

Course No: TECH 1301  
Course Title: Mathematics II  
Date: 14/04/2019  
No. of Questions: (3)  
Time: 60 Minutes (1 hr)  
Using Calculator:(Yes)

University of Palestine



Major 2 Exam 1st semester  
2019/2020 Total Grade: 30

Instructor Name: Dr. Nabil Hamad, Dr.  
Diab El Aawar  
Student No.: \_\_\_\_\_  
Student Name: \_\_\_\_\_  
College Name:IT  
Dep. / Specialist: \_\_\_\_\_  
Using Dictionary:(No)

**Question 1:**

12 marks

1. let  $\mathbf{u} = (-3, 1, 2)$ ,  $\mathbf{v} = (4, 0, -8)$  and  $\mathbf{w} = (6, -1, -4)$ .  
Find the components of  $(2\mathbf{u} - 7\mathbf{w}) - (8\mathbf{v} + \mathbf{u})$ .

4 marks

2. If the determinants of  $\begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix} = -6$ , then the determinants

$$\text{of } \begin{vmatrix} 3a & 3b & 3c \\ -d & -e & -f \\ 4g & 4h & 4i \end{vmatrix} =$$

( 2 marks)

3. Show that points  $A(-3,6)$ ,  $B(-12,-4)$  and  $C(8,5)$  could not be the vertices of a rectangle  $ABCD$ . (*6 marks*)

**Question 2:**

10 marks

1. Find the area of the triangle having vertices  $A(1,0,1)$ ,  $B(0,2,3)$  and  $C(2,1,0)$   
(4 marks)

2. Let  $\mathbf{u} = (2,6,-7)$ ,  $\mathbf{v} = (-1,1,8)$  and  $k = 3$ . If  $k\mathbf{u} + l\mathbf{v} = (2,14,11)$ .  
What is the value of  $l$ ? (3 marks)

3. Consider the vectors  $\mathbf{u} = (-6,0,4)$  and  $\mathbf{v} = (3,1,6)$ . Find the type of the angle  $\theta$  between  $\mathbf{u}$  and  $\mathbf{v}$ . (3 marks)

**Question 3:**

**8 marks**

1. let  $\mathbf{u} = (-1, 2, 5)$ , Find all scalars  $k$  such that  $\|\mathbf{k}\mathbf{u}\| = 4$  (2 marks)

2. Find the vector that is orthogonal to both  $\mathbf{u} = (-6, 4, 2)$  and  $\mathbf{v} = (3, 1, 5)$  (2 marks)

3. Find the volume of the parallelepiped with sides  $\mathbf{u} = (2, -6, 2)$ ,  
 $\mathbf{v} = (0, 4, -2)$  and  $\mathbf{w} = (2, 2, -4)$ . (4 marks)

انتهت الأسئلة  
مع تمنياتنا لكم بالتوفيق والنجاح