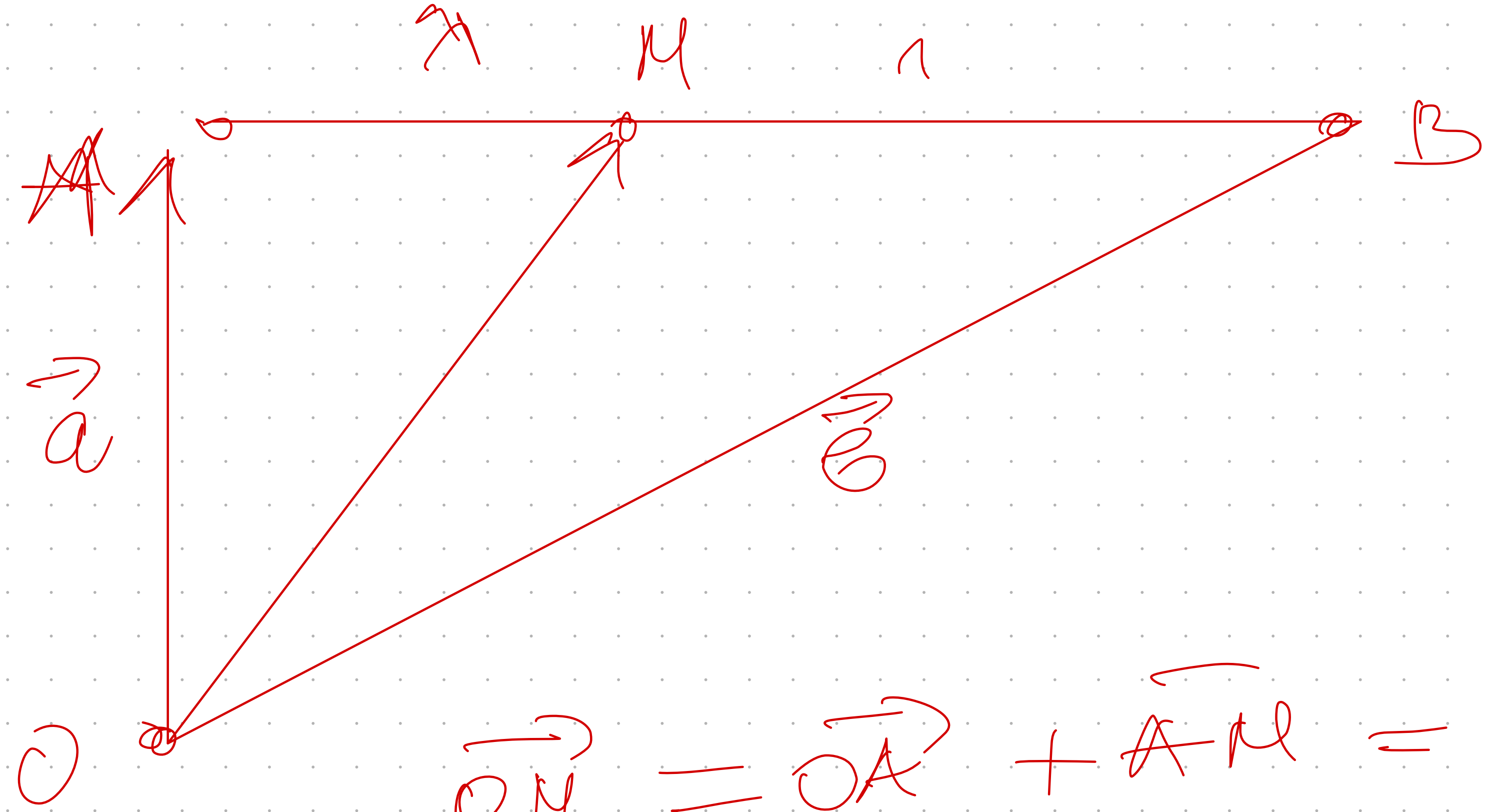

$$\vec{SK} = \vec{OK} - \vec{OS}$$

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$$\frac{\overline{AM}}{\overline{MB}} = \frac{\lambda}{1}$$

$$\vec{AB} = \vec{OB} - \vec{OA}$$

$$\vec{OM} = \vec{OA} + \overline{AM} = $$

$$\overset{(*)}{=} \vec{a} + \left(\frac{\lambda}{\lambda+1}\vec{b} - \frac{\lambda}{\lambda+1}\vec{a}\right)$$

$$\boxed{\vec{OM} = \frac{1}{\lambda+1}\vec{a} + \frac{\lambda}{\lambda+1}\vec{b}}$$

$\lambda = 1$ (M - средина AB)

$$\boxed{\vec{OM} = \frac{1}{2}\vec{a} + \frac{1}{2}\vec{b}}$$

$$\vec{AM} = \lambda\,\vec{MB}$$

$$\vec{AM} = \lambda\left(\vec{AB} - \vec{AM}\right)$$

$$\vec{AM} = \lambda\left(\vec{OB} - \vec{OA}\right) - \lambda\vec{AM}$$

$$(\lambda+1)\vec{AM} = \lambda\,\vec{OB} - \lambda\,\vec{OA}$$

$$\vec{AM} = \frac{\lambda}{\lambda+1}\vec{b} - \frac{\lambda}{\lambda+1}\vec{a} \quad (*)$$

Скаларен производ

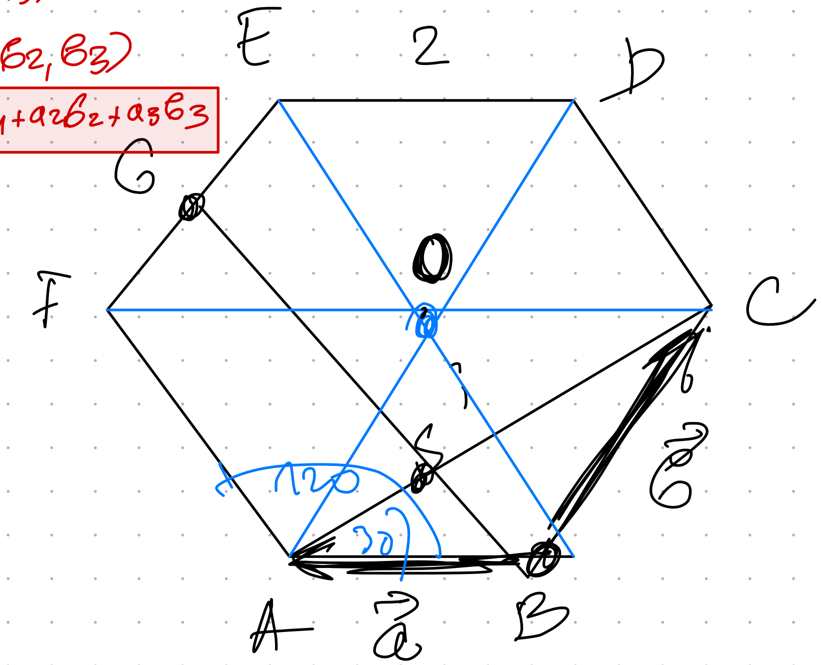
$\vec{a}=(a_1,a_2,a_3)$

$\vec{b}=(b_1,b_2,b_3)$

$$\vec{a}\circ\vec{b}=|\vec{a}|\cdot|\vec{b}|\cdot\cos\varphi$$

$$\cos\varphi=\frac{\vec{a}\cdot\vec{b}}{|\vec{a}|\cdot|\vec{b}|}$$

$$\boxed{\vec{a}\cdot\vec{b}=a_1b_1+a_2b_2+a_3b_3}$$



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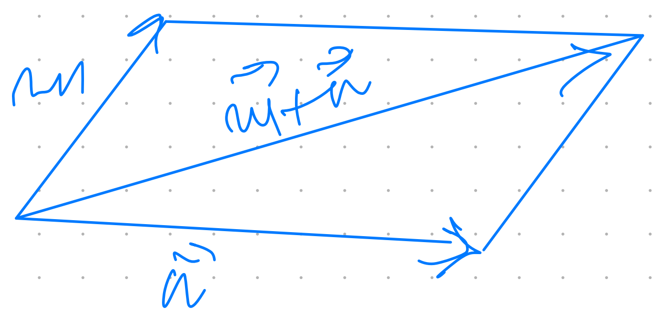
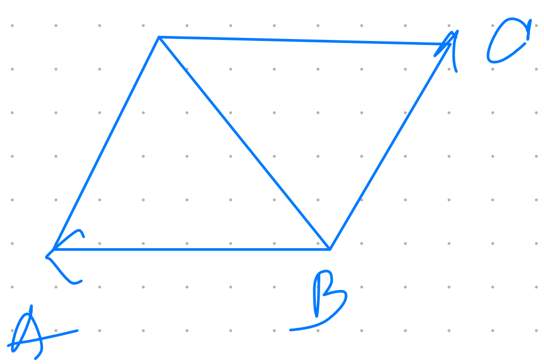
$\overline{AS}:\overline{SC}=3:4$

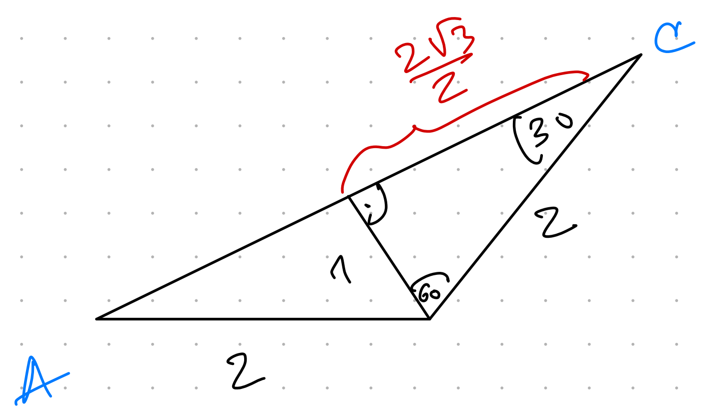
a) $\vec{SG}=?$

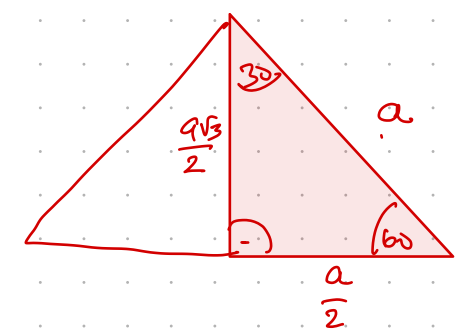
b) $|\vec{AC}|=?$

c) $\measuredangle(\vec{AC},\vec{AF})=90^\circ$ $(120-30^\circ)$









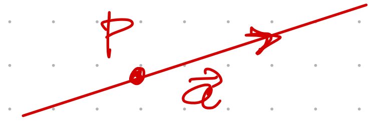
$$|\vec{AC}|=2\cdot\frac{2\sqrt{3}}{2}=2\sqrt{3}$$

Лин. нез. вектори $\vec{x}_1,\vec{x}_2,\dots,\vec{x}_n$

$$\alpha_1\vec{x}_1+\alpha_2\vec{x}_2+\dots+\alpha_n\vec{x}_n=0$$

$$\Rightarrow\alpha_1=\alpha_2=\dots=\alpha_n$$

$\boxed{3}$ $\ell: \frac{x}{6} = \frac{y-3}{-2} = \frac{z+5}{-1}$



$p: \frac{x-x_0}{a_1} = \frac{y-y_0}{a_2} = \frac{z-z_0}{a_3}$ $\quad P(x_0,y_0,z_0)$

$\vec{a}=(a_1,a_2,a_3) \parallel p$

$L(0,3,-5) \in \ell$

$\vec{e}=(6,-2,-1) \parallel \ell$

$p: \begin{cases} x = 1+\lambda \\ y = 7-2\lambda \\ z=-4+2\lambda \end{cases}$ $\quad \lambda = \frac{x-1}{1} = \frac{y-7}{-2} = \frac{z+4}{2}$

$A(1,7,-4) \in p$

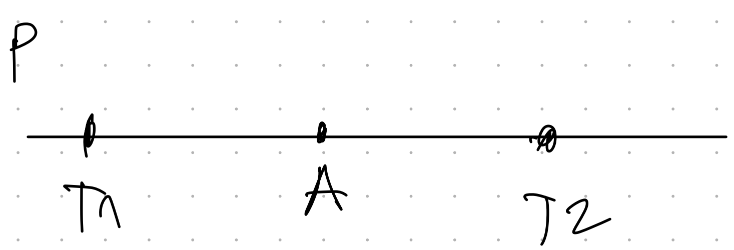
$\vec{a}=(1,-2,2) \parallel p$

$A(1,7,-4)$

$T \in p \Rightarrow T(1+\lambda, 7-2\lambda, -4+2\lambda)$

$\overline{TA}^2 = 6^2 \Leftrightarrow 36 = \lambda^2 + 4\lambda^2 + 4\lambda^2$

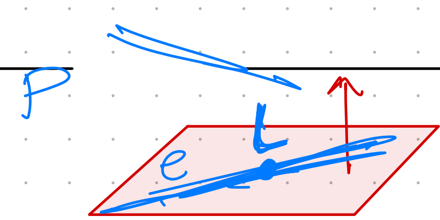
$36 = 9\lambda^2 \quad \lambda^2 = 4 \quad \lambda_{1/2} = \pm 2$



$T_1(\lambda=-2) = (-1, 11, -8)$

$T_2(\lambda=2) = (3, 3, 0)$

$\Sigma: Ax+By+Cz+D=0$



$n_\Sigma = (A,B,C)$

$\Sigma = ?$ $\quad \ell \in \Sigma \quad \Sigma \parallel p$

$\Sigma \parallel \ell$ и $\Sigma \parallel p$

$n \perp e$ и $n \perp p = \vec{a}$

$n = \vec{e} \times \vec{a}$

$\vec{c} = \vec{a} \times \vec{b}$ – вект. пр

$\vec{c} \perp \vec{a}$ и $\vec{c} \perp \vec{b}$

$|\vec{c}| = |\vec{a}||\vec{b}| \sin\sphericalangle(\vec{a},\vec{b})$

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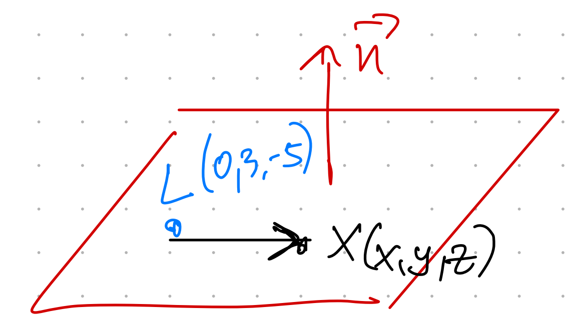
$\vec{n} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 6 & -2 & -1 \\ 1 & -2 & 2 \end{vmatrix} = (-6, -13, -10)$



р-ко на Σ со познатата $L \in \Sigma$ и познатиот n

$L \in \Sigma \quad \vec{LX} \perp \vec{n} \Leftrightarrow \boxed{\vec{LX} \cdot \vec{n} = 0}$

$\vec{LX} = (x, y-3, z+5)$

$\Sigma: (x, y-3, z+5) \cdot (-6,-13,-10) = 0$

$\Sigma: -6x - 13y + 39 - 10z - 50 = 0$

$\boxed{\Sigma: -6x - 13y - 10z - 11 = 0}$

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$$\begin{cases}(-3-\lambda)x-6y+8z=0\\ 2x+(1-\lambda)y+4z=0 \quad I\\ 4x+3y+(1-\lambda)z=0 \quad II\end{cases} \quad R_1 \leftrightarrow R_2$$

$$\left[\begin{array}{ccc|c}2 & 1-\lambda & 4 & 0\\ 4 & 3 & 1-\lambda & 0\\ -3-\lambda & -6 & 8 & 0\end{array}\right] \underset{R_1\left(\frac{3+\lambda}{2}\right)+R_3}{\overset{R_1(-2)+R_2}{\sim}} \left[\begin{array}{ccc|c}2 & 1-\lambda & 4 & 0\\ 0 & 1+2\lambda & -\lambda-7 & 0\\ 0 & \frac{-\lambda^2-2\lambda-9}{2} & 14+2\lambda & 0\end{array}\right] \overset{R_2\left(\frac{\lambda^2+2\lambda+9}{2(1+2\lambda)}\right)}{\sim} \left[\begin{array}{ccc|c}2 & 1-\lambda & 4 & 0\\ 0 & 1+2\lambda & -\lambda-7 & 0\\ 0 & 0 & A & 0\end{array}\right]$$

$\lambda \neq -1/2$

$$-6+\frac{(1-\lambda)(3+\lambda)}{2}=\frac{-12+3-2\lambda-\lambda^2}{2}=\frac{-\lambda^2-2\lambda-9}{2}$$

$$\frac{(-\lambda-7)(\lambda^2+2\lambda+9)}{(1+2\lambda)\cdot 2}+14+2\lambda=A$$

$r(A)=r(A|b)<n=3$ - бр. н̶е̶ позн.

Бесконечно многу решенија ќе има

$$\Leftrightarrow \boxed{A=0}$$

Со Детерминанта (квадратно правила)

$$\det A=0 \Leftrightarrow \begin{vmatrix}2 & 1-\lambda & 4\\ 4 & 3 & 1-\lambda\\ -3-\lambda & -6 & 8\end{vmatrix}=0$$

$$2\cdot(24+6(1-\lambda))-(1-\lambda)(32+(3+\lambda)(1-\lambda))+4(-24+3(3+\lambda))=0$$

$$\dots \quad \lambda^3+\dots=0$$

$$\lambda_{1/2/3}=\dots$$

$$D=\begin{vmatrix}1 & a & a^2\\ 1 & b & b^2\\ 1 & c & c^2\end{vmatrix} \underset{R_1(-1)+R_3}{\overset{R_1(-1)+R_2}{=}} \begin{vmatrix}1 & a & a^2\\ 0 & b-a & b^2-a^2\\ 0 & c-a & c^2-a^2\end{vmatrix} = \begin{vmatrix}1 & a & a^2\\ 0 & b-a & (b-a)(b+a)\\ 0 & c-a & (c-a)(c+a)\end{vmatrix} = (b-a)(c-a)\begin{vmatrix}1 & a & a^2\\ 0 & 1 & b+a\\ 0 & 1 & c+a\end{vmatrix} \overset{R_2(-1)+R_3}{=}$$

$$=(b-a)(c-a)\begin{vmatrix}1 & a & a^2\\ 0 & 1 & b+a\\ 0 & 0 & c-b\end{vmatrix} = (b-a)(c-a)(c-b)$$

D – дет. во горно △ – форма

$\Rightarrow D =$ произв. на ел. по главната дијагонал.