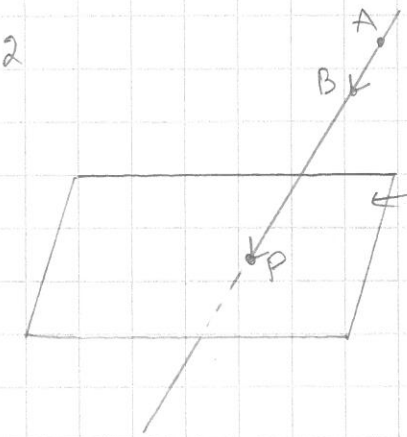
9. Tason leikkauspisteitä

9.2



$A = (-2, 0, 5)$, $B = (10, -4, 11)$

$x + 4y + 6z - 44 = 0$

P on suoralla $\Leftrightarrow \overrightarrow{AP} \parallel \overrightarrow{AB} \Leftrightarrow \overrightarrow{AP} = t\overrightarrow{AB}$

$\Leftrightarrow \overrightarrow{AP} = t(12\vec{i} - 4\vec{j} + 6\vec{k}) = 12t\vec{i} - 4t\vec{j} + 6t\vec{k}$

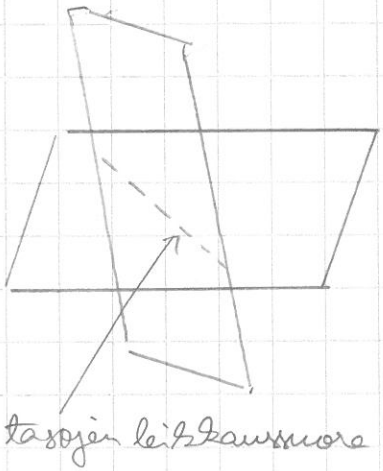
$\Rightarrow P = (-2 + 12t, 0 - 4t, 5 + 6t)$, $t \in \mathbb{R}$

P on tasolla $\Leftrightarrow (-2 + 12t) + 4 \cdot (-4t) + 6(5 + 6t) - 44 = 0$ sij.

$\Leftrightarrow 32t - 16 = 0 \quad \Leftrightarrow t = \frac{1}{2}$

$\Rightarrow P = (-2 + 12 \cdot \frac{1}{2}, -4 \cdot \frac{1}{2}, 5 + 6 \cdot \frac{1}{2}) = \underline{(4, -2, 8)}$

9.6



$T_1: \quad x - 2y + 4z + 3 = 0$

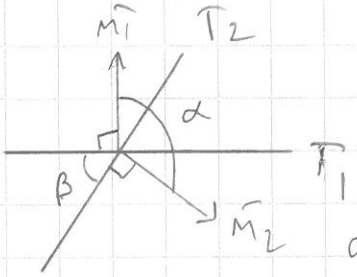
$\Rightarrow \vec{n}_1 = \vec{i} - 2\vec{j} + 4\vec{k}$ (T_1:n normaalivektori)

$T_2: \quad 7x - 2y - 4z - 35 = 0$

$\Rightarrow \vec{n}_2 = 7\vec{i} - 2\vec{j} - 4\vec{k}$ (T_2:n — " —)

$$\cos(\vec{n}_1, \vec{n}_2) = \frac{\vec{n}_1 \cdot \vec{n}_2}{|\vec{n}_1||\vec{n}_2|} = \frac{1 \cdot 7 + (-2) \cdot (-2) + 4 \cdot (-4)}{\sqrt{1^2 + (-2)^2 + 4^2}\sqrt{7^2 + (-2)^2 + (-4)^2}}$$

$$= \frac{-5}{\sqrt{21}\sqrt{69}} \Rightarrow \sphericalangle(\vec{n}_1, \vec{n}_2) \approx 97{,}5^\circ = \alpha$$



Tasojen välinen kulma $\leq 90^\circ$

$\alpha + \beta + 90^\circ + 90^\circ = 360^\circ$

$\Leftrightarrow \beta = 180^\circ - \alpha = 180^\circ - 97{,}5^\circ = \underline{82{,}5^\circ}$