King Saud University
Department of Mathematics
1st Semester 1432-1433 H

MATH 244 (Linear Algebra)
1st Assignment
To be submitted on or before 12-1-1433 H

Student's Name	Student's ID	Group No.	Lecturer's Name

Question No.	I	II	III	IV	Total
Mark					

Instructions.

1. Attempt all questions.
2. Use any source of information to handle this assignment WITH proper citation and no plagiarism.
3. Feel free to use the computer lab on the ground floor of Building 21.
4. Contact Mrs. Alhanouf Al-homaidhi (aalhomaidhi@ksu.edu.sa) for assistance with MATLAB.

[**I**]

(1) What is MATLAB?

(2) Why do you think it is necessary for a computer science student to know about linear algebra and MATLAB?

[**II**] Let $A = \begin{bmatrix} 2 & 1 & -1 \\ 3 & 1 & 4 \\ 5 & -3 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 5 & 1 & 3 \\ 0 & -1 & 0 \\ 0 & 1 & 2 \end{bmatrix}$.

(1) Use MATLAB to compute the following

(a) $\det(2A)$
(b) $A + B$
(c) The reduced row Echelon form of A
(d) A^2
(e) A^T
(f) B^{-1}

(2) Compute the eigenvalues and the eigenvectors of B using MATLAB. Redo the computations by hands.

(3) What do `ones(n)` and `eye(n)` produce in MATLAB where n is a positive integer.

[**III**]

(1) Use the following to produce a vector **x**

(a) The loop:

```
n = 21;
h = 1/(n − 1);
for  k = 1 : n
     x(k) = (k − 1) ∗ h;
end
```

(b) $\mathbf{x} = 0 : 0.05 : 1$

(c) $\mathbf{x} = 0.05 * (0 : 20)$

(d) Define the same vector $\mathbf{x}$ using the `linspace` function.

(e) compute $\|x\|$ using MATLAB.

(2) What does the commands `length(x)`, `x(1:4)`, `x(end:-1:1)` and `x(1,4)` produce?

[IV]

(1) Solve the following system using MATLAB.

$$\begin{aligned} x + 2y + 3z &= 1 \\ 2x + 4y + 7z &= 1 \\ -x \qquad + 5z &= 1 \end{aligned}$$

(2) Give an example of linear algebra's applications.
