

$$\vec{PC} \perp \vec{AB} \Leftrightarrow \vec{AB} \cdot \vec{PC} = 50(-1600 + 50t) + 2(-1400 + 2t) + 16t = 0$$

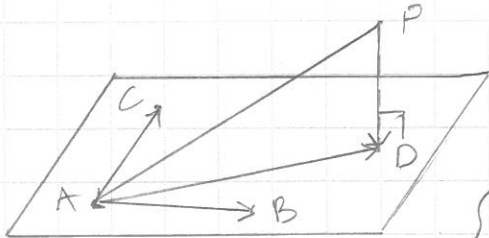
$$\Leftrightarrow t = 30$$

$$\Rightarrow \vec{PC} = -100\vec{i} - 1340\vec{j} + 480\vec{k}$$

$$a) |\vec{PC}| = \sqrt{(-100)^2 + (-1340)^2 + 480^2} \approx 1426.88 \text{ (m)} \Rightarrow \underline{1.427 \text{ km}}$$

$$b) C = (1700 + 100, 1450 - 1340, 0 + 480) \\ = (1600, 110, 480) \quad \text{horizontals: } \underline{480 \text{ m}}$$

11. Piteen stävöyys tarosta



$$\vec{PD} = \vec{PA} + \vec{AD}$$

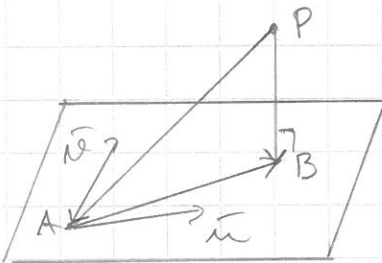
$$= \vec{PA} + \lambda \vec{AB} + t \vec{AC}$$

↑
kaksi nullevektoria

$$\begin{cases} \vec{PD} \perp \vec{AB} \Leftrightarrow \vec{PD} \cdot \vec{AB} = 0 \\ \vec{PD} \perp \vec{AC} \Leftrightarrow \vec{PD} \cdot \vec{AC} = 0 \end{cases} \Rightarrow \lambda = \dots, t = \dots$$

$$\Rightarrow \vec{PD} = \dots$$

11.6



$$A = (4, 3, -5)$$

$$\vec{u} = -2\vec{i} - \vec{j} + \vec{k}$$

$$\vec{v} = \vec{i} + 2\vec{j} - 3\vec{k}$$

$$P = (3, -13, -2)$$

$$\vec{PB} = \vec{PA} + \vec{AB} = \vec{PA} + \lambda \vec{u} + t \vec{v} = (\vec{i} + 16\vec{j} - 3\vec{k}) + \lambda(-2\vec{i} - \vec{j} + \vec{k}) + t(\vec{i} + 2\vec{j} - 3\vec{k}) \\ = (1 - 2\lambda + t)\vec{i} + (16 - \lambda + 2t)\vec{j} + (-3 + \lambda - 3t)\vec{k}$$

$$\begin{cases} \vec{PB} \perp \vec{u} \Leftrightarrow \vec{u} \cdot \vec{PB} = -2(1 - 2\lambda + t) + 1 \cdot (16 - \lambda + 2t) + 1 \cdot (-3 + \lambda - 3t) = 0 \\ \vec{PB} \perp \vec{v} \Leftrightarrow \vec{v} \cdot \vec{PB} = 1 \cdot (1 - 2\lambda + t) + 2 \cdot (16 - \lambda + 2t) - 3 \cdot (-3 + \lambda - 3t) = 0 \end{cases}$$

$$\Leftrightarrow \begin{cases} 6\lambda - 7t - 2 = 0 & | \cdot 2 \\ -7\lambda + 14t + 42 = 0 \end{cases}$$

$$5\lambda = 0 \quad \Leftrightarrow \lambda = 0 \quad \Rightarrow t = -3$$

$$\Rightarrow \vec{PB} = -3\vec{v} = \dots$$