

$$\vec{AB} = -\vec{i} - \vec{j} + 4\vec{k}, \quad \vec{AC} = -2\vec{i} + 2\vec{j} + \vec{k}, \quad \vec{AD} = \vec{i} + (y-2)\vec{j} + 3\vec{k}$$

$$\vec{AB} \times \vec{AC} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ -1 & -1 & 4 \\ -2 & 2 & 1 \end{vmatrix} = -9\vec{i} - 7\vec{j} - 4\vec{k}$$

Tetraedrin tilavuus: $V_t = \frac{1}{6} V_N = \frac{1}{6} |(\vec{AB} \times \vec{AC}) \cdot \vec{AD}|$

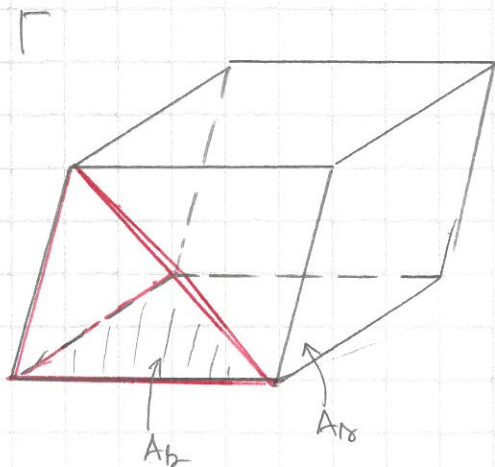
$$= \frac{1}{6} |-9 \cdot 1 + (-7) \cdot (y-2) + (-4) \cdot 3|$$

$$= \frac{1}{6} |-7y - 7| = \frac{21}{4} \cdot 1.6$$

$$\Rightarrow |-7y - 7| = \frac{63}{2}$$

$$\Rightarrow -7y - 7 = \frac{63}{2} \quad \text{tai} \quad -7y - 7 = -\frac{63}{2}$$

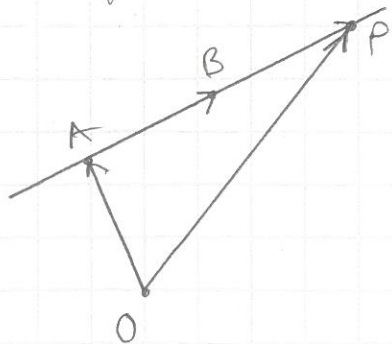
$$\Rightarrow y = -\frac{11}{2} \quad \text{tai} \quad y = \frac{7}{2} \quad \text{Vast. } D = (0, -\frac{11}{2}, 0) \quad \text{tai} \quad D = (0, \frac{7}{2}, 0)$$



$$V_t = \frac{1}{3} \underbrace{A_b}_{\frac{1}{2} A_N} h = \frac{1}{3} \cdot \frac{1}{2} \underbrace{A_N}_{V_N} h = \frac{1}{6} V_N$$

6. suorunden suora

Kaksi pistettä A ja B määrittävät suoran



P on suoralla $\Leftrightarrow \vec{AP} \parallel \vec{AB}$

$$\Leftrightarrow \vec{AP} = t \vec{AB}$$

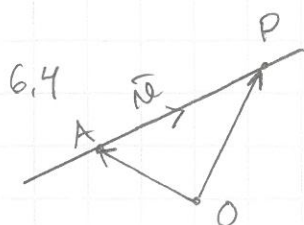
↑
suoran suunta-
vektori

$$\Rightarrow P = (\dots, \dots, \dots)$$

$$\Rightarrow \begin{cases} x = \dots \\ y = \dots \\ z = \dots \end{cases} \quad \begin{array}{l} \text{suoran parametrisointi,} \\ \text{parametri } t \in \mathbb{R} \end{array}$$

$$\vec{OP} = \vec{OA} + \vec{AP} = \vec{OA} + t \vec{AB}$$

suoran vektoriyhtälö



$$A = (6, -1, 0), \quad \vec{AB} = -2\vec{i} + \vec{j} + 3\vec{k}$$

$$a) \quad \vec{OP} = \vec{OA} + \vec{AP} = \vec{OA} + t \vec{AB} = (6\vec{i} - \vec{j}) + t(-2\vec{i} + \vec{j} + 3\vec{k})$$

$$= (6 - 2t)\vec{i} + (-1 + t)\vec{j} + 3t\vec{k}$$