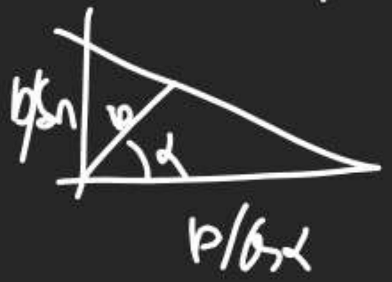
Nishant Jindal

① $ax+by+c=0$ Gen. Eq

② $y=mx+c \rightarrow$ Slope-Int

③ $\frac{x}{a}+\frac{y}{b}=1 \rightarrow$ D. Inter

④ $x\cos\alpha+y\sin\alpha=p \rightarrow$ Nor.



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

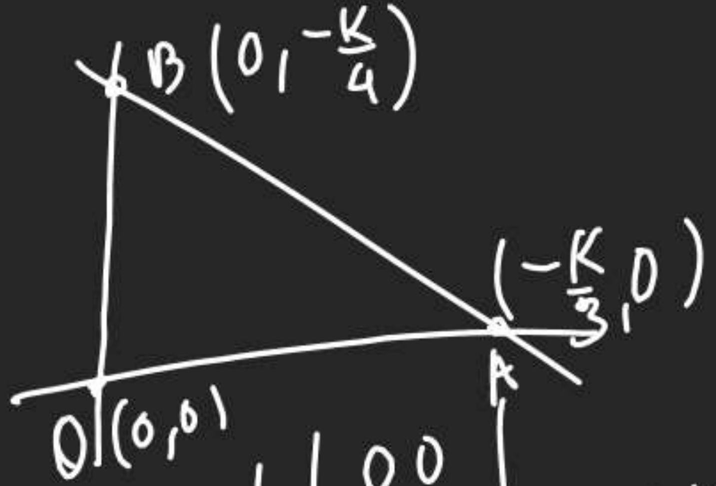
(6) $y-y_1=\frac{y_2-y_1}{x_2-x_1}(x-x_1)$

(7) $\tan\theta=\left|\frac{m_1-m_2}{1+m_1m_2}\right|$

(1) Find EOL $\parallel^{r}$ to $3x+4y+4=0$ & make Δ with coaxes of area 24 sq units.

Line $\parallel$ to $3x+4y+4=0$

$3x+4y+K=0$



$$\frac{1}{2}\begin{vmatrix} 0 & 0 \\ -\frac{K}{3} & 0 \\ 0 & -\frac{K}{4} \\ 0 & 0 \end{vmatrix}=\pm 24$$

$0+\frac{K^2}{12}+0=\pm 48$

$K^2=\pm 12\times 48$

$K^2=\pm 12\times 12\times 2\times 2$

$K=\pm 12\times 2$

$K=24,-24$

∴ EOL

$3x+4y+24=0$

$3x+4y-24=0$

Q EOL $\perp^{r}$ to $3x+4y+7=0$ P.T. $(1,1)$

$\perp^{r}$ $4x-3y+K=0$

$(1,1)$

$4-3+K=0$

$K=-1$

$4x-3y-1=0$ Ans

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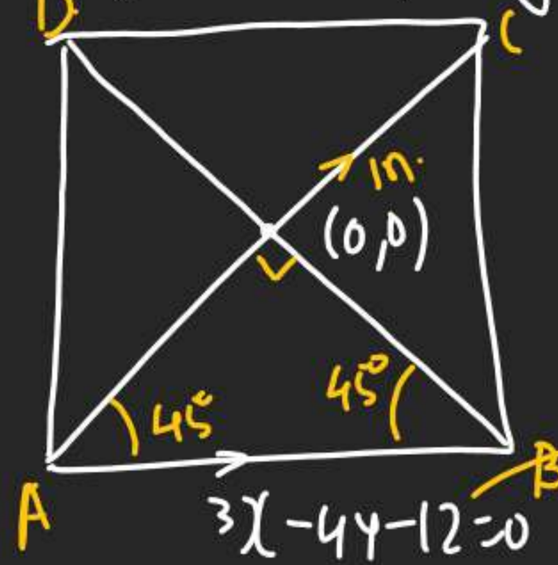
Q3. If One Side of sqr is $3x-4y-12=0$ & Centre is $(0,0)$ find Eqn of diagonal?

good



Diagonal AC, BD

$$\tan 45° = \left|\frac{\frac{3}{4} - m}{1 + \frac{3m}{4}}\right| = 1$$

$$\left|\frac{3}{4} - m\right| = \left|1 + \frac{3m}{4}\right|$$

$$\frac{3}{4} - m = \pm\left(1 + \frac{3m}{4}\right)$$

(+) $\frac{3}{4} - m = 1 + \frac{3m}{4}$

$\frac{7m}{4} = -\frac{1}{4}$

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

(−) $\frac{3}{4} - m = -1 - \frac{3m}{4}$

$+\frac{m}{4} = +\frac{7}{4}$

$\boxed{m = 7}$

AC → $(y-0) = 7(x-0) \Rightarrow 7x - y = 0$

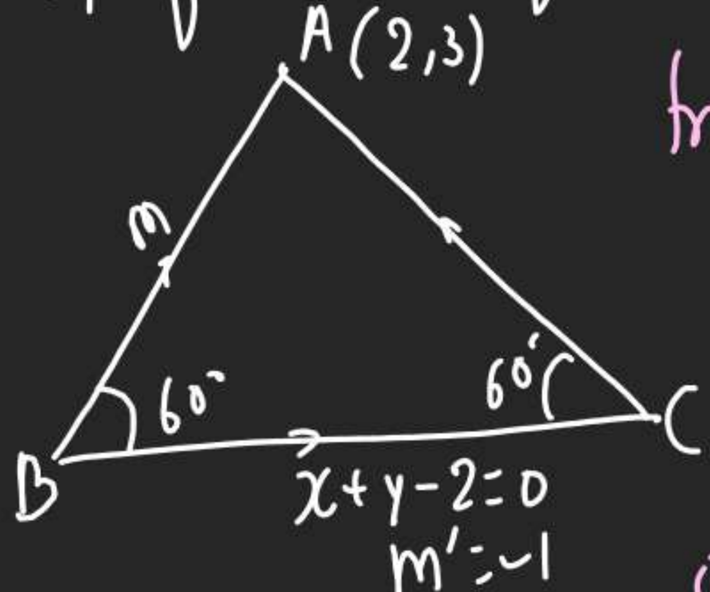
BD → $y - 0 = -\frac{1}{7}(x-0)$

$x + 7y = 0$

1) Coord Geometry need Lots of hard Work

2) Once it is started then no need to Work hard any More.

Q4 Vertex of eql Δ is (2,3) Eqn of opp side is $x+y=2$ Eqn of other sides of Δ are?



$$\tan 60° = \left|\frac{m+1}{1+m\times -1}\right|$$

$$\sqrt{3} = \frac{|m+1|}{|1-m|}$$

$$\sqrt{3}(1-m) = \pm(m+1)$$

(+) $\sqrt{3} - \sqrt{3}m = m+1$

$m(1+\sqrt{3}) = \sqrt{3}-1$

$m = \frac{\sqrt{3}-1}{\sqrt{3}+1}$

$(y-3) = 2-\sqrt{3}(x-2)$

(−) $\sqrt{3} - \sqrt{3}m = -m-1$

$m(1-\sqrt{3}) = -1-\sqrt{3}$

$m = \frac{1+\sqrt{3}}{\sqrt{3}-1} = 2+\sqrt{3}$

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

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(5) A Ray of light is sent

along Line $x-2y-3=0$

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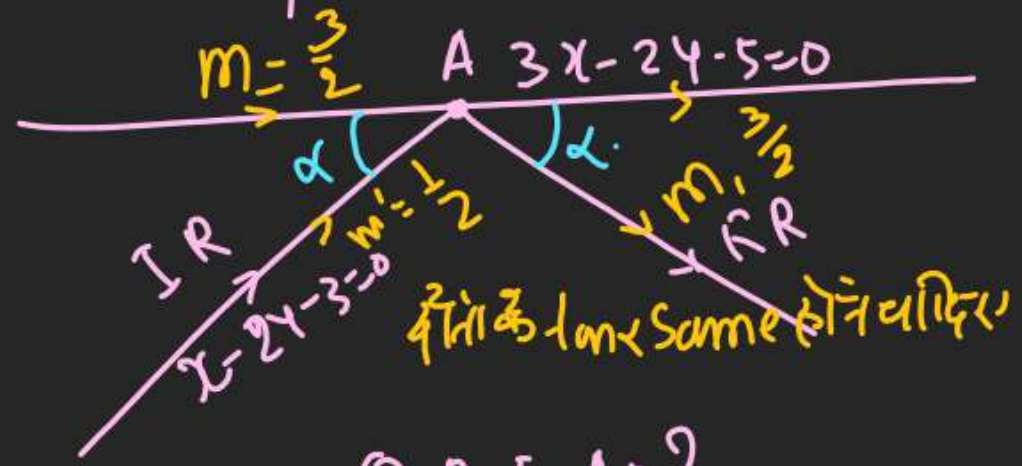
Q(5) A Ray of light is sent along Line $x-2y-3=0$ upon reaching the line $3x-2y-5=0$ Ray is Reflected from it Find Reflected Ray.



(1) PoI A = ?

$$3x-2y-5=0$$
$$-x+2y+3=0$$
$$2x=2$$
$x=1, y=-1$
$(1,-1)$

(2) $\tan\alpha = \left|\dfrac{\frac{3}{2}-\frac{1}{2}}{1+\frac{3}{2}\times\frac{1}{2}}\right| = \left|\dfrac{m_1-\frac{3}{2}}{1+\frac{3m_1}{2}}\right|$

$$\frac{4}{7} = \left|\frac{m_1-3/2}{1+\frac{3m_1}{2}}\right|$$

$$4\left(1+\frac{3m_1}{2}\right) = \pm 7\left(m_1-\frac{3}{2}\right)$$

(+) $4+6m = 7m_1 - \frac{21}{2}$

$m_1 = \frac{29}{2}$

(−) $4+6m = -7m + \frac{21}{2}$

$13m_1 = \frac{13}{2}$

$m_1 = \frac{1}{2}$ (✗)

(3) RR

$(y+1) = \frac{29}{2}(x-1)$

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

ये तो IR की Slope है

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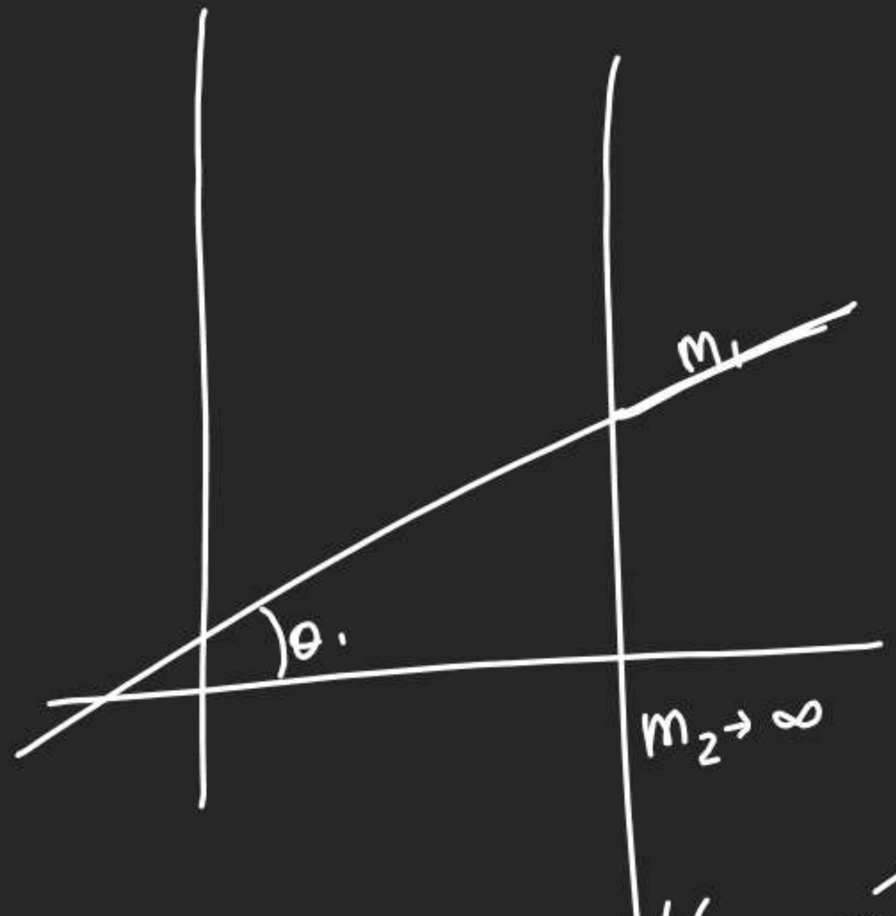
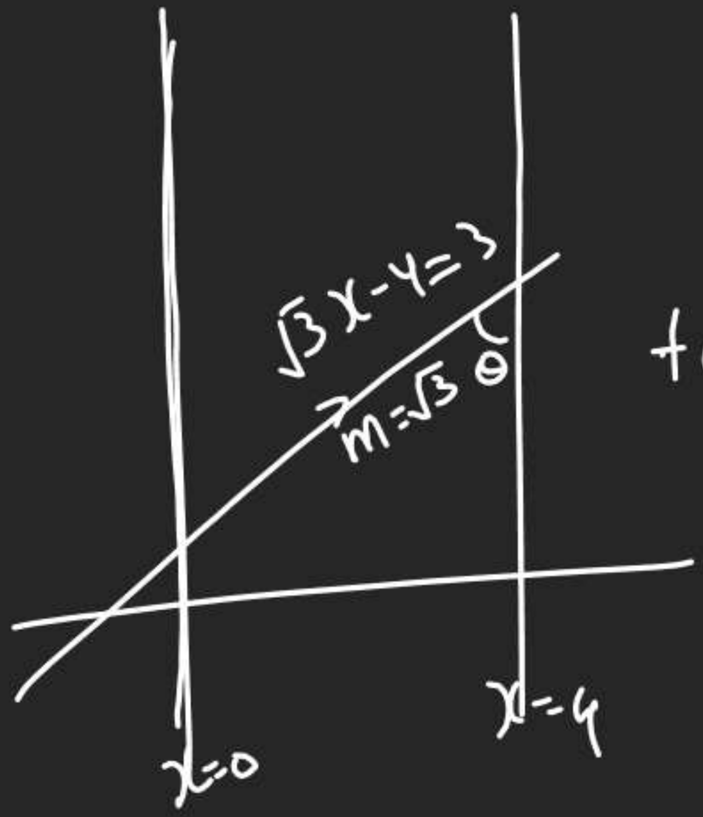
Angle betn 2 Lines When 1 Line is ll to y Axis



$$\tan\theta = \left|\frac{(m_1 - m_2)}{(1 + m_1 m_2)}\right| \quad \frac{\infty}{\infty}$$

$$= \left|\frac{m_2\left(\cancel{\frac{m_1}{m_2}} - 1\right)}{m_2\left(\cancel{\frac{1}{m_2}} + m_1\right)}\right| = \left|\frac{-1}{m_1}\right| = \frac{1}{|m_1|}$$

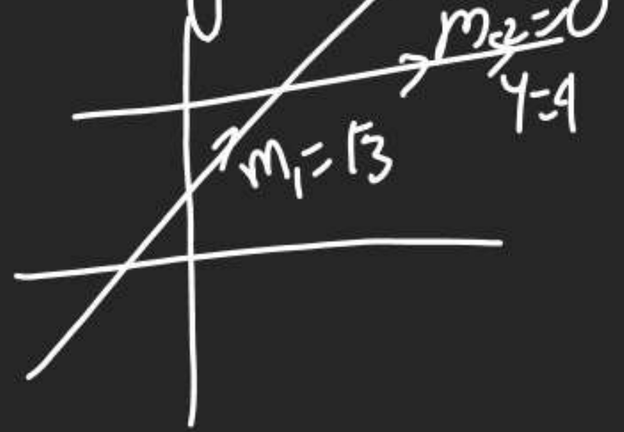
Q Find angle betn Lines $\sqrt{3}x - y - 3 = 0$ & $x = 4$



$$\tan\theta = \left(\frac{1}{\sqrt{3}}\right) = \frac{1}{\sqrt{3}}$$

$$\theta = \tan^{-1}\frac{1}{\sqrt{3}} = \frac{\pi}{6} = 30^\circ$$

Q1 Find angle betn $\sqrt{3}x - y - 3 = 0$ & $y = 4$



$$\tan\theta = \left|\frac{\sqrt{3} - 0}{1 + \sqrt{3} \times 0}\right| = \sqrt{3}$$

$$\theta = 60^\circ$$

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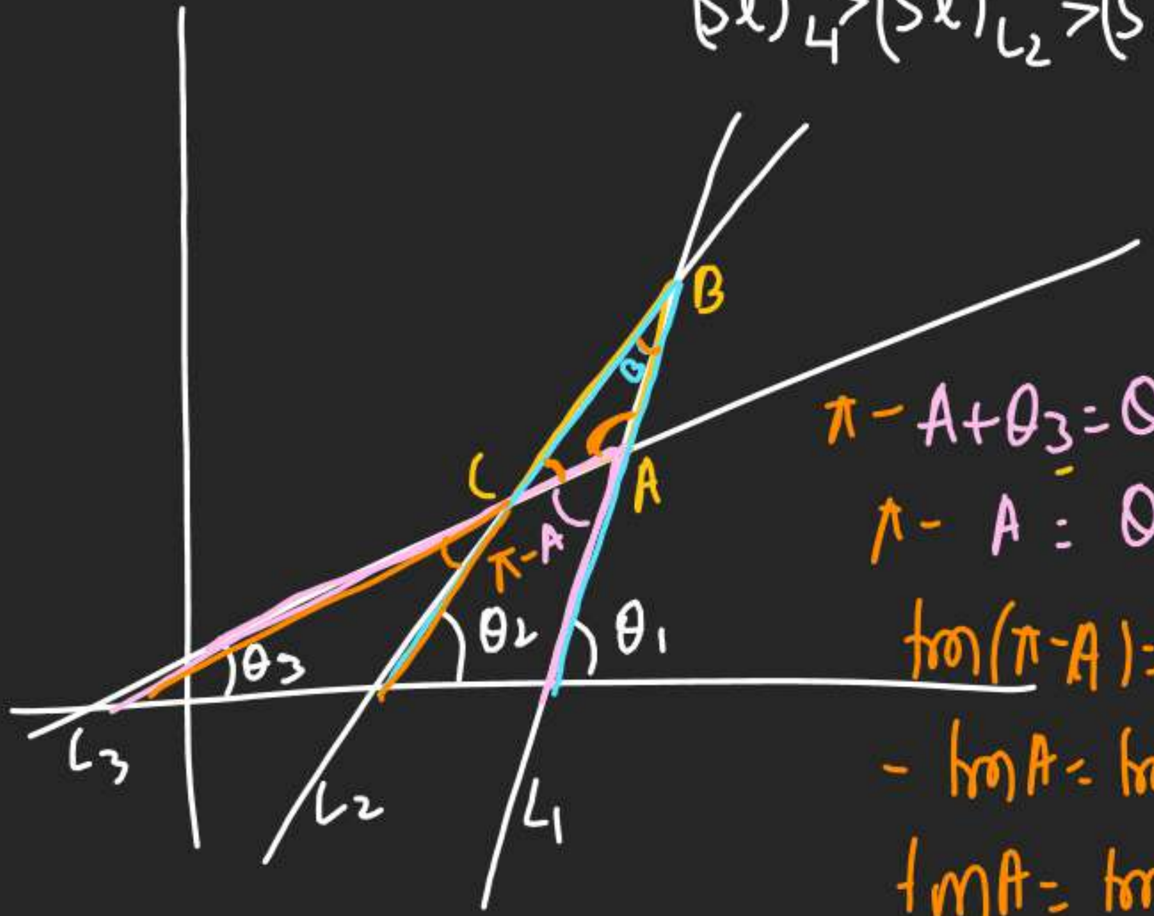
Tangent of Interior Angles formed by 3 given Lines

① Arrange Lines L_1, L_2, L_3 according to decreasing order of slope

$(Sl)_{L_1} > (Sl)_{L_2} > (Sl)_{L_3}$

$\tan A, \tan B, \tan C \to$ या तो तीनों +ve

या 2 +ve एक -ve



$\pi - A + \theta_3 = \theta_1$

$\pi - A = \theta_1 - \theta_3$

$\tan(\pi - A) = \tan(\theta_1 - \theta_3)$

$-\tan A = \tan(\theta_1 - \theta_3)$

$\tan A = \tan(\theta_3 - \theta_1)$

$= \dfrac{\tan\theta_3 - \tan\theta_1}{1 + \tan\theta_3 \cdot \tan\theta_1}$

$\tan A = \left|\dfrac{m_3 - m_1}{1 + m_1 m_3}\right|$

$B + \theta_2 = \theta_1$

$\tan B = \tan(\theta_1 - \theta_2)$

$= \dfrac{\tan\theta_1 - \tan\theta_2}{1 + \tan\theta_1 \cdot \tan\theta_2}$

$\tan B = \left|\dfrac{m_1 - m_2}{1 + m_1 m_2}\right|$

$C + \theta_3 = \theta_2$

$\tan C = \tan(\theta_2 - \theta_3)$

$= \dfrac{\tan\theta_2 - \tan\theta_3}{1 + \tan\theta_2 \cdot \tan\theta_3}$

$\tan C = \left|\dfrac{m_2 - m_3}{1 + m_2 m_3}\right|$

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Q8 If a $\triangle ABC$ is formed by

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Q8 If a $\triangle ABC$ is formed by Lines

$L_1: 2x+y-3=0$, $L_2: 3x-y+1=0$

$L_3: x-y+5=0$ then obtain a Cubic Eq^n whose roots are tangents of Interior Angle of $\triangle$.

(1) पहले m निकालो

$m=-2$ $m=3$ $m=1$

(2) Now decide $m_1\, m_2\, m_3$

$m_1=3$ $m_2=1$ $m_3=-2$

(3) $\tan A = \frac{m_1-m_2}{1+m_1m_2} = \frac{3-1}{1+3\times1}$

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

$\tan B = \frac{m_2-m_3}{1+m_2m_3}$

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

$\tan C = \frac{m_3-m_1}{1+m_3m_1}$

$\gamma = \frac{-2-3}{1+-2\times3} = \frac{-5}{-5} = 1$

Cubic Eqn.

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

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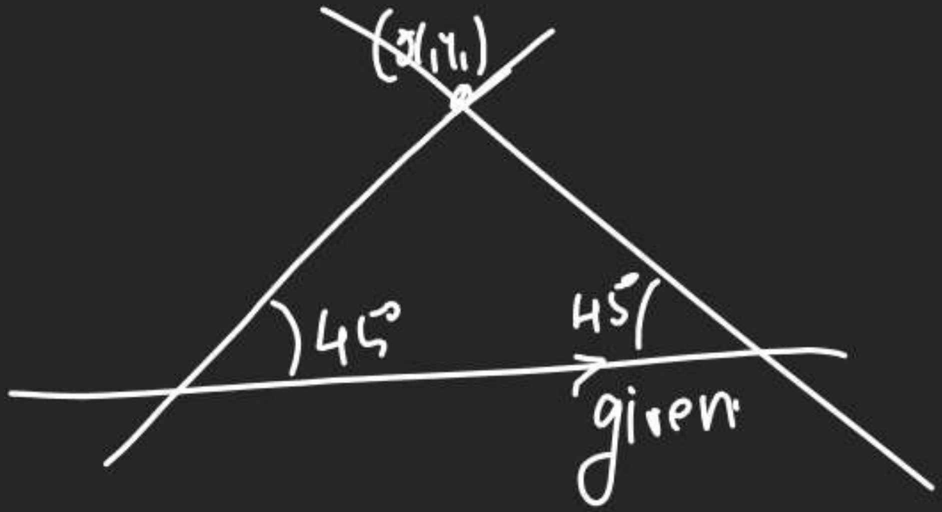
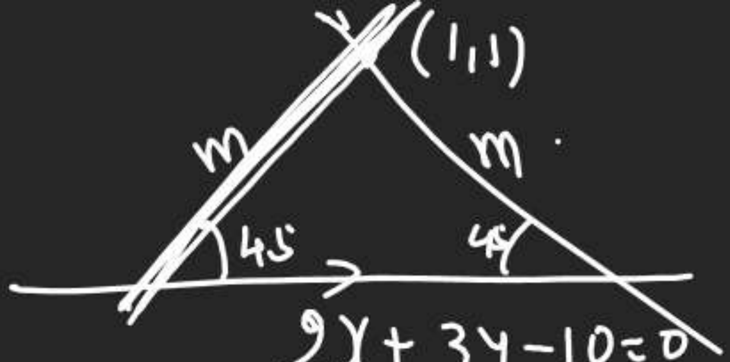
Karate Prob

Line Di hogi

Us line se Line जो θ Angle बनाते हुए जा रही होगी पूछी जाएगी



Q9 EOLPT. (1,1) makes an angle of 45° with Line $2x+3y=10$?



$2x+3y-10=0$

$m' = -\frac{2}{3}$

$$\tan 45° = \left|\frac{m-\left(-\frac{2}{3}\right)}{1+m\left(-\frac{2}{3}\right)}\right|$$

$$1 = \frac{\left|m+\frac{2}{3}\right|}{\left|1-\frac{2m}{3}\right|}$$

$$\left(1-\frac{2m}{3}\right) = \pm\left(m+\frac{2}{3}\right)$$

$\oplus$ $1-\frac{2m}{3} = m+\frac{2}{3}$

$\frac{5m}{3} = \frac{1}{\cancel{3}}$

$m = \frac{1}{5}$

$\ominus$ $1-\frac{2m}{3} = -m-\frac{2}{3}$

$\frac{m}{\cancel{3}} = \frac{-5}{\cancel{3}}$

$m = -5$

$(y-1) = \frac{1}{5}(x-1)$ | $y-1 = -5(x-1)$

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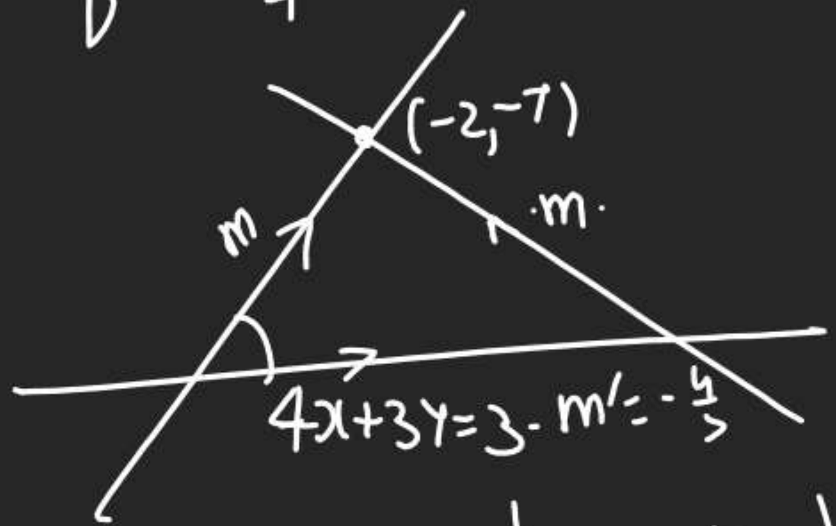
Q EOLPT $(-2,-7)$ makes an angle of $\tan^{-1}\frac{3}{4}$ with Line $4x+3y=3$.



$$\tan\left(\tan^{-1}\frac{3}{4}\right) = \left|\frac{m+\frac{4}{3}}{1-\frac{4m}{3}}\right|$$

$$\frac{3}{4} = \left|\frac{m+\frac{4}{3}}{1-\frac{4m}{3}}\right|$$

$$3\left(1-\frac{4m}{3}\right) = \pm 4\left(m+\frac{4}{3}\right)$$

$\oplus$ $3-4m = 4m+\frac{16}{3}$

$8m = -\frac{7}{3} \Rightarrow m = -\frac{7}{24}$

$y+7 = -\frac{7}{24}(x+2)$

$\ominus$ $3-4m = -4m-\frac{16}{3}$

$4m-4m-\frac{16}{3}-3=0$

$(4-4)m-\frac{25}{3}=0$

$0\cdot m = \frac{25}{3}$

$m \to \infty$

$(y+7) = \frac{1}{0}(x+2)$

$x=-2 \to (2)$

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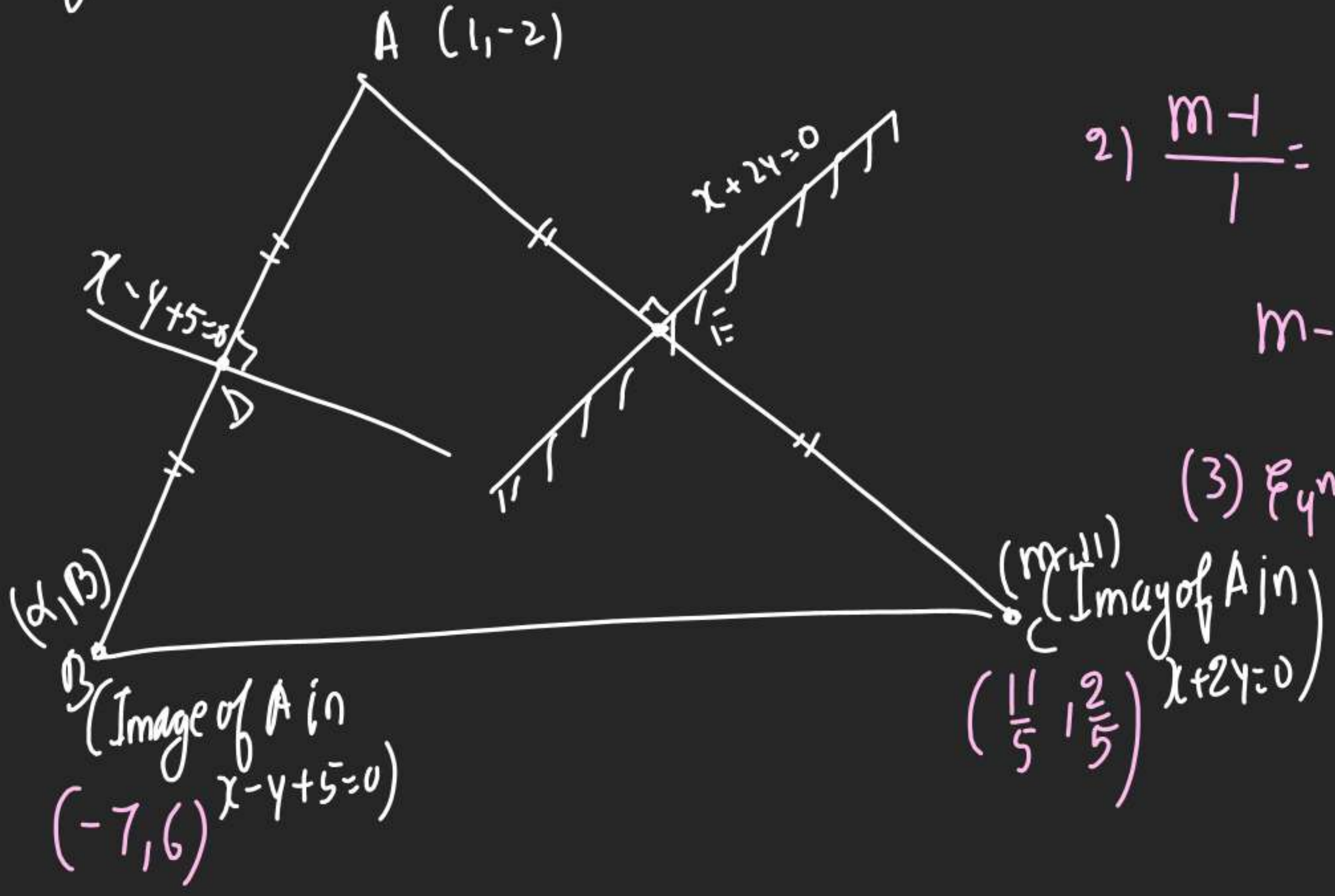
Q11 Eq^n of ⊥^r Bisectors of Sides AB & AC of ΔABC are $x-y+5=0$ & $x+2y=0$. If vertex is $A(1,-2)$ find Eq^n of BC



1) $\dfrac{\alpha-1}{1}=\dfrac{\beta+2}{-1}=\dfrac{-2(1\times1+-1\times-2+5)}{1^2+(-1)^2}=-8$

$\alpha-1=-8 \Rightarrow \alpha=-7$ | $\beta+2=8 \Rightarrow \beta=6$

2) $\dfrac{m-1}{1}=\dfrac{n+2}{2}=\dfrac{-2(1\times1+2\times-2+0)}{1^2+2^2}=\dfrac{6}{5}$

$m-1=\dfrac{6}{5} \Rightarrow m=\dfrac{11}{5}$ | $\dfrac{n+2}{2}=\dfrac{6}{5} \Rightarrow n=\dfrac{12}{5}-2=\dfrac{2}{5}$

(3) Eq^n of BC

$(y-6)=\dfrac{\frac{2}{5}-6}{\frac{11}{5}+7}(x+7)$

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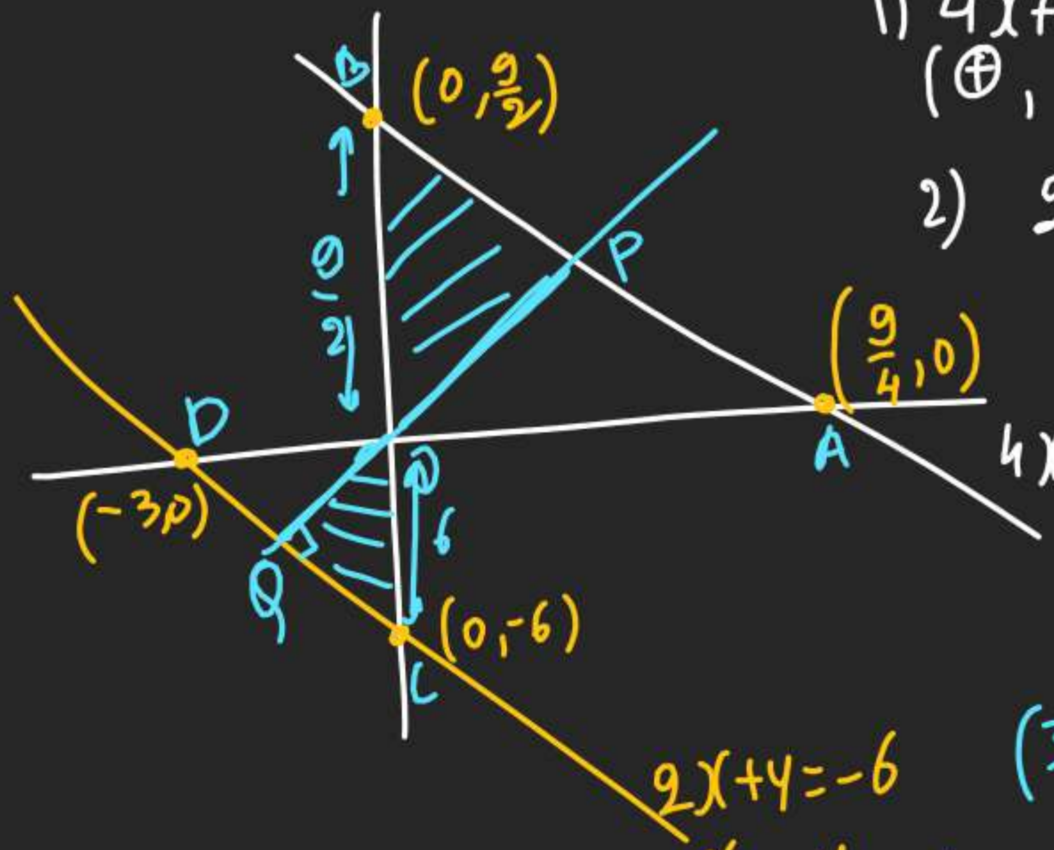
Q12 If a line P.T. origin meets $\parallel^{rd}$ Lines $4x+2y=9$ & $2x+y+6=0$ at P & Q then O divides PQ in Ratio?



1) $4x+2y=9$ ⊕
$(\oplus,\oplus) = 1$ Quad

2) $2x+y+6=0$
$-2x-y=6$ ⊕
$(\ominus,\ominus) \to 3^{rd}$ Quad

$4x+2y=9$
$\frac{x}{9/4}+\frac{y}{9/2}=1 \to$ Int

Int for. $\frac{x}{-3}+\frac{y}{-6}=1$

(3) $\frac{OP}{OQ}=?$

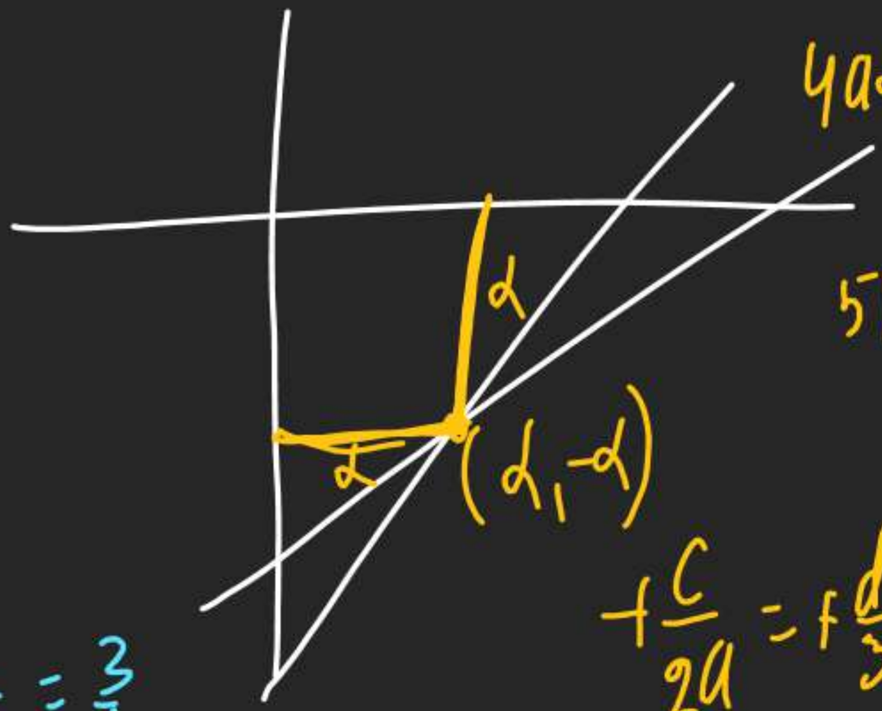
Similar Δ

$\frac{OP}{OQ}=\frac{OB}{OC}=\frac{9/2}{6}=\frac{3}{4}$

Q Let a,b,c,d be Non Zero No. If PoI of Lines $4ax+2ay+c=0$ & $5bx+2by+d=0$ Lies in 4^{th} Quad & is equidistant from 2 Axes then

$3bc-2ad=0$ ✓ $\quad 3bc+2ad=0$

$2bc-3ad=0 \quad 2bc+3ad=0$



$4a\alpha-2a\alpha+c=0$
$2a\alpha=-c \Rightarrow \alpha=\frac{-c}{2a}$

$5b\alpha-2b\alpha+d=0$
$3b\alpha=-d$
$\alpha=-\frac{d}{3b}$

$+\frac{c}{2a}=+\frac{d}{3b}$
$3bc-2ad=0$