Nishant Jindal

$$\left(\frac{\cos(\beta-\alpha)\cos\theta+\sin\theta(-\sin(\beta-\alpha))}{\cos\theta+\sin\theta},\ \frac{\sin\beta\cos\theta+\sin\theta(-\cos\beta)}{\cos\theta+\sin\theta}\right)$$

$$\cos\theta+\sin\theta \neq 1$$

$$\sqrt{2}\sin\left(\theta+\frac{\pi}{4}\right)\in(1,\sqrt{2})$$

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

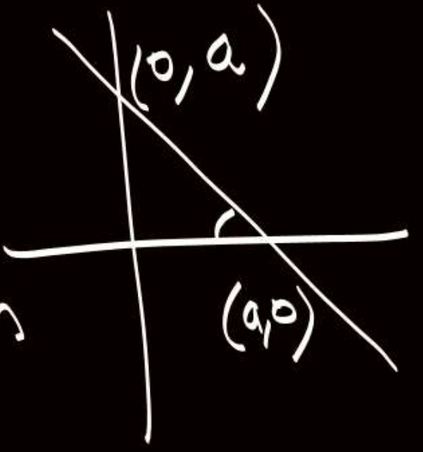
$$\cos 2x+\cos^2 2x-\sin^2 2x$$

$$\cos 2x+\cos 4x \leq 2$$

$$f'(x)= -2\sin 2x-4\sin 4x$$

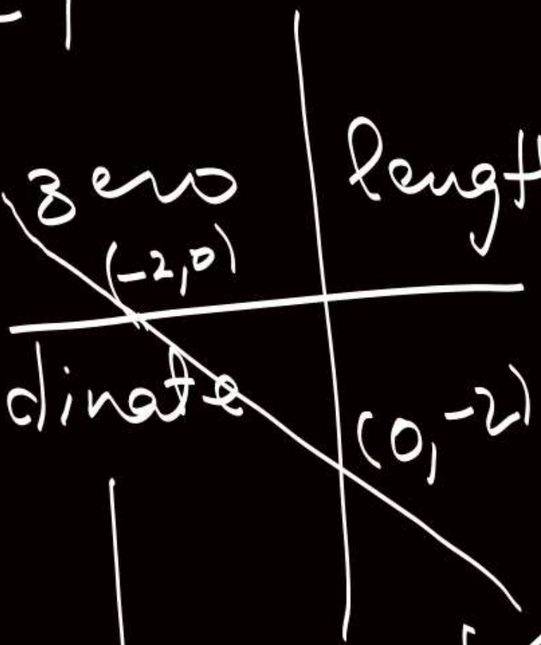
Note → (1) Line having equal non zero intercepts on coordinate axes.

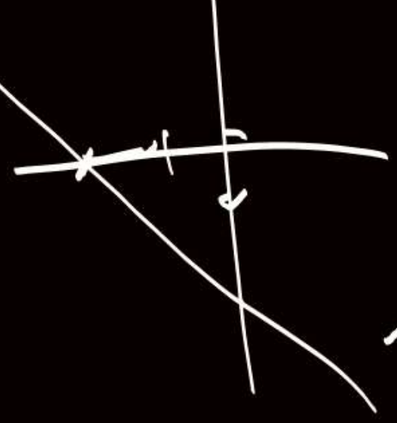
$\Rightarrow$ slope $= -1$

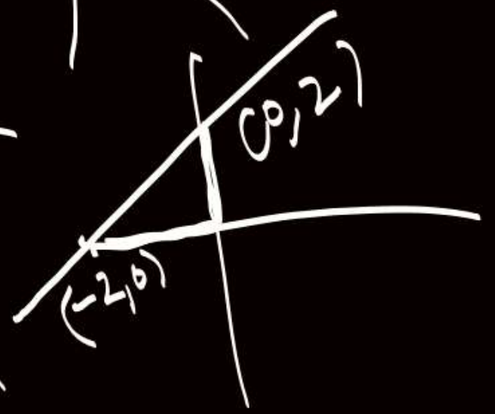


(2) Line has equal non zero lengths of intercepts on coordinate axes

$\Rightarrow$ slope $= \pm 1$







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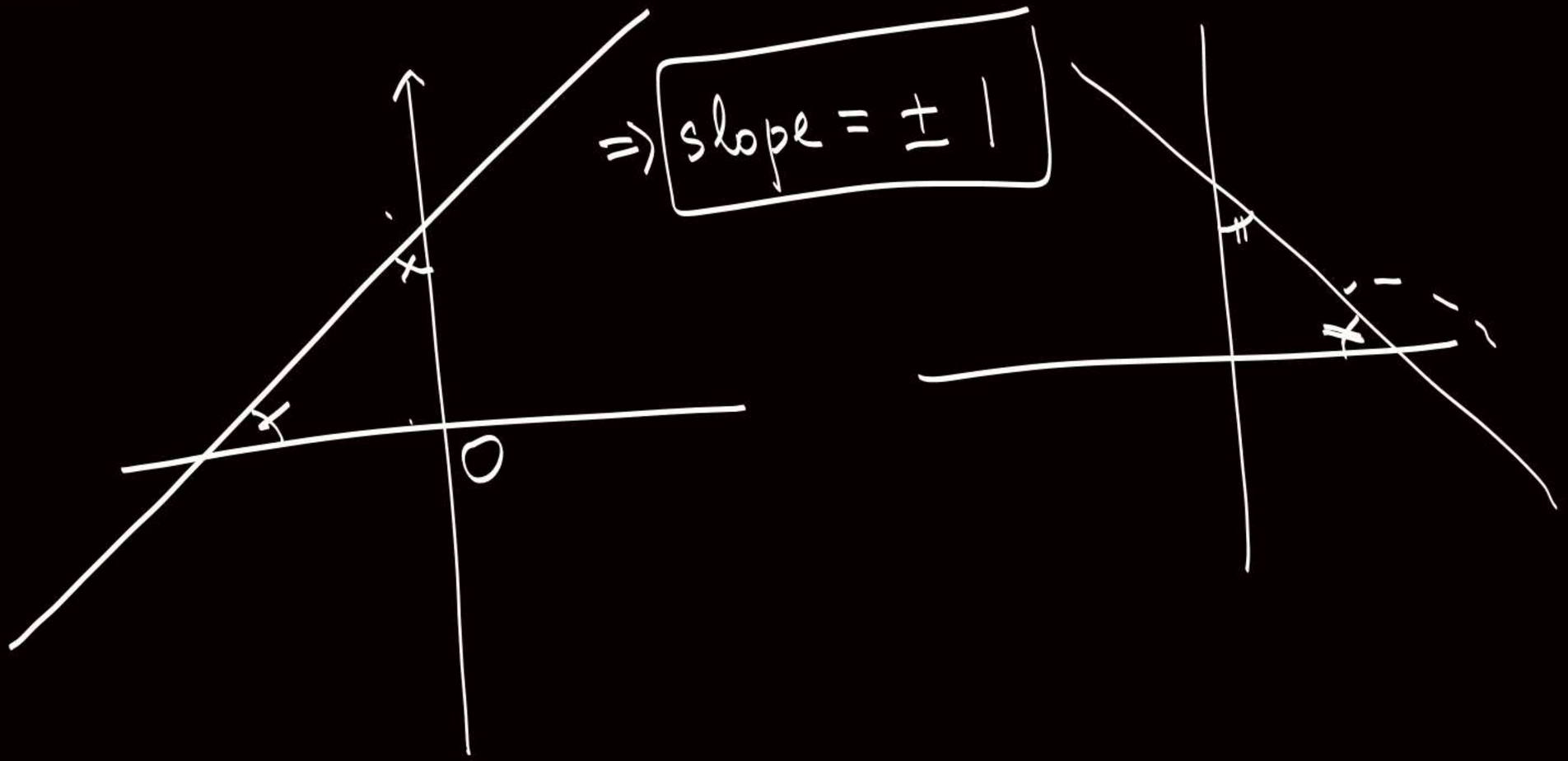
(3) Line equally inclined with coordinate axes



$\Rightarrow$ slope $= \pm 1$

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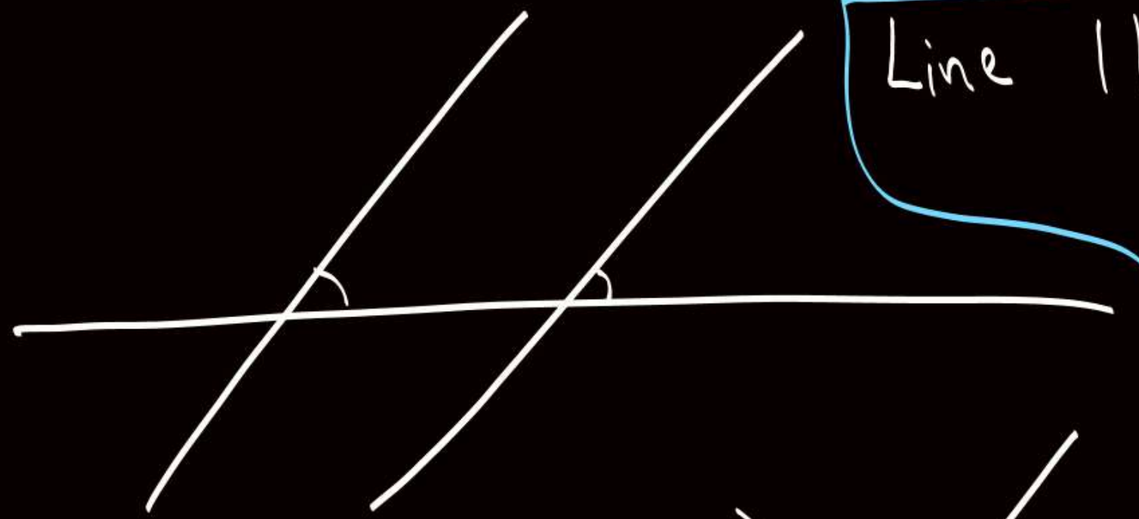
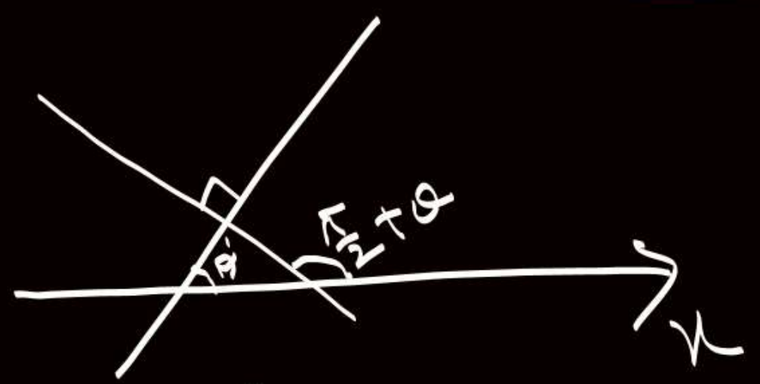
(4) Lines $L_1 \parallel L_2 \Rightarrow$ $m_1 = m_2$ ✓



Line $\parallel$ to $3x-2y=4$.

$3x-2y+c=0$.

Lines $L_1 \perp L_2$



Lines $\perp$ on to line $ax+by+c=0$ is $bx-ay+c'=0$

$m_1 = \tan\theta$

$m_2 = \tan\left(\frac{\pi}{2}+\theta\right) = -\cot\theta$

$m_1 m_2 = -1$ ✓

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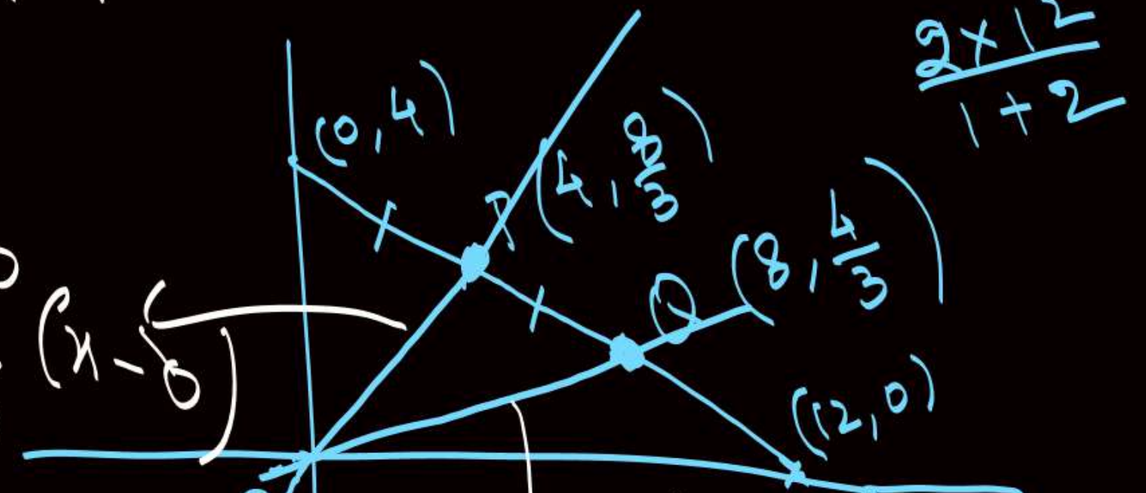
1. Find the eqn. of straight lines which join the origin and the points of trisection of portion of line $x+3y-12=0$ intercepted between the coordinate axes.



$y-0=\left(\frac{8/3-0}{4-0}\right)(x-0)$

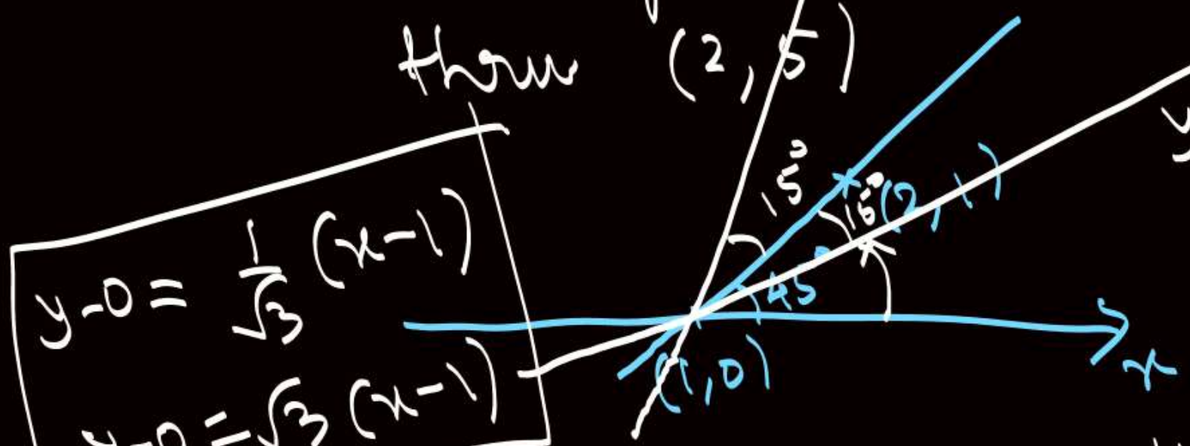
$y=\frac{2}{3}x$

$y-0=\left(\frac{4/3-0}{8-0}\right)x-0 \Rightarrow y=\frac{x}{6}$

2: Find the eqn. which make equal non zero intercepts on coordinate axes and passes thrw (2, 5)

$y - 5 = -1(x-2)$

$x + y = 7$



3: A line passing thrw points (1, 0) and (2, 1) is rotated about point (1, 0) by an angle of 15°. Find the equation in new position.

4: Find the eqn. line thro the point whose area is 8.
dinate axes

$y-1 = (x-4)m$, $m<0$

$\frac{1}{2} \times \frac{(4m-1)}{m} \times (1-4m) = 8 \Rightarrow (4m-1)^2 + 16m = 0 = (4m+1)^2$.

$\Rightarrow \boxed{m = -\frac{1}{4}}$

$(0, 1-4m) =$ $(0,b)$

$\frac{1}{2}ab = 8 \Rightarrow ab = 16$

$\frac{x}{a} + \frac{y}{b} = 1$

$\frac{4}{a} + \frac{1}{b} = 1$

$\frac{4}{a} + \frac{a}{16} = 1$

$64 + a^2 = 16a$

$(a-8)^2 = 0$

$\boxed{\frac{x}{8} + \frac{y}{2} = 1}$

$\boxed{x + 4y = 8}$

$(4, 1)$

$(a, 0)$

$(0, 0)$

$(4 - \frac{1}{m}, 0)$

$b = 2$.

$\boxed{a = 8}$

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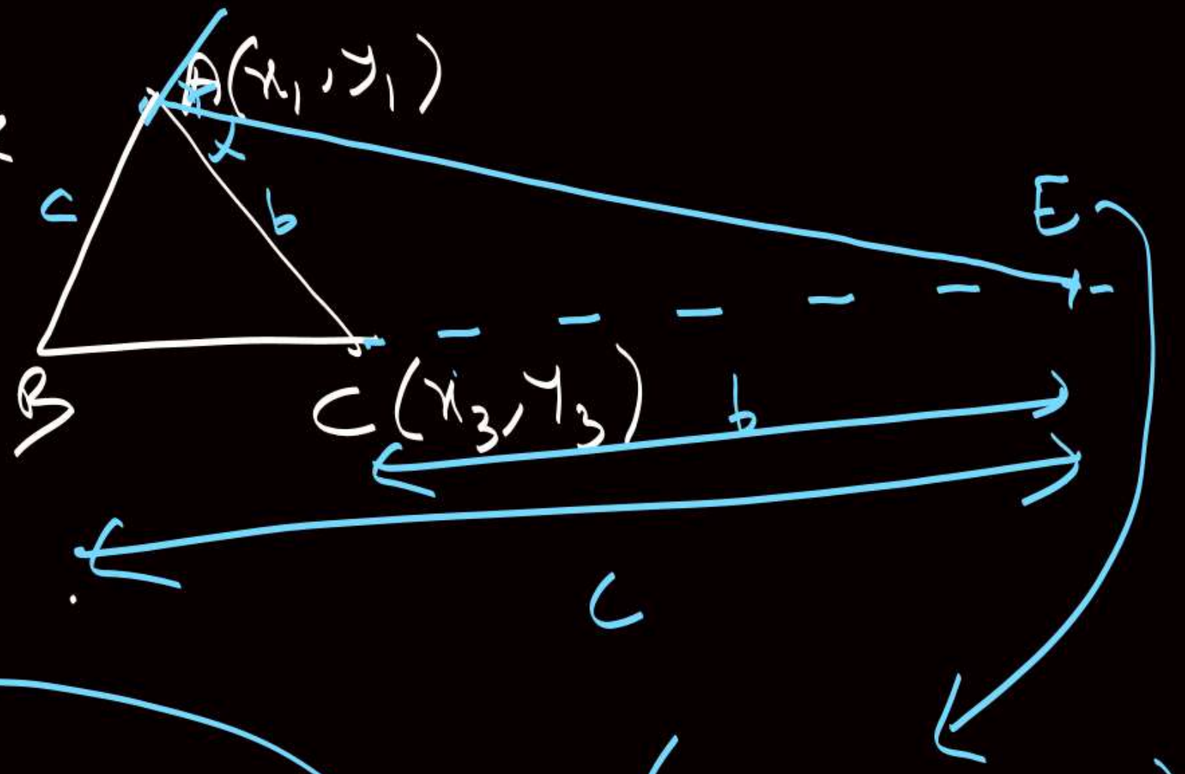
5: P.T. eqn. of external angle bisector of $\angle A$ is

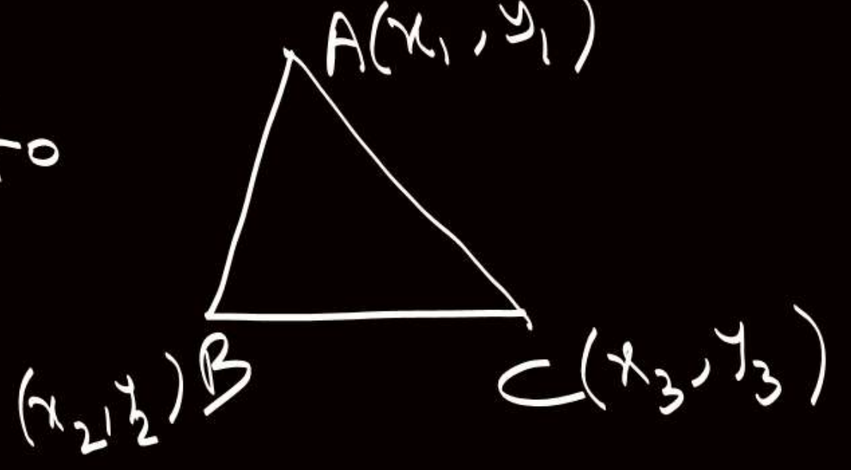


$$b\begin{vmatrix} x & y & 1 \\ x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \end{vmatrix} - c\begin{vmatrix} x & y & 1 \\ x_1 & y_1 & 1 \\ x_3 & y_3 & 1 \end{vmatrix} = 0$$

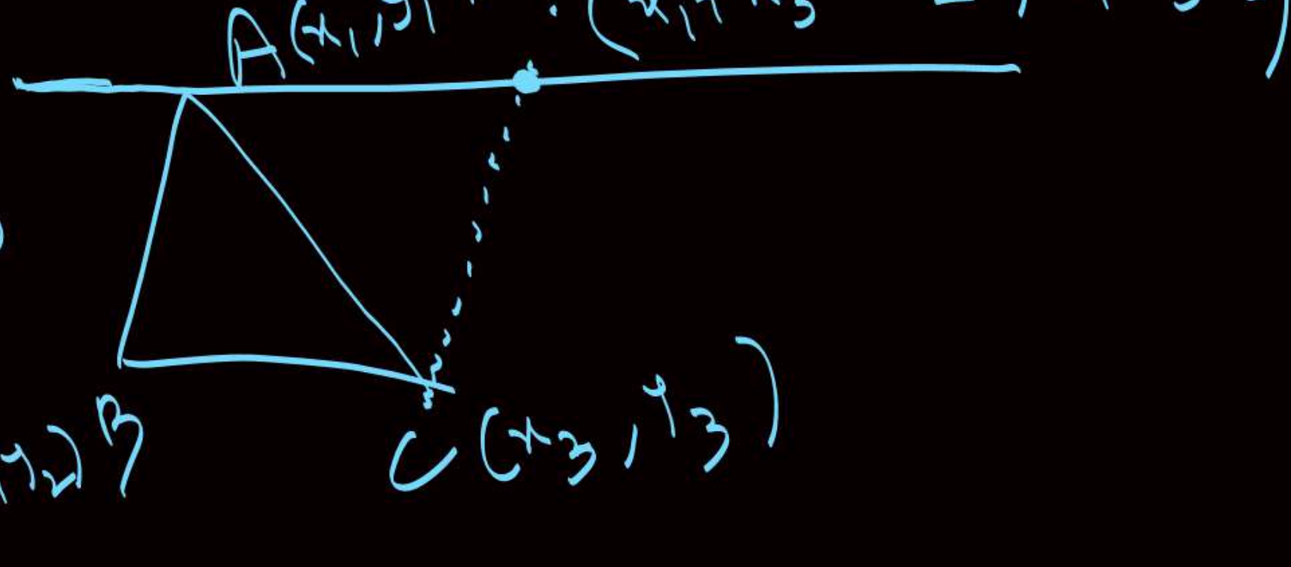
$$\begin{vmatrix} x & y & 1 \\ x_1 & y_1 & 1 \\ bx_2 - cx_3 & by_2 - cy_3 & b-c \end{vmatrix} = 0$$

$$\left(\frac{bx_2 - cx_3}{b-c}, \frac{by_2 - cy_3}{b-c}\right)$$

6: Find the eqn of line thru A and parallel to BC in terms of a determinant.



$$\begin{vmatrix} x & y & 1 \\ x_1 & y_1 & 1 \\ x_1+x_3-x_2 & y_1+y_3-y_2 & 1 \end{vmatrix} = 0$$



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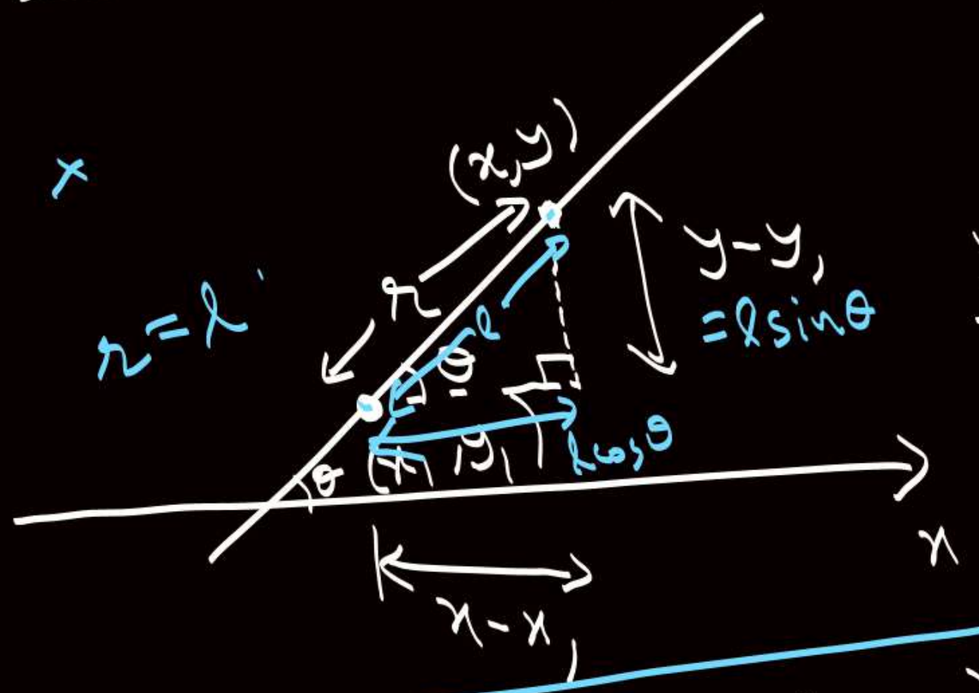
Parametric form



$$y - y_1 = \tan\theta (x - x_1)$$

$$\frac{y - y_1}{\sin\theta} = \frac{x - x_1}{\cos\theta} = r$$

$$x = x_1 + r\cos\theta$$
$$y = y_1 + r\sin\theta$$

$\Rightarrow$ Parametric form.

$r \rightarrow$ parameter

$r > 0$, if (x,y) lies above (x_1,y_1)

$r < 0$, if (x,y) lies below (x_1,y_1)

$|r|$ = Distance b/w (x,y) & (x_1,y_1).

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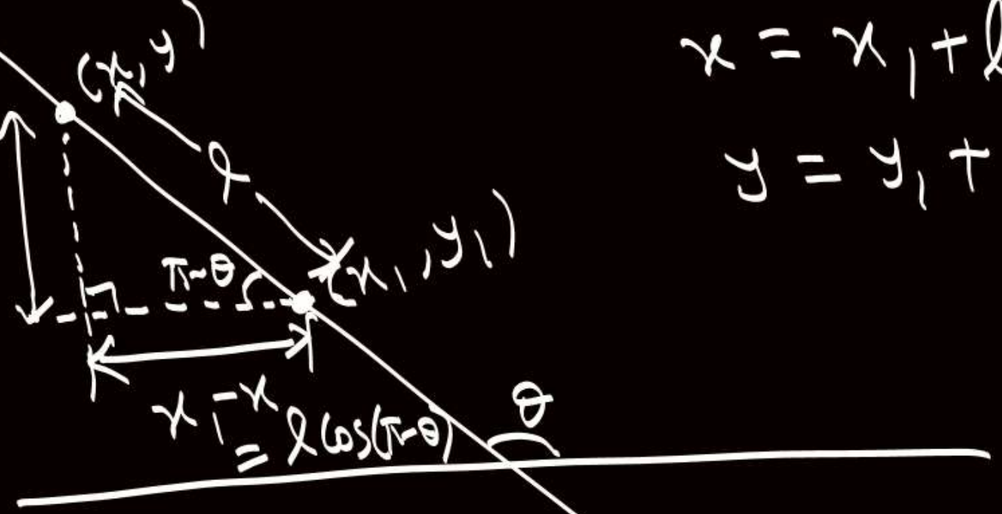

$l\sin\theta = l\sin(\pi-\theta) = y - y_1$

$x_1 - x = l\cos(\pi-\theta)$

$x = x_1 + l\cos\theta$

$y = y_1 + l\sin\theta$

Ex-3, PT-3

$x_1 - x = l\cos(\pi-\theta) = -l\cos\theta$

$x_1 + l\cos\theta = x$

$y_1 + l\sin\theta = y$