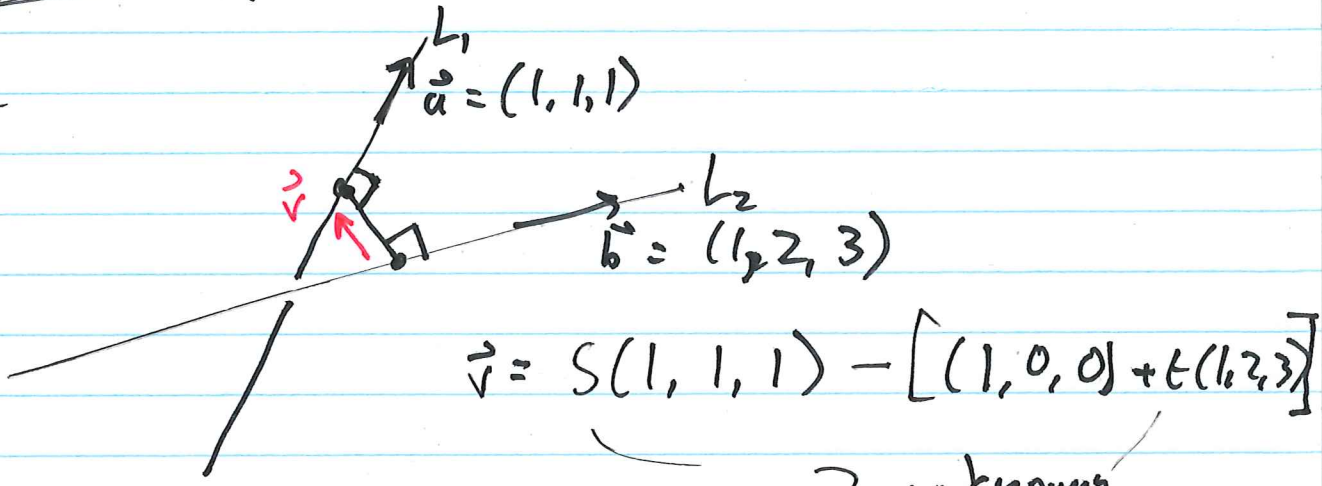
Review

Practice problems set

#8



$$\vec{v} = s(1,1,1) - [(1,0,0) + t(1,2,3)]$$

2 unknowns

2 eqns $\begin{cases} \vec{v} \cdot \vec{a} = 0 \\ \vec{v} \cdot \vec{b} = 0 \end{cases}$

$$\vec{v} = \begin{pmatrix} s-1-t \\ s-2t \\ s-3t \end{pmatrix}$$

$$(1,1,1) \cdot \vec{v} = \boxed{3s - 6t - 1 = 0}$$

$$(1,2,3) \cdot \vec{v} = \boxed{6s - 14t - 1 = 0}$$

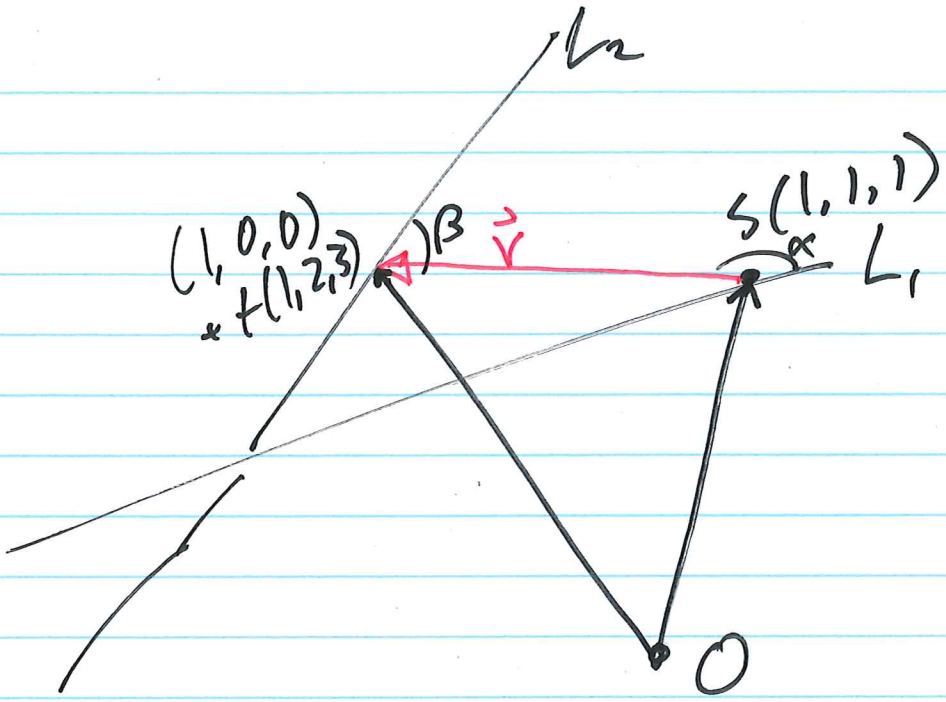
$$\begin{bmatrix} 3 & -6 \\ 6 & -14 \end{bmatrix} \begin{pmatrix} s \\ t \end{pmatrix} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

$$\left[\begin{array}{cc|c} 3 & -6 & 1 \\ 6 & -14 & 1 \end{array}\right] \sim \left[\begin{array}{cc|c} 3 & -6 & 1 \\ 0 & -2 & -1 \end{array}\right] \Rightarrow \boxed{t = 1/2}$$

$s = \ldots$

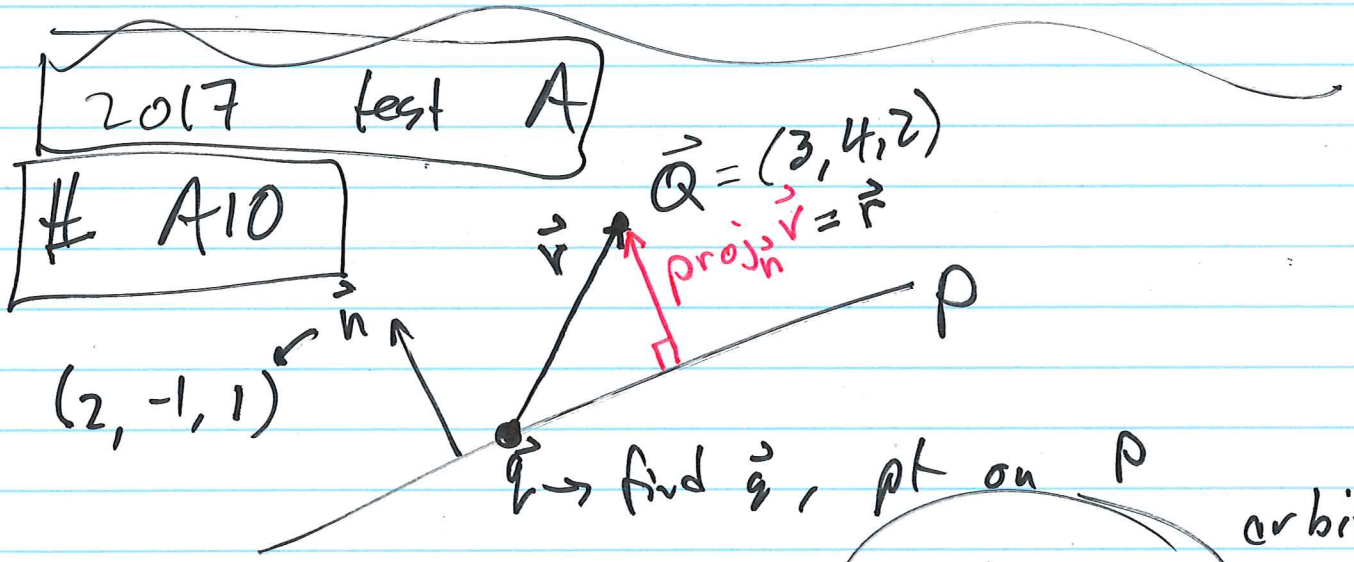
put t into param for L_1 ... $(x,y,z) = (\ )$

put s " " " L_2 ... $(x,y,z) = (\ )$



2017 test A

A10



arbitrary

$x = 0, \quad y = 0$

$z = 6$

$$\vec{r} = \vec{Q} - \vec{q} = (3, 4, -4)$$

$$\vec{r} \quad \text{proj}_{\vec{n}} \vec{r} = \frac{\vec{r} \cdot \vec{n}}{\|\vec{n}\|^2} \vec{n} = \frac{(6-4-4)}{4+1+1} \begin{bmatrix} 2 \\ -1 \\ 1 \end{bmatrix}$$

$$= -\frac{2}{6} \begin{bmatrix} 2 \\ -1 \\ 1 \end{bmatrix} = s\vec{n}$$

$$\|\vec{r}\| = \pm\frac{2}{6} \cdot \sqrt{4+1+1} = \pm\frac{2}{6}\sqrt{6}$$

P.P. #17 f)

$$\left[\begin{array}{ccc|c} 1 & 0 & 2 & 3 \\ 0 & 5 & 3 & 2 \\ 0 & 0 & 9 & 9 \end{array}\right] \sim \left[\begin{array}{ccc|c} 1 & 0 & 2 & 3 \\ 0 & 1 & 3/5 & 2/5 \\ 0 & 0 & 1 & 1 \end{array}\right]$$

$$\sim_{② - \frac{3}{5}③} \left[\begin{array}{ccc|c} 0 & 1 & 0 & 2/5 - 3/5 \\ 0 & 0 & 1 & 1 \end{array}\right]$$

$$\sim_{① - 2③} \left[\begin{array}{ccc|c} 1 & -2 & 0 & 1 \\ 0 & 1 & 0 & -1/5 \\ 0 & 0 & 1 & 1 \end{array}\right]$$

$$\sim_{① + 2②} \left[\begin{array}{ccc|c} 1 & 0 & 0 & 1 - 2/5 \\ 0 & 1 & 0 & -1/5 \\ 0 & 0 & 1 & 1 \end{array}\right]$$