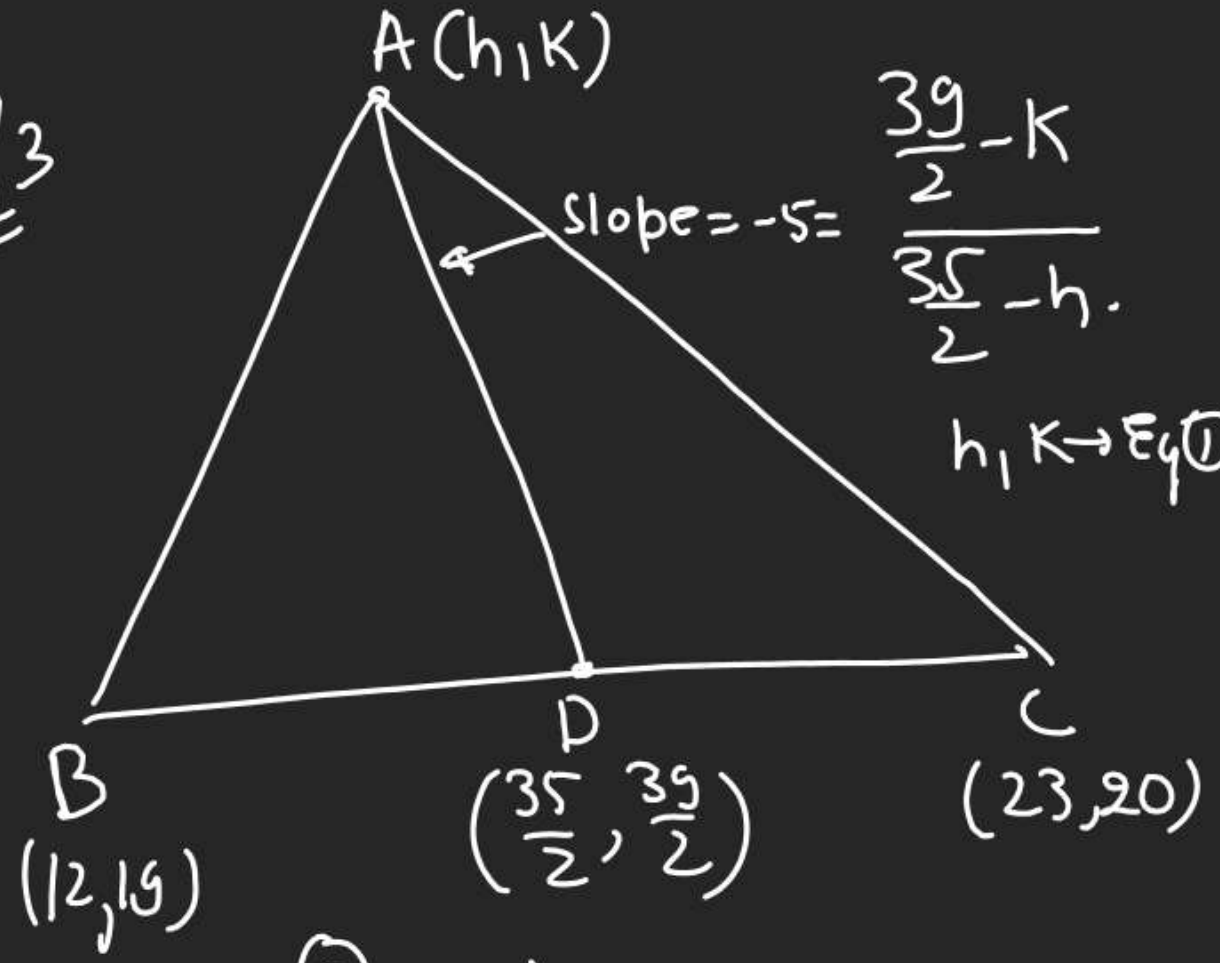
Nishant Jindal

DPP-2

VIQs Slope & angle betn 2 Lines.

Q3



$$\text{slope} = -5 = \frac{\frac{39}{2} - K}{\frac{35}{2} - h}.$$

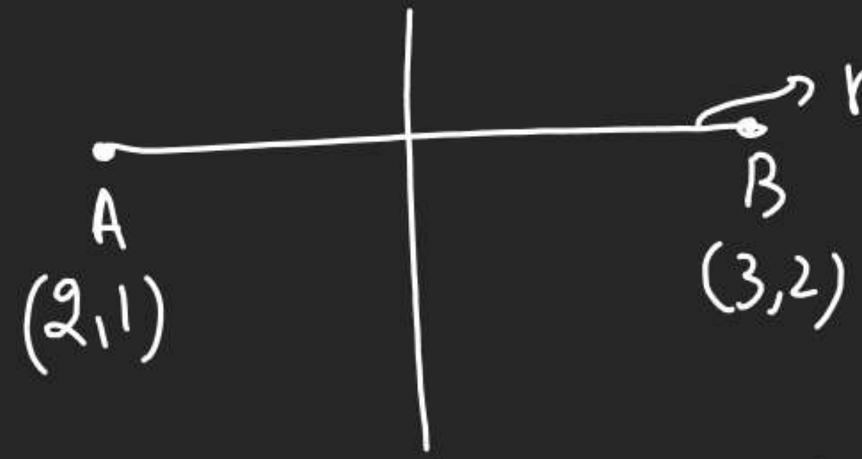
h, K → Eq(1)

(2) $\frac{1}{2}\begin{vmatrix} h & K \\ 12 & 19 \\ 23 & 20 \\ h & K \end{vmatrix} = \pm 70 \rightarrow$ Eq(2)

(+) & (−)

$(h, K) = (\quad)_{(+)} \;\&\; (\quad)_{(-)}$

(5)



$m_1 = \frac{2-1}{3-2} = 1$

$a^2x + (a+2)y + 2 = 0$

$m_2 = -\frac{(a^2)}{(a+2)}$

$-\frac{a^2}{(a+2)} \times 1 = -1$

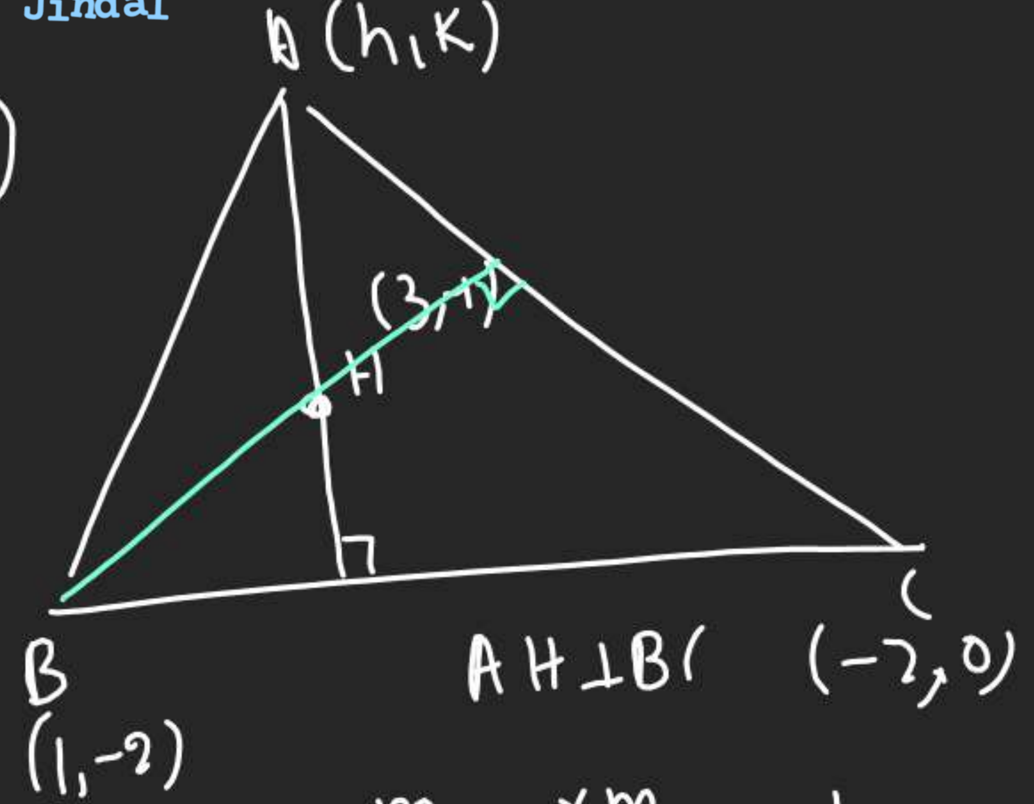
$a^2 = a + 2$

$a^2 - a - 2 = 0$

$(a-2)(a+1) = 0$

$a = 2, -1$

7)



AH ⊥ BC

$m_{AH}\times m_{BC}=-1$

$$\frac{K+1}{h-3}\times\frac{0+2}{-2-1}=-1$$

$$\frac{K+1}{h-3}=\frac{3}{2}$$

$$2K+2=3h-9\to (1)$$

Solve & Get (h, K)

BH ⊥ AC

$m_{BH}\times m_{AC}=-1$

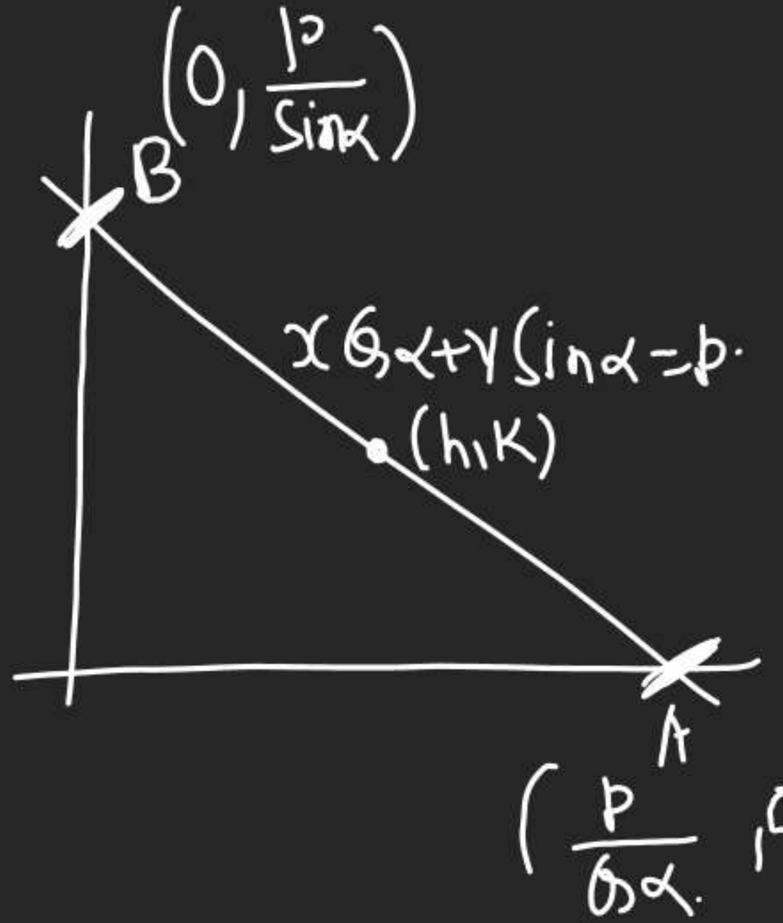
$$\frac{-1+2}{3-1}\times\frac{K-0}{h+2}=-1$$

$$\frac{K}{h+2}=-2$$

$$K=-2h-4$$

$$2h+K=-4\to (2)$$

(13)



Intercepted Betⁿ Axes

$$h=\frac{\frac{p}{\cos\alpha}+0}{2}$$

$$\frac{2h}{p}=\frac{1}{\cos\alpha}$$

$$\cos\alpha=\frac{p}{2h}$$

$$K=\frac{0+\frac{p}{\sin\alpha}}{2}$$

$$\sin\alpha=\frac{p}{2K}$$

$$\frac{p^2}{4x^2}+\frac{p^2}{4y^2}=1$$

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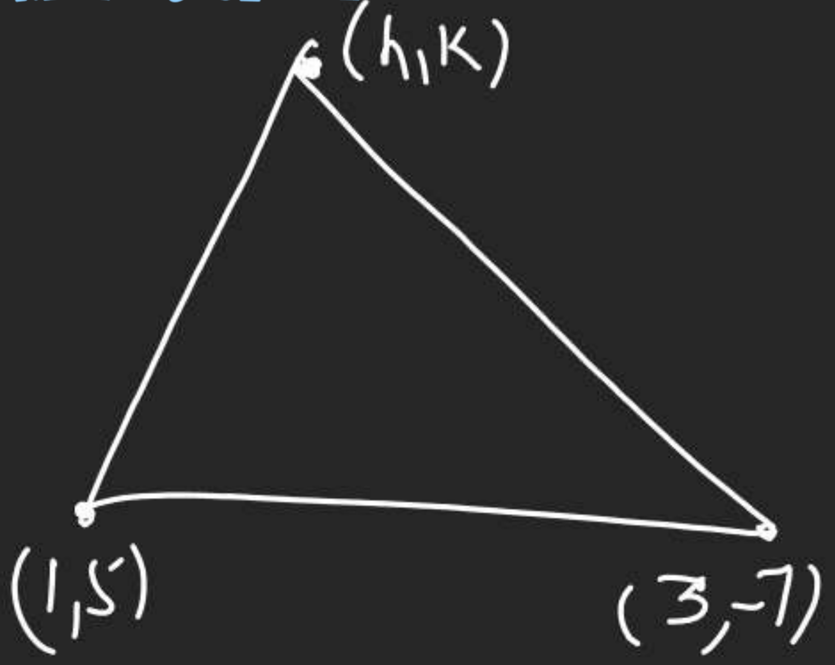
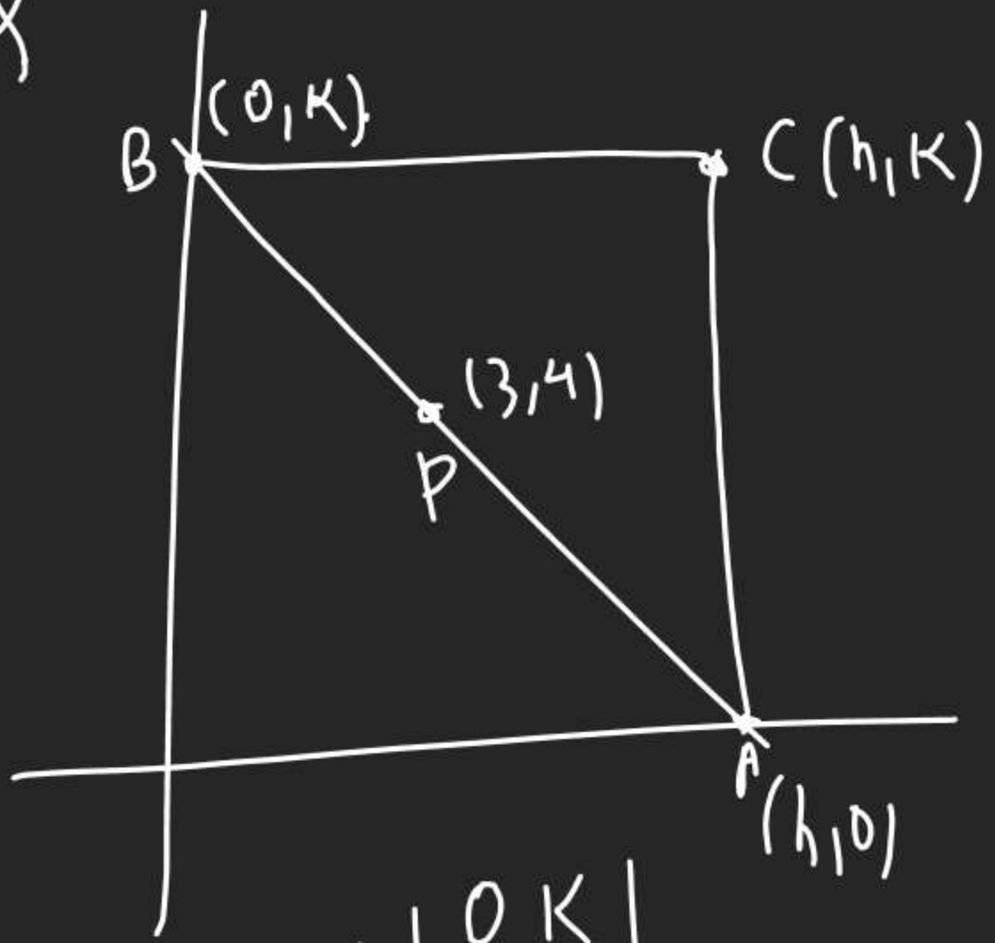


Area = 21

$$\frac{1}{2}\begin{vmatrix} h & K \\ 1 & 5 \\ 3 & -7 \\ h & K \end{vmatrix} = \pm 2$$

Q



$$\frac{1}{2}\begin{vmatrix} 0 & K \\ 3 & 4 \\ h & 0 \\ 3 & 4 \end{vmatrix} = 0$$

A, P, B collinear

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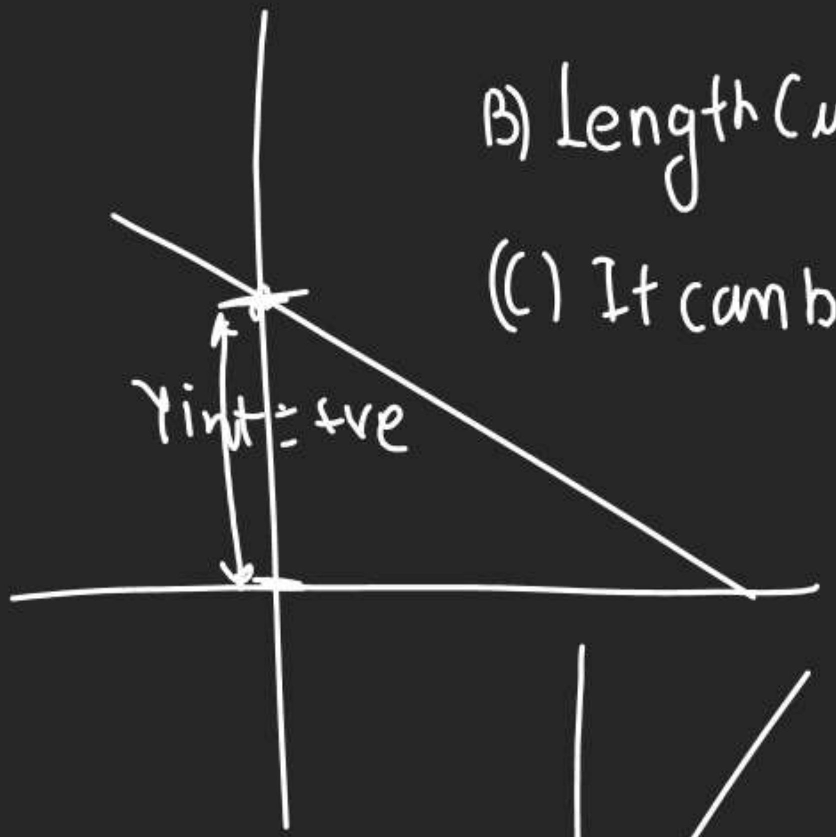
(C) Slope Intercept form.

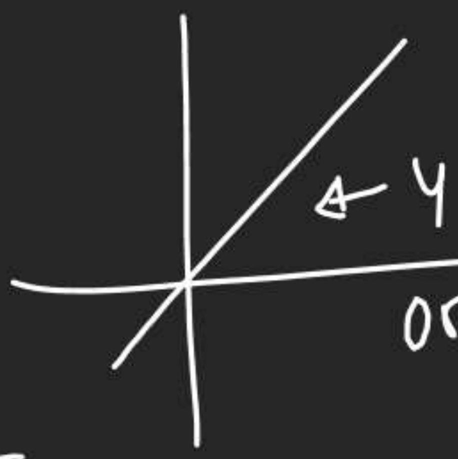
m
Y Intercept

(A) y Intercept Represent distance betⁿ PoI of Line & origin.

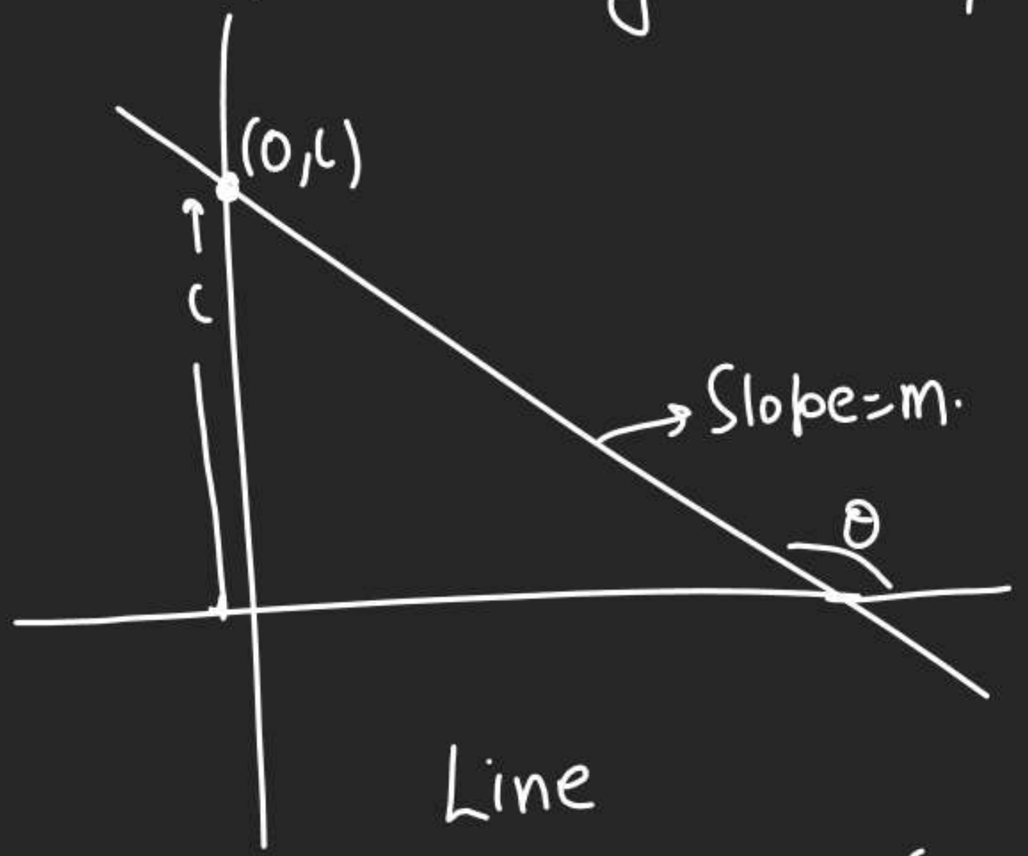
B) Length Cut by the line on Y Axis

(C) It can be +ve, -ve & Zero.





(D) Y intercept Normally shown by "c"



Line

$$(Y - c) = m\,(x - 0)$$

$$y - c = mx$$

(E) $\boxed{Y = mx + c}$ is Slope Int. form.

(F) $Y = mx$ Rep. line P.T. origin.

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Line $\perp^r$ & $\parallel^{re}$ $ax+by+c=0$

Line $ax+by+c=0$

$\parallel^{re}$ line $\rightarrow$ $ax+by+K=0$ (K can be find out using cond^n of Qs)

$\perp^r$ Line $bx-ay+K=0$

Coff of a & b Interchanged & Sign of y will be changed.

Q Line $3x-4y+7=0$
find Line $\perp^r$ / $\parallel^{re}$ to given line P.T. $(1,-2)$

A) $\parallel^{re}$ Line $3x-4y+K=0$ is P.T. $(1,-2)$

$3\times1-4\times-2+K=0$ $K=-11$

$3x-4y-11=0$

(B) $\perp^r$ Line to $3x-4y+7=0$

$4x+3y+K=0$ P.T. $(1,-2)$

$4\times1+3\times-2+K=0 \Rightarrow K=2$

$4x+3y+2=0$ is $\perp^r$ to $3x-4y+7=0$

Q Line $\perp^r$ to $x-y+2=0$ P.T. $(1,3)$

$\perp^r$ line $\rightarrow$ $x+y+K=0$ P.T. $(1,3)$

$1+3+K=0 \Rightarrow K=-4$

$y=mx+c$ $\therefore \perp^r$ line $x+y-4=0$

Q Find $\boxed{\text{Slope Intercept}}$ form of $3x-4y+5=0$

$4y=3x+5$

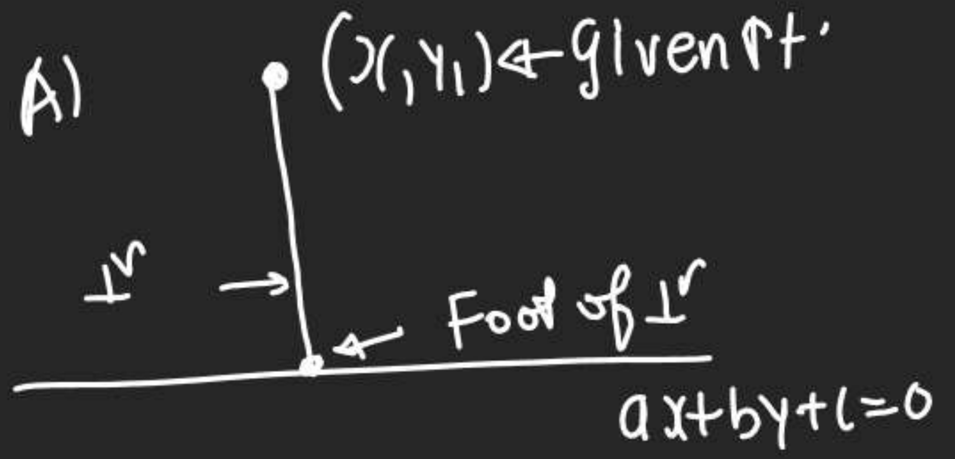
$y=\boxed{\frac{3}{4}}x+\boxed{\frac{5}{4}}$

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

$y\text{int}=c=5/4$

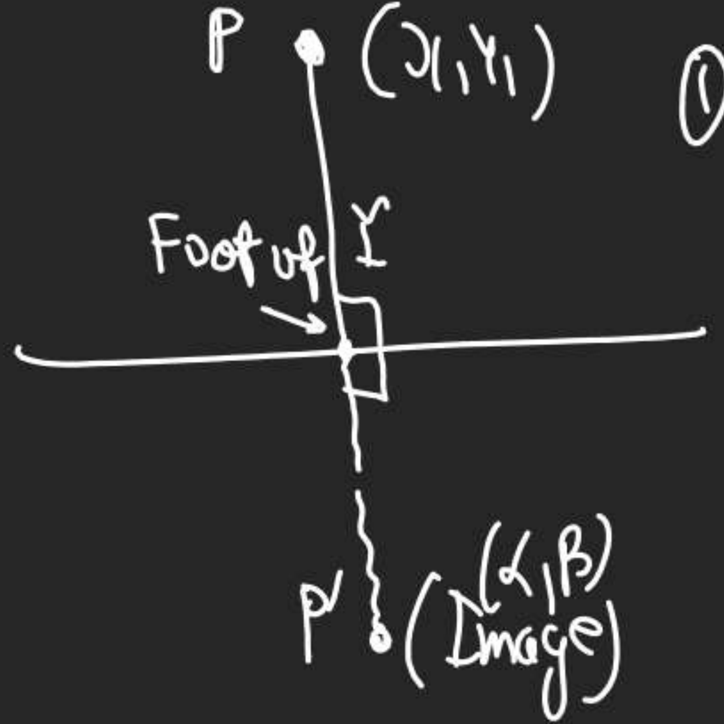
finding Image / Foot of ⊥r.

A)



Foot of ⊥r is PoI of Line & ⊥r Line.

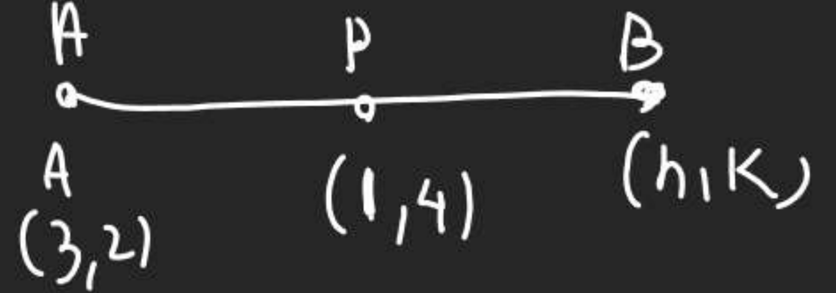
B)



① Image P' is at same distance of P & Line

② Foot of ⊥r = MP of PP'

Q



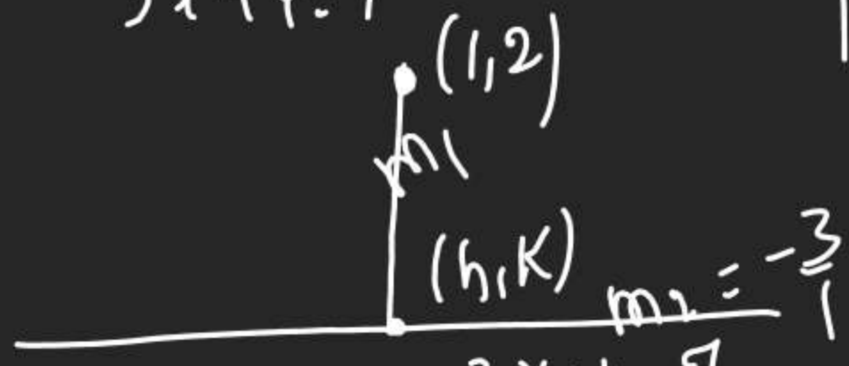
P is M.P. of AB find B = ?

$\frac{h+3}{2} = 1$ | $\frac{K+2}{2} = 4$

$h = -1$ | $K = 6$

$\therefore (h,K) = B = (-1,6)$

Q Find Foot of ⊥r of (1,2) in $3x+y=7$



$3x+y=7$

$3h+K=7$

① Let (h,K) is foot of ⊥r

② $m_1 = \frac{K-2}{h-1}$

③ $m_2 = -3$ | $h = \frac{8}{5}$

④ $m_1 \times m_2 = -1$ | $K = \frac{11}{5}$

$\frac{K-2}{h-1} \times +3 = +1$

$3K-6 = h-1$

$h-3K = -5 \rightarrow$ Ⓐ

$3h+K = 7 \quad \times 3$

$-9h - 3K = -21$

$h \mp 3K = \mp 5$

$-10h = -16$

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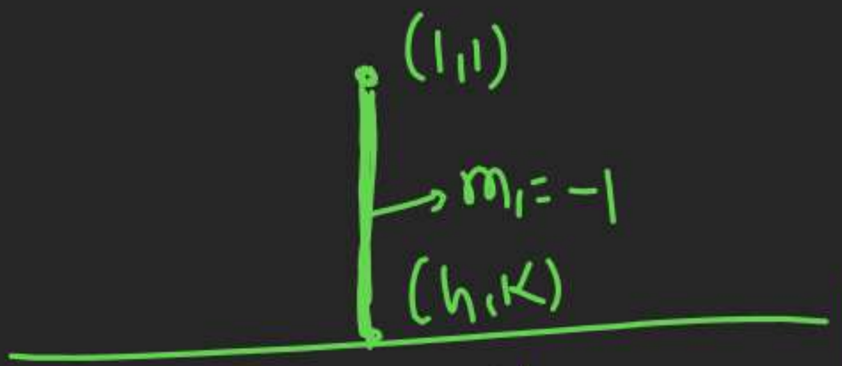
Foot :→ $m_1 \times m_2 = -1 \rightarrow Eq^{①}$ in (h,k)

Eq of L using (h,k) & eq ②

Solve (h,k) Foot of $\perp^r$.

Q. Find Foot of $\perp^r$ of $(1,1)$ in Line $x-y+1=0$



$x-y+1=0$

$m_2=1$

$h-k+1=0$

$\frac{k-1}{h-1} \times 1 = -1$

$k-1 = 1-h$

$h+k=2$

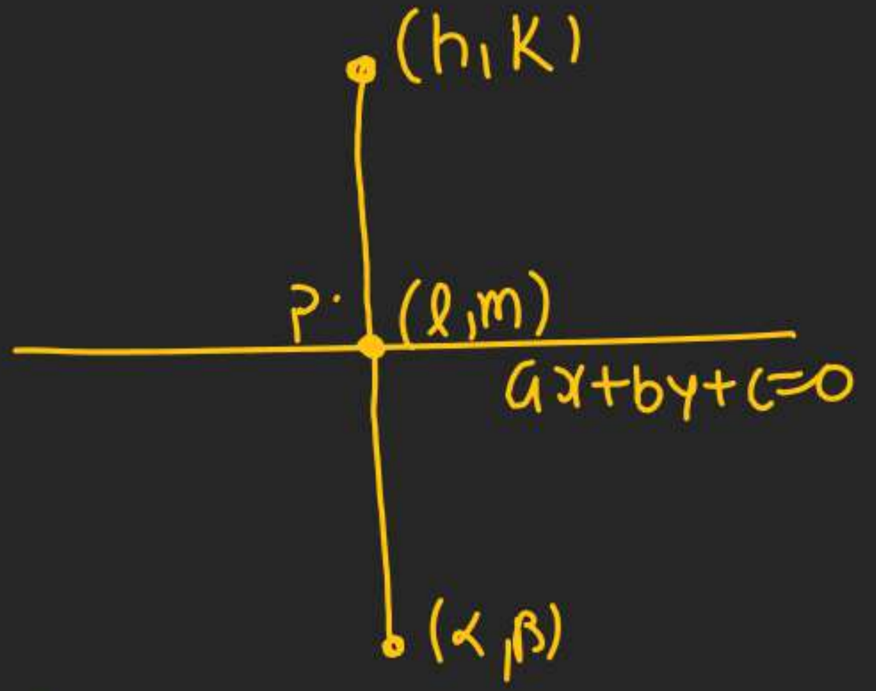
$h-k=-1$

$2h=1$

$h=\frac{1}{2}, k=\frac{3}{2}$

$\left(\frac{1}{2},\frac{3}{2}\right)$

Formula for Foot of $\perp^r$ & Image



$$\frac{l-h}{a} = \frac{m-k}{b} = -\frac{(ah+bk+c)}{a^2+b^2}$$

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Q Foot of $\perp^r$ of $(1,1)$ on Line $x-y+1=0$

let Foot of $\perp^r$ is (x,y)

$$\frac{x-1}{1}=\frac{y-1}{-1}=\frac{-(\cancel{1\times1}-\cancel{1\times1}+1)}{1^2+(-1)^2}$$

$x-1=-\frac{1}{2}$ | $y-1=\frac{1}{2}$

$x=\frac{1}{2}$ | $y=\frac{3}{2}$

$\therefore$ Foot $\left(\frac{1}{2},\frac{3}{2}\right)$

Q Foot of $\perp^r$ of $(1,2)$ in $3x+y=7$

Foot of $\perp^r$ in (x,y) (let)

$$\frac{x-1}{3}=\frac{y-2}{1}=\frac{-(3\times1+1\times2-7)}{3^2+1^2}$$

$$\frac{x-1}{3}=\frac{y-2}{1}=\frac{\cancel{2}\,1}{\cancel{10}\,5}$$

$x-1=\frac{3}{5}$ | $y-2=\frac{1}{5}$

$x=\frac{8}{5}$ $y=\frac{11}{5}$

$\left(\frac{8}{5},\frac{11}{5}\right)$

Q Image of $(1,2)$ in $3x+y=7$

$$\frac{x-1}{3}=\frac{y-2}{1}=\frac{-2(3\times1+1\times2-7)}{3^2+1^2}$$

$$\frac{x-1}{3}=\frac{y-2}{1}=\frac{\cancel{4}\,2}{\cancel{10}\,5}$$

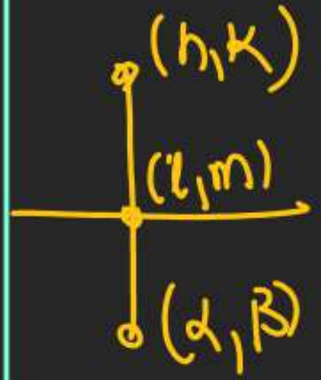
$x-1=\frac{6}{5}$ | $y-2=\frac{2}{5}$

$x=\frac{11}{5}$ | $y=\frac{12}{5}$

Image Without Using Formula.

Step 1 → find Foot of $\perp^r$ → (l, m)

Step 2 → Assume Image $= (\alpha, \beta)$



$$\frac{\alpha + h}{2} = l \quad \Big| \quad \frac{\beta + K}{2} = m.$$

Q Find Eqn of $\perp^r$ Bisector of $A(3,4)$, $B(-1,2)$

$$m_{AB} = \frac{2-4}{-1-3} = \frac{-2}{-4} = \frac{1}{2}$$

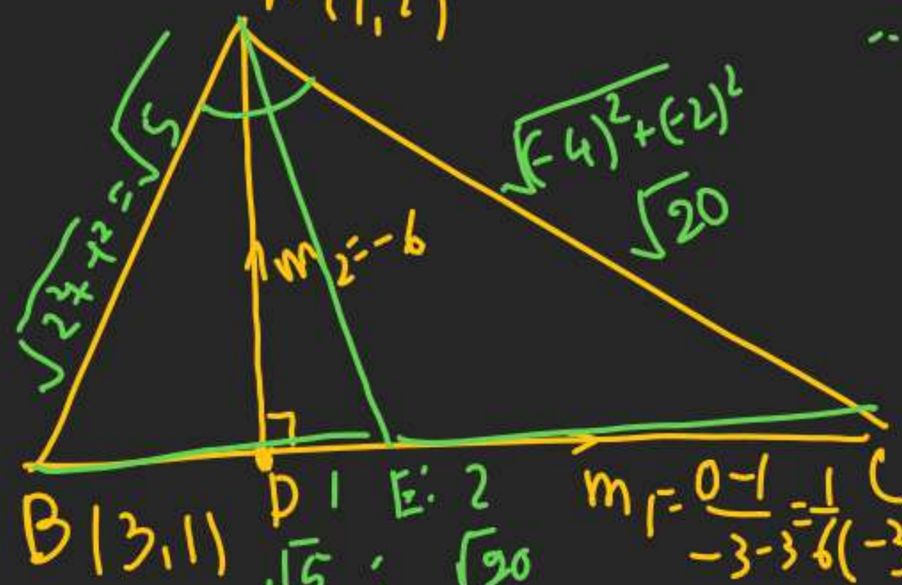
$\perp^r$ Bisector $m_1 = -2$

EOL → $(y-3) = -2(x-1)$

$y - 3 = -2x + 2$

$2x + y = 5$

Q



$$m_1 = \frac{0-1}{-3-3} = \frac{1}{6}$$

① Altitude from A

AD → $(y-2) = -6(x-1)$

$6x + y = 8$

② Internal Angle Bisector of A

AE ?

E divides BC in $\sqrt{5} : \sqrt{20}$

$1 : 2$

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

∴ A(1,2) —— $E\left(1, \frac{2}{3}\right)$

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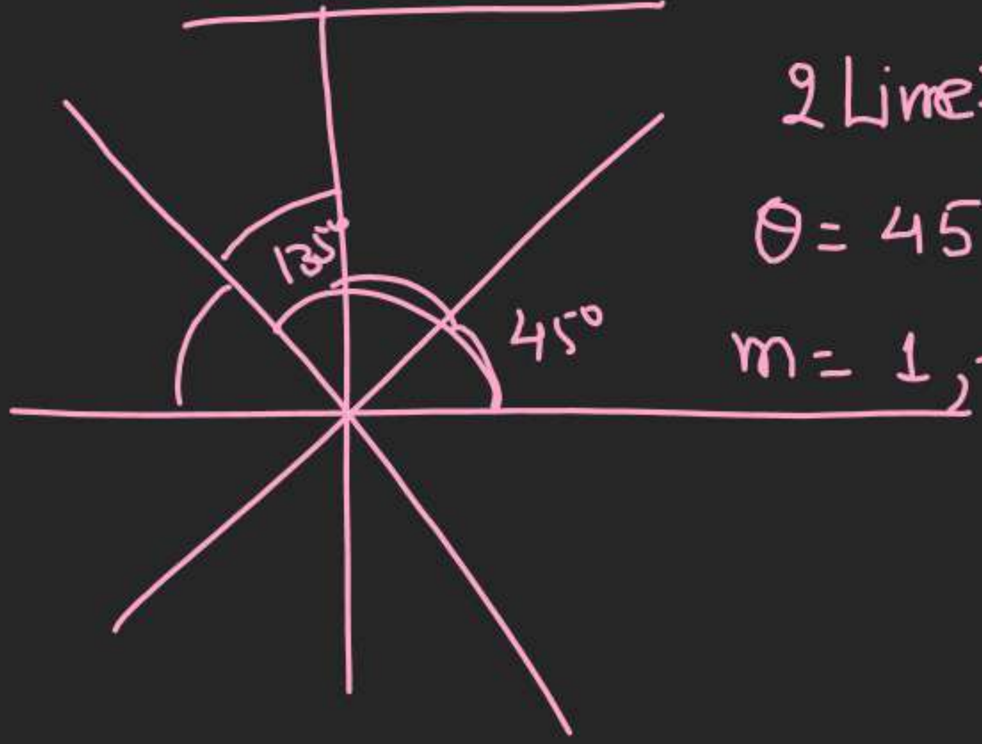
Concept:

① When Line make equal angle with both axes. → $m = \pm 1$



2 Lines Psbl

$\theta = 45° / 135°$

$m = 1, -1$

② When Line cut equal Intercept:

$\theta = 135°$

$m = -1$