NCERT Solutions for Class 10 Maths Chapter 7 Coordinate Geometry EXERCISE 7.2

1. Find the coordinates of the point which divides the join of (–1, 7) and (4, –3) in the ratio 2: 3

Solution: Let P(*x*, *y*) be the required point.

Now,

Using the section formula, we get

$x = \frac{2*4+3*-1}{2+3}$

$= \frac{8-3}{5} = \frac{5}{5}$

$= 1$

$y = \frac{2*-3+3*7}{2+3}$

$= \frac{-6+21}{5}$

$= \frac{15}{5} = 3$

Therefore, the point is (1, 3)

2. Find the coordinates of the points of trisection of the line segment joining (4,–1) and (–2, –3)

Solution: Let P (*x*1, *y*1) and Q (*x*2, *y*2) are the points of trisection of the line segment joining the given points i.e., AP = PQ = QB

Therefore, point P divides AB internally in the ratio 1:2

$x_1 = \frac{1*-2+2*4}{1+2}$

$= \frac{6}{3} = 2$

$y_1 = \frac{1*-3+2*-1}{1+2}$

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

$= \frac{-5}{5}$

Therefore, p $(x_1, y_1) = (2, -\frac{5}{3})$

Point Q divides AB internally in the ratio 2:1

$x_2 = \frac{2*-2+1*4}{1+2}$

$= \frac{-4+4}{3} = 0$

$y_1 = \frac{2*-3+1*-1}{1+2}$

$= \frac{-6\ -1}{3}$

$= \frac{-7}{3}$

Q $(x_2, y_2) = (0, \frac{-7}{3})$

3. To conduct Sports Day activities, in your rectangular shaped school ground ABCD, lines have been drawn with chalk powder at a distance of 1m each. 100 flower pots have been placed at a distance of 1m from each other along AD, as shown in Fig. 7.12. Niharika runs $\frac{1}{4}$ th thedistance AD on the 2nd line andposts a green flag. Preet runs $\frac{1}{5}$ ththe distance AD on the eighth lineand posts a red flag. What is thedistance between both the flags? IfRashmi has to post a blue flag exactlyhalfway between the line segmentjoining the two flags, where shouldshe post her flag?

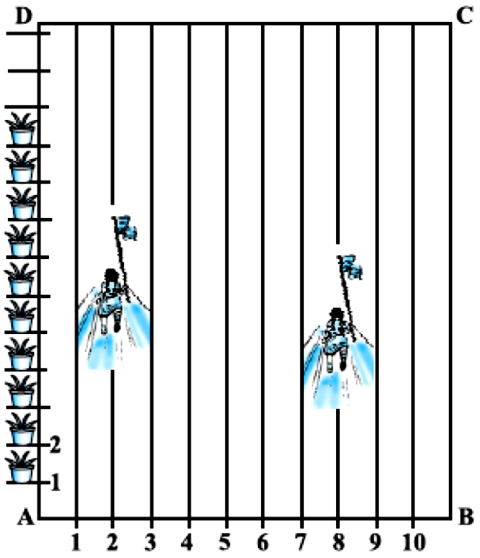


Fig. 7.12

Solution:It can be observed that Niharika posted the green flag at$\frac{1}{4}$ of the distance AD i.e.,$\frac{1}{4} * 100$ = 25 m from thestarting point of 2nd line. Therefore, the coordinates of this point G is (2, 25)

Similarly, Preet posted red flag at$\frac{1}{5}$ of the distance AD i.e.,$\frac{1}{5} * 100$ = 20 m from the starting point of 8th line. Therefore, the coordinates of this point R are (8, 20)

Distance between these flags by using distance formula = GR

= $[(8 – 2)^2 + (25 – 20)^2]^{1/2}$

= $(36 + 25)^{1/2}$

= $\sqrt{61}$ m

The point at which Rashmi should post her blue flag is the mid-point of the line joining these points. Let this point beA (*x*,*y*)

x = $\frac{2+8}{2}$ = 5

y = $\frac{25+20}{2}$ = 22.5

Hence, A (x, y) = (5, 22.5)

Therefore, Rashmi should post her blue flag at 22.5m on 5th line

4. Find the ratio in which the line segment joining the points (– 3, 10) and (6, – 8) is divided by (– 1, 6)

Solution: Let the ratio in which the line segment joining (- 3, 10) and (6, - 8) is divided by point (- 1, 6) be *k* : 1

Therefore,

-1 = $\frac{6k-3}{k+1}$

-k – 1 = 6k – 3

7k = 2

k = $\frac{2}{7}$

Therefore, the required ratio is 2: 7

5. Find the ratio in which the line segment joining A(1, – 5) and B(– 4, 5) is divided by thex-axis. Also find the coordinates of the point of division

Solution:Let the ratio in which the line segment joining A (1, - 5) and B (- 4, 5) is divided by *x*-axis be k: 1

Therefore, the coordinates of the point of division is ($\frac{-4k+1}{k+1}$, $\frac{5k-5}{k+1}$)

We know that *y*-coordinate of any point on *x*-axis is 0

Therefore,

$\frac{5k-5}{k+1}$ = 0

k = 1

Therefore, *x*-axis divides it in the ratio 1:1.

Division point = ($\frac{-4\,(1)+1}{1+1}$, $\frac{5\,(1)-5}{1+1}$)

= $(\frac{-4+1}{2}, \frac{5-5}{2})$

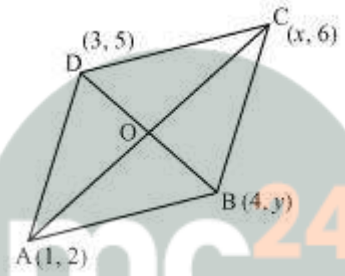
= $(\frac{-3}{2}, 0)$

6. If (1, 2), (4, y), (x, 6) and (3, 5) are the vertices of a parallelogram taken in order, find x and y

Solution:Let (1, 2), (4, *y*), (*x*, 6), and (3, 5) are the coordinates of A, B, C, D vertices of a parallelogram ABCD.

Intersectionpoint O of diagonal AC and BD also divides these diagonals.

Therefore, O is the mid-point of AC and BD



If O is the mid-point of AC, then the coordinates of O are:

$(\frac{1+x}{2}, \frac{2+6}{2}) = (\frac{x+1}{2}, 4)$

If O is the mid-point of BD, then the coordinates of O are:

$(\frac{4+3}{2}, \frac{5+y}{2}) = (\frac{7}{2}, \frac{5+y}{2})$

Since both the coordinates are of the same point O

$$\frac{x+1}{2} = \frac{7}{2}$$

x + 1 = 7

x = 6

And,

$\frac{5+y}{2}$ = 4

5 + y = 8

y = 3

7. Find the coordinates of a point A, where AB is the diameter of a circle whose centre is (2, – 3) and B is (1, 4)

Solution:Let the coordinates of point A be (*x*, *y*)

Mid-point of AB is (2, - 3), which is the center of circle

(2, -3) = ($\frac{x+1}{2}$, $\frac{y+4}{2}$)

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

x + 1 = 4

x = 3

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

y + 4 = -6

y = -10

Therefore, the coordinates of A are (3, -10)

8. If A and B are (– 2, – 2) and (2, – 4), respectively, find the coordinates of P such that $AP = \frac{3}{7}AB$ and P lies on the line segment AB

Solution:The coordinates of point A and B are (- 2, - 2) and (2, - 4) respectively

AP = $\frac{3}{7}$ AB

Therefore, AP: PB = 3:4

Point P divides the line segment AB in the ratio 3:4

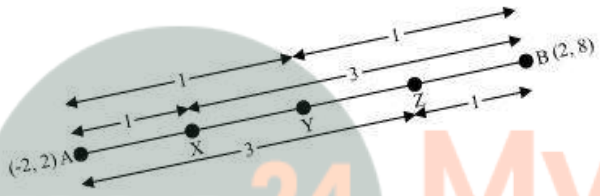
Coordinates of P = $(\frac{3*2+4*-2}{3+4}, \frac{3*-4+4*-2}{3+4})$

= $(\frac{6-8}{7}, \frac{-12-8}{7})$

= $(\frac{-2}{7}, \frac{-20}{7})$

9. Find the coordinates of the points which divide the line segment joining A(– 2, 2) andB (2, 8) into four equal parts

Solution: It can be observed from the figure that points P, Q, R are dividing the line segment in a ratio 1:3, 1:1, 3:1respectively



Coordinates of P = $(\frac{1*2+3*-2}{1+3}, \frac{1*8+3*2}{1+3})$

= (-1, $\frac{7}{2}$)

Coordinates of Q = $(\frac{2+-2}{2}, \frac{2+8}{2})$

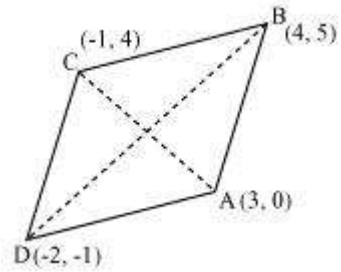
= (0, 5)

Coordinates of R = $(\frac{3*2+1*-2}{3+1}, \frac{3*8+1*2}{3+1})$

= (1, $\frac{13}{2}$)

10. Find the area of a rhombus if its vertices are (3, 0), (4, 5), (– 1, 4) and (– 2, – 1) taken inorder. [Hint: Area of a rhombus $= \frac{1}{2}$ (product of its diagonals)]

Solution: Let (3, 0), (4, 5), (- 1, 4) and (- 2, - 1) are the vertices A, B, C, D of a rhombus ABCD



Length of diagonal AC = $[(3 + 1)^2 + (0 – 4)^2]^{1/2}$

= $\sqrt{16 + 16}$

= $4\sqrt{2}$

Length of diagonal BD = $[(4 + 2)^2 + (5+ 1)^2]^{1/2}$

= $\sqrt{36 + 36}$

= $6\sqrt{2}$

Therefore,

Area of rhombus ABCD = $\frac{1}{2} * 4\sqrt{2} * 6\sqrt{2}$

= 24 square units