

Subject: Practice Exam 1

Year . Month . Date . ()

Exam 1

Problem 1

(a) $OQ = \langle 1, 1, 1 \rangle$

$OR = \left\langle 1, \frac{1}{2}, 1, \frac{1}{2} \right\rangle$

b) $\cos \theta = \frac{\frac{1}{2}}{\sqrt{3} \sqrt{\frac{3}{2}}}$

Problem 2

$V = -3 \sin t i + 3 \cos t j + 1 k$

$|V| = \sqrt{10}$

Problem 3

(a) $\text{adj}(A) = \begin{bmatrix} 1 & -1 & 2 \\ 2 & -2 & 2 \\ -3 & 5 & -6 \end{bmatrix}^T \rightarrow a = 2, b = 3$

(b) $\frac{1}{2} \begin{bmatrix} 1 & 2 & -3 \\ -1 & -2 & 5 \\ 2 & 2 & -6 \end{bmatrix} \begin{bmatrix} 1 \\ -2 \\ 1 \end{bmatrix} = \begin{bmatrix} -3 \\ 0 \\ 8 \end{bmatrix}$

$$(C) \begin{vmatrix} 1 & 3 & C \\ 2 & 0 & -1 \\ 1 & 1 & 0 \end{vmatrix} = 1 \times (+1) - 3 \times (1) + C(2)$$

$$= -2 + 2C = 0$$

$$\Rightarrow C = 1$$

$$\begin{vmatrix} i & j & k \\ 1 & 3 & 1 \\ 1 & 1 & 0 \end{vmatrix}$$

$$= -i + j - 2k$$

Problem 4

$$\left\langle -L_1 \cos \theta, L_1 \sin \theta \right\rangle$$

$$\text{Problem 5 (a)} \quad \overrightarrow{P_0 P_1} = \langle -1, -1, 1 \rangle \quad (b)$$

$$\overrightarrow{P_0 P_2} = \langle 0, -2, 1 \rangle \quad n+y+2z = 0$$

$$\begin{vmatrix} i & j & k \\ -1 & -1 & 1 \\ 0 & -2 & 1 \end{vmatrix} = \begin{vmatrix} i & j & k \\ -1 & 1 & 0 \\ 0 & -2 & 1 \end{vmatrix} = i + j + 2k \quad (2)$$

$$\Rightarrow \frac{1}{2} \sqrt{6}$$

Subject:

Year . Month . Date . ()

(C) $\mathbf{r} = -\mathbf{i} + t\mathbf{j}$

$$y = t$$

$$z = t$$

$$-\mathbf{i} + t\mathbf{j} + t\mathbf{k} = -\mathbf{i} + 4t\mathbf{j} \quad t=1 \Rightarrow (0, 1, 1)$$

~~No intersection~~

Problem 6

(a) $2 \nparallel \vec{R} \nparallel \vec{V} \Rightarrow R \cdot R' + R' \cdot R$

(b) $|R| = C \rightarrow (R \cdot R) = 0 \Rightarrow 2RV$

(c) ~~$\vec{R} \parallel \vec{V}$~~ $\Rightarrow R \cdot V = (R \cdot V) = V \cdot V + R \cdot A = 0$
 ~~$R \parallel V \Rightarrow R \cdot A = -|V|^2$~~ $\Rightarrow R \cdot A = -|V|^2$