مدونة المناهج السعودية

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الموقع التعليمي لجميع المراحل الدراسية

في المملكة العربية السعودية

TAIBAH UNIVERSITY
COLLEGE OF SCIENCE
MATHEMATICS DEPARTMENT

HOMEWORK 1

Course : Linear Algebra 1
Due Date : 24/11/2018

Name : .....

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Exercises	Marks
Ex. 1	
Ex. 2	
Ex. 3	
Ex. 4	
Ex. 5	

TOTAL

Exercise 1

20 Marks

Let $A = \begin{pmatrix} 1 & 2 \\ -2 & 4 \end{pmatrix}$ and $B = \begin{pmatrix} 4 & 0 \\ 1 & 1 \end{pmatrix}$

(1) Find AB and BA.

(2) Let $C = 3B - I_2$. Find C^T.

(3) Find A^{-1} and $(A^T)^{-1}$.

(4) Find a matrix F such that $(2F - A)^T = B$.

Exercise 2

20 Marks

(1) Solve the following system by using the Gauss-Jordan reduction :

$$\begin{cases} x + y + 2z - 5t &= 3 \\ 2x + 5y - z - 9t &= -3 \\ 2x + y - z + 3t &= -11 \\ x - 3y + 2z + 7t &= -5 \end{cases}$$

(2) Let $A = \begin{pmatrix} 1 & 1 & 2 & -5 \\ 2 & 5 & -1 & -9 \\ 2 & 1 & -1 & 3 \\ 1 & -3 & 2 & 7 \end{pmatrix}$

(i) Evaluate $\det A$ and $\det A^T$

(ii) Is A a singular matrix?

Exercise 3

20 Marks

Evaluate :

$$\begin{vmatrix} 1 & 2 & -1 \\ 2 & 1 & 3 \\ 0 & 3 & -2 \end{vmatrix} \qquad \begin{vmatrix} 2 & 1 & 3 \\ 0 & 3 & -2 \\ 1 & 2 & -1 \end{vmatrix} \qquad \begin{vmatrix} -2 & 2 & -3 \\ 0 & 6 & 2 \\ -1 & 4 & 1 \end{vmatrix} \qquad \begin{vmatrix} 1 & 2 & 0 \\ 2 & 1 & 3 \\ -1 & 3 & -2 \end{vmatrix}$$

Exercise 4

20 Marks

Let $A = \begin{pmatrix} 1 & 2 & -1 \\ 2 & 1 & 3 \\ 0 & 3 & -2 \end{pmatrix}$

(1) Find the adj(A) and A^{-1}.

(2) Deduce the inverse of $B = \begin{pmatrix} 1 & 2 & 0 \\ 2 & 1 & 3 \\ -1 & 3 & -2 \end{pmatrix}$

(3) Evaluate : $\det\left(4(2(3A^2)^T)^{-1}\right)$

(4) Solve the following linear system :

$$\begin{cases} x + 2y - z &= 1 \\ 2x + y + 3z &= 2 \\ 3y - 2z &= 3 \end{cases}$$

(i) by using A^{-1}.

(ii) by using Cramar's rule.

Exercise 5

20 Marks

(1) Solve the following system by using the Gaussian elimination:

$$\begin{cases} x_2 + 2\,x_3 - x_4 &= 1 \\ x_1 + x_3 + x_4 &= 4 \\ -x_1 + x_2 - x_4 &= 2 \\ 2\,x_2 + 3\,x_3 - x_4 &= 7 \end{cases}$$

(2) Let $B = \begin{pmatrix} 0 & 1 & 2 & -1 \\ 1 & 0 & 1 & 1 \\ -1 & 1 & 0 & -1 \\ 0 & 2 & 3 & -1 \end{pmatrix}$

(i) Evaluate $\det B$.

(ii) Is B a singular matrix?