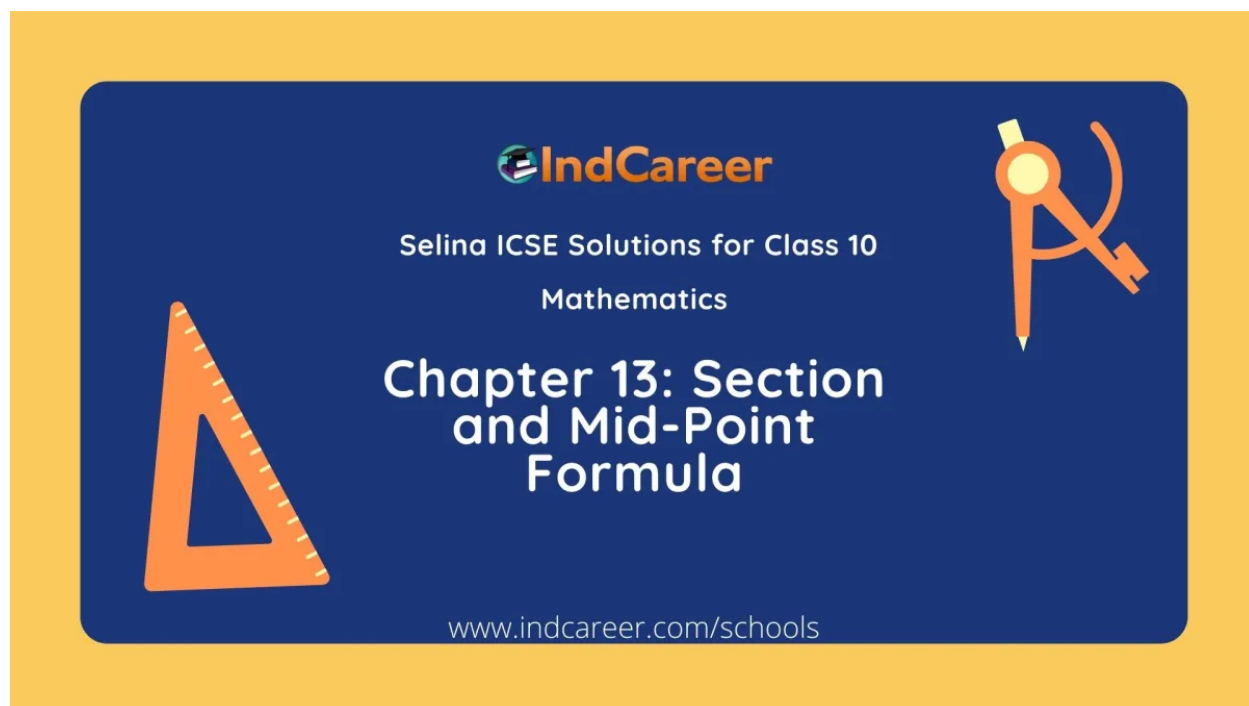


Selina Class 10 ICSE Solutions Mathematics :

Chapter 13 - Section and Mid-Point Formula



For any clarifications or questions you can write to **info@indcareer.com**

Postal Address

IndCareer.com, 52, Shilpa Nagar, Somalwada Nagpur - 440015
Maharashtra, India

WhatsApp: +91 9561 204 888, **Website:** <https://www.indcareer.com>

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>



Selina Class 10 ICSE Solutions Mathematics :

Chapter 13 - Section and Mid-Point Formula

Class 10: Maths Chapter 13 solutions. Complete Class 10 Maths Chapter 13 Notes.

Selina Class 10 ICSE Solutions Mathematics : Chapter 13 - Section and Mid-Point Formula

Selina 10th Maths Chapter 13, Class 10 Maths Chapter 13 solutions

Exercise 13A

Question 1.

Calculate the co-ordinates of the point P which divides the line segment joining:

- (i) A (1, 3) and B (5, 9) in the ratio 1: 2.
- (ii) A (-4, 6) and B (3, -5) in the ratio 3: 2.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

(i) Let the co-ordinates of the point P be (x, y).

$$x = \frac{m_1x_2 + m_2x_1}{m_1 + m_2} = \frac{1 \times 5 + 2 \times 1}{1 + 2} = \frac{7}{3}$$

$$y = \frac{m_1y_2 + m_2y_1}{m_1 + m_2} = \frac{1 \times 9 + 2 \times 3}{1 + 2} = \frac{15}{3} = 5$$

Thus, the co-ordinates of point P are $\left(\frac{7}{3}, 5\right)$.

(ii) Let the co-ordinates of the point P be (x, y).

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

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

Thus, the co-ordinates of point P are $\left(\frac{1}{5}, -\frac{3}{5}\right)$.

Question 2.

In what ratio is the line joining (2, -3) and (5, 6) divided by the x-axis.

Solution:

Let the line joining points A (2, -3) and B (5, 6) be divided by point P (x, 0) in the ratio k: 1.

$$y = \frac{ky_2 + y_1}{k + 1}$$

$$0 = \frac{k \times 6 + 1 \times (-3)}{k + 1}$$

$$0 = 6k - 3$$

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

Thus, the required ratio is 1: 2.

Question 3.

In what ratio is the line joining (2, -4) and (-3, 6) divided by the y-axis.

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Solution:

Let the line joining points A (2, -4) and B (-3, 6) be divided by point P (0, y) in the ratio k: 1.

$$x = \frac{kx_2 + x_1}{k + 1}$$

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

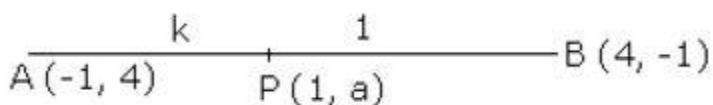
$$0 = -3k + 2$$

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

Thus, the required ratio is 2: 3.

Question 4.

In what ratio does the point (1, a) divided the join of (-1, 4) and (4, -1)? Also, find the value of a.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Let the point P (1, a) divides the line segment AB in the ratio k: 1.
Using section formula, we have:

$$1 = \frac{4k - 1}{k + 1},$$

$$\Rightarrow k + 1 = 4k - 1$$

$$\Rightarrow 2 = 3k$$

$$\Rightarrow k = \frac{2}{3} \quad \dots (1)$$

$$\Rightarrow a = \frac{-k + 4}{k + 1}$$

$$\Rightarrow a = \frac{\frac{-2}{3} + 4}{\frac{2}{3} + 1} \quad (\text{from (1)})$$

$$\Rightarrow a = \frac{10}{5} = 2$$

Hence, the required ratio is 2 : 3 and the value of a is 2.

Question 5.

In what ratio does the point (a, 6) divide the join of (-4, 3) and (2, 8)? Also, find the value of a.

Solution:

Let the point P (a, 6) divides the line segment joining A (-4, 3) and B (2, 8) in the ratio k: 1.

Using section formula, we have:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

$$6 = \frac{8k + 3}{k + 1},$$

$$\Rightarrow 6k + 6 = 8k + 3$$

$$\Rightarrow 3 = 2k$$

$$\Rightarrow k = \frac{3}{2} \quad \dots (1)$$

$$\Rightarrow a = \frac{2k - 4}{k + 1}$$

$$\Rightarrow a = \frac{2 \times \frac{3}{2} - 4}{\frac{3}{2} + 1} \quad (\text{from (1)})$$

$$\Rightarrow a = -\frac{2}{5}$$

Hence, the required ratio is 3 : 2 and the value of a is $-\frac{2}{5}$.

Question 6.

In what ratio is the join of (4, 3) and (2, -6) divided by the x-axis. Also, find the co-ordinates of the point of intersection.

Solution:

Let the point P (x, 0) on x-axis divides the line segment joining A (4, 3) and B (2, -6) in the ratio k : 1.

Using section formula, we have:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

$$0 = \frac{-6k + 3}{k + 1}$$

$$0 = -6k + 3$$

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

Thus, the required ratio is 1: 2.

Also, we have:

$$x = \frac{2k + 4}{k + 1}$$

$$= \frac{2 \times \frac{1}{2} + 4}{\frac{1}{2} + 1}$$

$$= \frac{10}{3}$$

Thus, the required co-ordinates of the point of intersection are $\left(\frac{10}{3}, 0\right)$.

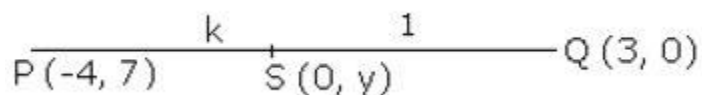
Question 7.

Find the ratio in which the join of $(-4, 7)$ and $(3, 0)$ is divided by the y-axis. Also, find the coordinates of the point of intersection.

Solution:

Let $S(0, y)$ be the point on y -axis which divides the line segment PQ in the ratio $k:1$.

Using section formula, we have:



<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

$$0 = \frac{3k - 4}{k + 1}$$

$$\Rightarrow 3k = 4$$

$$k = \frac{4}{3} \quad \dots(1)$$

$$y = \frac{0 + 7}{k + 1}$$

$$y = \frac{7}{\frac{4}{3} + 1} \quad (\text{from (1)})$$

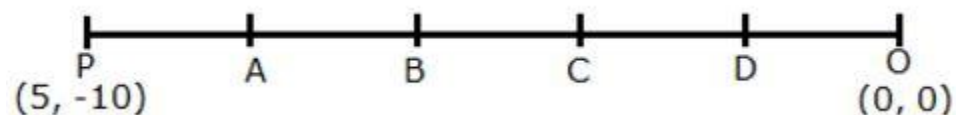
$$y = 3$$

Hence, the required ratio is 4 : 3 and the required point is S(0, 3).

Question 8.

Points A, B, C and D divide the line segment joining the point (5, -10) and the origin in five equal parts. Find the co-ordinates of A, B, C and D.

Solution:



<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Point A divides PO in the ratio 1: 4.

Co-ordinates of point A are:

$$\left(\frac{1 \times 0 + 4 \times 5}{1 + 4}, \frac{1 \times 0 + 4 \times (-10)}{1 + 4} \right) = \left(\frac{20}{5}, \frac{-40}{5} \right) = (4, -8)$$

Point B divides PO in the ratio 2: 3.

Co-ordinates of point B are:

$$\left(\frac{2 \times 0 + 3 \times 5}{2 + 3}, \frac{2 \times 0 + 3 \times (-10)}{2 + 3} \right) = \left(\frac{15}{5}, \frac{-30}{5} \right) = (3, -6)$$

Point C divides PO in the ratio 3: 2.

Co-ordinates of point C are:

$$\left(\frac{3 \times 0 + 2 \times 5}{3 + 2}, \frac{3 \times 0 + 2 \times (-10)}{3 + 2} \right) = \left(\frac{10}{5}, \frac{-20}{5} \right) = (2, -4)$$

Point D divides PO in the ratio 4: 1.

Co-ordinates of point D are:

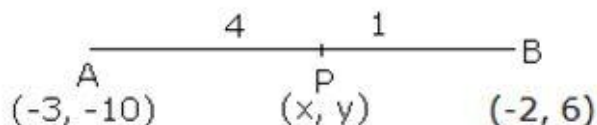
$$\left(\frac{4 \times 0 + 1 \times 5}{4 + 1}, \frac{4 \times 0 + 1 \times (-10)}{4 + 1} \right) = \left(\frac{5}{5}, \frac{-10}{5} \right) = (1, -2)$$

Question 9.

The line joining the points A (-3, -10) and B (-2, 6) is divided by the point P such that PB:AB=1:5
Find the co-ordinates of P.

Solution:

Let the co-ordinates of point P are (x, y).



Given : PB : AB = 1 : 5

∴ PB : PA = 1 : 4

Coordinates of P are

$$(x, y) = \left(\frac{4 \times (-2) + 1 \times (-3)}{5}, \frac{4 \times 6 + 1 \times (-10)}{5} \right) = \left(-\frac{11}{5}, \frac{14}{5} \right)$$

Question 10.

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

P is a point on the line joining A (4, 3) and B (-2, 6) such that $5AP = 2BP$. Find the co-ordinates of P.

Solution:

$$5AP = 2BP$$

$$\frac{AP}{BP} = \frac{2}{5}$$

The co-ordinates of the point P are

$$\left(\frac{2 \times (-2) + 5 \times 4}{2 + 5}, \frac{2 \times 6 + 5 \times 3}{2 + 5} \right)$$

$$\left(\frac{16}{7}, \frac{27}{7} \right)$$

Question 11.

Calculate the ratio in which the line joining the points (-3, -1) and (5, 7) is divided by the line $x = 2$. Also, find the co-ordinates of the point of intersection.

Solution:

The co-ordinates of every point on the line $x = 2$ will be of the type (2, y).

Using section formula, we have:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

$$x = \frac{m_1 \times 5 + m_2 \times (-3)}{m_1 + m_2}$$

$$2 = \frac{5m_1 - 3m_2}{m_1 + m_2}$$

$$2m_1 + 2m_2 = 5m_1 - 3m_2$$

$$5m_2 = 3m_1$$

$$\frac{m_1}{m_2} = \frac{5}{3}$$

Thus, the required ratio is 5: 3.

$$y = \frac{m_1 \times 7 + m_2 \times (-1)}{m_1 + m_2}$$

$$y = \frac{5 \times 7 + 3 \times (-1)}{5 + 3}$$

$$y = \frac{35 - 3}{8}$$

$$y = \frac{32}{8} = 4$$

Thus, the required co-ordinates of the point of intersection are (2, 4).

Question 12.

Calculate the ratio in which the line joining A (6, 5) and B (4, -3) is divided by the line $y = 2$.

Solution:

The co-ordinates of every point on the line $y = 2$ will be of the type (x, 2).

Using section formula, we have:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

$$y = \frac{m_1 \times (-3) + m_2 \times 5}{m_1 + m_2}$$

$$2 = \frac{-3m_1 + 5m_2}{m_1 + m_2}$$

$$2m_1 + 2m_2 = -3m_1 + 5m_2$$

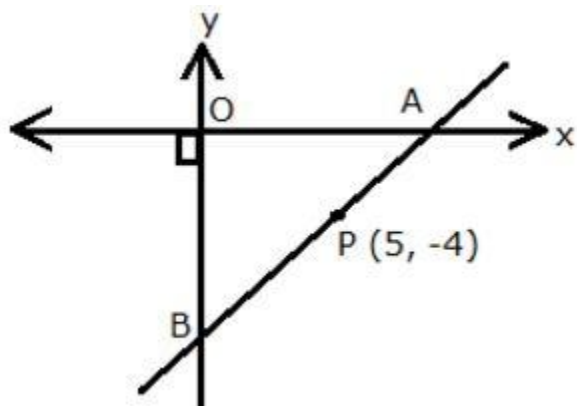
$$5m_1 = 3m_2$$

$$\frac{m_1}{m_2} = \frac{3}{5}$$

Thus, the required ratio is 3: 5.

Question 13.

The point P (5, -4) divides the line segment AB, as shown in the figure, in the ratio 2: 5. Find the co-ordinates of points A and B.



Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Point A lies on x-axis. So, let the co-ordinates of A be $(x, 0)$.

Point B lies on y-axis. So, let the co-ordinates of B be $(0, y)$.

P divides AB in the ratio 2: 5.

We have:

$$x = \frac{m_1 x_2 + m_2 x_1}{m_1 + m_2}$$

$$5 = \frac{2 \times 0 + 5 \times x}{2 + 5}$$

$$5 = \frac{5x}{7}$$

$$x = 7$$

Thus, the co-ordinates of point A are $(7, 0)$.

$$y = \frac{m_1 y_2 + m_2 y_1}{m_1 + m_2}$$

$$-4 = \frac{2 \times y + 5 \times 0}{2 + 5}$$

$$-4 = \frac{2y}{7}$$

$$-2 = \frac{y}{7}$$

$$y = -14$$

Thus, the co-ordinates of point B are $(0, -14)$.

Question 14.

Find the co-ordinates of the points of trisection of the line joining the points $(-3, 0)$ and $(6, 6)$.

Solution:

Let P and Q be the point of trisection of the line segment joining the points A $(-3, 0)$ and B $(6, 6)$.

So, $AP = PQ = QB$

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

We have AP: PB = 1: 2

Co-ordinates of the point P are

$$\left(\frac{1 \times 6 + 2 \times (-3)}{1 + 2}, \frac{1 \times 6 + 2 \times 0}{1 + 2} \right)$$

$$= \left(\frac{6 - 6}{3}, \frac{6}{3} \right)$$

$$= (0, 2)$$

We have AQ: QB = 2: 1

Co-ordinates of the point Q are

$$\left(\frac{2 \times 6 + 1 \times (-3)}{2 + 1}, \frac{2 \times 6 + 1 \times 0}{2 + 1} \right)$$

$$= \left(\frac{9}{3}, \frac{12}{3} \right)$$

$$= (3, 4)$$

Question 15.

Show that the line segment joining the points (-5, 8) and (10, -4) is trisected by the co-ordinate axes.

Solution:

Let P and Q be the point of trisection of the line segment joining the points A (-5, 8) and B (10, -4).

So, AP = PQ = QB

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

We have $AP:PB = 1:2$

Co-ordinates of the point P are

$$\left(\frac{1 \times 10 + 2 \times (-5)}{1+2}, \frac{1 \times (-4) + 2 \times 8}{1+2} \right)$$

$$= \left(\frac{10 - 10}{3}, \frac{12}{3} \right)$$

$$= (0, 4)$$

So, point P lies on the y-axis.

We have $AQ:QB = 2:1$

Co-ordinates of the point Q are

$$\left(\frac{2 \times 10 + 1 \times (-5)}{2+1}, \frac{2 \times (-4) + 1 \times 8}{2+1} \right)$$

$$= \left(\frac{20 - 5}{3}, \frac{-8 + 8}{3} \right)$$

$$= (5, 0)$$

So, point Q lies on the x-axis.

Hence, the line segment joining the given points A and B is trisected by the co-ordinate axes.

Question 16.

Show that A (3, -2) is a point of trisection of the line-segment joining the points (2, 1) and (5, -8). Also, find the co-ordinates of the other point of trisection.

Solution:

Let A and B be the point of trisection of the line segment joining the points P (2, 1) and Q (5, -8).

So, $PA = AB = BQ$

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

We have PA: AQ = 1: 2

Co-ordinates of the point A are

$$\left(\frac{1 \times 5 + 2 \times 2}{1 + 2}, \frac{1 \times (-8) + 2 \times 1}{1 + 2} \right)$$

$$= \left(\frac{9}{3}, \frac{-6}{3} \right)$$

$$= (3, -2)$$

Hence, A (3, -2) is a point of trisection of PQ.

We have PB: BQ = 2: 1

Co-ordinates of the point B are

$$\left(\frac{2 \times 5 + 1 \times 2}{2 + 1}, \frac{2 \times (-8) + 1 \times 1}{2 + 1} \right)$$

$$= \left(\frac{10 + 2}{3}, \frac{-16 + 1}{3} \right)$$

$$= (4, -5)$$

Question 17.

If A = (-4, 3) and B = (8, -6)

(i) Find the length of AB.

(ii) In what ratio is the line joining A and B, divided by the x-axis?

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

(i) A (-4,3) and B (8, -6)

$$\begin{aligned} AB &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(8 + 4)^2 + (-6 - 3)^2} \\ &= \sqrt{144 + 81} \\ &= \sqrt{225} \\ &= 15 \text{ units} \end{aligned}$$

(ii) Let P be the point, which divides AB on the x-axis in the ratio k : 1.
Therefore, y-co-ordinate of P = 0.

$$\begin{aligned} \Rightarrow \frac{-6k + 3}{k + 1} &= 0 \\ \Rightarrow -6k + 3 &= 0 \\ \Rightarrow k &= \frac{1}{2} \end{aligned}$$

$\therefore$ Required ratio is 1 : 2.

Question 18.

The line segment joining the points M (5, 7) and N (-3, 2) is intersected by the y-axis at point L. Write down the abscissa of L. Hence, find the ratio in which L divides MN. Also, find the co-ordinates of L.

Solution:

Since, point L lies on y-axis, its abscissa is 0.

Let the co-ordinates of point L be (0, y). Let L divides MN in the ratio k: 1.

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Using section formula, we have:

$$x = \frac{k \times (-3) + 1 \times 5}{k + 1}$$

$$0 = \frac{-3k + 5}{k + 1}$$

$$-3k + 5 = 0$$

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

Thus, the required ratio is 5: 3.

$$\text{Now, } y = \frac{k \times 2 + 1 \times 7}{k + 1}$$

$$= \frac{\frac{5}{3} \times 2 + 7}{\frac{5}{3} + 1}$$

$$= \frac{\frac{10}{3} + 7}{\frac{5}{3} + 1}$$

$$= \frac{10 + 21}{5 + 3}$$

$$= \frac{31}{8}$$

Question 19.

A (2, 5), B (-1, 2) and C (5, 8) are the co-ordinates of the vertices of the triangle ABC. Points P and Q lie on AB and AC respectively, such that AP: PB = AQ: QC = 1: 2.

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

(ii) Show that PQ = 1/3 BC.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

(i) Co-ordinates of P are

$$\left(\frac{1 \times (-1) + 2 \times 2}{1 + 2}, \frac{1 \times 2 + 2 \times 5}{1 + 2} \right)$$

$$= \left(\frac{3}{3}, \frac{12}{3} \right)$$

$$= (1, 4)$$

Co-ordinates of Q are

$$\left(\frac{1 \times 5 + 2 \times 2}{1 + 2}, \frac{1 \times 8 + 2 \times 5}{1 + 2} \right)$$

$$= \left(\frac{9}{3}, \frac{18}{3} \right)$$

$$= (3, 6)$$

(ii) Using distance formula, we have:

$$BC = \sqrt{(5 + 1)^2 + (8 - 2)^2} = \sqrt{36 + 36} = 6\sqrt{2}$$

$$PQ = \sqrt{(3 - 1)^2 + (6 - 4)^2} = \sqrt{4 + 4} = 2\sqrt{2}$$

$$\text{Hence, } PQ = \frac{1}{3} BC.$$

Question 20.

A (-3, 4), B (3, -1) and C (-2, 4) are the vertices of a triangle ABC. Find the length of line segment AP, where point P lies inside BC, such that BP: PC = 2: 3.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

BP: PC = 2:3

Co-ordinates of P are

$$\left(\frac{2 \times (-2) + 3 \times 3}{2+3}, \frac{2 \times 4 + 3 \times (-1)}{2+3} \right)$$
$$= \left(\frac{-4+9}{5}, \frac{8-3}{5} \right)$$
$$= (1, 1)$$

Using distance formula, we have:

$$AP = \sqrt{(1+3)^2 + (1-4)^2} = \sqrt{16+9} = \sqrt{25} = 5 \text{ units}$$

Question 21.

The line segment joining A (2, 3) and B (6, -5) is intercepted by x-axis at the point K. Write down the ordinate of the point K. Hence, find the ratio in which K divides AB. Also, find the co-ordinates of the point K.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Since, point K lies on x-axis, its ordinate is 0.

Let the point K (x, 0) divides AB in the ratio k: 1.

We have,

$$y = \frac{k \times (-5) + 1 \times 3}{k + 1}$$

$$0 = \frac{-5k + 3}{k + 1}$$

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

Thus, K divides AB in the ratio 3: 5.

Also, we have:

$$x = \frac{k \times 6 + 1 \times 2}{k + 1}$$

$$x = \frac{\frac{3}{5} \times 6 + 2}{\frac{3}{5} + 1}$$

$$x = \frac{18 + 10}{3 + 5}$$

$$x = \frac{28}{8} = \frac{7}{2} = 3\frac{1}{2}$$

Thus, the co-ordinates of the point K are $\left(3\frac{1}{2}, 0\right)$.

Question 22.

The line segment joining A (4, 7) and B (-6, -2) is intercepted by the y-axis at the point K. Write down the abscissa of the point K. Hence, find the ratio in which K divides AB. Also, find the co-ordinates of the point K.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Since, point K lies on y-axis, its abscissa is 0.

Let the point K (0, y) divides AB in the ratio k: 1.

We have,

$$x = \frac{k \times (-6) + 1 \times 4}{k + 1}$$

$$0 = \frac{-6k + 4}{k + 1}$$

$$k = \frac{4}{6} = \frac{2}{3}$$

Thus, K divides AB in the ratio 2: 3.

Also, we have:

$$y = \frac{k \times (-2) + 1 \times 7}{k + 1}$$

$$y = \frac{-2k + 7}{k + 1}$$

$$y = \frac{-2 \times \frac{2}{3} + 7}{\frac{2}{3} + 1}$$

$$y = \frac{-4 + 21}{2 + 3}$$

$$y = \frac{17}{5}$$

Thus, the co-ordinates of the point K are $\left(0, \frac{17}{5}\right)$.

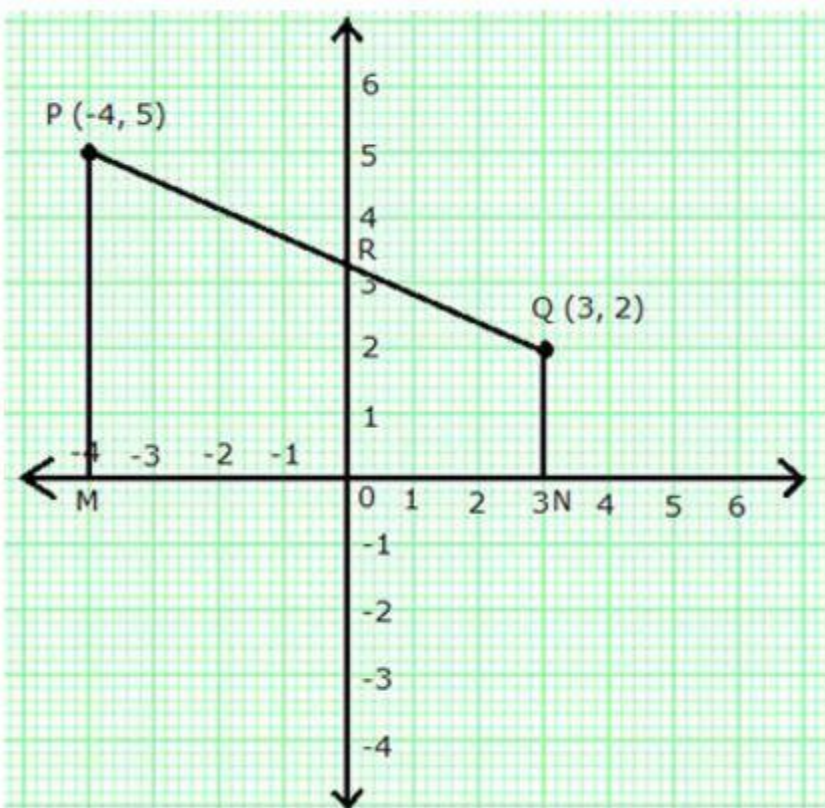
Question 23.

The line joining P (-4, 5) and Q (3, 2) intersects the y-axis at point R. PM and QN are perpendiculars from P and Q on the x-axis. Find:

- (i) the ratio PR: RQ.
- (ii) the co-ordinates of R.
- (iii) the area of the quadrilateral PMNQ.

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Solution:



<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

(i) Let point R (0, y) divides PQ in the ratio k: 1.

We have:

$$x = \frac{k \times 3 + 1 \times (-4)}{k + 1}$$

$$0 = \frac{3k - 4}{k + 1}$$

$$0 = 3k - 4$$

$$k = \frac{4}{3}$$

Thus, PR: RQ = 4: 3

(ii) Also, we have:

$$y = \frac{k \times 2 + 1 \times 5}{k + 1}$$

$$y = \frac{2k + 5}{k + 1}$$

$$y = \frac{2 \times \frac{4}{3} + 5}{\frac{4}{3} + 1}$$

$$y = \frac{8 + 15}{4 + 3}$$

$$y = \frac{23}{7}$$

Thus, the co-ordinates of point R are $\left(0, \frac{23}{7}\right)$.

(iii) Area of quadrilateral PMNQ

$$= \frac{1}{2} \times (PM + QN) \times MN$$

$$= \frac{1}{2} \times (5 + 2) \times 7$$

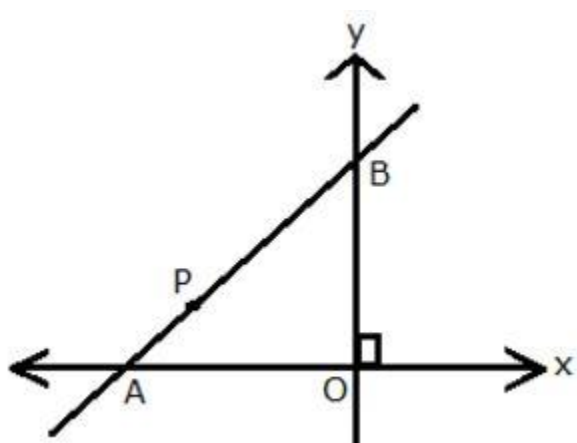
$$= \frac{1}{2} \times 7 \times 7$$

$$= 24.5 \text{ sq units}$$

Question 24.

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

In the given figure, line APB meets the x-axis at point A and y-axis at point B. P is the point (-4, 2) and AP: PB = 1: 2. Find the co-ordinates of A and B.



Solution:

Given, A lies on x-axis and B lies on y-axis.

Let the co-ordinates of A and B be (x, 0) and (0, y) respectively.

Given, P is the point (-4, 2) and AP: PB = 1: 2.

Using section formula, we have:

$$-4 = \frac{1 \times 0 + 2 \times x}{1 + 2}$$

$$-4 = \frac{2x}{3}$$

$$x = \frac{-4 \times 3}{2} = -6$$

Also,

$$2 = \frac{1 \times y + 2 \times 0}{1 + 2}$$

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

$$y = 6$$

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Thus, the co-ordinates of points A and B are (-6, 0) and (0, 6) respectively.

Question 25.

Given a line segment AB joining the points A(-4, 6) and B(8, -3). Find:

- (i) the ratio in which AB is divided by the y-axis
- (ii) find the coordinates of the point of intersection
- (iii) the length of AB

Solution:

(i)

Let the required ratio be $m_1 : m_2$

Consider $A(-4, 6) = (x_1, y_1)$; $B(8, -3) = (x_2, y_2)$ and let $P(x, y)$ be the point of intersection of the line segment and the y-axis.

By section formula, we have,

$$x = \frac{m_1 x_2 + m_2 x_1}{m_1 + m_2}, \quad y = \frac{m_1 y_2 + m_2 y_1}{m_1 + m_2}$$

$$\Rightarrow x = \frac{8m_1 - 4m_2}{m_1 + m_2}, \quad y = \frac{-3m_1 + 6m_2}{m_1 + m_2}$$

The equation of the y-axis is $x=0$

$$\Rightarrow x = \frac{8m_1 - 4m_2}{m_1 + m_2} = 0$$

$$\Rightarrow 8m_1 - 4m_2 = 0$$

$$\Rightarrow 8m_1 = 4m_2$$

$$\Rightarrow \frac{m_1}{m_2} = \frac{4}{8}$$

$$\Rightarrow \frac{m_1}{m_2} = \frac{1}{2}$$

(ii)

From the previous subpart, we have,

$$\frac{m_1}{m_2} = \frac{1}{2}$$

$\Rightarrow m_1 = k$ and $m_2 = 2k$, where k is any constant.

Also, we have,

$$x = \frac{8m_1 - 4m_2}{m_1 + m_2}, \quad y = \frac{-3m_1 + 6m_2}{m_1 + m_2}$$

$$\Rightarrow x = \frac{8 \times k - 4 \times 2k}{k + 2k}, \quad y = \frac{-3 \times k + 6 \times 2k}{k + 2k}$$

$$\Rightarrow x = \frac{8k - 8k}{3k}, \quad y = \frac{-3k + 12k}{3k}$$

$$\Rightarrow x = \frac{0}{3k}, \quad y = \frac{9k}{3k}$$

$$\Rightarrow x = 0, \quad y = 3$$

Thus, the point of intersection is $P(0, 3)$

(iii)

The length of AB = Distance between two points A and B.

The distance between two given points

A (x_1, y_1) and B (x_2, y_2) is given by,

$$\begin{aligned} \text{Distance AB} &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(8 - 4)^2 + (-3 - 6)^2} \\ &= \sqrt{(4)^2 + (-9)^2} \\ &= \sqrt{16 + 81} \\ &= \sqrt{97} \\ &= 10 \text{ units} \end{aligned}$$

Question 26.

If $P(-b, 9a - 2)$ divides the line segment joining the points A $(-3, 3a + 1)$ and B $(5, 8a)$ in the ratio 3: 1, find the values of a and b .

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Solution:

Take $(x_1, y_1) = (-3, 3a + 1)$; $(x_2, y_2) = B(5, 8a)$ and

$$(x, y) = (-b, 9a - 2)$$

Here $m_1 = 3$ and $m_2 = 1$

$$\therefore \text{Coordinate of } P(x, y) = \left(\frac{m_1 x_2 + m_2 x_1}{m_1 + m_2}, \frac{m_1 y_2 + m_2 y_1}{m_1 + m_2} \right)$$

$$\Rightarrow x = \frac{m_1 x_2 + m_2 x_1}{m_1 + m_2} \text{ and } y = \frac{m_1 y_2 + m_2 y_1}{m_1 + m_2}$$

$$\Rightarrow -b = \frac{3 \times 5 + 1 \times (-3)}{3 + 1} \text{ and } 9a - 2 = \frac{3 \times 8a + 1 \times (3a + 1)}{3 + 1}$$

$$\Rightarrow -b = \frac{15 - 3}{4} \text{ and } 9a - 2 = \frac{24a + 3a + 1}{4}$$

$$\Rightarrow -4b = 12 \text{ and } 36a - 8 = 27a + 1$$

$$\Rightarrow b = -3 \text{ and } 9a = 9$$

$$\therefore a = 1 \text{ and } b = -3$$

Exercise 13B**Question 1.**

Find the mid-point of the line segment joining the points:

(i) $(-6, 7)$ and $(3, 5)$

(ii) $(5, -3)$ and $(-1, 7)$

Solution:

(i) A $(-6, 7)$ and B $(3, 5)$

$$\text{Mid-point of AB} = \left(\frac{-6 + 3}{2}, \frac{7 + 5}{2} \right) = \left(\frac{-3}{2}, 6 \right)$$

(ii) A $(5, -3)$ and B $(-1, 7)$

$$\text{Mid-point of AB} = \left(\frac{5 - 1}{2}, \frac{-3 + 7}{2} \right) = (2, 2)$$

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Question 2.

Points A and B have co-ordinates (3, 5) and (x, y) respectively. The mid-point of AB is (2, 3). Find the values of x and y.

Solution:

Mid-point of AB = (2, 3)

$$\therefore \left(\frac{3+x}{2}, \frac{5+y}{2} \right) = (2, 3)$$

$$\Rightarrow \frac{3+x}{2} = 2 \quad \text{and} \quad \frac{5+y}{2} = 3$$

$$\Rightarrow 3+x = 4 \quad \text{and} \quad 5+y = 6$$

$$\Rightarrow x = 1 \quad \text{and} \quad y = 1$$

Question 3.

A (5, 3), B (-1, 1) and C (7, -3) are the vertices of triangle ABC. If L is the mid-point of AB and M is the mid-point of AC, show that $LM = \frac{1}{2} BC$.

Solution:

Given, L is the mid-point of AB and M is the mid-point of AC.

Co-ordinates of L are

$$\left(\frac{5-1}{2}, \frac{3+1}{2} \right) = (2, 2)$$

Co-ordinates of M are

$$\left(\frac{5+7}{2}, \frac{3-3}{2} \right) = (6, 0)$$

Using distance formula, we have:

$$BC = \sqrt{(7+1)^2 + (-3-1)^2} = \sqrt{64+16} = \sqrt{80} = 4\sqrt{5}$$

$$LM = \sqrt{(6-2)^2 + (0-2)^2} = \sqrt{16+4} = \sqrt{20} = 2\sqrt{5}$$

$$\text{Hence, } LM = \frac{1}{2} BC$$

Question 4.

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Given M is the mid-point of AB, find the co-ordinates of:

(i) A; if M = (1, 7) and B = (-5, 10)

(ii) B; if A = (3, -1) and M = (-1, 3).

Solution:

(i) Let the co-ordinates of A be (x, y).

$$\therefore (1, 7) = \left(\frac{x - 5}{2}, \frac{y + 10}{2} \right)$$

$$\Rightarrow 1 = \frac{x - 5}{2} \quad \text{and} \quad 7 = \frac{y + 10}{2}$$

$$\Rightarrow 2 = x - 5 \quad \text{and} \quad 14 = y + 10$$

$$\Rightarrow x = 7 \quad \text{and} \quad y = 4$$

Hence, the co-ordinates of A are (7, 4).

(ii) Let the co-ordinates of B be (x, y).

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

$$\Rightarrow -1 = \frac{3 + x}{2} \quad \text{and} \quad 3 = \frac{-1 + y}{2}$$

$$\Rightarrow -2 = 3 + x \quad \text{and} \quad 6 = -1 + y$$

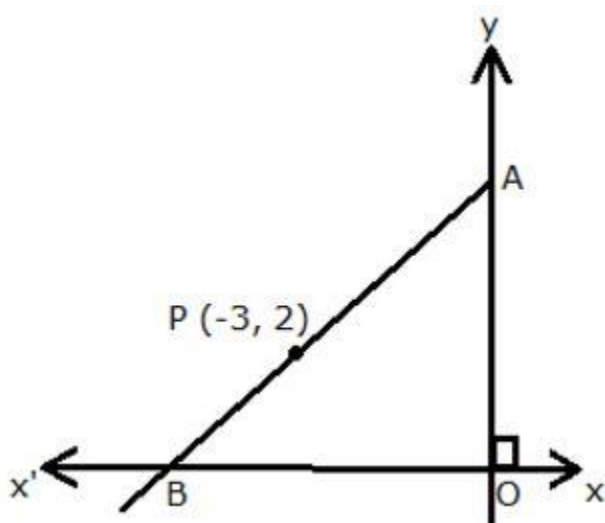
$$\Rightarrow x = -5 \quad \text{and} \quad y = 7$$

Hence, the co-ordinates of B are (-5, 7).

Question 5.

P (-3, 2) is the mid-point of line segment AB as shown in the given figure. Find the co-ordinates of points A and B.

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>



Solution:

Point A lies on y-axis, so let its co-ordinates be $(0, y)$.

Point B lies on x-axis, so let its co-ordinates be $(x, 0)$.

P $(-3, 2)$ is the mid-point of line segment AB.

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

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

$$\Rightarrow -3 = \frac{x}{2} \quad \text{and} \quad 2 = \frac{y}{2}$$

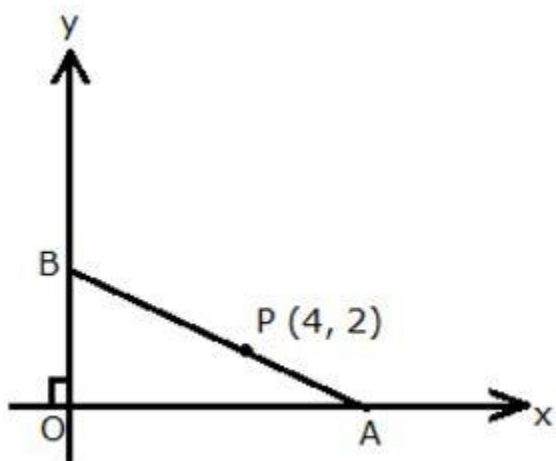
$$\Rightarrow -6 = x \quad \text{and} \quad 4 = y$$

Thus, the co-ordinates of points A and B are $(0, 4)$ and $(-6, 0)$ respectively.

Question 6.

In the given figure, P $(4, 2)$ is mid-point of line segment AB. Find the co-ordinates of A and B.

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>



Solution:

Point A lies on x-axis, so let its co-ordinates be $(x, 0)$.

Point B lies on y-axis, so let its co-ordinates be $(0, y)$.

P $(4, 2)$ is mid-point of line segment AB.

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

$$\Rightarrow 4 = \frac{x}{2} \quad \text{and} \quad 2 = \frac{y}{2}$$

$$\Rightarrow 8 = x \quad \text{and} \quad 4 = y$$

Hence, the co-ordinates of points A and B are $(8, 0)$ and $(0, 4)$ respectively.

Question 7.

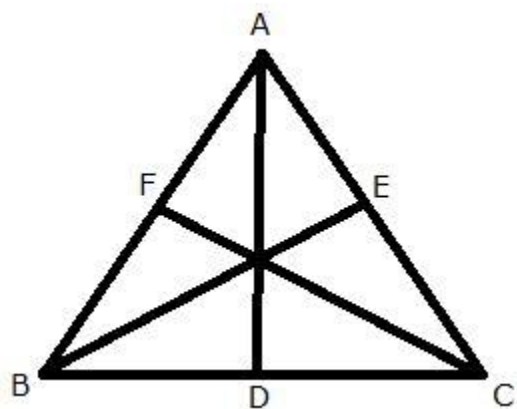
$(-5, 2)$, $(3, -6)$ and $(7, 4)$ are the vertices of a triangle. Find the lengths of its median through the vertex $(3, -6)$

Solution:

Let A $(-5, 2)$, B $(3, -6)$ and C $(7, 4)$ be the vertices of the given triangle.

Let AD be the median through A, BE be the median through B and CF be the median through C.

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>



We know that median of a triangle bisects the opposite side.

Co-ordinates of point F are

$$\left(\frac{-5+3}{2}, \frac{2-6}{2} \right) = \left(\frac{-2}{2}, \frac{-4}{2} \right) = (-1, -2)$$

Co-ordinates of point D are

$$\left(\frac{3+7}{2}, \frac{-6+4}{2} \right) = \left(\frac{10}{2}, \frac{-2}{2} \right) = (5, -1)$$

Co-ordinates of point E are

$$\left(\frac{-5+7}{2}, \frac{2+4}{2} \right) = \left(\frac{2}{2}, \frac{6}{2} \right) = (1, 3)$$

The median of the triangle through the vertex B(3, -6) is BE

Using distance formula,

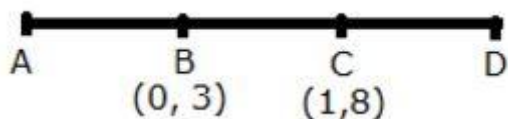
$$BE = \sqrt{(1-3)^2 + (3+6)^2} = \sqrt{4+81} = \sqrt{85} = 9.22$$

Question 8.

Given a line ABCD in which $AB = BC = CD$, $B = (0, 3)$ and $C = (1, 8)$. Find the co-ordinates of A and D.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>



Given, $AB = BC = CD$

So, B is the mid-point of AC. Let the co-ordinates of point A be (x, y) .

$$\therefore (0, 3) = \left(\frac{x+1}{2}, \frac{y+8}{2} \right)$$

$$\Rightarrow 0 = \frac{x+1}{2} \quad \text{and} \quad 3 = \frac{y+8}{2}$$

$$\Rightarrow 0 = x+1 \quad \text{and} \quad 6 = y+8$$

$$\Rightarrow -1 = x \quad \text{and} \quad -2 = y$$

Thus, the co-ordinates of point A are $(-1, -2)$.

Also, C is the mid-point of BD. Let the co-ordinates of point D be (p, q) .

$$\therefore (1, 8) = \left(\frac{0+p}{2}, \frac{3+q}{2} \right)$$

$$\Rightarrow 1 = \frac{0+p}{2} \quad \text{and} \quad 8 = \frac{3+q}{2}$$

$$\Rightarrow 2 = 0+p \quad \text{and} \quad 16 = 3+q$$

$$\Rightarrow 2 = p \quad \text{and} \quad 13 = q$$

Thus, the co-ordinates of point D are $(2, 13)$.

Question 9.

One end of the diameter of a circle is $(-2, 5)$. Find the co-ordinates of the other end of it, if the centre of the circle is $(2, -1)$.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

We know that the centre is the mid-point of diameter.

Let the required co-ordinates of the other end of mid-point be (x, y) .

$$\therefore (2, -1) = \left(\frac{-2+x}{2}, \frac{5+y}{2} \right)$$

$$\Rightarrow 2 = \frac{-2+x}{2} \text{ and } -1 = \frac{5+y}{2}$$

$$\Rightarrow 4 = -2+x \text{ and } -2 = 5+y$$

$$\Rightarrow 6 = x \text{ and } -7 = y$$

Thus, the required co-ordinates are $(6, -7)$.

Question 10.

A $(2, 5)$, B $(1, 0)$, C $(-4, 3)$ and D $(-3, 8)$ are the vertices of a quadrilateral ABCD. Find the co-ordinates of the mid-points of AC and BD.

Give a special name to the quadrilateral.

Solution:

Co-ordinates of the mid-point of AC are

$$\left(\frac{2-4}{2}, \frac{5+3}{2} \right) = \left(\frac{-2}{2}, \frac{8}{2} \right) = (-1, 4)$$

Co-ordinates of the mid-point of BD are

$$\left(\frac{1-3}{2}, \frac{0+8}{2} \right) = \left(\frac{-2}{2}, \frac{8}{2} \right) = (-1, 4)$$

Since, mid-point of AC = mid-point of BD

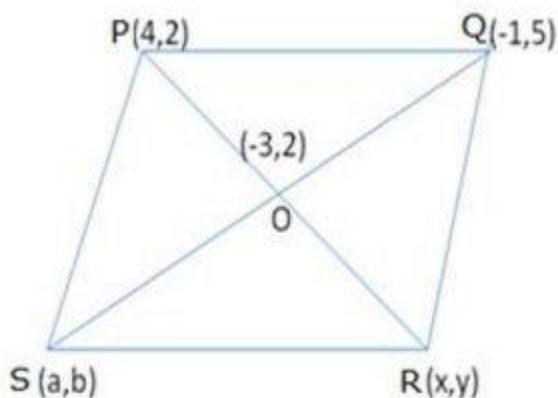
Hence, ABCD is a parallelogram.

Question 11.

P $(4, 2)$ and Q $(-1, 5)$ are the vertices of a parallelogram PQRS and $(-3, 2)$ are the co-ordinates of the points of intersection of its diagonals. Find the coordinates of R and S.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>



Let the coordinates of R and S be (x,y) and (a,b) respectively.
Mid-point of PR is O.

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

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

$$-6 = 4+x, 4 = 2+y$$

$$x = -10, y = 2$$

$$\text{Hence, } R = (-10, 2)$$

Similarly, the mid-point of SQ is O.

$$\therefore O(-3,2) = O\left(\frac{a-1}{2}, \frac{b+5}{2}\right)$$

$$-3 = \frac{a-1}{2}, 2 = \frac{b+5}{2}$$

$$-6 = a-1, 4 = b+5$$

$$a = -5, b = -1$$

$$\text{Hence, } S = (-5, -1)$$

Thus, the coordinates of the point R and S are (-10, 2) and (-5, -1).

Question 12.

A (-1, 0), B (1, 3) and D (3, 5) are the vertices of a parallelogram ABCD. Find the co-ordinates of vertex C.

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Solution:

Let the co-ordinates of vertex C be (x, y).

ABCD is a parallelogram.

∴ Mid-point of AC = Mid-point of BD

$$\left(\frac{-1+x}{2}, \frac{0+y}{2} \right) = \left(\frac{1+3}{2}, \frac{3+5}{2} \right)$$

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

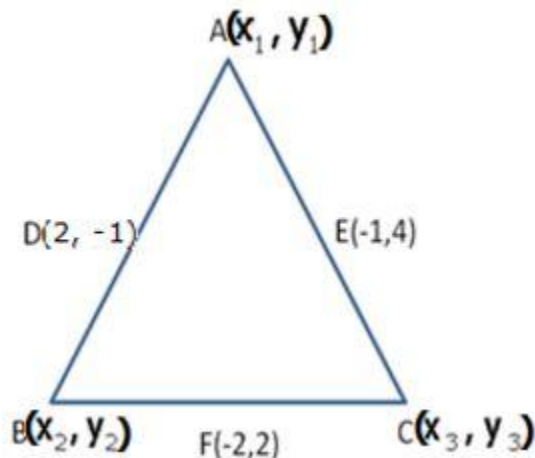
$$\frac{-1+x}{2} = 2 \quad \text{and} \quad \frac{y}{2} = 4$$

$$x = 5 \quad \text{and} \quad y = 8$$

Thus, the co-ordinates of vertex C is (5, 8).

Question 13.

The points (2, -1), (-1, 4) and (-2, 2) are mid-points of the sides of a triangle. Find its vertices.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Let $A(x_1, y_1)$, $B(x_2, y_2)$ and $C(x_3, y_3)$ be the co-ordinates of the vertices of ΔABC .

Midpoint of AB, i.e. D

$$D(2, -1) = D\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

$$2 = \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} = -1$$

$$x_1 + x_2 = 4 \quad \text{---(1)} \quad y_1 + y_2 = -2 \quad \text{---(2)}$$

Similarly,

$$x_1 + x_3 = -2 \quad \text{---(3)} \quad y_1 + y_3 = 8 \quad \text{---(4)}$$

$$x_2 + x_3 = -4 \quad \text{---(5)} \quad y_2 + y_3 = 4 \quad \text{---(6)}$$

Adding (1), (3) and (5), we get,

$$2(x_1 + x_2 + x_3) = -2$$

$$x_1 + x_2 + x_3 = -1$$

$$4 + x_3 = -1 \quad [\text{from (1)}]$$

$$x_3 = -5$$

From (3)

$$x_1 - 5 = -2$$

$$x_1 = 3$$

From (5)

$$x_2 - 5 = -4$$

$$x_2 = 1$$

Adding (2), (4) and (6), we get,

$$2(y_1 + y_2 + y_3) = 10$$

$$y_1 + y_2 + y_3 = 5$$

$$-2 + y_3 = 5[\text{from (2)}]$$

$$y_3 = 7$$

From (4)

$$y_1 + 7 = 8$$

$$y_1 = 1$$

From (6)

$$y_2 + 7 = 4$$

$$y_2 = -3$$

Thus, the co-ordinates of the vertices of ΔABC are (3, 1), (1, -3) and (-5, 7).

Question 14.

Points A (-5, x), B (y, 7) and C (1, -3) are collinear (i.e., lie on the same straight line) such that $AB = BC$. Calculate the values of x and y.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Given, $AB = BC$, i.e., B is the mid-point of AC.

$$\therefore (y, 7) = \left(\frac{-5+1}{2}, \frac{x-3}{2} \right)$$

$$(y, 7) = \left(-2, \frac{x-3}{2} \right)$$

$$\Rightarrow y = -2 \quad \text{and} \quad 7 = \frac{x-3}{2}$$

$$\Rightarrow y = -2 \quad \text{and} \quad x = 17$$

Question 15.

Points P (a, -4), Q (-2, b) and R (0, 2) are collinear. If Q lies between P and R, such that $PR = 2QR$, calculate the values of a and b.

Solution:

Given, $PR = 2QR$

Now, Q lies between P and R, so, $PR = PQ + QR$

$$\therefore PQ + QR = 2QR$$

$$\Rightarrow PQ = QR$$

$\Rightarrow$ Q is the mid-point of PR.

$$\therefore (-2, b) = \left(\frac{a+0}{2}, \frac{-4+2}{2} \right)$$

$$(-2, b) = \left(\frac{a}{2}, -1 \right)$$

$$\Rightarrow a = -4, \quad b = -1$$

Question 16.

Calculate the co-ordinates of the centroid of a triangle ABC, if A = (7, -2), B = (0, 1) and C = (-1, 4).

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Co-ordinates of the centroid of triangle ABC are

$$\begin{aligned} & \left(\frac{7+0-1}{3}, \frac{-2+1+4}{3} \right) \\ &= \left(\frac{6}{3}, \frac{3}{3} \right) \\ &= (2, 1) \end{aligned}$$

Question 17.

The co-ordinates of the centroid of a PQR are (2, -5). If Q = (-6, 5) and R = (11, 8); calculate the co-ordinates of vertex P.

Solution:

Let G be the centroid of DPQR whose coordinates are (2, -5) and let (x,y) be the coordinates of vertex P.

Coordinates of G are,

$$G(2, -5) = G\left(\frac{x - 6 + 11}{3}, \frac{y + 5 + 8}{3}\right)$$

$$2 = \frac{x+5}{3}, \quad -5 = \frac{y+13}{3}$$

$$6 = x+5, \quad -15 = y+13$$

$$x = 1, y = -28$$

Coordinates of vertex P are (1, -28)

Question 18.

A (5, x), B (-4, 3) and C (y, -2) are the vertices of the triangle ABC whose centroid is the origin. Calculate the values of x and y.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Given, centroid of triangle ABC is the origin.

$$\therefore (0, 0) = \left(\frac{5 - 4 + y}{3}, \frac{x + 3 - 2}{3} \right)$$

$$(0, 0) = \left(\frac{1 + y}{3}, \frac{x + 1}{3} \right)$$

$$0 = \frac{1 + y}{3} \quad \text{and} \quad 0 = \frac{x + 1}{3}$$

$$y = -1 \quad \text{and} \quad x = -1$$

Exercise 13C

Question 1.

Given a triangle ABC in which A = (4, -4), B = (0, 5) and C = (5, 10). A point P lies on BC such that BP: PC = 3: 2. Find the length of line segment AP.

Solution:

Given, BP: PC = 3: 2

Using section formula, the co-ordinates of point P are

$$\left(\frac{3 \times 5 + 2 \times 0}{3 + 2}, \frac{3 \times 10 + 2 \times 5}{3 + 2} \right)$$

$$= \left(\frac{15}{5}, \frac{40}{5} \right)$$

$$= (3, 8)$$

Using distance formula, we have:

$$AP = \sqrt{(3 - 4)^2 + (8 + 4)^2} = \sqrt{1 + 144} = \sqrt{145} = 12.04$$

Question 2.

A (20, 0) and B (10, -20) are two fixed points. Find the co-ordinates of a point P in AB such that: 3PB = AB. Also, find the co-ordinates of some other point Q in AB such that AB = 6AQ.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Given, $3PB = AB$

$$\Rightarrow \frac{AB}{PB} = \frac{3}{1}$$

$$\Rightarrow \frac{AB - PB}{PB} = \frac{3 - 1}{1}$$

$$\Rightarrow \frac{AP}{PB} = \frac{2}{1}$$

Using section formula,
Coordinates of P are

$$\begin{aligned} P(x, y) &= P\left(\frac{2 \times 10 + 1 \times 20}{2 + 1}, \frac{2 \times (-20) + 1 \times 0}{2 + 1}\right) \\ &= P\left(\frac{40}{3}, -\frac{40}{3}\right) \end{aligned}$$

Given, $AB = 6AQ$

$$\Rightarrow \frac{AQ}{AB} = \frac{1}{6}$$

$$\Rightarrow \frac{AQ}{AB - AQ} = \frac{1}{6 - 1}$$

$$\Rightarrow \frac{AQ}{QB} = \frac{1}{5}$$

Using section formula,
Coordinates of Q are

$$\begin{aligned} Q(x, y) &= Q\left(\frac{1 \times 10 + 5 \times 20}{1 + 5}, \frac{1 \times (-20) + 5 \times 0}{1 + 5}\right) \\ &= Q\left(\frac{110}{6}, -\frac{20}{6}\right) \\ &= Q\left(\frac{55}{3}, -\frac{10}{3}\right) \end{aligned}$$

Question 3.

A (-8, 0), B (0, 16) and C (0, 0) are the vertices of a triangle ABC. Point P lies on AB and Q lies on AC such that AP: PB = 3: 5 and AQ: QC = 3: 5. Show that: PQ = $\frac{3}{8}$ BC.

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Solution:

Given that, point P lies on AB such that AP: PB = 3: 5.

The co-ordinates of point P are

$$\begin{aligned} & \left(\frac{3 \times 0 + 5 \times (-8)}{3 + 5}, \frac{3 \times 16 + 5 \times 0}{3 + 5} \right) \\ &= \left(\frac{-40}{8}, \frac{48}{8} \right) \\ &= (-5, 6) \end{aligned}$$

Also, given that, point Q lies on AB such that AQ: QC = 3: 5.

The co-ordinates of point Q are

$$\begin{aligned} & \left(\frac{3 \times 0 + 5 \times (-8)}{3 + 5}, \frac{3 \times 0 + 5 \times 0}{3 + 5} \right) \\ &= \left(\frac{-40}{8}, \frac{0}{8} \right) \\ &= (-5, 0) \end{aligned}$$

Using distance formula,

$$PQ = \sqrt{(-5 + 5)^2 + (0 - 6)^2} = \sqrt{0 + 36} = 6$$

$$BC = \sqrt{(0 - 0)^2 + (0 - 16)^2} = \sqrt{0 + (16)^2} = 16$$

$$\text{Now, } \frac{3}{8}BC = \frac{3}{8} \times 16 = 6 = PQ$$

Hence, proved.

Question 4.

Find the co-ordinates of points of trisection of the line segment joining the point (6, -9) and the origin.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Let P and Q be the points of trisection of the line segment joining A (6, -9) and B (0, 0).

P divides AB in the ratio 1: 2. Therefore, the co-ordinates of point P are

$$\left(\frac{1 \times 0 + 2 \times 6}{1 + 2}, \frac{1 \times 0 + 2 \times (-9)}{1 + 2} \right)$$

$$= \left(\frac{12}{3}, \frac{-18}{3} \right)$$

$$= (4, -6)$$

Q divides AB in the ratio 2: 1. Therefore, the co-ordinates of point Q are

$$\left(\frac{2 \times 0 + 1 \times 6}{2 + 1}, \frac{2 \times 0 + 1 \times (-9)}{2 + 1} \right)$$

$$= \left(\frac{6}{3}, \frac{-9}{3} \right)$$

$$= (2, -3)$$

Thus, the required points are (4, -6) and (2, -3).

Question 5.

A line segment joining A(-1, 5/3) and B (a, 5) is divided in the ratio 1: 3 at P, point where the line segment AB intersects the y-axis.

- (i) Calculate the value of 'a'.
- (ii) Calculate the co-ordinates of 'P'.

Solution:

Since, the line segment AB intersects the y-axis at point P, let the co-ordinates of point P be (0, y).

P divides AB in the ratio 1: 3.

+++++

Question 6.

In what ratio is the line joining A (0, 3) and B (4, -1) divided by the x-axis? Write the co-ordinates of the point where AB intersects the x-axis.

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Solution:

Let the line segment AB intersects the x-axis by point P (x, 0) in the ratio k: 1.

$$\therefore (x, 0) = \left(\frac{k \times 4 + 1 \times 0}{k + 1}, \frac{k \times (-1) + 1 \times 3}{k + 1} \right)$$

$$(x, 0) = \left(\frac{4k}{k + 1}, \frac{-k + 3}{k + 1} \right)$$

$$\Rightarrow 0 = \frac{-k + 3}{k + 1}$$

$$\Rightarrow k = 3$$

Thus, the required ratio in which P divides AB is 3: 1.

Also, we have:

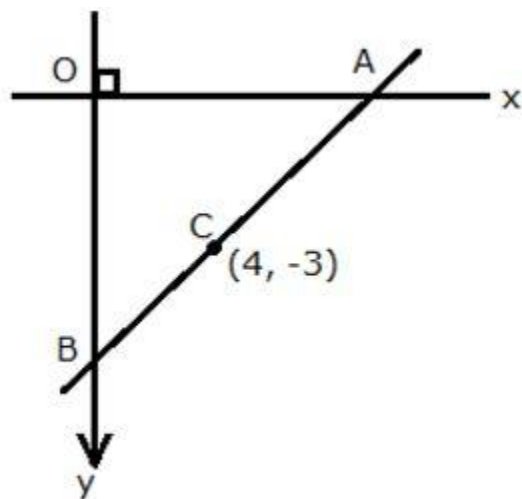
$$x = \frac{4k}{k + 1}$$

$$\Rightarrow x = \frac{4 \times 3}{3 + 1} = \frac{12}{4} = 3$$

Thus, the co-ordinates of point P are (3, 0).

Question 7.

The mid-point of the segment AB, as shown in diagram, is C (4, -3). Write down the co-ordinates of A and B.

**Solution:**

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Since, point A lies on x-axis, let the co-ordinates of point A be $(x, 0)$.

Since, point B lies on y-axis, let the co-ordinates of point B be $(0, y)$.

Given, mid-point of AB is C $(4, -3)$.

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

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

$$\Rightarrow 4 = \frac{x}{2} \quad \text{and} \quad -3 = \frac{y}{2}$$

$$\Rightarrow x = 8 \quad \text{and} \quad y = -6$$

Thus, the co-ordinates of point A are $(8, 0)$ and the co-ordinates of point B are $(0, -6)$.

Question 8.

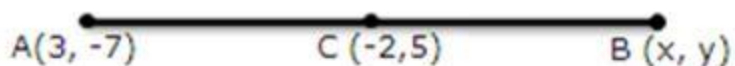
AB is a diameter of a circle with centre $C = (-2, 5)$. If $A = (3, -7)$, find

(i) the length of radius AC

(ii) the coordinates of B.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>



$$\begin{aligned}\text{(i) Radius AC} &= \sqrt{(3+2)^2 + (-7-5)^2} \\ &= \sqrt{5^2 + (-12)^2} \\ &= \sqrt{25 + 144} \\ &= \sqrt{169} \\ &= 13 \text{ units}\end{aligned}$$

$$\begin{aligned}\text{(ii) Let the coordinates of B be (x, y).} \\ \text{Using mid-point formula, we have} \\ -2 &= \frac{3+x}{2} \quad \text{and} \quad 5 = \frac{-7+y}{2} \\ \Rightarrow -4 &= 3+x \quad \text{and} \quad 10 = -7+y \\ \Rightarrow x &= -7 \quad \text{and} \quad y = 17 \\ \text{Thus, the coordinates of B are } &(-7, 17).\end{aligned}$$

Question 9.

Find the co-ordinates of the centroid of a triangle ABC whose vertices are:

A (-1, 3), B (1, -1) and C (5, 1)

Solution:

Co-ordinates of the centroid of triangle ABC are

$$\begin{aligned}&\left(\frac{-1+1+5}{3}, \frac{3-1+1}{3} \right) \\ &= \left(\frac{5}{3}, 1 \right)\end{aligned}$$

Question 10.

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

The mid-point of the line-segment joining $(4a, 2b - 3)$ and $(-4, 3b)$ is $(2, -2a)$. Find the values of a and b .

Solution:

It is given that the mid-point of the line-segment joining $(4a, 2b - 3)$ and $(-4, 3b)$ is $(2, -2a)$.

$$\therefore (2, -2a) = \left(\frac{4a - 4}{2}, \frac{2b - 3 + 3b}{2} \right)$$

$$\Rightarrow 2 = \frac{4a - 4}{2}$$

$$\Rightarrow 4a - 4 = 4$$

$$\Rightarrow 4a = 8$$

$$\Rightarrow a = 2$$

Also,

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

$$\Rightarrow -2 \times 2 = \frac{5b - 3}{2}$$

$$\Rightarrow 5b - 3 = -8$$

$$\Rightarrow 5b = -5$$

$$\Rightarrow b = -1$$

Question 11.

The mid-point of the line segment joining $(2a, 4)$ and $(-2, 2b)$ is $(1, 2a + 1)$. Find the value of a and b .

Solution:

Mid-point of $(2a, 4)$ and $(-2, 2b)$ is $(1, 2a + 1)$, therefore using mid-point formula, we have:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

$$x = \frac{x_1 + x_2}{2} \quad y = \frac{y_1 + y_2}{2}$$

$$1 = \frac{2a - 2}{2} \quad 2a + 1 = \frac{4 + 2b}{2}$$

$$1 = a - 1$$

$$\therefore a = 2 \quad 2a + 1 = 2 + b$$

Putting, $a = 2$ in $2a + 1 = 2 + b$, we get,

$$5 - 2 = b \Rightarrow b = 3$$

Therefore, $a = 2, b = 3$.

Question 12.

- (i) Write down the co-ordinates of the point P that divides the line joining A (-4, 1) and B (17, 10) in the ratio 1: 2.
- (ii) Calculate the distance OP, where O is the origin.
- (iii) In what ratio does the y-axis divide the line AB?

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

(i) Co-ordinates of point P are

$$\begin{aligned} & \left(\frac{1 \times 17 + 2 \times (-4)}{1 + 2}, \frac{1 \times 10 + 2 \times 1}{1 + 2} \right) \\ &= \left(\frac{17 - 8}{3}, \frac{10 + 2}{3} \right) \\ &= \left(\frac{9}{3}, \frac{12}{3} \right) \\ &= (3, 4) \end{aligned}$$

$$(ii) OP = \sqrt{(0 - 3)^2 + (0 - 4)^2} = \sqrt{9 + 16} = \sqrt{25} = 5 \text{ units}$$

(iii) Let AB be divided by the point P (0, y) lying on y-axis in the ratio k: 1.

$$\begin{aligned} \therefore (0, y) &= \left(\frac{k \times 17 + 1 \times (-4)}{k + 1}, \frac{k \times 10 + 1 \times 1}{k + 1} \right) \\ \Rightarrow (0, y) &= \left(\frac{17k - 4}{k + 1}, \frac{10k + 1}{k + 1} \right) \\ \Rightarrow 0 &= \frac{17k - 4}{k + 1} \\ \Rightarrow 17k - 4 &= 0 \\ \Rightarrow k &= \frac{4}{17} \end{aligned}$$

Thus, the ratio in which the y-axis divide the line AB is 4: 17.

Question 13.

Prove that the points A (-5, 4), B (-1, -2) and C (5, 2) are the vertices of an isosceles right-angled triangle. Find the co-ordinates of D so that ABCD is a square.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

We have:

$$AB = \sqrt{(-1+5)^2 + (-2-4)^2} = \sqrt{16+36} = \sqrt{52}$$

$$BC = \sqrt{(-1-5)^2 + (-2-2)^2} = \sqrt{36+16} = \sqrt{52}$$

$$AC = \sqrt{(5+5)^2 + (2-4)^2} = \sqrt{100+4} = \sqrt{104}$$

$$AB^2 + BC^2 = 52 + 52 = 104$$

$$AC^2 = 104$$

$$\therefore AB = BC \text{ and } AB^2 + BC^2 = AC^2$$

$\therefore$ ABC is an isosceles right-angled triangle.

Let the coordinates of D be (x, y).

If ABCD is a square, then,

Mid-point of AC = Mid-point of BD

$$\left(\frac{-5+5}{2}, \frac{4+2}{2} \right) = \left(\frac{x-1}{2}, \frac{y-2}{2} \right)$$

$$0 = \frac{x-1}{2}, 3 = \frac{y-2}{2}$$

$$x = 1, y = 8$$

Thus, the co-ordinates of point D are (1, 8).

Question 14.

M is the mid-point of the line segment joining the points A (-3, 7) and B (9, -1). Find the co-ordinates of point M. Further, if R (2, 2) divides the line segment joining M and the origin in the ratio p: q, find the ratio p: q.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Given, M is the mid-point of the line segment joining the points A (-3, 7) and B (9, -1).
The co-ordinates of point M are

$$\left(\frac{-3+9}{2}, \frac{7-1}{2} \right)$$

$$= \left(\frac{6}{2}, \frac{6}{2} \right)$$

$$= (3, 3)$$

Also, given that, R (2, 2) divides the line segment joining M and the origin in the ratio p: q.

$$\therefore (2, 2) = \left(\frac{p \times 0 + q \times 3}{p + q}, \frac{p \times 0 + q \times 3}{p + q} \right)$$

$$\Rightarrow \frac{p \times 0 + q \times 3}{p + q} = 2$$

$$\Rightarrow \frac{3q}{p + q} = 2$$

$$\Rightarrow 3q = 2p + 2q$$

$$\Rightarrow 3q - 2q = 2p$$

$$\Rightarrow q = 2p$$

$$\Rightarrow \frac{p}{q} = \frac{1}{2}$$

Thus, the ratio p: q is 1: 2.

Question 15.

Calculate the ratio in which the line joining A(-4, 2) and B(3, 6) is divided by point P(x, 3). Also, find

(a) x

(b) length of AP.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Let $P(x, 3)$ divides the line segment joining the points $A(-4, 2)$ and $B(3, 6)$ in the ratio $k : 1$.

Thus, we have

$$\frac{3k - 4}{k + 1} = x; \quad \frac{6k + 2}{k + 1} = 3$$

For

$$6k + 2 = 3(k + 1)$$

$$\Rightarrow 6k + 2 = 3k + 3$$

$$\Rightarrow 3k = 3 - 2$$

$$\Rightarrow 3k = 1 \Rightarrow k = \frac{1}{3}$$

$\therefore$ Required ratio is $1 : 3$.

a. Now consider the equation $\frac{3k - 4}{k + 1} = x$

Substituting the value of k in the above equation, we have

$$\frac{3 \times \frac{1}{3} - 4}{\frac{1}{3} + 1} = x \Rightarrow \frac{-3}{\frac{4}{3}} = x \Rightarrow \frac{-9}{4} = x$$

$$\therefore x = -\frac{9}{4}$$

$$\begin{aligned} \text{b. } AP &= \sqrt{\left(-\frac{9}{4} + 4\right)^2 + (3 - 2)^2} = \sqrt{\frac{49}{16} + 1} = \sqrt{\frac{49 + 16}{16}} = \sqrt{\frac{65}{16}} \\ &\Rightarrow AP = \frac{\sqrt{65}}{4} \text{ units} \end{aligned}$$

Question 16.

Find the ratio in which the line $2x + y = 4$ divides the line segment joining the points $P(2, -2)$ and $Q(3, 7)$.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Let the line $2x + y = 4$ divides the line segment joining the points $P(2, -2)$ and $Q(3, 7)$ in the ratio $k : 1$.

Then, we have

$$(x, y) = \left(\frac{3k + 2}{k + 1}, \frac{7k - 2}{k + 1} \right)$$

Since $\left(\frac{3k + 2}{k + 1}, \frac{7k - 2}{k + 1} \right)$ lies on line $2x + y = 4$, we have

$$2\left(\frac{3k + 2}{k + 1}\right) + \frac{7k - 2}{k + 1} = 4$$

$$\Rightarrow 6k + 4 + 7k - 2 = 4k + 4$$

$$\Rightarrow 13k + 2 = 4k + 4$$

$$\Rightarrow 9k = 2$$

$$\Rightarrow k = \frac{2}{9}$$

Hence, required ratio is $2 : 9$.

Question 17.

If the abscissa of a point P is 2. Find the ratio in which this point divides the line segment joining the point $(-4, 3)$ and $(6, 3)$. Also, find the co-ordinates of point P .

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Let the point P divides the line segment joining the points A(-4, 3) and B(6, 3) in the ratio $k : 1$.

Then, we have

$$(2, y) = \left(\frac{6k - 4}{k + 1}, \frac{3k + 3}{k + 1} \right)$$

$$\Rightarrow \frac{6k - 4}{k + 1} = 2$$

$$\Rightarrow 6k - 4 = 2k + 2$$

$$\Rightarrow 4k = 6$$

$$\Rightarrow k = \frac{3}{2}$$

$\therefore$ Required ratio is 3 : 2.

$$\text{Also, } \frac{3k + 3}{k + 1} = y$$

$$\Rightarrow \frac{3 \times \frac{3}{2} + 3}{\frac{3}{2} + 1} = y$$

$$\Rightarrow \frac{15/2}{5/2} = y$$

$$\Rightarrow y = 3$$

Hence, coordinates of point P are (2, 3).

Question 18.

The line joining the points (2, 1) and (5, -8) is trisected at the points P and Q, point P lies on the line $2x - y + k = 0$, find the value of k . Also, find the co-ordinates of point Q.

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Let $A(2, 1)$ and $B(5, -8)$ be the given points trisected by the points P and Q .

$$\Rightarrow AP = PQ = QB$$

For P :

$$m_1 : m_2 = AP : PB = 1 : 2$$

$$(x_1, y_1) = (2, 1) \text{ and } (x_2, y_2) = (5, -8)$$

$$\therefore x = \frac{1 \times 5 + 2 \times 2}{1 + 2} = \frac{5 + 4}{3} = \frac{9}{3} = 3$$

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

$\therefore$ Coordinates of P are $(3, -2)$.

Since point P lies on the line $2x - y + k = 0$, we have

$$2(3) - (-2) + k = 0$$

$$\Rightarrow 6 + 2 + k = 0$$

$$\Rightarrow k = -8$$

For Q :

$$m_1 : m_2 = AQ : QB = 2 : 1$$

$$(x_1, y_1) = (2, 1) \text{ and } (x_2, y_2) = (5, -8)$$

$$\therefore x = \frac{2 \times 5 + 1 \times 2}{2 + 1} = \frac{10 + 2}{3} = \frac{12}{3} = 4$$

$$y = \frac{2 \times (-8) + 1 \times 1}{1 + 2} = \frac{-16 + 1}{3} = \frac{-15}{3} = -5$$

$\therefore$ Coordinates of Q are $(4, -5)$.

Question 19.

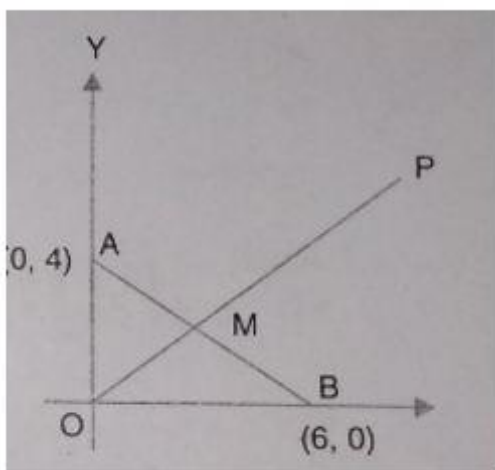
M is the mid-point of the line segment joining the points $A(0, 4)$ and $B(6, 0)$. M also divides the line segment OP in the ratio $1 : 3$. Find :

(a) co-ordinates of M

(b) co-ordinates of P

(c) length of BP

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>



Solution:

a. M is the mid-point of line segment joining points A(0, 4) and B(6, 0).

$$\therefore M = \left(\frac{0+6}{2}, \frac{4+0}{2} \right) = (3, 2)$$

b. M divides OP in the ratio 1 : 3

Let the coordinates of P be (x, y).

$$\therefore M = \left(\frac{x+0}{1+3}, \frac{y+0}{1+3} \right) = \left(\frac{x}{4}, \frac{y}{4} \right)$$

But, M = (3, 2)

$$\therefore \frac{x}{4} = 3 \text{ and } \frac{y}{4} = 2$$

$$\Rightarrow x = 12 \text{ and } y = 8$$

$\therefore$ Coordinates of P are (12, 8).

$$\text{c. } BP = \sqrt{(12-6)^2 + (8-0)^2} = \sqrt{6^2 + 8^2} = \sqrt{36 + 64} = \sqrt{100} = 10 \text{ units}$$

Question 20.

Find the image of the point A(5, -3) under reflection in the point P(-1, 3).

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

Solution:

Let the image be B(x, y).

Since A is reflected in P, P is the mid-point of AB.

Using Mid-point Formula, we get

$$\Rightarrow P(-1, 3) = \left(\frac{x+5}{2}, \frac{y-3}{2} \right)$$

$$\Rightarrow \frac{x+5}{2} = -1 \text{ and } \frac{y-3}{2} = 3$$

$$\Rightarrow x+5 = -2 \text{ and } y-3 = 6$$

$$\Rightarrow x = -7 \text{ and } y = 9$$

So, the image of A in P is B(-7, 9).

Question 21.

A(-4, 2), B(0, 2) and C(-2, -4) are the vertices of a triangle ABC. P, Q and R are mid-points of sides BC, CA and AB respectively. Show that the centroid of ΔPQR is the same as the centroid of ΔABC .

Solution:

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

A(-4, 2), B(0, 2) and C(-2, -4) are the vertices of ΔABC .

$$\therefore \text{Centroid of } \Delta ABC = \left(\frac{-4+0-2}{3}, \frac{2+2-4}{3} \right) = \left(\frac{-6}{3}, \frac{0}{3} \right) = (-2, 0)$$

P, Q and R are the mid-points of sides BC, CA and AB respectively.

$$\therefore \text{Coordinates of P} = \left(\frac{0-2}{2}, \frac{2-4}{2} \right) = \left(\frac{-2}{2}, \frac{-2}{2} \right) = (-1, -1)$$

$$\text{Coordinates of Q} = \left(\frac{-2-4}{2}, \frac{-4+2}{2} \right) = \left(\frac{-6}{2}, \frac{-2}{2} \right) = (-3, -1)$$

$$\text{Coordinates of R} = \left(\frac{-4+0}{2}, \frac{2+2}{2} \right) = \left(\frac{-4}{2}, \frac{4}{2} \right) = (-2, 2)$$

$$\therefore \text{Centroid of } \Delta PQR = \left(\frac{-1-3-2}{3}, \frac{-1-1+2}{3} \right) = \left(\frac{-6}{3}, \frac{0}{3} \right) = (-2, 0)$$

$\Rightarrow$ Centroid of ΔABC = Centroid of ΔPQR .

Question 22.

From (i) and (ii), we get

Centroid of a ΔABC = Centroid of a ΔPQR



Selina Publishers ICSE Solutions

Class 10 Maths

- [Chapter 1 - GST \(Goods and Services Tax\)](#)
- [Chapter 2 - Banking \(Recurring Deposit Accounts\)](#)
- [Chapter 3 - Shares and Dividends](#)
- [Chapter 4 - Linear Inequations \(in one variable\)](#)
- [Chapter 5 - Quadratic Equations](#)
- [Chapter 6 - Solving Simple Problems \(Based on Quadratic Equations\)](#)
- [Chapter 7 - Ratio and Proportion \(Including Properties and Uses\)](#)
- [Chapter 8 - Remainder and Factor Theorems](#)
- [Chapter 9 - Matrices](#)
- [Chapter 10- Arithmetic Progression](#)
- [Chapter 11- Geometric Progression](#)
- [Chapter 12- Reflection](#)
- [Chapter 13 - Section and Mid-Point Formula](#)
- [Chapter 14- Equation of a Line](#)
- [Chapter 15- Similarity](#)
- [Chapter 16- Loci \(Locus and Its Constructions\)](#)
- [Chapter 17- Circles](#)
- [Chapter 18- Tangents and Intersecting Chords](#)
- [Chapter 19- Constructions \(Circles\)](#)
- [Chapter 20- Cylinder, Cone and Sphere](#)
- [Chapter 21- Trigonometrical Identities](#)
- [Chapter 22- Heights and Distances](#)
- [Chapter 23- Graphical Representation](#)
- [Chapter 24- Measures of Central Tendency](#)
- [Chapter 25- Probability](#)

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

About About Selina Publishers ICSE

Selina Publishers has been serving the students since 1976 and is one of the quality ICSE school textbooks publication houses. Mathematics and Science books for classes 6-10 form the core of our business, apart from certain English and Hindi literature as well as a few primary books. All these books are based upon the syllabus published by the Council for the I.C.S.E. Examinations, New Delhi. The textbooks are composed by a panel of subject experts and vetted by teachers practising in ICSE schools all over the country. Continuous efforts are made in complying with the standards and ensuring lucidity and clarity in content, which makes them stand tall in the industry.

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>

About IndCareer

IndCareer.com is a leading developer of online career guidance resources for the Indian marketplace. Established in 2007, IndCareer.com is currently used by over thousands of institutions across India, including schools, employment agencies, libraries, colleges and universities.

IndCareer.com is designed to assist you in making the right career decision - a decision that meets your unique interests and personality.

For any clarifications or questions you can write to **info@indcareer.com**

Postal Address

IndCareer.com
52, Shilpa Nagar,
Somalwada
Nagpur - 440015
Maharashtra, India

WhatsApp: +91 9561 204 888

Website: <https://www.indcareer.com>

<https://www.indcareer.com/schools/selina-class-10-icse-solutions-mathematics-chapter-13-section-and-mid-point-formula/>