

PHILADELPHIA UNIVERSITY  
DEPARTMENT OF BASIC SCIENCES

Exam 1

Linear Algebra

16-11-2014

1. Solve the system of linear equations using matrix inverse.

$$\begin{cases} 2x + y = 10 \\ 3x + y = 18 \end{cases}$$

2. Solve the system of linear equations using Cramer's rule.

$$\begin{cases} x + y + z = 6 \\ 2x - y = -1 \\ 4x - y + 3z = 0 \end{cases}$$

3. Solve the system of linear equations using Gauss-Jordan algorithm.

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

4. Evaluate  $\det A$ .

$$A = \begin{bmatrix} 1 & 5 & 0 & 0 & 3 \\ 2 & 6 & 4 & 0 & 0 \\ 0 & 2 & 1 & -1 & 0 \\ 0 & 0 & 0 & 2 & -4 \\ 0 & 2 & 5 & 3 & 0 \end{bmatrix}$$

5. Bonus problem (2 points): Find  $A^{-1}$ .

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