1. $\vec{a}+\vec{b} = 3\vec{i}+3\vec{j}$

$(\vec{a}+\vec{b})^0 = \frac{3\vec{i}+3\vec{j}}{\sqrt{3^2+3^2}} = \frac{3\vec{i}+3\vec{j}}{\sqrt{18}} = \frac{3\vec{i}+3\vec{j}}{3\sqrt{2}} = \frac{\vec{i}+\vec{j}}{\sqrt{2}}$ (:2·9)

$= \frac{1}{\sqrt{2}}(\vec{i}+\vec{j})$

2. $\vec{i}+7\vec{j} = s(2\vec{i}+3\vec{j}) + r(-7\vec{i}+6\vec{j})$

$\vec{i}+7\vec{j} = 2s\vec{i} + 3s\vec{j} - 7r\vec{i} + 6r\vec{j}$

$$\begin{cases} 1 = 2s - 7r & |\cdot 3 \\ 7 = 3s + 6r & |\cdot(-2) \end{cases}$$

$+$

$-11 = -33r \quad |\cdot(-\frac{1}{33}) \rightarrow r = \frac{1}{3}$

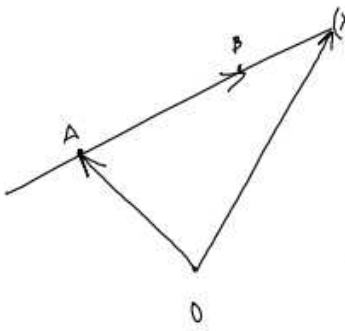
$7 = 3s + 2$

$s = \frac{5}{3}$

V:

$\vec{i}+7\vec{j} = \frac{5}{3}(2\vec{i}+5\vec{j}) + \frac{1}{3}(-7\vec{i}+6\vec{j})$

5.



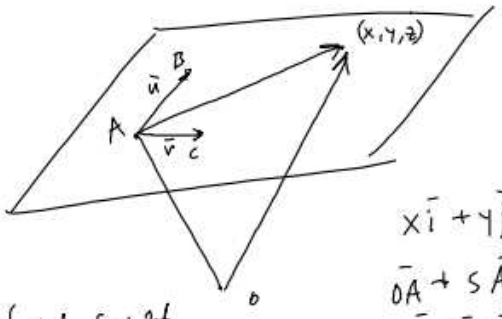

$\overline{AB} = -2\bar{i} + 2\bar{j} + 4\bar{k}$

$x\bar{i} + y\bar{j} + z\bar{k} = \overbrace{2\bar{i} - \bar{k}}^{\overline{OA}} + t(-2\bar{i} + 2\bar{j} + 4\bar{k})$

$$\begin{cases} x = 2 - 2t \\ y = 2t \\ z = -1 + 4t \end{cases}$$

xy-tasó: $\begin{cases} z = 0 = -1 + 4t \\ \rightarrow t = \frac{1}{4} \\ x = \frac{3}{2} \\ y = \frac{1}{2} \end{cases}$

6.




$$\begin{cases} x = 1 - s + 2t \\ y = 2 - s - 2t \\ z = 3 - 5s - 4t \end{cases}$$

$x\vec{i} + y\vec{j} + z\vec{k} =$

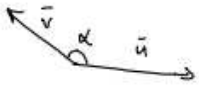
$\vec{OA} + s\vec{AB} + t\vec{AC}$

$= \vec{i} + 2\vec{j} + 3\vec{k} + s(-\vec{i} - \vec{j} - 5\vec{k}) + t(2\vec{i} - 2\vec{j} - 4\vec{k})$

4.

$|\vec{u}| = \sqrt{\left(\frac{2}{3}\right)^2 + 1^2} = \sqrt{\frac{13}{9}} = \frac{\sqrt{13}}{3}$

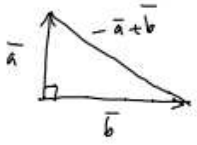
$|\vec{v}| = \sqrt{5}$




$\vec{u} \cdot \vec{v} = -\frac{2}{3} - 2 = -\frac{8}{3}$

$\cos\alpha = \frac{-\frac{8}{3}}{\sqrt{5} \cdot \frac{\sqrt{13}}{3}} \rightarrow \alpha = 172{,}9°$

3.




$|-\vec{a}+\vec{b}|^2 = |\vec{a}|^2 + |\vec{b}|^2$

$(-\vec{a}+\vec{b}) \cdot (-\vec{a}+\vec{b}) =$

$\vec{a}\cdot\vec{a} - \underbrace{\vec{a}\cdot\vec{b}}_{=0} - \underbrace{\vec{a}\cdot\vec{b}}_{=0} + \vec{b}\cdot\vec{b} = |\vec{a}|^2 + |\vec{b}|^2$

because 90°

□.