

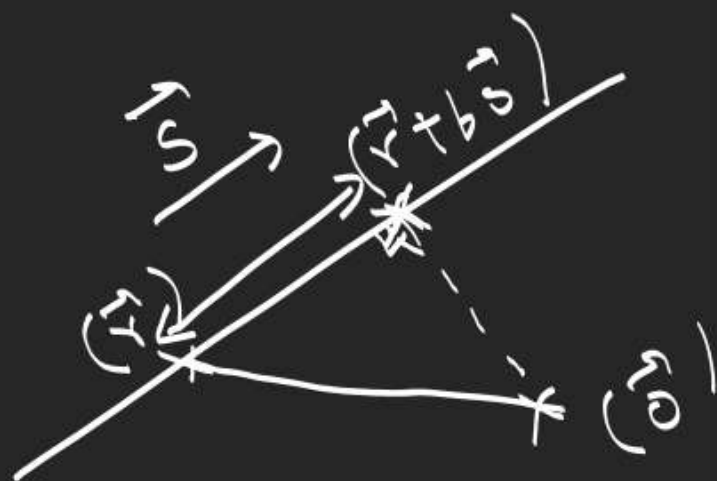
$$\vec{a} \cdot \vec{b} = \vec{a} \cdot \vec{c} \Rightarrow \checkmark$$

$$x - y + 2z = 0$$

$$x^2 + y^2 + z^2 = 12$$

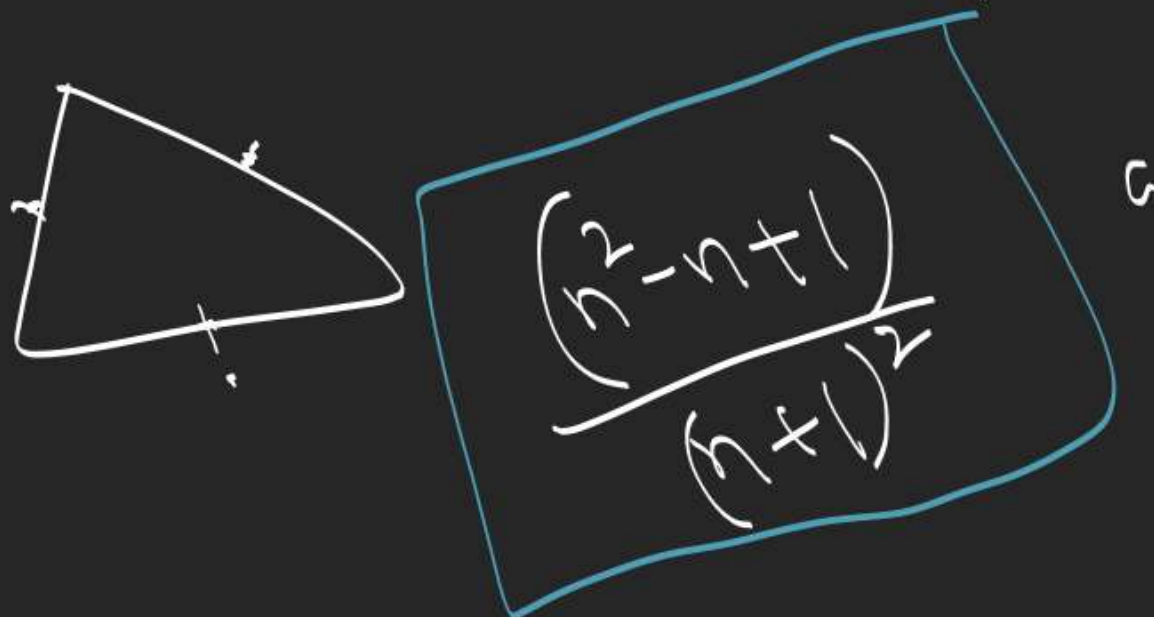
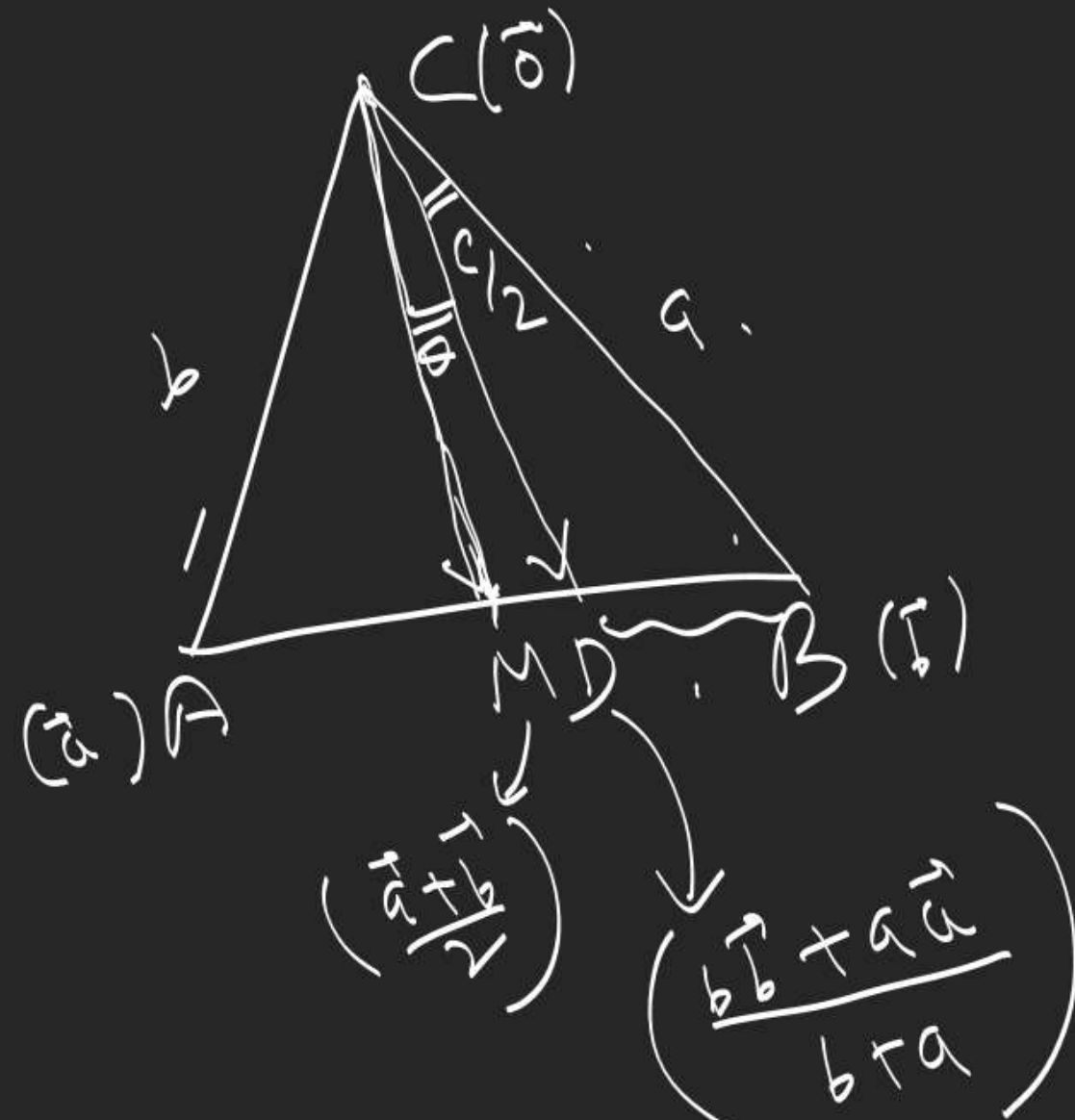
$$x, y, z = ?$$

$$y < 0$$



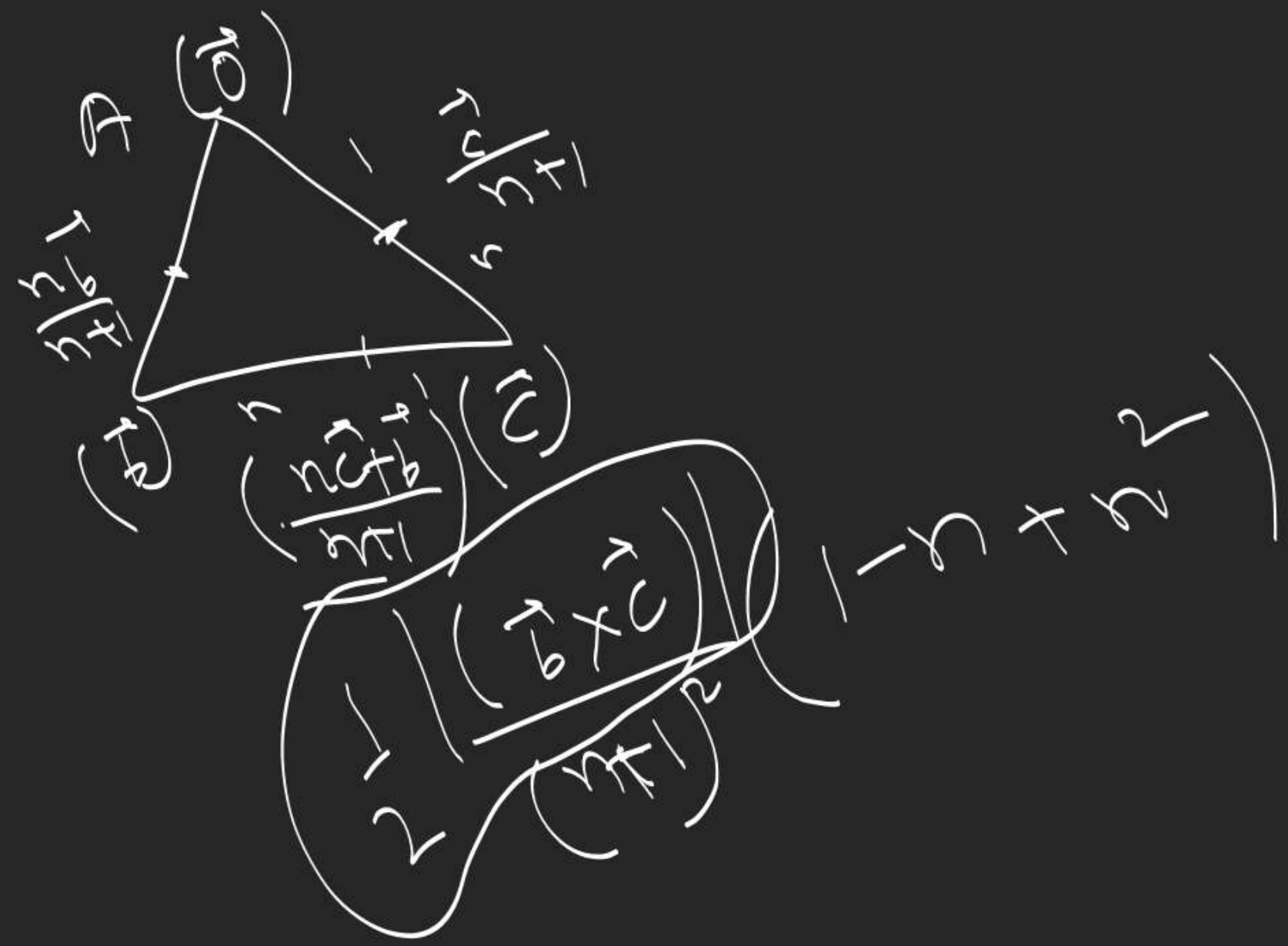
$$\vec{u} = \frac{|\vec{u}|}{2} \hat{i} + \frac{|\vec{u}| \sqrt{3}}{2} \hat{j}$$

$$\frac{|\vec{u}|^4}{2} = \left(\left(\frac{|\vec{u}|}{2} - 2 \right)^2 + |\vec{u}|^2 \frac{3}{4} \right) \left(\left(\frac{|\vec{u}|}{2} - 1 \right)^2 + |\vec{u}|^2 \frac{3}{4} \right)$$

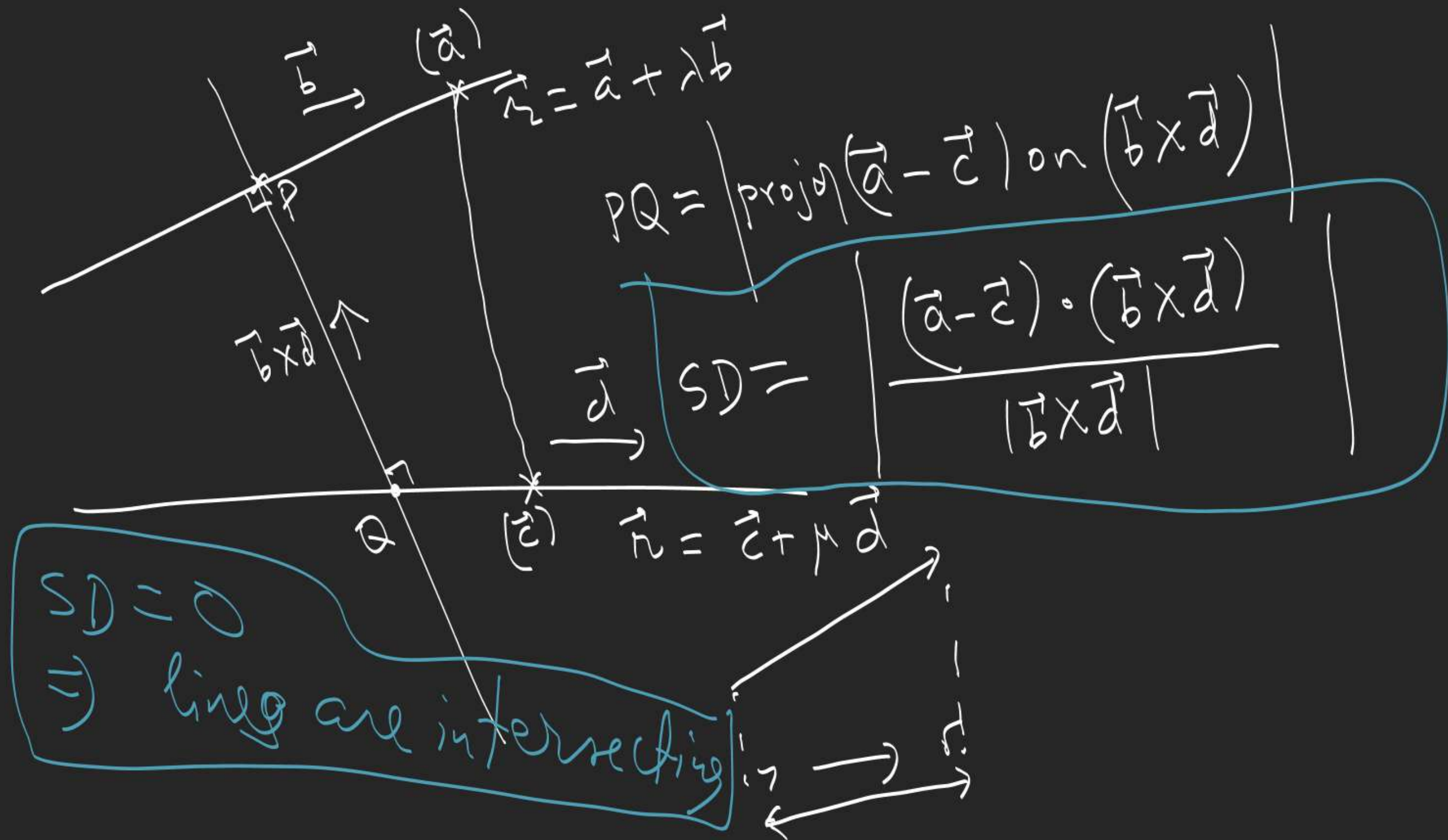


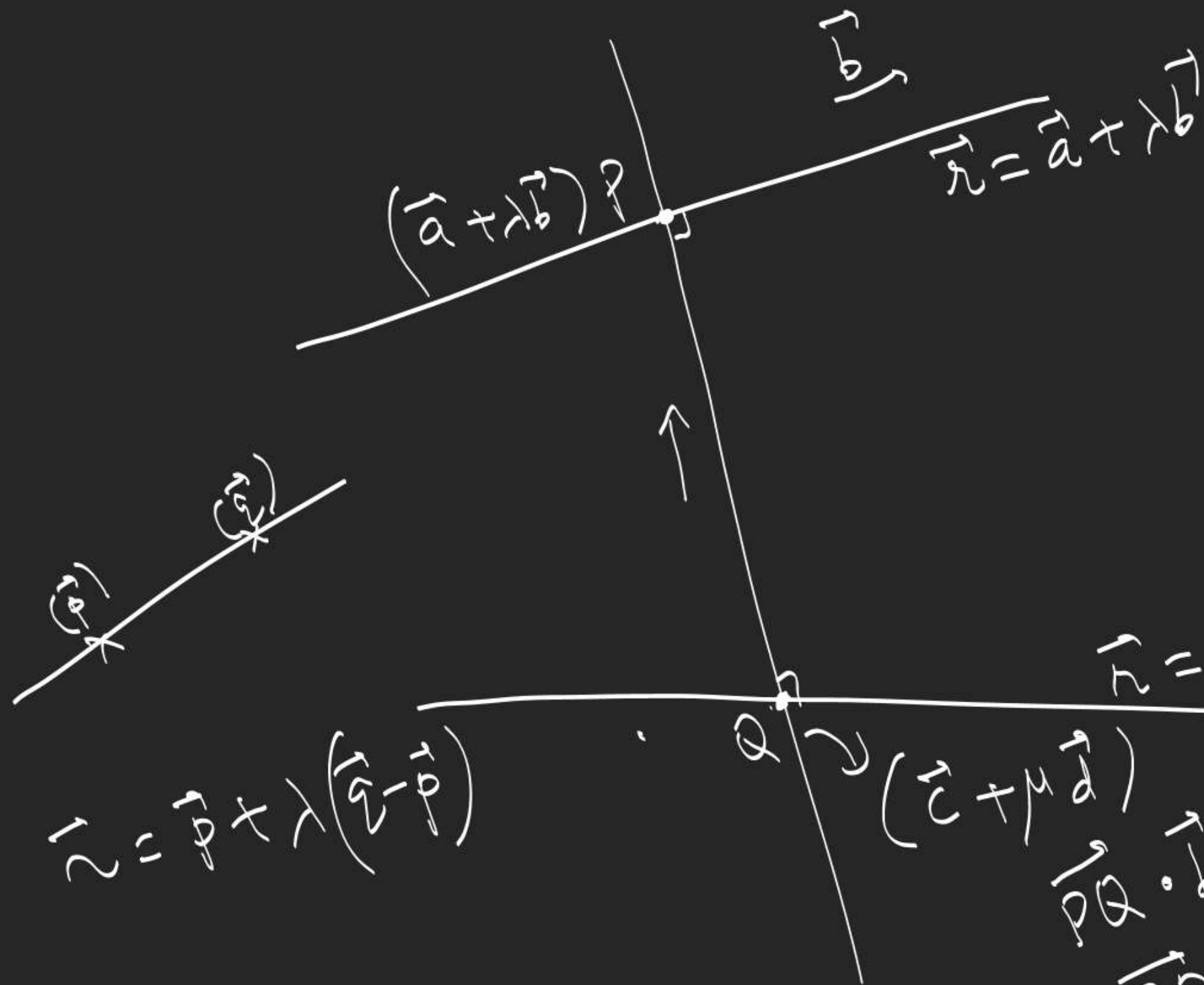
$$\cos \theta = \frac{\left(\frac{\vec{a} + \vec{b}}{2}\right) \cdot \left(\frac{a\vec{a} + b\vec{b}}{a+b}\right)}{\sqrt{b^2 + a^2 + 2ab \cos C} \left(\frac{2ab \cos \frac{C}{2}}{a+b}\right)}$$

$$= \frac{ab^2 + ba^2 + (b+a)ab \cos C}{\sqrt{a^2 + b^2 + 2ab \cos C} \frac{2ab \cos \frac{C}{2}}{2(a+b)}}$$



Shortest Distance b/w two Skew Lines





Eqn. of PQ line

$$\vec{r} = \vec{p} + \lambda(\vec{q} - \vec{p})$$

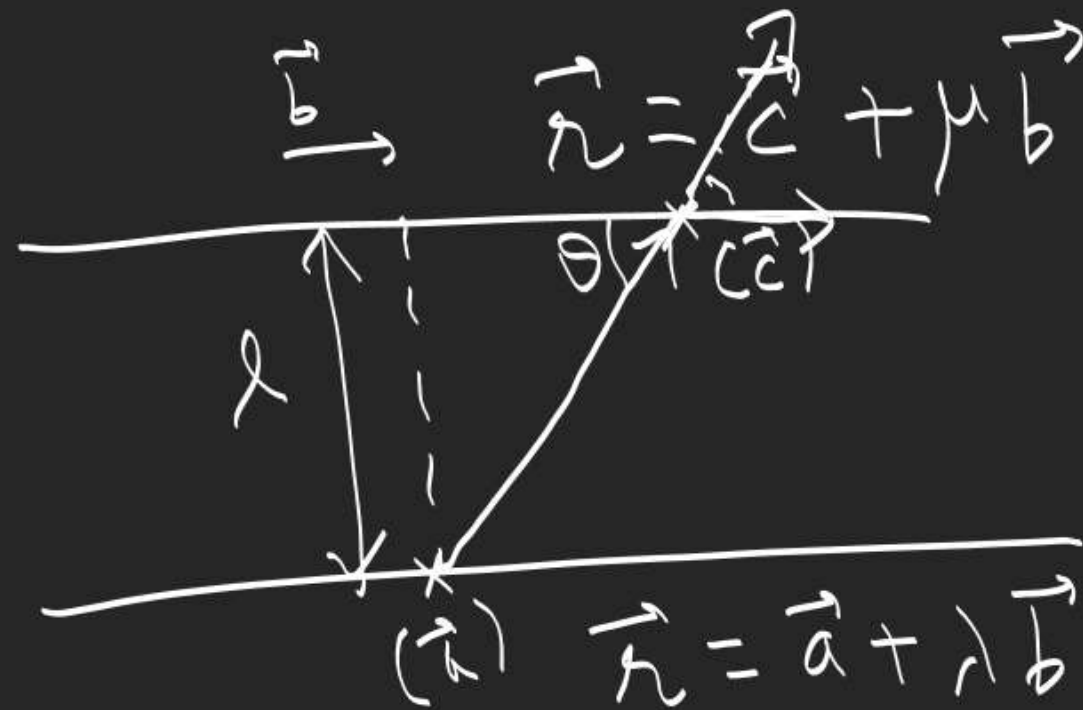
$$(\vec{c} + \mu \vec{d})$$

$$\vec{PQ} \cdot \vec{b} = 0$$

$$\vec{PQ} \cdot \vec{d} = 0$$

$\lambda, \mu = ?$

SD b/w two parallel Lines



$$\begin{aligned} \lambda &= |\vec{c} - \vec{a}| \sin \theta \\ &= \frac{|(\vec{c} - \vec{a}) \times \vec{b}|}{|\vec{b}|} \end{aligned}$$

∴ Find the SD. b/w the lines

$$\vec{r} = (1-t)\hat{i} + (t-2)\hat{j} + (3-2t)\hat{k}$$

and $\vec{r} = (s+1)\hat{i} + (2s-1)\hat{j} - (2s+1)\hat{k}$

$$\left((\hat{i} - 2\hat{j} + 3\hat{k}) - (\hat{i} - \hat{j} - \hat{k}) \right) \cdot \left((\hat{i} - \hat{j} + 2\hat{k}) \times (\hat{i} + 2\hat{j} - 2\hat{k}) \right)$$

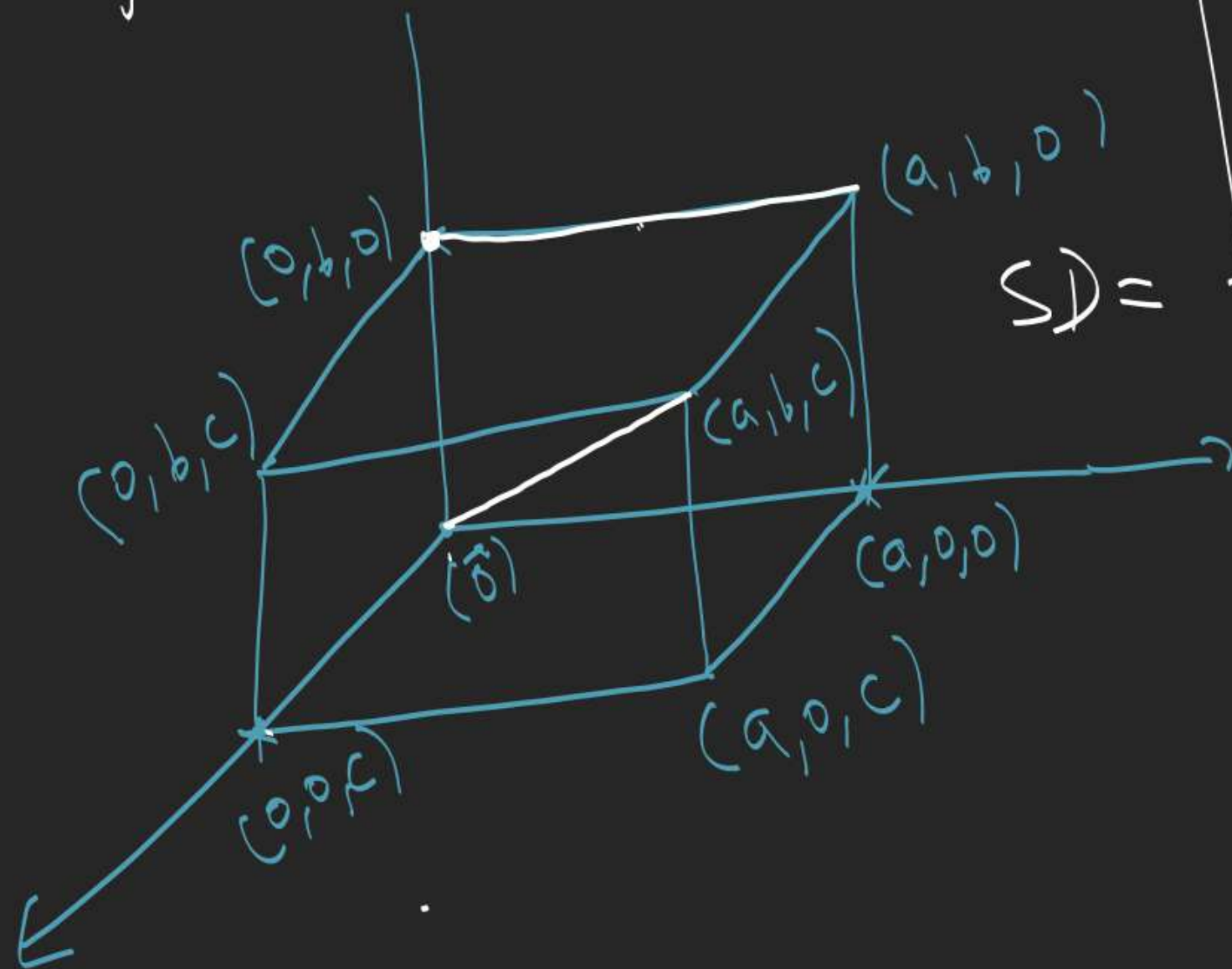
$-2\hat{i} + 4\hat{j}$

$$\frac{8}{\sqrt{29}}$$

$$= \frac{(-\hat{j} + 4\hat{k}) \cdot (-2\hat{i} + 4\hat{j} + 3\hat{k})}{\sqrt{29}}$$

$$\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & -1 & 2 \\ -1 & 2 & -2 \end{vmatrix} = -2\hat{i} + 4\hat{j} + 3\hat{k}$$

2. Find the SD b/n the diagonal of a cuboid,
the length of whose cotermious edges are a, b, c .
and the edges not meeting it.

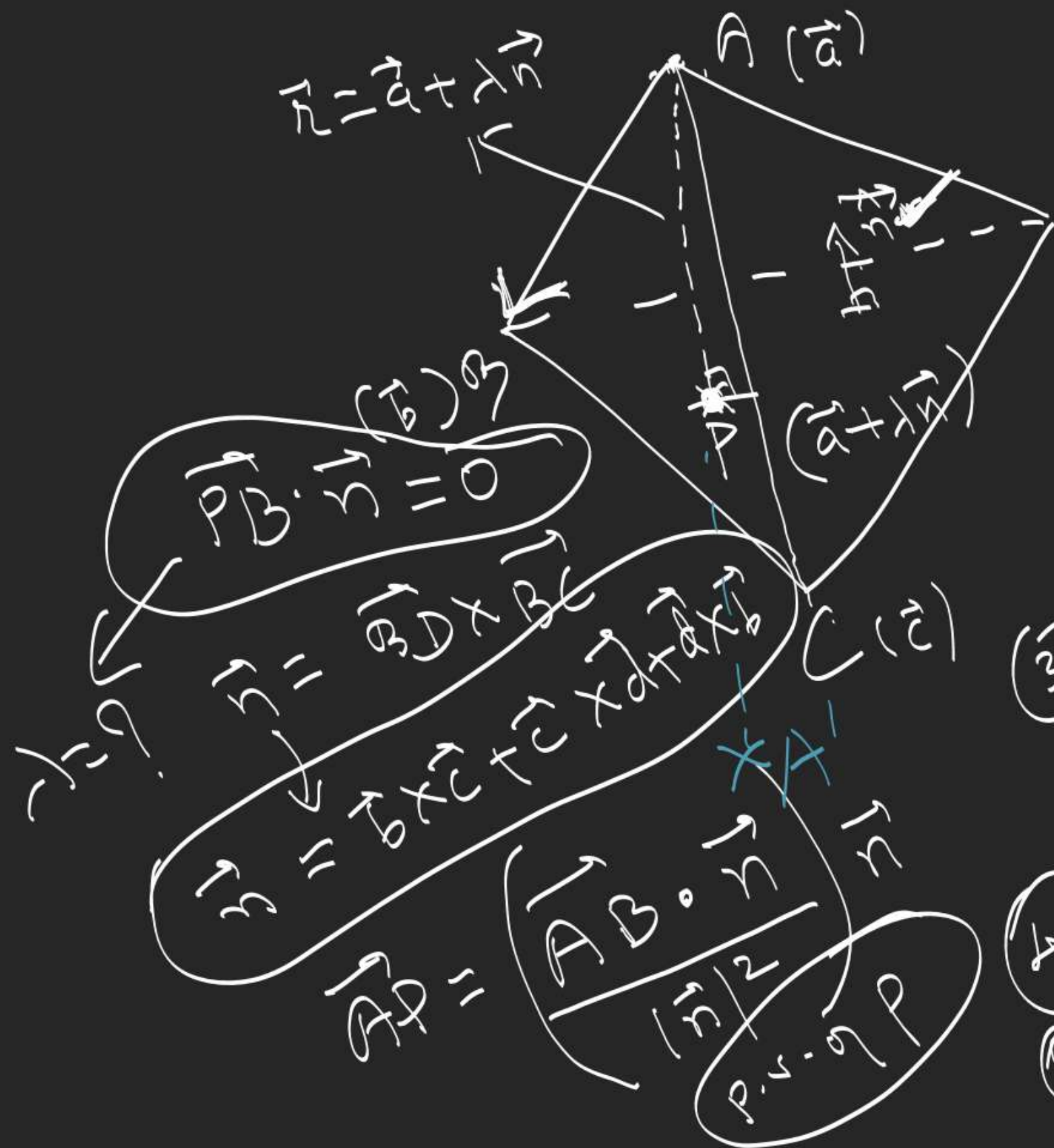


SD =

$$(\hat{j}) \cdot \left((\hat{i} + \hat{j} + \hat{k}) \times \begin{pmatrix} \hat{i} \\ -b\hat{k} + c\hat{j} \end{pmatrix} \right)$$

$$| -b\hat{k} + c\hat{j} |$$

$$\frac{bc}{\sqrt{b^2 + c^2}}$$

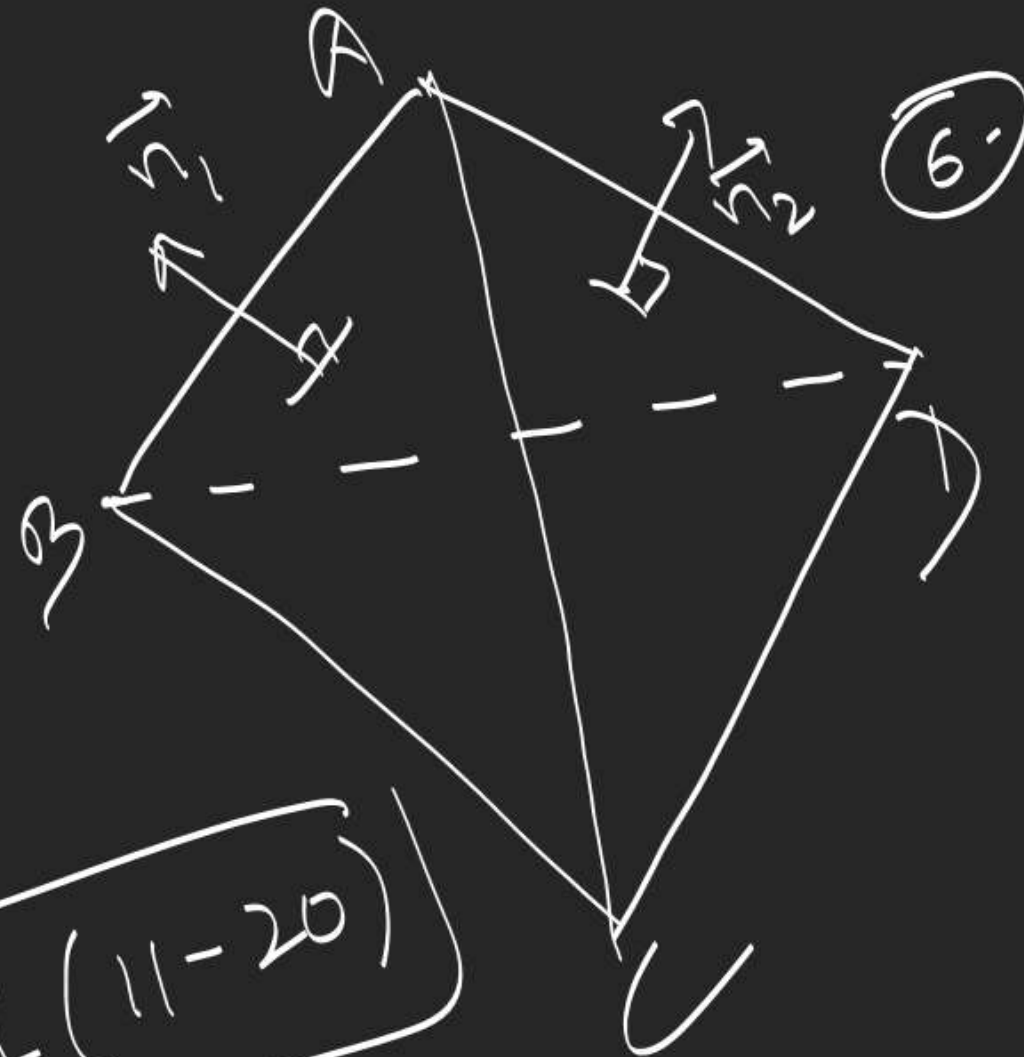


① Find p.v. foot of \perp ar from A on plane BCD.

② find p.v. of image of A from plane BCD

③ Volume of tetrahedron ABCD = $\frac{1}{3} \times \frac{1}{2} |\vec{n}| \times |\vec{AP}|$

④ Find SD b/n AD & BC.
⑤ Find angle b/n lines AD & BC.



angle b/n planes
 ABC & ACD .

$$= \left| \frac{\vec{n}_1 \cdot \vec{n}_2}{|\vec{n}_1| |\vec{n}_2|} \right|$$

Ex-I (11-20)
 Thurs