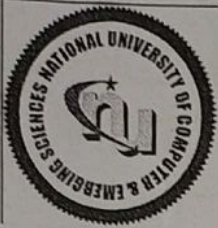


(SE) 3A

National University of Computer and Emerging Sciences, Lahore Campus



Course:	Linear Algebra	Course Code:	
Program:	BS SE 3A	Semester:	
Duration:		Total Marks:	4
Paper Date:	11/11/2021	Weight	4
Section:	BS SE 3A	Page(s):	
Exam:	2nd Quiz	Roll No:	

Instruction/Notes:

Attempt All Questions

1. Find k , such that $\|k\underline{v}\| = 7$, $\underline{v} = (4, 3, -\frac{1}{2})$

$$|k| \|\underline{v}\| = 7$$

$$|k| \sqrt{4^2 + 3^2 + (-\frac{1}{2})^2} = 7$$

$$|k| \left(\frac{\sqrt{101}}{2} \right) = 7$$

$$k = \pm 1.393$$

0.9

2.9
4.0

2. Find $\underline{u} \times (\underline{v} \times \underline{w})$, where $\underline{u} = (1, 1, 1)$

$$\underline{v} = (-1, -1, -1)$$

$$\underline{w} = (4, 3, -2)$$

$$(\underline{u} \cdot \underline{w})\underline{v} - (\underline{u} \cdot \underline{v})\underline{w}$$

$$[(1, 1, 1) \cdot (4, 3, -2)](-1, -1, -1) - [(1, 1, 1) \cdot (-1, -1, -1)](4, 3, -2)$$

$$(4 + 3 - 2)(-1, -1, -1) - [(-1 - 1 - 1)(4, 3, -2)]$$

$$(5)(-1, -1, -1) - [(-3)(4, 3, -2)]$$

$$(-5, -5, -5) - (-12, -9, -6)$$

$$= (7, 4, +1)$$

$$= (+7, 4, 1)$$

0.7

Q3 Find distance between parallel planes

$$3x - y + 2z = 1 \quad \& \quad 9x - 3y + 6z = 2$$

↳ Plane 1 ↳ Plane 2

↓
Point on Plane 1

$$x = y = 0$$

$$z = 1/2$$

$(0, 0, 1/2)$ with Plane 2 ↗

$$9x - 3y - 6z - 2 = 0$$

$$D = \frac{|9(0) + (-3)(0) + (-6)(1/2) - 2|}{\sqrt{9^2 + (-3)^2 + (-6)^2}}$$

$$= \frac{5}{3\sqrt{14}}$$

Formula =

0.7

Q4 Find the volume of tetrahedron given by

vectors $\underline{u} = (1, 2, 3)$, $\underline{v} = 2\underline{i} + 3\underline{j} + \underline{k}$

$$\underline{w} = (-1, -3, -2)$$

$$\begin{vmatrix} u_1 & u_2 & u_3 \\ v_1 & v_2 & v_3 \\ w_1 & w_2 & w_3 \end{vmatrix}$$

$$\begin{vmatrix} 1 & 2 & 3 \\ 2 & 3 & 1 \\ -1 & -3 & -2 \end{vmatrix}$$

0.6

$$= |1(3)(-2) + (2)(1)(-1) + 3(2)(-3) - [(3)(3)(-1) + (2)(2)(-2) + (1)(1)(-3)]|$$

$$= |(-6 - 2 - 18) - (-20)|$$

$$= |-6|$$

$$= 6$$

$$\begin{bmatrix} -1 & 0 \end{bmatrix} \begin{bmatrix} \downarrow & \downarrow \\ -1 & 0 \end{bmatrix} = 0$$

diff