$= (-1600 + 50t)\vec{i} + (-1400 + 2t)\vec{j} + 16t\vec{k}$

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

$\Leftrightarrow t = 30$

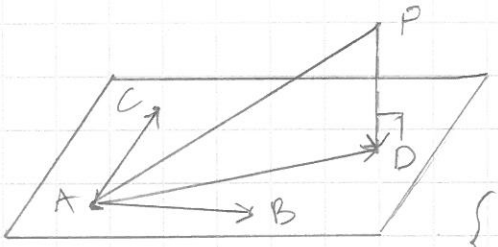
$\Rightarrow \vec{PC} = -100\vec{i} - 1340\vec{j} + 480\vec{k}$

a) $|\vec{PC}| = \sqrt{(-100)^2 + (-1340)^2 + 480^2} \approx 1426{,}88\ (m) \Rightarrow$ m. 1,42km

b) $C = (1700 - 100, 1450 - 1340, 0 + 480)$

$= (1600, 110, 480)$ Korkeus: 480 m

11. Piiteen etäisyys tasosta



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

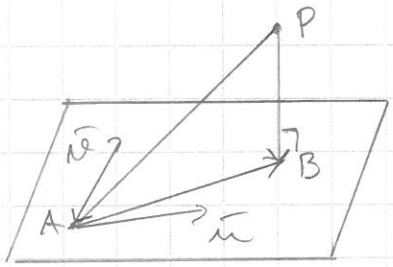
$= \vec{PA} + r\vec{AB} + t\vec{AC}$

↑ tason suuntavektorit

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

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

11.6



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

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

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

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

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

$= (1 - 2r + t)\vec{i} + (16 - r + 2t)\vec{j} + (-3 + r - 3t)\vec{k}$

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

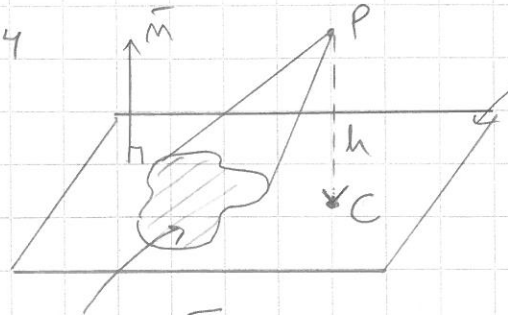
$\Leftrightarrow \begin{cases} 6r - 7t - 21 = 0 & | \cdot 2 \\ -7r + 14t + 42 = 0 \end{cases}$

$5r = 0 \Leftrightarrow r = 0 \Rightarrow t = -3$

$\Rightarrow \vec{PB} = -2\vec{i} + 10\vec{j} + 6\vec{k}$

$\Rightarrow B = (3 - 2, -13 + 10, -2 + 6) = (1, -3, 4)$

11.4



$\times \quad -y + 3z + 10 = 0$

$P = (2, -1, 3)$

Normaalivektori: $\vec{n} = \vec{i} - \vec{j} + 3\vec{k}$

$\vec{PC} \parallel \vec{n} \Leftrightarrow \vec{PC} = t\vec{n} = t\vec{i} - t\vec{j} + 3t\vec{k}$

$\Rightarrow C = (2 + t, -1 - t, 3 + 3t)$

C on tasolla: $(2 + t) - (-1 - t) + 3(3 + 3t) + 10 = 0$

$\Leftrightarrow 11t + 22 = 0 \Leftrightarrow t = -2$

$\Rightarrow \vec{PC} = -2\vec{i} + 2\vec{j} - 6\vec{k}$