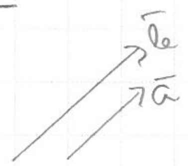
$(1):\ s = 3 - 4 = -1$

$\Rightarrow \underline{\bar{d} = 4\bar{a} - \bar{b} + 3\bar{c}}$

2.10 $\bar{u} = -11t\,\bar{i} - 9\bar{j} + 6t\,\bar{k}$ $\qquad \bar{v} = (t+2)\,\bar{i} + 3\bar{j} - 2t\,\bar{k}$



$\bar{a} \parallel \bar{b} \Leftrightarrow \bar{a} = t\bar{b},\ t \in \mathbb{R}$

a) $\bar{u} \parallel \bar{v} \Leftrightarrow \bar{u} = s\bar{v}$

$\Leftrightarrow -11t\bar{i} - 9\bar{j} + 6t\bar{k} = s((t+2)\bar{i} + 3\bar{j} - 2t\bar{k})$

$\Leftrightarrow \underline{-11t\bar{i}} \underline{-9\bar{j}} \underline{+6t\bar{k}} = \underline{s(t+2)}\,\bar{i} + \underline{3s}\bar{j} \underline{-2ts}\,\bar{k}$

Sivuaggi 2.0 $\Rightarrow \begin{cases} -11t = s(t+2) & \Rightarrow -11t = -3(t+2) \Leftrightarrow t = \frac{3}{4} \\ -9 = 3s & \Leftrightarrow s = -3 \\ 6t = -2ts & \Rightarrow 6t = -2t\cdot(-3) \Leftrightarrow 6t = 6t ✓ \end{cases}$

Siis $t = \frac{3}{4}$ ja $s = -3$ $\qquad \Rightarrow \underline{t = \frac{3}{4}}$

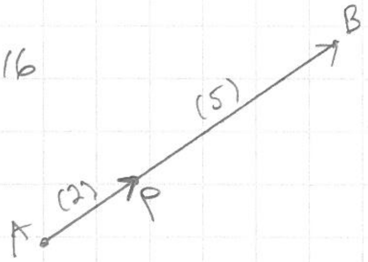
b) $\bar{u} \uparrow\downarrow \bar{v} \Leftrightarrow \bar{u} = s\bar{v},\ s < 0$

a)-kohta $s = -3 < 0$ ✓ $\Rightarrow \underline{t = \frac{3}{4}}$

c) $\bar{u} \uparrow\uparrow \bar{v} \Leftrightarrow \bar{u} = s\bar{v},\ s > 0$

a)-kohta $s = -3 > 0$ ↯ $\Rightarrow$ ei ratk.

2.16



$A = (2, -9, 1)$, $B = (-5, 5, 5)$

a) $\overline{AB} = -7\bar{i} + 14\bar{j} + 4\bar{k}$

b) $\overline{AP} = \frac{2}{7}\overline{AB} = \frac{2}{7}(-7\bar{i} + 14\bar{j} + 4\bar{k}) = -2\bar{i} + 4\bar{j} + \frac{8}{7}\bar{k}$

$\Rightarrow P = (2 + (-2), -9 + 4, 1 + \frac{8}{7}) = \underline{(0, -5, \frac{15}{7})}$

3. Pistetulo

$\bar{a} = x_1\bar{i} + y_1\bar{j} + z_1\bar{k}$ $\qquad \bar{b} = x_2\bar{i} + y_2\bar{j} + z_2\bar{k}$

$$\boxed{\bar{a}\cdot\bar{b} = x_1x_2 + y_1y_2 + z_1z_2}$$ PISTETULO

Huom. 1° $\bar{a}\cdot\bar{b}$ on luku, ei vektori

2° Pistetulossa piste $(\cdot)$ on aina merkittävä näkyviin

3° Pistetulolle pätee "tavalliset" laskusäännöt (s.29)