1})^{2}}

A A is true, R is true; R is a correct explanation for A.

B A is true, R is true; R is not a correct explanation for A.

C A is true; R is False.

D A is false; R is true.

Ans: D A is false; R is true.

4. A is false; R is true.

Q40.Assertion: There is no such point or X - axis which are at a distance c(c < 3) from the point (2, 3). **1 Mark**

Reason: The distance between two points (x_1, y_1,)and (x_2, y_2) is \sqrt{(\text{x}_{2}-\text{x}_{1})^{2}+(\text{y}_{2}-\text{y}_{1})^{2}}

A A is true, R is true; R is a correct explanation for A.

B A is true, R is true; R is not a correct explanation for A.

C A is true; R is False.

D A is false; R is true.

Ans: A A is true, R is true; R is a correct explanation for A.

1. A is true, R is true; R is a correct explanation for A.