Studybeesofficial

Where Minds Pollinate

Class 12

Mathematics

Chapter 6

Exercise 6.1

Handwritten Solution

$m = \tan\theta$

Concept

Exercise 6.1.

Equation of straight line: $ax+by+c=0$. $= l$.

① slope of $l = m = -\dfrac{\text{coefficient of } x}{\text{coefficient of } y}$

$$m = -\frac{a}{b}$$

② $P(x_1, y_1)$ ———— $Q(x_2, y_2)$

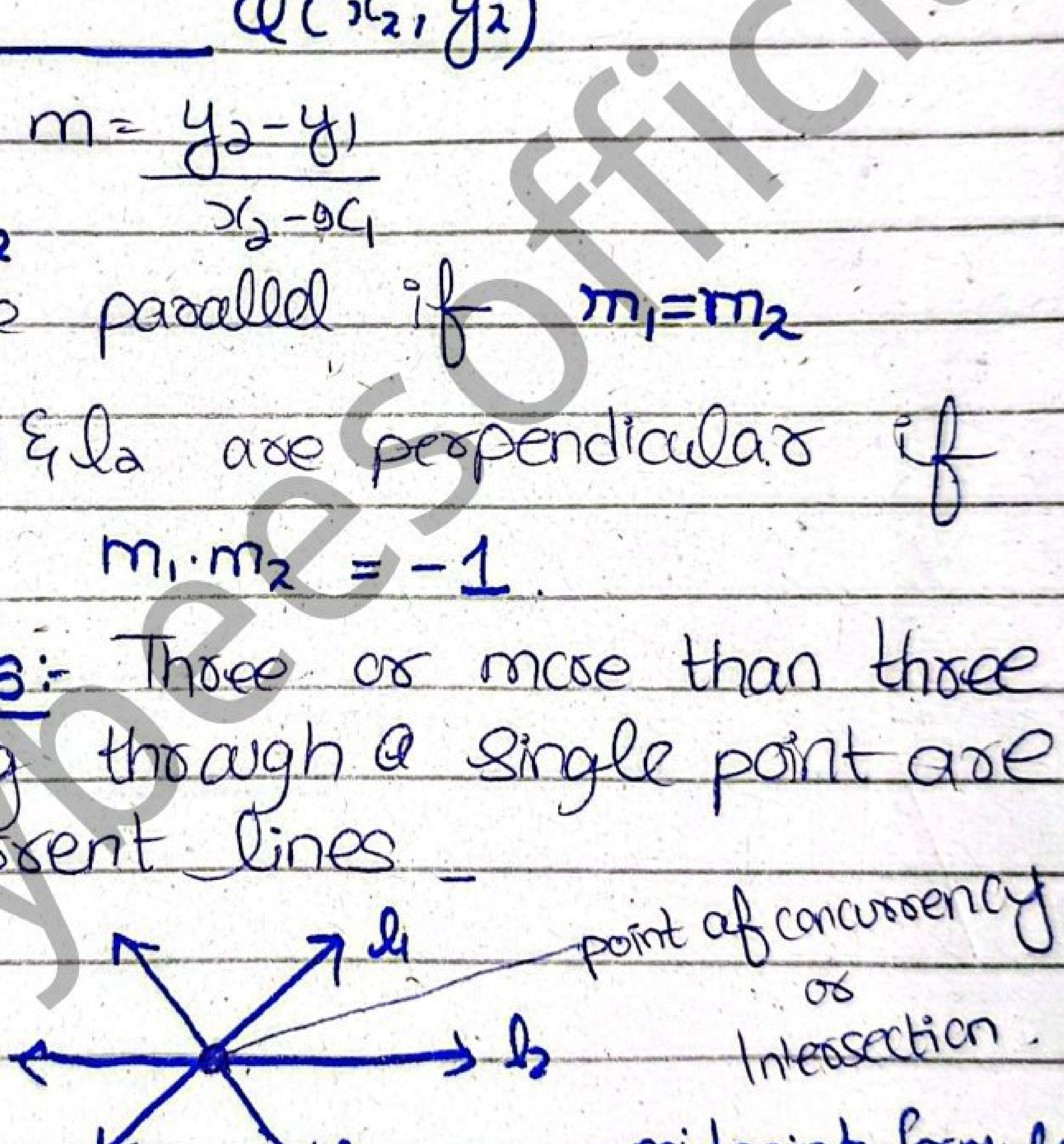
Slope of $PQ = m = \dfrac{y_2 - y_1}{x_2 - x_1}$

③ Two lines l_1 & l_2 are parallel if $m_1 = m_2$

④ Two lines l_1 & l_2 are perpendicular if

$$m_1 \cdot m_2 = -1.$$

. Concurrent lines:- Three or more than three lines passing through a single point are called concurrent lines.



midpoint formula
$$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$

$l_1 : a_1x + b_1y + c_1 = 0$

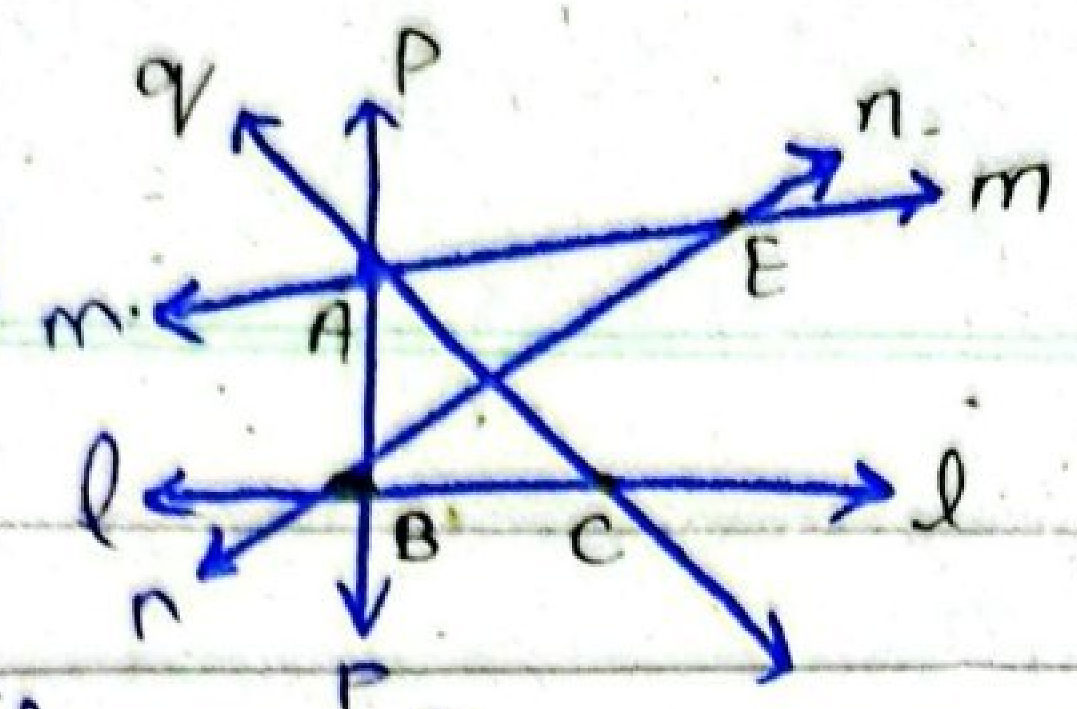
$l_2 : a_2x + b_2y + c_2 = 0$

$l_3 : a_3x + b_3y + c_3 = 0$

l_1, l_2 & l_3 are ~~called~~ concurrent

if
$$\begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix} = 0$$

Q1) (i)



Sol: a) lines p, q, m are concurrent & their point of concurrency is A.

b) lines l, n, p are concurrent & point of concurrency is B.

(ii) a) lines a, b, c are concurrent & their point of concurrency is A

(b) Point p, q, r are concurrent and their point of concurrency is D.

Q2) (i) $3x - 4y - 13 = 0$

$8x - 11y - 33 = 0$

$2x - 3y - 7 = 0$.

Sol

$$\begin{vmatrix} 3 & -4 & -13 \\ 8 & -11 & -33 \\ 2 & 3 & -7 \end{vmatrix}$$

Sol $= 3(-11 \times -7) - (3 \times -33) + 4(-56 + 66) - 13(-24 + 22)$

$= 0$.

so given lines $l_1, l_2, \&\ l_3$ are concurrent.

(ii) Sol
$$\begin{vmatrix} 1 & 2 & -4 \\ 1 & -1 & -1 \\ 4 & 5 & -13 \end{vmatrix} = 0$$

$= 1(-1\times-13) - (5\times-1) + (1\times-13) - (-1\times4) + (1\times-1) - (4\times5)$

$= 0$ Hence l_1, l_2, l_3 are concurrent.

Q4 Concept: equation of line or altitude passing through point $p(x,y)$, having slope m is

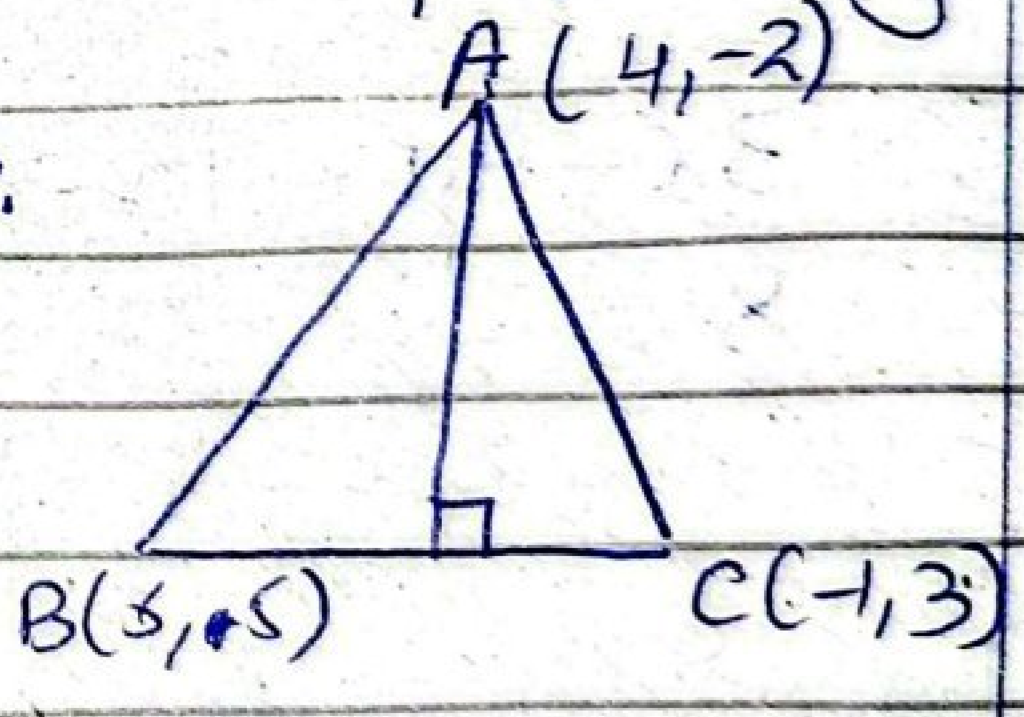
$$y - y_1 = m(x - x_1)$$

e.g. eqn of line having slope $m = 2$ & passing through $\underset{x_1}{(0,}\underset{y_1}{0)}$

$y - 0 = 2(x-0)$

$\boxed{y = 2x}$

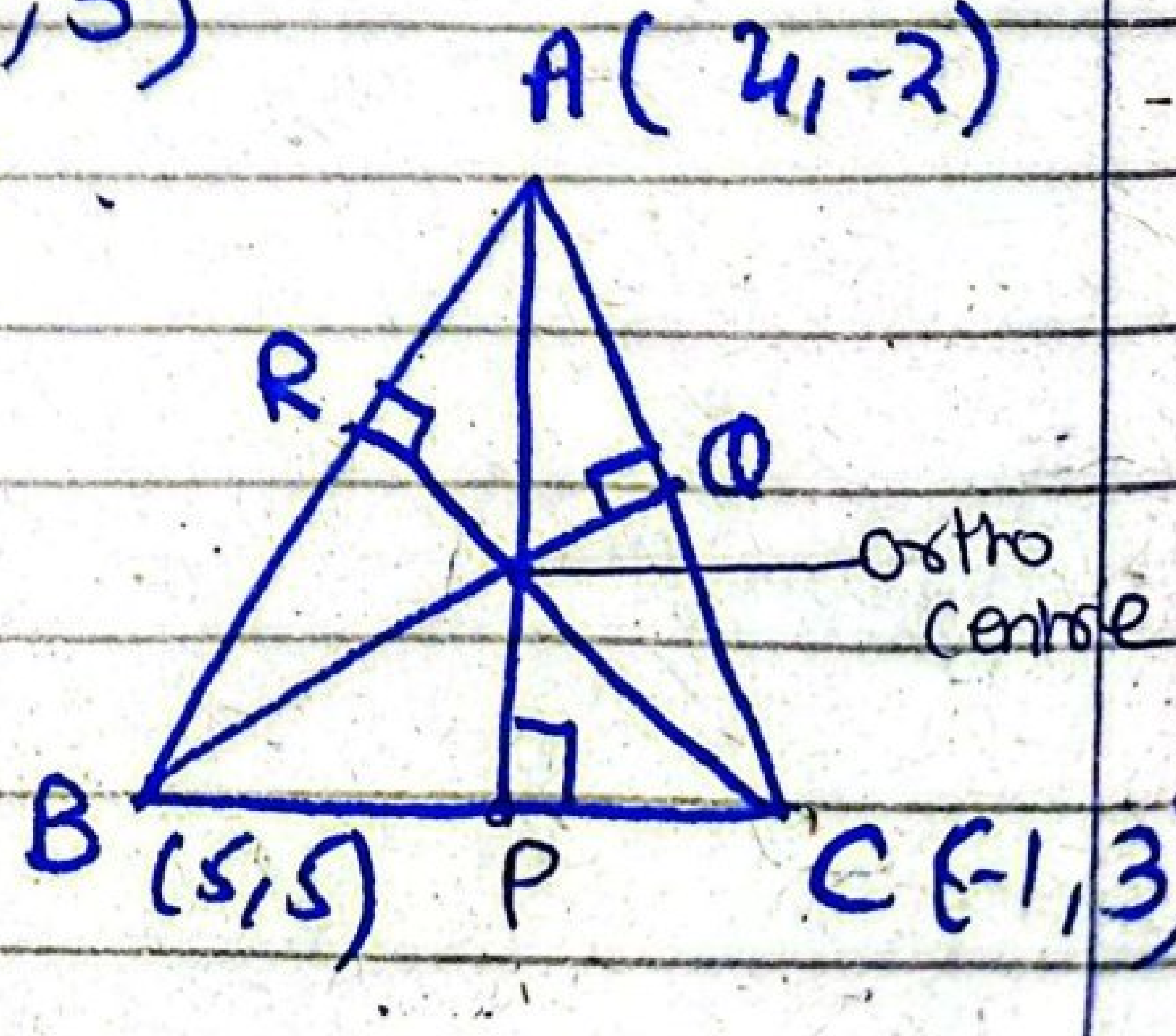
Altitude:



Q5. V.V.V.IMP find altitude or orthocentre

Solution. $A(4,-2)$, $B(5,5)$, $C(-1,3)$

Equation of altitudes: or orthocentre



• slope of $\overline{AB} = m_1 = \dfrac{y_2 - y_1}{x_2 - x_1}$

$= \dfrac{5+2}{5-4}$

$\boxed{m_1 = 7}$

- Slope of $\overline{BC} = m_2 = \frac{3-5}{-1-5} = \frac{-2}{-6} = \boxed{\frac{1}{3}} = m_2$

- slope of $\overline{AC} = m_3 = \frac{3+2}{-1-4} = \frac{5}{-5} \Rightarrow m_3 = -1$

Let $\overline{AP}$ be the altitude on $\overline{BC}$.

As $\overline{AP} \perp BC$.

so

$(\text{slope of } \overline{AP}) \cdot (\text{Slope of } \overline{BC}) = -1$

$$\text{slope of } \overline{AP} = \frac{-1}{\text{slope of } \overline{BC}}$$

$$= \frac{-1}{+1/3} \Rightarrow \boxed{-3}$$

Equation of Altitude $\overline{AP}$ having slope $m = -3$ & passing through Point $A(4, -2)$

$x_1 \quad y_1$

$$y - y_1 = m(x - x_1)$$

$$y + 2 = -3(x - 4)$$

$$y + 2 = -3x + 12$$

$$3x + y + 2 - 12 = 0$$

$$\boxed{3x + y - 10 = 0} \quad \text{—(1)}$$

Let $\overline{BQ}$ be the altitude on $\overline{AC}$.

i.e. $BQ \perp AC$. ~~so Q slope of BQ~~ So

$(\text{slope of } \overline{BQ})(\text{slope of } \overline{AC}) = -1$

Slope of $\overline{BQ}$ = $\frac{-1}{\text{Slope of } \overline{AC}}$

$= \frac{-1}{-1} \Rightarrow \boxed{1}$.

equation of altitude $\overline{BQ}$ having slope $\boxed{m=1}$ passing through $B(5,5)$

$$y - y_1 = m(x - x_1)$$

$$y - 5 = 1(x - 5)$$

$$0 = x - y \cancel{-5+5}$$

$$\boxed{x - y = 0} \text{ — } ②$$

let $\overline{CR}$ be the altitude on $\overline{AB}$ i.e $\overline{CR} \perp \overline{AB}$

So

$$(\text{Slope of } \overline{CR})(\text{Slope of } AB) = -1$$

$$\text{Slope of } CR = \frac{-1}{\text{Slope of } AB}$$

$$= \frac{-1}{7}$$

Eq of altitude CR having slope $m = \frac{-1}{7}$ Passing through $C(-1,3)$

$$y - y_1 = m(x - x_1)$$

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

$$7y - 21 = -x - 1$$

$$x + 7y - 21 + 1 = 0$$

$$x + 7y - 20 = 0 \text{ — } ③.$$

For point of Concurrency solving ① & ②.

$$3x + y - 10 = 0$$
$$x - y = 0$$
$$4x - 10 = 0$$

$\boxed{x = \frac{5}{2}}$ put in ②

$\frac{5}{2} - y = 0$

$\boxed{y = \frac{5}{2}}$ So point of concurrency is $\left(\frac{5}{2}, \frac{5}{2}\right)$.

Name or = ortho centre

Q3) Sol

$$\begin{array}{ccc} + & - & + \end{array}$$
$$\begin{vmatrix} 2 & -1 & 3 \\ 1 & -1 & 0 \\ 3 & a & 1 \end{vmatrix} = 0.$$

$= \cancel{2(1\times1) - (a\times0) + 1(1\times1) - (a\times3) + 3(1\times a) - (3\times-1)}$

$= \cancel{-2 + 1 + 3a + 9}$

$$= 2\begin{vmatrix} -1 & 0 \\ a & 1 \end{vmatrix} + 1\begin{vmatrix} 1 & 0 \\ 3 & 1 \end{vmatrix} + 3\begin{vmatrix} 1 & -1 \\ 3 & a \end{vmatrix}$$

$$= 2[(-1\times1) - (a\times0)] + 1[(1\times1) - (3\times0)] + 3[(1\times a) - (3\times-1)]$$

$$= -2 + 1 + 3(a + 3)$$

$$= -2 + 1 + 3a + 9$$

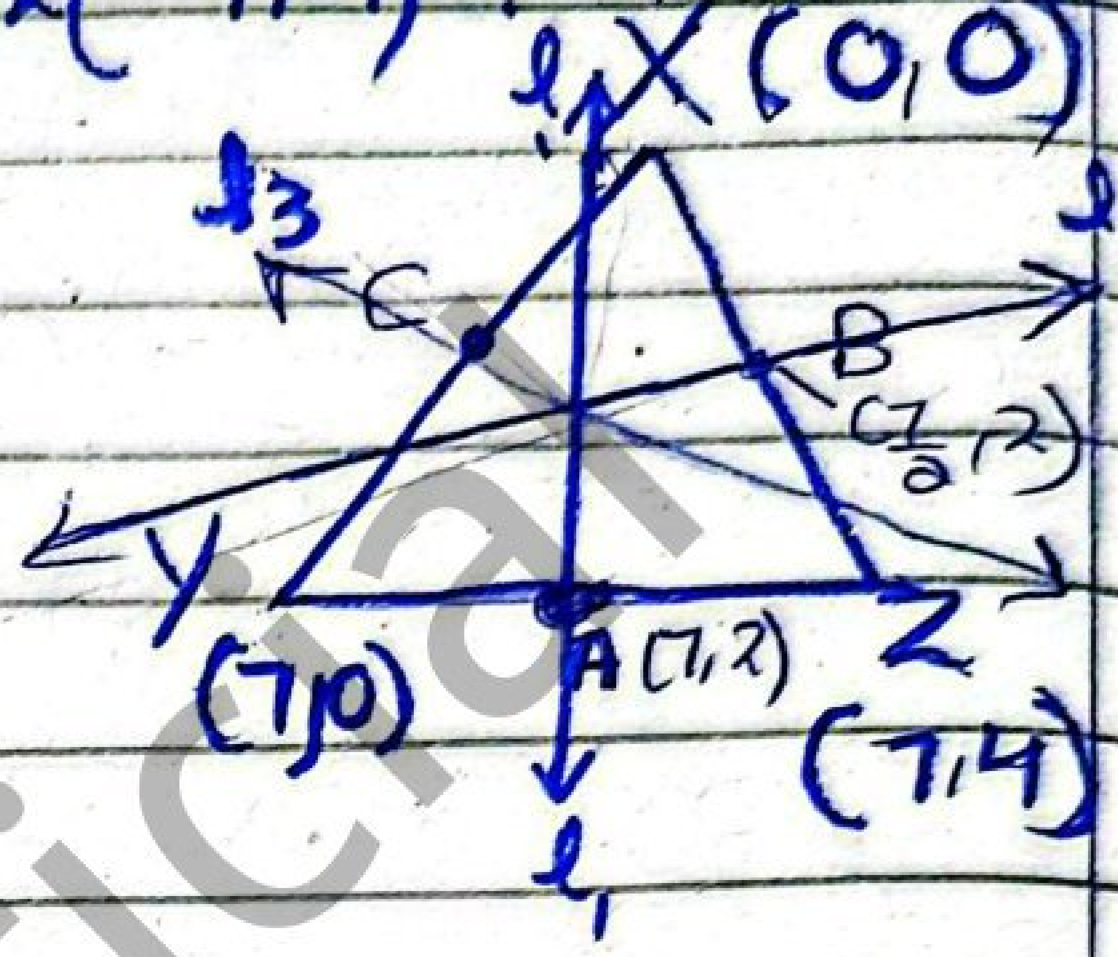
$$8 + 3a$$

$\boxed{a = -\frac{8}{3}}$ Ans

MCQ:- Slope of vertical line is ∞.
slope of horizontal line is 0.

Right bisector. or circumcentre. VVIMP

Q6) Solution: $X(0,0)$, $Y(7,0)$, $Z(7,4)$



Let A be the midpoint of $\overline{YZ}$

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

$A\left(\frac{7+7}{2}, \frac{0+4}{2}\right)$

$A(7,2)$

Let l_1 be the right bisector of $\overline{YZ}$.

So (Slope of l_1)(Slope of $\overline{YZ}$) $= -1$

(Slope of l_1) $= \frac{-1}{0} = \boxed{\infty}$

Slope of $\overline{YZ}$

$= \frac{y_2-y_1}{x_2-x_1}$

$= \frac{4-0}{7-7}$

$= \boxed{\infty}$

Eq of right bisector l_1 passing through $A(7,2)$ having slope $M=0$.

$y-y_1 = m(x-x_1)$

$y-2 = 0(x-7)$

$\boxed{y-2=0}$ — (1)

Let l_2 be the right bisector of $\overline{XZ}$

Midpoint

$B\left(\frac{7+0}{2}, \frac{4+0}{2}\right)$

$B\left(\frac{7}{2}, 2\right)$

(Slope of l_2)(Slope of XZ) $= -1$

Slope of $l_2 = \frac{-1}{\frac{4}{7}}$

$= \boxed{\frac{-7}{4}}$

eq of right bisector l_2 passing through $B(\frac{7}{2}, 2)$ having slope $m = -\frac{7}{4}$

$$y - y_1 = m(x - x_1)$$

$$y - 2 = -\frac{7}{4}\left(x - \frac{7}{2}\right)$$

$$4y - 8 = -7x + \frac{49}{2}$$

$$7x + 4y - 8 - \frac{49}{2} = 0$$

$$\boxed{14x + 8y - 65 = 0} - 2$$

$C(\frac{7}{2}, 0)$ midpoint.

let l_3 be the right bisector of $\overline{XY}$

slope of $XY = \frac{0-0}{7-0} = \boxed{0}$

$$(\text{slope of } l_3) = \frac{-1}{\text{slope of } XY}$$

$$= \frac{-1}{0} = \boxed{\infty}$$

- Eq of l_3 passing through $C\left(\frac{7}{2}, 0\right)$ having slope $m = \infty$

$$y - y_1 = m(x - x_1)$$

$$y - 0 = \infty\left(x - \frac{7}{2}\right)$$

$$y - 0 = \frac{1}{0}\left(x - \frac{7}{2}\right)$$

$$0 = 2x - 7$$

$$\boxed{2x - 7 = 0} - 3$$

$m_1 \cdot m_2 = -1$

IMP note
∴ if demand these points are concurrent or not then take **determinant**

So eqs of right bisectors are:

$y-2=0$ — (1)

$2x-7=0$ — (2)

$14x+8y-68=0$ — (3)

put $x=\frac{7}{2}$, $y=2$ in (3)

$14\left(\frac{7}{2}\right)+8(2)-68=0$

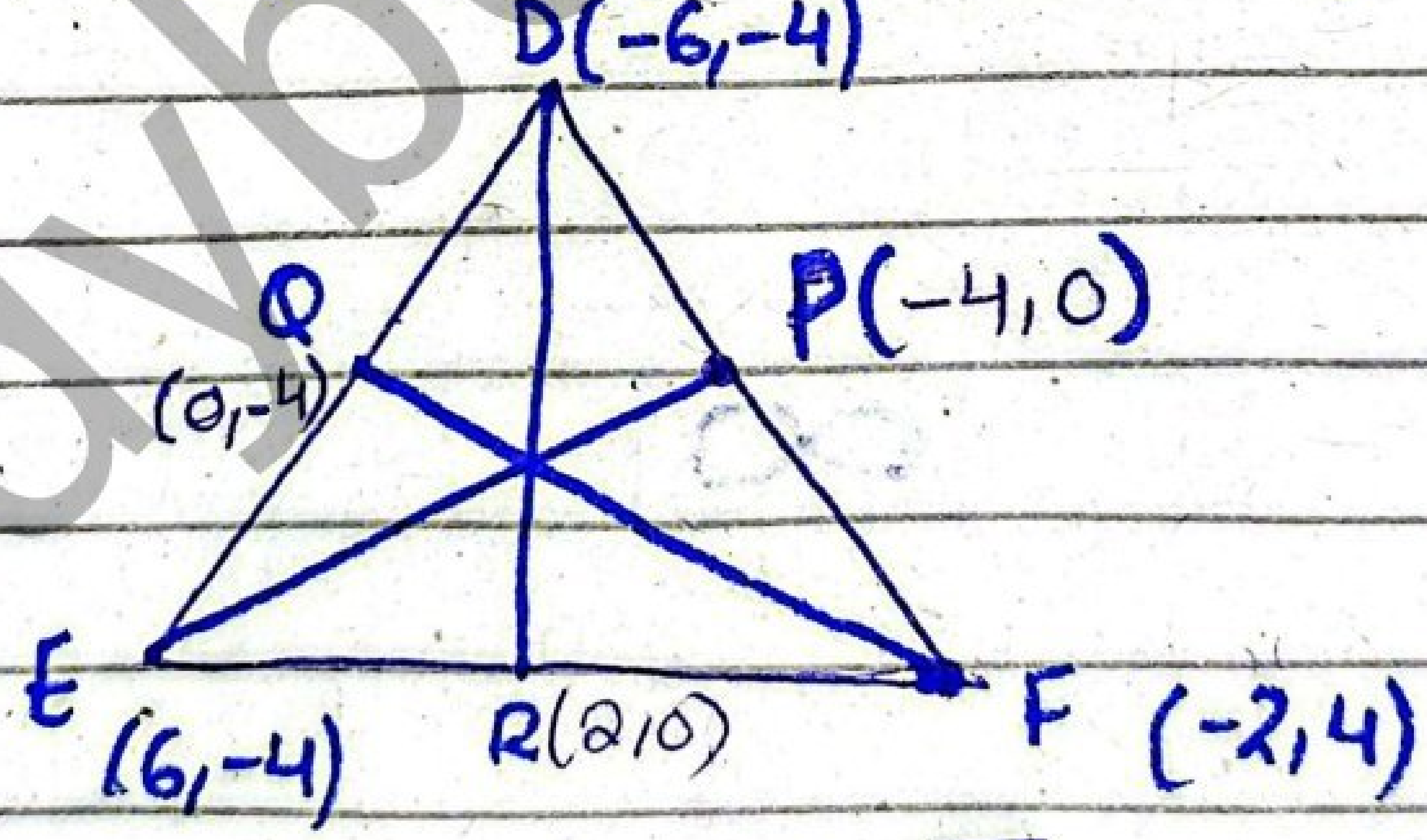
$49+16-65=0$

$0=0$

Hence point of concurrency is $P(x,y) = P\left(\frac{7}{2}, 2\right)$

The point of concurrency $P\left(\frac{7}{2}, 2\right)$ is called circumcentre

Q7) Medians. D(−6,−4) E(6,−4) F(−2,4)



Let P be the midpoint of $\overline{DF}$.

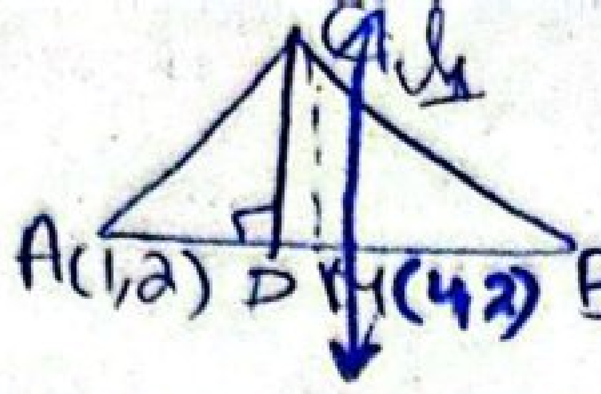
$P\left(\frac{-6-2}{2}, \frac{-4+4}{2}\right)$

P(−4, 0)

let EP be the median on $\overline{DF}$

slope of $\overline{EP} = \frac{0+4}{-4-6} = \boxed{\frac{-2}{5}}$

FBISE Question



(a) find eq of median $\overline{CM}$.
(b) find altitude $\overline{CD}$
(c) eq of Right bisector of $\overline{AB}$.

So equation of $\overline{EP}$ passing though $P(-4,0)$ having slope $\boxed{m=-\frac{2}{5}}$.

$$y-y_1=m(x-x_1)$$
$$y-0=-\frac{2}{5}(x+4)$$
$$5y=-2x-8$$
$$2x+5y+8=0 \text{ — } (1)$$

let Q be the midpoint DE. $Q\left(\frac{-6+6}{2}, \frac{-4+4}{2}\right)$
$Q(0,-4)$

let FQ be the median on DE.

slope of $FQ = \left(\frac{-4-4}{0-(-2)}\right) = \frac{-8}{2} = \boxed{-4}$.

Slope of $FQ = -4$

So equation of FQ passing through poin $(0,-4)$ having slope $\boxed{m=-4}$

$$y-y_1=m(x-x_1)$$
$$y+4=-4(x)$$
$$y+4x+4=0 \text{ — } (2)$$

let R be the midpoint of EF. $R\left(\frac{6-2}{2}, \frac{-4+4}{2}\right)$
$R(2,0)$.

let DR be the median on EF.

slope of $DR = \frac{(-4-0)}{-6-2} = \frac{+4}{-8} = \boxed{\frac{1}{2}}$.

So equation of median DR passing through point $(2,0)$ having slope $m=\frac{1}{2}$

$$y - y_1 = m(x - x_1)$$

$$y = \frac{1}{2}(x - 2)$$

$$2y = x - 2$$

$$2y - x + 2 = 0 \text{ —— } (3)$$

solving eq (1) & (2)

$$2(2x + 5y + 8 = 0)$$

$$4x + y + 4 = 0$$

$$\cancel{4x} + 10y + 16 = 0$$

$$\underline{+\cancel{4x} + y + 4 = 0}$$

$$9y + 12 = 0$$

$$y = \frac{12}{9} \qquad \boxed{y = \frac{-4}{3}} \quad \text{put } y = \frac{-4}{3} \text{ in } (3)$$

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

$$-\frac{8}{3} - x + 2 = 0$$

$$-\frac{8}{3} + 2 = x$$

$$\frac{-8 + 6}{3} = x$$

$$-\frac{2}{3} = x \Rightarrow \boxed{x = -\frac{2}{3}} \quad \text{put } x = -\frac{2}{3} \text{ \& } y = -\frac{4}{3} \text{ in } (3)$$

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

$$-\frac{8}{3} + \frac{2}{3} + 2 = 0$$

$$-\frac{6}{3} + 2 = 0$$

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

$$\boxed{0 = 0}$$

Hence centroid

$$\left(-\frac{2}{3}, -\frac{4}{3}\right)$$

Concept.

Prove that altitudes of a ΔABC are concurrent.

$A(7,8,)$ $B(2,9)$ $C(1,5)$.

$$\begin{vmatrix} x_3-x_2 & y_3-y_2 & -x_1(x_3-x_2)-y_1(y_3-y_2) \\ x_1-x_3 & y_1-y_3 & -x_2(x_1-x_3)-y_2(y_1-y_3) \\ x_2-x_1 & y_2-y_1 & -x_3(x_2-x_1)-y_3(y_2-y_1) \end{vmatrix}$$

if determinat $= 0$.

So altitudes of ΔABC are concurrent

others on book pg 164.

Area of triangle ABC. $A(x_1,y_1)$, $B(x_2,y_2)$, $C(x_3,y_3)$.

$$\text{Area of } \Delta ABC = \frac{1}{2}\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$$

Q9. (i) $A(1,1)$, $B(4,5)$, $C(12,-1)$

Sol Area $= \frac{1}{2}\begin{vmatrix} 1 & 1 & 1 \\ 4 & 5 & 1 \\ 12 & -1 & 1 \end{vmatrix}$

$= \frac{1}{2}\left(1(6)-1(-8)+1(-64)\right)$

$= \frac{1}{2}(-50)$

$= \boxed{-25}$

$= +25$ square units. since area is always +ve.

(ii) D(3,1), E(2,3) F(2,2)

Sol Area of $\Delta DEF = \frac{1}{2}\begin{vmatrix} 3 & 1 & 1 \\ 2 & 3 & 1 \\ 2 & 2 & 1 \end{vmatrix}$

$= \cancel{\frac{1}{2}\left[3(3\times1)-(2\times1)\right]-1\left[(2\times1)-(2\times1)\right]+1\left[2\times2-(3\times2)\right]}$

$= \frac{1}{2}$ square unit Ans.

Q10) A(6,0), B(−3,6) C(3,2).

Sol Area of triangle $= \frac{1}{2}\begin{vmatrix} 6 & 0 & 1 \\ -3 & 6 & 1 \\ 3 & 2 & 1 \end{vmatrix}$

$= 0$

so points ABC are collinear

Q11) As PQR are collinear so $\Delta PQR = 0$.

$\frac{1}{2}\begin{vmatrix} 3 & 2 & 1 \\ -1 & x & 1 \\ 7 & 3 & 1 \end{vmatrix} = 0$

$\begin{vmatrix} 3 & 2 & 1 \\ -1 & x & 1 \\ 7 & 3 & 1 \end{vmatrix} = 0$

$3(x-3)-2(-8)+1(-3-7x)=0$

$3x-9+16-3-7x=0$

$-4x+4=0$

$\boxed{x=1}$ So A B & C are collinear.

Q14) (ii) $l_1: x-2y-6=0$, $l_2: 3x-y+3=0$ & $l_3: 2x+y-4=0$.

for Point of $\cap$ of l_1 & l_2.

multiply l_1 by 3 then $l_1 - l_2$

$$3x-6y-18=0$$
$$\underline{\pm 3x \mp y \pm 3 = 0}$$
$$-5y-21=0$$

$\boxed{y = \frac{21}{-5}}$ put in l_2.

$3x + \frac{21}{5} + 3 = 0$

$3x = -\frac{21}{5} - 3$

$\boxed{x = \frac{12}{-5}}$. let $A(x,y) = A\left(\frac{-12}{5}, \frac{-21}{5}\right)$.

point of $\cap$ of l_2 & l_3.

$l_2 + l_3$

$$3x-y+3=0$$
$$\underline{2x+y-4=0}$$
$$5x-1=0$$

$\boxed{x = \frac{1}{5}}$ put in l_2.

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

$\frac{3}{5} + \frac{3}{1} = y$

$\boxed{y = \frac{18}{5}}$ let $B\left(\frac{1}{5}, \frac{18}{5}\right)$

point of $\cap$ of l_1 & l_3

$$2x - 4y - 12 = 0$$
$$\pm 2x \pm y \mp 4 = 0$$
$$-5y - 8 = 0$$

$-5y = 8$

$\boxed{y = -\frac{8}{5}}$ put y in l_1

$$x - 2\left(\frac{-8}{5}\right) - 6 = 0$$

$$x + \frac{16}{5} - 6 = 0$$

$\boxed{x = \frac{14}{5}}$ $C\left(\frac{14}{5}, \frac{-8}{5}\right)$

now Area of $\triangle ABC = \frac{1}{2}\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$

$$= \frac{1}{2}\begin{vmatrix} -\frac{12}{5} & -\frac{21}{5} & 1 \\ \frac{1}{5} & \frac{18}{5} & 1 \\ \frac{14}{5} & -\frac{8}{5} & 1 \end{vmatrix}$$

$= -16.9$

$= \boxed{+16.9 \text{ sq unit}}$

Q4) $l_1 : x+y+1 = 0$

$l_2 : x-y+1 = 0$

$l_3 : y = 0$

∴ ~~on x-axis~~

slope of x-axis is 0

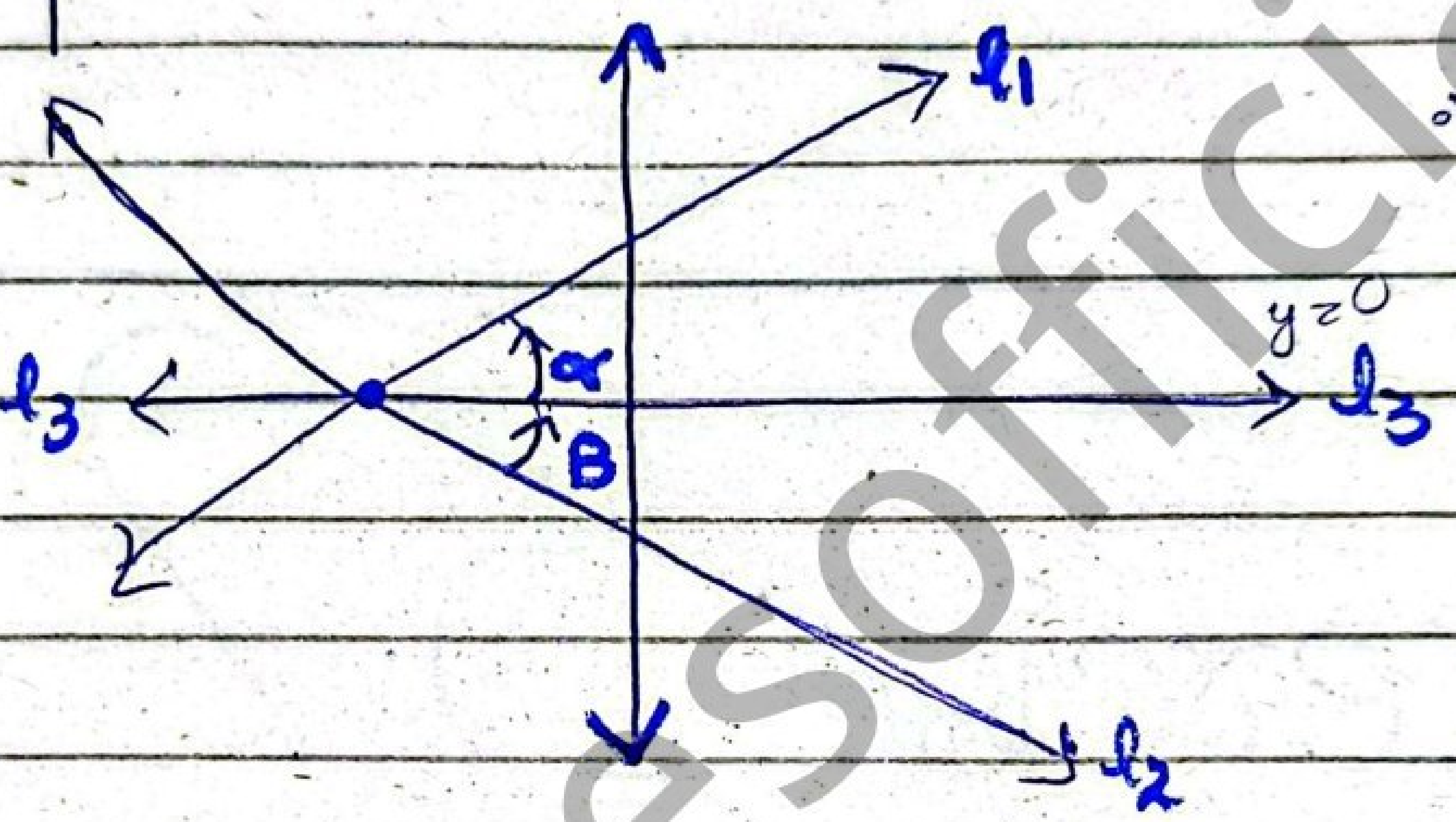
" " y axis is ∞.

Solution:- $\begin{vmatrix} 1 & 1 & 1 \\ 1 & -1 & 1 \\ 0 & 1 & 0 \end{vmatrix}$

expand by R_3

$= 0 - 1\begin{vmatrix} 1 & 1 \\ 1 & 1 \end{vmatrix} \Rightarrow = 0$ so l_1, l_2, l_3 are concurrent.

∴ move anticlockwise wise



Slope of l_1

$m_1 = \frac{-a}{b} = -\frac{1}{1} = -1$

Slope of l_2

$m_2 = \frac{-1}{-1} = 1$

slope of l_3

$m_3 = 0$

let α be the angle from l_3 to l_1

$$\tan\alpha = \frac{m_1 - m_3}{1 + m_1 m_3}$$

$$= \frac{-1-0}{-1+(-1)(0)}$$

$$= \boxed{-1} \Rightarrow \alpha = \tan^{-1}(-1) = \boxed{135^0}$$

∴ Concept:- Angle b/w two lines. ~~Jesmeller~~ First will to will be

From l_1 to $\boxed{l_2}$

∴ $\tan\theta = \frac{m_2 - m_1}{1 - m_2 m_1}$

From l_2 to l_1

∴ $\tan\theta = \frac{m_1 - m_2}{1 + m_1 m_2}$

let β be the angle from l_2 to l_3.

$$\tan\beta = \frac{m_3 - m_2}{1 + m_3 m_2}$$

$$= \frac{0 - 1}{1 + (0)(1)} = -1$$

$$\beta = \tan^{-1}(-1)$$

$\boxed{\beta = 135^{0}}$ Hence third line bisects them.

Exercise 6.1

Q12. (3,-4), (4,h) and (2,6) find h = ? Area = 10 sq. unit

Sol:- Area = $\frac{1}{2}\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$

$10 = \frac{1}{2}\begin{vmatrix} 3 & -4 & 1 \\ 4 & h & 1 \\ 2 & 6 & 1 \end{vmatrix}$

$10 = \frac{1}{2}\left(3\begin{vmatrix} h & 1 \\ 6 & 1 \end{vmatrix} + 4\begin{vmatrix} 4 & 1 \\ 2 & 1 \end{vmatrix} + \begin{vmatrix} 4 & h \\ 2 & 6 \end{vmatrix}\right)$

$10 = \frac{1}{2}\left(3(h-6) + 4(4-2) + 24 - 2h\right)$

$10 = \frac{1}{2}\left(3h - 18 + 8 + 24 - 2h\right)$

$10 = \frac{1}{2}\left[h - 10 + 24\right] \Rightarrow 10 = \frac{1}{2}\left[h + 14\right]$

$20 = h + 14 \Rightarrow \boxed{h = 6}$

Q13) (i) A(2,3) B(-3,-1) C(2,-1)

Sol Area = $\frac{1}{2}\begin{vmatrix} 2 & 3 & 1 \\ -3 & -1 & 1 \\ 2 & -1 & 1 \end{vmatrix}$

Area = $\frac{1}{2}(20) = \boxed{10 \text{ sq. unit}}$

(ii) A(1,3) B(-2,-3) C(4,-3)

Sol Area = $\frac{1}{2}\begin{vmatrix} 1 & 3 & 1 \\ -2 & -3 & 1 \\ 4 & -3 & 1 \end{vmatrix}$

Area = $\frac{1}{2}(36) = \boxed{18 \text{ square unit}}$

Q8) (i) A$\overset{x_1\ y_1}{(4,6)}$ B$\overset{x_2\ y_2}{(7,2)}$ C$\overset{x_3\ y_3}{(2,3)}$.

for) **Altitude:-**

$$\begin{vmatrix} 2-7 & 3-2 & -4(2-7)-6(3-2) \\ 4-2 & 6-3 & -7(4-2)-2(6-3) \\ 7-4 & 2-6 & -2(7-4)-3(2-6) \end{vmatrix}$$

$$\begin{vmatrix} -5 & 1 & 14 \\ 2 & 3 & -20 \\ 3 & -4 & 6 \end{vmatrix}$$

= 0 Hence altitude are concurrent

(ii) right bisector

$$\begin{vmatrix} 2-7 & 3-2 & -\frac{1}{2}(2^2-7^2)-\frac{1}{2}(3^2-2^2) \\ 4-2 & 6-3 & -\frac{1}{2}(4^2-2^2)-\frac{1}{2}(6^2-3^2) \\ 7-4 & 2-6 & -\frac{1}{2}(7^2-4^2)-\frac{1}{2}(2^2-6^2) \end{vmatrix}$$

$$\begin{vmatrix} -5 & 1 & 20 \\ 2 & 3 & -\frac{39}{2} \\ 3 & -4 & -\frac{1}{2} \end{vmatrix}$$

= 0 Hence right bisector are concurrent.

(iii) Median

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

= 0 Hence median are concurrent.

Q14) (ii) $4x - 5y + 7 = 0$ —(1) ; $x - 2 = 0$ —(2) & $y + 1 = 0$ —(3)

Solution:- • point of $\cap$ of l_1 & l_2

$\boxed{x = 2}$

put $x = 2$ in (1).

$4(2) - 5y + 7 = 0$

$15 - 5y = 0$

$15 = 5y \Rightarrow \boxed{y = 3}$ $A(2, 3)$

• point of $\cap$ of l_2 & l_3

$\boxed{x = 2}$, $\boxed{y = -1}$

$B(2, -1)$

• point of $\cap$ of l_1 & l_3

$\boxed{y = -1}$ put in (1) $4x - 5(-1) + 7 = 0$

$4x + 12 = 0$

$x = -\frac{12}{4} = -3 \Rightarrow \boxed{x = -3}$

$C(-3, -1)$

$$\text{Area} = \frac{1}{2}\begin{vmatrix} 2 & 3 & 1 \\ 2 & -1 & 1 \\ -3 & -1 & 1 \end{vmatrix}$$

$= \frac{1}{2}(-10) = -10 = 10$ sq unit.