MT-104 Linear Algebra

Wednesday, June 03, 2020

Course Instructors

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Serial No:

2nd Mid Term Exam

Spring Semester 2020

Max Time:1 Hour

Max Marks: 35

Exam Weight (Out of 100). 10

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Roll No	Section

Guidelines for Submission:

1. You should submit only one PDF document. equations, figures can be taken as pictures (all figures/equations can be pasted as images inside that document).
2. You must submit your solution before due time via **Google Classroom**. Submissions submitted after the due time shall not be considered.
3. If you don't finish every part of a question, don't worry! You can still submit what you've done to get marks based on your efforts.
4. In case of copied or plagiarized solutions in exam Or If a student provided help to another student during exam both will be awarded "F" grade and it will affect the student CGPA.
5. Viva of any student can be conducted by the instructor after conducting an online exam in case of any doubt.
6. This document should be submitted through LMS (**Google Classroom)**. But in worst case, you can email it within the deadline.

National University of Computer and Emerging Sciences

Department of Computer Science **Chiniot-Faisalabad Campus**

Question # 1	3+3+4=10

Consider the transformation defined by $T(x) = Ax$, where A is given by

$$A = \begin{bmatrix} 1 & 3 & 2 \\ 3 & 2 & 5 \end{bmatrix}$$

a. Find order of given transformation.

b. Find image of $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$

c. Is $\begin{bmatrix} 2 \\ 4 \end{bmatrix} \in$ range of T? If yes, find a vector in the domain whose image is $\begin{bmatrix} 2 \\ 4 \end{bmatrix}$.

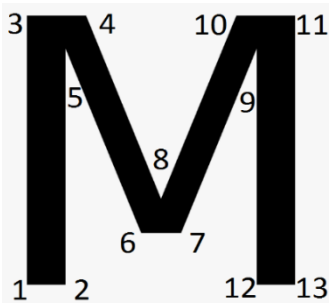
Question # 2	Marks 10

Find the inverse of following matrix A, if possible, by using elementary row operations.

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

Question # 3	Marks 10+5=15

a. The letter M with vertices $\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 6 \end{bmatrix}, \begin{bmatrix} 2 \\ 6 \end{bmatrix}, \begin{bmatrix} 1 \\ 5.5 \end{bmatrix}, \begin{bmatrix} 2.5 \\ 2 \end{bmatrix}, \begin{bmatrix} 3.5 \\ 2 \end{bmatrix}, \begin{bmatrix} 3 \\ 2.5 \end{bmatrix}, \begin{bmatrix} 5 \\ 5.5 \end{bmatrix}, \begin{bmatrix} 4 \\ 6 \end{bmatrix}, \begin{bmatrix} 6 \\ 6 \end{bmatrix}, \begin{bmatrix} 5 \\ 0 \end{bmatrix}, \begin{bmatrix} 6 \\ 0 \end{bmatrix}$ named by 1,2,3,4,5,6,7,8,9,10,11,12 and 13 respectively. Make possible transformation to convert this letter similar to W. Also draw the transformed figure.



b. A unit disk D is transformed under the transformation $T: R^2 \to R^2$ defined by $Tx = Ax$ where $A = \begin{bmatrix} \frac{3\sqrt{3}}{2} & -1 \\ \frac{3}{2} & \sqrt{3} \end{bmatrix}$. Find the area of the transformed figure.