

PHILADELPHIA UNIVERSITY
DEPARTMENT OF BASIC SCIENCES

Exam 1

Linear Algebra 1

21-11-2019

1. (2 points) Compute the matrix multiplication.

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

2. (2 points) Solve the system of linear equations using the formula $X = A^{-1}B$.

$$\begin{bmatrix} 2 & 4 \\ 2 & 3 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 2 \\ -1 \end{bmatrix}$$

3. (2 points) Compute $\det A$ using the 3x3 formula.

$$A = \begin{bmatrix} 5 & 1 & 1 \\ 1 & -2 & 0 \\ 2 & 3 & -1 \end{bmatrix}$$

4. (2 points) The matrix A is not invertible. Find k .

$$A = \begin{bmatrix} k+2 & 2 \\ 4 & k-5 \end{bmatrix}$$

5. (6 points) Solve the system of linear equations using Gauss-Jordan algorithm.

$$\begin{cases} a + b + 3c + d + 2e = 0 \\ \quad b + c + 3e = 3 \\ \quad \quad -d + e = 1 \\ \quad \quad -2d + 2e = 2 \end{cases}$$

6. (6 points) Compute A^{-1} using Gauss-Jordan algorithm.

$$A = \begin{bmatrix} 3 & 1 & 3 \\ 0 & -2 & -2 \\ 2 & 4 & 6 \end{bmatrix}$$