

Course No: TECH 1301
 Course Title: Mathematics II
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 Time: 60 Minutes (1 hr)
 Using Calculator:(Yes)

University of Palestine

 Major 1 Exam 2nd semester
 2018/2019 Total Grade: 30

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 Student No.: _____
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 College Name:IT
 Dep. / Specialist: _____
 Using Dictionary:(No)

Q1	Q2	Q3	Q4	Total
10	5	10	5	30

Question 1:

10 marks

1. Given that k is a constant and not zero, which of the following is not a linear equation?

- a. $x_1 + x_2 - 2x_3 = e^k$
- b. $2^k x_1 + 8x_2 - 2x_3 = 0$
- c. $3x_1 x_2 + x_2 - 8x_3 = 5$
- d. $x_1 \sin(k) = -7x_2 + kx_3$

2. A homogeneous system of linear equations with more unknowns than equations has.

- a. Only the trivial solution.
- b. Infinitely many solutions in addition to the trivial solution
- c. No solution.
- d. a and b
- e. a, b and c

3. Which of the following matrices are not in reduced row-echelon form?

- a. $\begin{bmatrix} 1 & 4 & -3 & 7 \\ 0 & 1 & 6 & 2 \\ 0 & 0 & 1 & 5 \end{bmatrix}$ b. $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ c. $\begin{bmatrix} 1 & 0 & 0 & 4 \\ 0 & 1 & 0 & 7 \\ 0 & 0 & 1 & -1 \end{bmatrix}$ d. $\begin{bmatrix} 0 & 1 & -2 & 0 & 1 \\ 0 & 0 & 0 & 1 & 3 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

4. One of the following is false.

- a. The inverse of an invertible lower triangular matrix is upper triangular, and the inverse of an invertible upper triangular matrix is lower triangular.
- b. If A is an invertible matrix, then AA^T and $A^T A$ are also invertible.
- c. A and B be square matrices of the same size. If AB is invertible, then A and B must also be invertible
- d. If the sizes of the matrices are such that the stated operations can be performed, then $(AB)^T = B^T A^T$.

5. The identity matrix is:

- a. Upper triangular matrix.
- b. Lower triangular matrix.
- c. Triangular matrix.
- d. None of the above.

Question 2:

1. What is the value of " a " that makes the next system consistent? 2 marks

$$\begin{bmatrix} 1 & 5 & 4 & 6 \\ 0 & 1 & 1 & 2 \\ 0 & 0 & a & 0 \end{bmatrix}$$

2. The augmented matrix for a system of linear equations has been reduced by row operations to the given row-echelon form. Solve the system. 1 marks

$$\begin{bmatrix} 1 & -3 & 4 & 7 \\ 0 & 1 & 2 & 2 \\ 0 & 0 & 1 & 5 \end{bmatrix}$$

3. Find the matrix A that satisfies

2 marks

$$A^{-2} = \begin{bmatrix} 9 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

Question 3:

10marks

Find the inverse of the matrix A using row operations, and check your answer by

$$\frac{1}{\det(A)} \text{adj}(A).$$

$$A = \begin{bmatrix} 2 & 6 & 6 \\ 2 & 7 & 6 \\ 2 & 7 & 7 \end{bmatrix}$$

Question 4:

5marks

Solve the following system using Cramer's rule:

$$\begin{aligned}x - 4y + z &= 6 \\4x - y + 2z &= -1 \\2x + 2y - 3z &= -20\end{aligned}$$

Good Luck