NCERT Class 10 Maths: Chapter 7 Coordinate Geometry Solutions

Ex 7.1 Question 1.

Find the distance between the following pairs of points:
(i) $(2,3),(4,1)$
(ii) $(-5,7),(-1,3)$
(iii) (a, b), (-a, -b)

Answer.

(i) Applying Distance Formula to find distance between points $(2,3)$ and $(4,1)$, we get
$\mathrm{d}=\sqrt{(4-2)^2+(1-3)^2}=\sqrt{(2)^2+(-2)^2}=\sqrt{4+4}=\sqrt{8}=2\sqrt{2}$ units
(ii) Applying Distance Formula to find distance between points $(-5,7)$ and $(-1,3)$, we get
$d=\sqrt{[-1-(-5)]^2+(3-7)^2}=\sqrt{(4)^2+(-4)^2}=\sqrt{16+16}=\sqrt{32}=4\sqrt{2}$ units
(iii) Applying Distance Formula to find distance between points (a,b) and $(-a,-b)$, we get
d
$\sqrt{(-a-a)^2+(-b-b)^2}=\sqrt{(-2a)^2+(-2b)^2}=\sqrt{4a^2+4b^2}=\sqrt{4\left(a^2+b^2\right)}=2\sqrt{a^2+b^2}$

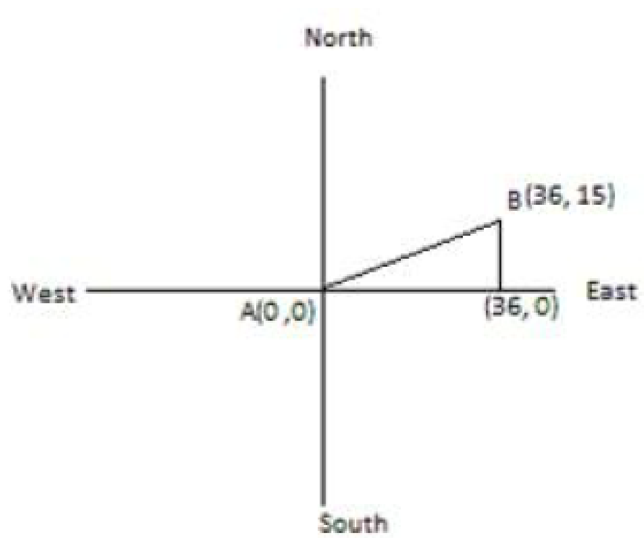
Ex 7.1 Question 2.

Find the distance between the points $(0,0)$ and $(36,15)$. Also, find the distance between towns A and B if town B is located at 36 km east and15 $\mathbf{km}$ north of town A.

Answer.

Applying Distance Formula to find distance between points $(0,0)$ and $(36,15)$, we get
$d=\sqrt{(36-0)^2+(15-0)^2}=\sqrt{(36)^2+(15)^2}=\sqrt{1296+225}=\sqrt{1521}=39$ units

Town B is located at 36 km east and15 km north of town A. So, the location of town A and B can be shown as:



Clearly, the coordinates of point A are $(0,0)$ and coordinates of point B are $(36,15)$.
To find the distance between them, we use Distance formula:
$d=\sqrt{[36-0]^2+(15-0)^2}=\sqrt{(36)^2+(15)^2}=\sqrt{1296+225}=\sqrt{1521}=39\mathrm{Km}$

Ex 7.1 Question 3.

Determine if the points $(1,5),(2,3)$ and $(-2,-11)$ are collinear.

Answer.

Let $A=(1,5), B=(2,3)$ and $C=(-2,-11)$

Using Distance Formula to find distance AB, BC and CA.

$$\mathrm{AB}=\sqrt{[2-1]^{2}+(3-5)^{2}}=\sqrt{(1)^{2}+(-2)^{2}}=\sqrt{1+4}=\sqrt{5}$$

$$\mathrm{BC}=\sqrt{[-2-2]^{2}+(-11-3)^{2}}=\sqrt{(-4)^{2}+(-14)^{2}}=\sqrt{16+196}=\sqrt{212}=2\sqrt{53}$$

$$\mathrm{CA}=\sqrt{[-2-1]^{2}+(-11-5)^{2}}=\sqrt{(-3)^{2}+(-16)^{2}}=\sqrt{9+256}=\sqrt{265}$$

Since $\mathrm{AB}+\mathrm{AC} \neq \mathrm{BC}, \mathrm{BC}+\mathrm{AC} \neq \mathrm{AB}$ and $\mathrm{AC} \neq \mathrm{BC}$.

Therefore, the points A, B and C are not collinear.

Ex 7.1 Question 4.

Check whether $(5,-2),(6,4)$ and $(7,-2)$ are the vertices of an isosceles triangle.

Answer.

Let $\mathrm{A}=(5,-2), \mathrm{B}=(6,4)$ and $\mathrm{C}=(7,-2)$

Using Distance Formula to find distances AB, BC and CA.

$$\mathrm{AB}=\sqrt{[6-5]^{2}+[4-(-2)]^{2}}=\sqrt{(1)^{2}+(6)^{2}}=\sqrt{1+36}=\sqrt{37}$$

$$\mathrm{BC}=\sqrt{[7-6]^{2}+(-2-4)^{2}}=\sqrt{(1)^{2}+(-6)^{2}}=\sqrt{1+36}=\sqrt{37}$$

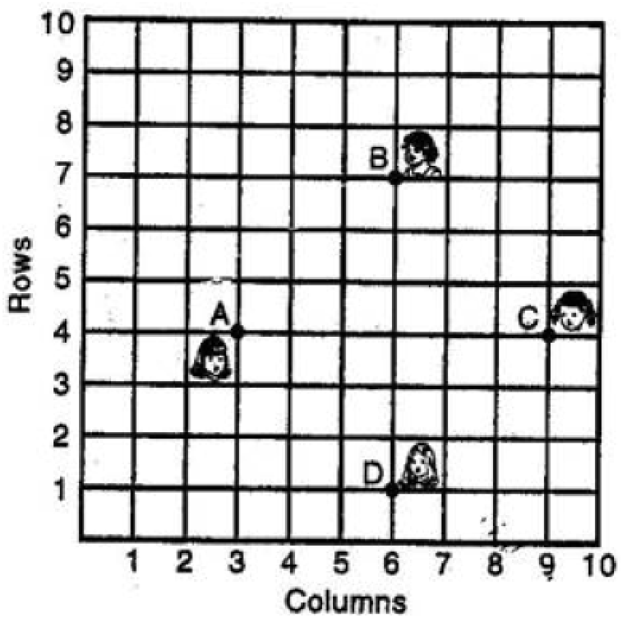
$$\mathrm{CA}=\sqrt{[7-5]^{2}+[-2-(-2)]^{2}}=\sqrt{(2)^{2}+(0)^{2}}=\sqrt{4+0}=\sqrt{4}=2$$

Since $AB=BC$.

Therefore, A, B and C are vertices of an isosceles triangle.

Ex 7.1 Question 5.

In a classroom, 4 friends are seated at the points A $(3,4)$, B $(6,7), C(9,4)$ and D $(6,1)$. Champa and Chameli walk into the class and after observing for a few minutes Champa asks Chameli. "Don't you think ABCD is a square?"Chameli disagrees. Using distance formula, find which of them is correct.



Answer.

We have $\mathrm{A}=(3,4), \mathrm{B}=(6,7), \mathrm{C}=(9,4)$ and $\mathrm{D}=(6,1)$

Using Distance Formula to find distances $\mathrm{AB}, \mathrm{BC}, \mathrm{CD}$ and DA, we get

$$\mathrm{AB}=\sqrt{[6-3]^{2}+[7-4]^{2}}=\sqrt{(3)^{2}+(3)^{2}}=\sqrt{9+9}=\sqrt{18}=3\sqrt{2}$$

$$\mathrm{BC}=\sqrt{[9-6]^{2}+[4-7]^{2}}=\sqrt{(3)^{2}+(-3)^{2}}=\sqrt{9+9}=\sqrt{18}=3\sqrt{2}$$

$$\mathrm{CD}=\sqrt{[6-9]^{2}+[1-4]^{2}}=\sqrt{(-3)^{2}+(-3)^{2}}=\sqrt{9+9}=\sqrt{18}=3\sqrt{2}$$

$$\mathrm{DA}=\sqrt{[6-3]^{2}+[1-4]^{2}}=\sqrt{(3)^{2}+(-3)^{2}}=\sqrt{9+9}=\sqrt{18}=3\sqrt{2}$$

Therefore, All the sides of $ABCD$ are equal here.

Now, we will check the length of its diagonals.

$$\mathrm{AC}=\sqrt{[9-3]^{2}+[4-4]^{2}}=\sqrt{(6)^{2}+(0)^{2}}=\sqrt{36+0}=6$$

$$\mathrm{BD}=\sqrt{[6-6]^{2}+[1-7]^{2}}=\sqrt{(0)^{2}+(-6)^{2}}=\sqrt{0+36}=\sqrt{36}=6$$

So, Diagonals of ABCD are also equal. ... (2)

From (1) and (2), we can definitely say that ABCD is a square.

Therefore, Champa is correct.

Ex 7.1 Question 6.

Name the type of quadrilateral formed, if any, by the following points, and give reasons for your answer.
(i) $(-1,-2),(1,0),(-1,2),(-3,0)$
(ii) $(-3,5),(3,1),(0,3),(-1,-4)$
(iii) $(4,5),(7,6),(4,3),(1,2)$

Answer.

(i) Let $\mathrm{A}=(-1,-2), \mathrm{B}=(1,0), \mathrm{C}=(-1,2)$ and $\mathrm{D}=(-3,0)$
Using Distance Formula to find distances $\mathrm{AB}, \mathrm{BC}, \mathrm{CD}$ and DA, we get

$$\mathrm{AB}=\sqrt{[1-(-1)]^2+[0-(-2)]^2}=\sqrt{(2)^2+(2)^2}=\sqrt{4+4}=\sqrt{8}=2\sqrt{2}$$
$$\mathrm{BC}=\sqrt{[-1-1]^2+[2-0]^2}=\sqrt{(-2)^2+(2)^2}=\sqrt{4+4}=\sqrt{8}=2\sqrt{2}$$
$$\mathrm{CD}=\sqrt{[-3-(-1)]^2+[0-2]^2}=\sqrt{(-2)^2+(-2)^2}=\sqrt{4+4}=\sqrt{8}=2\sqrt{2}$$
$$\mathrm{DA}=\sqrt{[-3-(-1)]^2+[0-(-2)]^2}=\sqrt{(-2)^2+(2)^2}=\sqrt{4+4}=\sqrt{8}=2\sqrt{2}$$

Therefore, all four sides of quadrilateral are equal. ... (1)
Now, we will check the length of diagonals.
$$\mathrm{AC}=\sqrt{[-1-(-1)]^2+[2-(-2)]^2}=\sqrt{(0)^2+(4)^2}=\sqrt{0+16}=\sqrt{16}=4$$
$$\mathrm{BD}=\sqrt{[-3-1]^2+[0-0]^2}=\sqrt{(-4)^2+(0)^2}=\sqrt{16+0}=\sqrt{16}=4$$

Therefore, diagonals of quadrilateral ABCD are also equal. ... (2)
From (1) and (2), we can say that ABCD is a square.
(ii) Let $\mathrm{A}=(-3,5), \mathrm{B}=(3,1), \mathrm{C}=(0,3)$ and $\mathrm{D}=(-1,-4)$

Using Distance Formula to find distances $\mathrm{AB}, \mathrm{BC}, \mathrm{CD}$ and DA, we get
$$\mathrm{AB}=\sqrt{[3-(-3)]^2+[1-5]^2}=\sqrt{(6)^2+(-4)^2}=\sqrt{36+16}=\sqrt{52}=2\sqrt{13}$$
$$\mathrm{BC}=\sqrt{[0-3]^2+[3-1]^2}=\sqrt{(-3)^2+(2)^2}=\sqrt{9+4}=\sqrt{13}$$
$$\mathrm{CD}=\sqrt{[-1-0]^2+[-4-3]^2}=\sqrt{(-1)^2+(-7)^2}=\sqrt{1+49}=\sqrt{50}=5\sqrt{2}$$
$$\mathrm{DA}=\sqrt{[-1-(-3)]^2+[-4-5]^2}=\sqrt{(2)^2+(-9)^2}=\sqrt{4+81}=\sqrt{85}$$

We cannot find any relation between the lengths of different sides.
Therefore, we cannot give any name to the quadrilateral $ABCD$.

(iii) Let $\mathrm{A}=(4,5), \mathrm{B}=(7,6), \mathrm{C}=(4,3)$ and $\mathrm{D}=(1,2)$

Using Distance Formula to find distances AB, BC, CD and DA, we get
$$\mathrm{AB}=\sqrt{[7-4]^2+[6-5]^2}=\sqrt{(3)^2+(1)^2}=\sqrt{9+1}=\sqrt{10}$$
$$\mathrm{BC}=\sqrt{[4-7]^2+[3-6]^2}=\sqrt{(-3)^2+(-3)^2}=\sqrt{9+9}=\sqrt{18}=3\sqrt{2}$$
$$\mathrm{CD}=\sqrt{[1-4]^2+[2-3]^2}=\sqrt{(-3)^2+(-1)^2}=\sqrt{9+1}=\sqrt{10}$$
$$\mathrm{DA}=\sqrt{[1-4]^2+[2-5]^2}=\sqrt{(-3)^2+(-3)^2}=\sqrt{9+9}=\sqrt{18}=3\sqrt{2}$$

Here opposite sides of quadrilateral $ABCD$ are equal. ... (1)

We can now find out the lengths of diagonals.
$$\mathrm{AC}=\sqrt{[4-4]^2+[3-5]^2}=\sqrt{(0)^2+(-2)^2}=\sqrt{0+4}=\sqrt{4}=2$$
$$\mathrm{BD}=\sqrt{[1-7]^2+[2-6]^2}=\sqrt{(-6)^2+(-4)^2}=\sqrt{36+16}=\sqrt{52}=2\sqrt{13}$$

Here diagonals of $ABCD$ are not equal. ... (2)

From (1) and (2), we can say that ABCD is not a rectangle therefore it is a parallelogram.

Ex 7.1 Question 7.

Find the point on the x-axis which is equidistant from $(2,-5)$ and $(-2,9)$.

Answer.

Let the point be $(\mathrm{x}, 0)$ on x-axis which is equidistant from $(2,-5)$ and $(-2,9)$.
Using Distance Formula and according to given conditions we have:
$$\sqrt{[x-2]^2+[0-(-5)]^2}=\sqrt{[x-(-2)]^2+[(0-9)]^2}$$
$$\Rightarrow \sqrt{x^2+4-4x+25}=\sqrt{x^2+4+4x+81}$$

Squaring both sides, we get
$$\Rightarrow x^2+4-4x+25=x^2+4+4x+81$$

$\Rightarrow -4x+29=4x+85$
$\Rightarrow 8x=-56$
$\Rightarrow x=-7$

Therefore, point on the x-axis which is equidistant from $(2,-5)$ and $(-2,9)$ is $(-7,0)$

Ex 7.1 Question 8.

Find the values of y for which the distance between the points $P(2,-3)$ and $Q(10, y)$ is 10 units.

Answer.

Using Distance formula, we have

$10=\sqrt{(2-10)^2+(-3-y)^2}$

$\Rightarrow 10=\sqrt{(-8)^2+9+y^2+6y}$

$\Rightarrow 10=\sqrt{64+9+y^2+6y}$

Squaring both sides, we get

$100=73+y^2+6y$
$\Rightarrow y^2+6y-27=0$

Solving this Quadratic equation by factorization, we can write

$\Rightarrow y^2+9y-3y-27=0$
$\Rightarrow y(y+9)-3(y+9)=0$
$\Rightarrow (y+9)(y-3)=0$
$\Rightarrow y=3,-9$

Ex 7.1 Question 9.

If, $Q(0,1)$ is equidistant from $P(5,-3)$ and $R(x, 6)$, find the values of x. Also, find the distances QR and PR.

Answer.

It is given that Q is equidistant from P and R. Using Distance Formula, we get

$PQ=RQ$

$\Rightarrow \sqrt{(0-5)^2+[1-(-3)]^2}=\sqrt{(0-x)^2+(1-6)^2}$

$\Rightarrow \sqrt{(-5)^2+[4]^2}=\sqrt{(-x)^2+(-5)^2}$

$\Rightarrow \sqrt{25+16}=\sqrt{x^2+25}$

Squaring both sides, we get

$\Rightarrow 25+16=x^2+25$
$\Rightarrow x^2=16$
$\Rightarrow \mathbf{x}=4,-4$

Thus, Q is $(4,6)$ or $(-4,6)$.
Using Distance Formula to find QR, we get
Using value of $\mathrm{x}=4 \mathrm{QR}=\sqrt{(4-0)^2+(6-1)^2}=\sqrt{16+25}=\sqrt{41}$
Using value of $\mathrm{x}=-4 \mathrm{QR}=\sqrt{(-4-0)^2+(6-1)^2}=\sqrt{16+25}=\sqrt{41}$
Therefore, $\mathrm{QR}=\sqrt{41}$
Using Distance Formula to find PR, we get
Using value of $x=4 PR=\sqrt{(4-5)^2+[6-(-3)]^2}=\sqrt{1+81}=\sqrt{82}$
Using value of $\mathrm{x}=-4 \mathrm{PR}=\sqrt{(-4-5)^2+[6-(-3)]^2}=\sqrt{81+81}=\sqrt{162}=9 \sqrt{2}$
Therefore, $x=4,-4$

$\mathrm{QR}=\sqrt{41}, \mathrm{PR}=\sqrt{82}, 9 \sqrt{2}$

Ex 7.1 Question 10.

Find a relation between x and y such that the point (x, y) is equidistant from the point $(3,6)$ and $(-3,4)$.

Answer.

It is given that (x, y) is equidistant from $(3,6)$ and $(-3,4)$.
Using Distance formula, we can write

$\sqrt{(x-3)^2+(y-6)^2}=\sqrt{[x-(-3)]^2+(y-4)^2}$

$\Rightarrow \sqrt{x^2+9-6x+y^2+36-12y}=\sqrt{x^2+9+6x+y^2+16-8y}$

Squaring both sides, we get

$\Rightarrow x^2+9-6x+y^2+36-12y=x^2+9+6x+y^2+16-8y$
$\Rightarrow -6x-12y+45=6x-8y+25$
$\Rightarrow 12x+4y=20$
$\Rightarrow 3x+y=5$

NCERT Class 10 Maths: Chapter 7 Coordinate Geometry Solutions

Ex 7.2 Question 1.

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

Answer.

Let $x_1=-1, x_2=4, y_1=7$ and $y_2=-3, m_1=2$ and $m_2=3$
Using Section Formula to find coordinates of point which divides join of $(-1,7)$ and $(4,-3)$ in the ratio $2:3$, we get

$$x=\frac{m_1x_2+m_2x_1}{m_1+m_2}=\frac{2\times 4+3\times(-1)}{2+3}=\frac{8-3}{5}=\frac{5}{5}=1$$

$$y=\frac{m_1y_2+m_2y_1}{m_1+m_2}=\frac{2\times(-3)+3\times 7}{2+3}=\frac{-6+21}{5}=\frac{15}{5}=3$$

Therefore, the coordinates of point are $(1,3)$ which divides join of $(-1,7)$ and $(4,-3)$ in the ratio 2:3.

Ex 7.2 Question 2.

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

Answer

We want to find coordinates of the points of trisection of the line segment joining $(4,-1)$ and $(-2,-3)$.
We are given $\mathrm{AC}=\mathrm{CD}=\mathrm{DB}$
We want to find coordinates of point C and D.
Let coordinates of point C be (x_1, y_1) and let coordinates of point D be (x_2, y_2).
Clearly, point C divides line segment AB in $1:2$ and point D divides line segment AB in 2:1.
Using Section Formula to find coordinates of point C which divides join of $(4,-1)$ and $(-2,-3)$

in the ratio $1:2$, we get

$$x_1=\frac{1\times(-2)+2\times 4}{1+2}=\frac{-2+8}{3}=\frac{6}{3}=2$$

$$y_1=\frac{1\times(-3)+2\times(-1)}{1+2}=\frac{-3-2}{3}=\frac{-5}{3}$$

Using Section Formula to find coordinates of point D which divides join of $(4,-1)$ and $(-2,-3)$ in the ratio $2:1$, we get

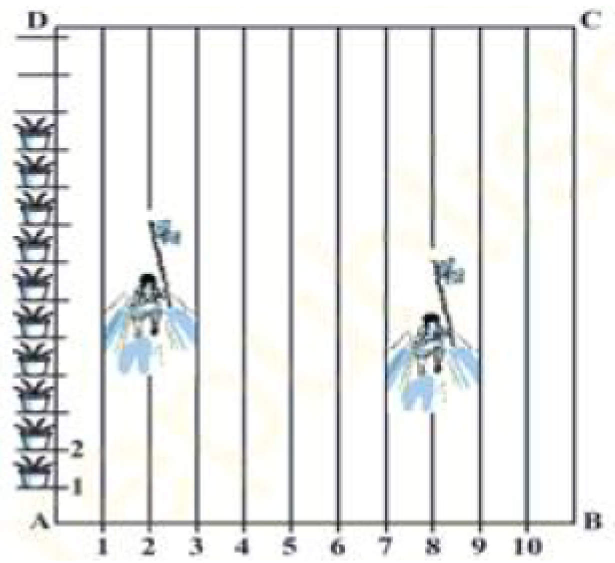
$$x_2=\frac{2\times(-2)+1\times 4}{1+2}=\frac{-4+4}{3}=\frac{0}{3}=0$$

$$y_2=\frac{2\times(-3)+1\times(-1)}{1+2}=\frac{-6-1}{3}=\frac{-7}{3}$$

Therefore, coordinates of point C are $\left(2,-\frac{5}{3}\right)$ and coordinates of point D are $\left(0,-\frac{7}{3}\right)$

Ex 7.2 Question 3.

To conduct sports day activities, in your rectangular shaped school ground ABCD, lines have been drawn with chalk powder at a distance of $1 \mathrm{~m}$ each. 100 flower pots have been placed at a distance of $1 \mathrm{~m}$ from each other along AD. Niharika runs 14th of the distance AD on the 2nd line and posts a green flag. Preet runs 15th of the distance AD on the eighth line and posts a red flag. What is the distance between both the flags? If Rashmi has to post a blue flag exactly halfway between the line segment joining the two flags, where should she post her flag?



Answer.

Niharika runs 14^{th} of the distance AD on the 2^{nd} line and posts a green flag.
There are 100 flower pots. It means, she stops at 25 th flower pot.
Therefore, the coordinates of point where she stops are $(2 \mathrm{~m}, 25 \mathrm{~m})$.
Preet runs 15th of the distance AD on the eighth line and posts a red flag. There are 100 flower pots. It means, she stops at 20th flower pot.

Therefore, the coordinates of point where she stops are $(8,20)$.
Using Distance Formula to find distance between points $(2 \mathrm{~m}, 25 \mathrm{~m})$ and $(8 \mathrm{~m}, 20 \mathrm{~m})$, we get
$d=\sqrt{(2-8)^2+(25-20)^2}=\sqrt{(-6)^2+5^2}=\sqrt{36+25}=\sqrt{61} m$

Rashmi posts a blue flag exactly halfway the line segment joining the two flags.
Using section formula to find the coordinates of this point, we get
$x=\frac{2+8}{2}=\frac{10}{2}=5$
$y=\frac{25+20}{2}=\frac{45}{2}$

Therefore, coordinates of point, where Rashmi posts her flag are $\left(5, \frac{45}{2}\right)\left(5, \frac{45}{2}\right)$.
It means she posts her flag in 5th line after covering $\frac{45}{2}=22.5 \mathrm{~m}$ of distance.

Ex 7.2 Question 4.

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

Answer.

Let $(-1,6)$ divides line segment joining the points $(-3,10)$ and $(6,-8)$ in $\mathrm{k}: 1$.
Using Section formula, we get
$-1=\frac{(-3) \times 1+6 \times k}{k+1}$

$\Rightarrow-\mathrm{k}-1=(-3+6 \mathrm{k})$
$\Rightarrow-7 \mathrm{k}=-2$
$\Rightarrow \mathrm{k}=\frac{2}{7}$

Therefore, the ratio is $\frac{2}{7}: 1$ which is equivalent to $2: 7$.
Therefore, $(-1,6)$ divides line segment joining the points $(-3,10)$ and $(6,-8)$ in 2:7.

Ex 7.2 Question 5.

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

Answer.

Let the coordinates of point of division be $(\mathrm{x}, 0)$ and suppose it divides line segment joining A $(1,-5)$ and $B(-4,5)$ in $k: 1$.

According to Section formula, we get
$x=\frac{1 \times 1+(-4) \times k}{k+1}=\frac{1-4 k}{k+1} \text{and } 0=\frac{(-5) \times 1+5 k}{k+1} \ldots$
$0=\frac{(-5) \times 1+5 k}{k+1}$
$\Rightarrow 5=5 \mathrm{k}$
$\Rightarrow \mathrm{k}=1$

Putting value of k in (1), we get
$x=\frac{1\times1+(-4)\times1}{1+1}=\frac{1-4}{2}=\frac{-3}{2}$

Therefore, point $\left(\frac{-3}{2},0\right)$ on x-axis divides line segment joining $A(1,-5)$ and $B(-4,5)$ in 1:1.

Ex 7.2 Question 6.

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

Answer.

Let $\mathrm{A}=(1,2),\mathrm{B}=(4,\mathrm{y}),\mathrm{C}=(\mathrm{x},6)$ and $\mathrm{D}=(3,5)$
We know that diagonals of parallelogram bisect each other. It means that coordinates of midpoint of diagonal AC would be same as coordinates of midpoint of diagonal BD.

Using Section formula, the coordinates of midpoint of AC are:
$\frac{1+x}{2},\frac{2+6}{2}=\frac{1+x}{2},4$

Using Section formula, the coordinates of midpoint of BD are:
$\frac{4+3}{2},\frac{5+y}{2}=\frac{7}{2},\frac{5+y}{2}$

According to condition (1), we have
$\frac{1+x}{2}=\frac{7}{2}$
$\Rightarrow(1+x)=7$
$\Rightarrow x=6$

Again, according to condition (1), we also have
$4=\frac{5+y}{2}$
$\Rightarrow 8=5+y$
$\Rightarrow y=3$

Therefore, $x=6$ and $y=3$

Ex 7.2 Question 7.

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

Answer.

We want to find coordinates of point A. AB is the diameter and coordinates of center

are $(2,-3)$ and, coordinates of point B are $(1,4)$.
Let coordinates of point A are (x, y). Using section formula, we get
$2=\frac{x+1}{2}$
$\Rightarrow 4=x+1$
$\Rightarrow x=3$

Using section formula, we get
$-3=\frac{4+y}{2}$
$\Rightarrow -6=4+y$
$\Rightarrow y=-10$

Therefore, Coordinates of point A are $(3,-10)$.
Ex 7.2 Question 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.

Answer.

$A=(-2,-2)$ and $B=(2,-4)$

It is given that $\mathrm{AP}=\frac{3}{7}\mathrm{AB}$
$\mathrm{PB}=\mathrm{AB}-\mathrm{AP}=\mathrm{AB}-\frac{3}{7}\mathrm{AB}=\frac{4}{7}\mathrm{AB}$

So, we have AP: $\mathrm{PB}=3:4$
Let coordinates of P be (x,y)

Using Section formula to find coordinates of P, we get
$x=\frac{(-2)\times4+2\times3}{3+4}=\frac{6-8}{7}=\frac{-2}{7}$
$y=\frac{(-2)\times4+(-4)\times3}{3+4}=\frac{-8-12}{7}=\frac{-20}{7}$

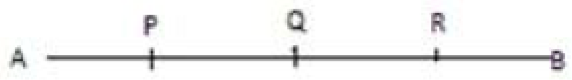
Therefore, Coordinates of point P are $\left(\frac{-2}{7}, \frac{-20}{7}\right)$.

Ex 7.2 Question 9.

Find the coordinates of the points which divides the line segment joining $A(-2,2)$ and B $(2,8)$ into four equal parts.

Answer.

$A=(-2,2)$ and $B=(2,8)$



Let P, Q and R are the points which divide line segment AB into 4 equal parts.
Let coordinates of point $P=(x_1, y_1), Q=(x_2, y_2)$ and $R=(x_3, y_3)$
We know $\mathrm{AP}=\mathrm{PQ}=\mathrm{QR}=\mathrm{RS}$.
It means, point P divides line segment AB in $1:3$.
Using Section formula to find coordinates of point P, we get

$$x_1=\frac{(-2)\times 3+2\times 1}{1+3}=\frac{-6+2}{4}=\frac{-4}{4}=-1$$
$$y_1=\frac{2\times 3+8\times 1}{1+3}=\frac{6+8}{4}=\frac{14}{4}=\frac{7}{2}$$

Since, $AP=PQ=QR=RS$.
It means, point Q is the mid-point of AB.
Using Section formula to find coordinates of point Q, we get

$$x_2=\frac{(-2)\times 1+2\times 1}{1+1}=\frac{-2+2}{2}=\frac{0}{2}=0$$
$$y_2=\frac{2\times 1+8\times 1}{1+1}=\frac{2+8}{2}=\frac{10}{2}=5$$

Because, $\mathrm{AP}=\mathrm{PQ}=\mathrm{QR}=\mathrm{RS}$.
It means, point R divides line segment AB in $3:1$
Using Section formula to find coordinates of point P, we get

$$x_3=\frac{(-2)\times 1+2\times 3}{1+3}=\frac{-2+6}{4}=\frac{4}{4}=1$$
$$y_3=\frac{2\times 1+8\times 3}{1+3}=\frac{2+24}{4}=\frac{26}{4}=\frac{13}{2}$$

Therefore, $\mathrm{P}=\left(-1, \frac{7}{2}\right), \mathrm{Q}=(0,5)$ and $\mathrm{R}=\left(1, \frac{13}{2}\right)$

Ex 7.2 Question 10.

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

Answer.

Let $\mathrm{A}=(3,0), \mathrm{B}=(4,5), \mathrm{C}=(-1,4)$ and $\mathrm{D}=(-2,-1)$
Using Distance Formula to find length of diagonal AC, we get

$$AC=\sqrt{[3-(-1)]^2+(0-4)^2}=\sqrt{4^2+(-4)^2}=\sqrt{16+16}=\sqrt{32}=4\sqrt{2}$$

Using Distance Formula to find length of diagonal BD, we get

$$BD=\sqrt{[4-(-2)]^2+[5-(-1)]^2}=\sqrt{6^2+6^2}=\sqrt{36+36}=\sqrt{72}=6\sqrt{2}$$

$\because$ Area of rhombus $=1/2$ (product of its diagonals)
$=\frac{1}{2}\times AC\times BD=\frac{1}{2}\times 4\sqrt{2}\times 6\sqrt{2}=24$ sq. units