Linear Algebra Homework #1
Fall 2020

Name: Due: Wednesday, Nov 25, 2019

**Instructions:**

*Please include essential steps in your solution. For most of the problems, answers without essential steps may receive a score of 0.*

1. Solve the following system algebraically.

$$\begin{aligned} x - y + 2z &= 6 \\ 2x \quad - \quad z &= 3 \\ y + 2z &= 0 \end{aligned}$$

2. Solve the following system algebraically.

$$\begin{aligned} x - y + 2z &= 0 \\ x \quad - \quad z &= -2 \\ z &= 0 \end{aligned}$$

3. Determine whether each of the following systems of equations is linear. If so, put it in standard format.

$$(a) \begin{aligned} x + 2 &= 1 \\ x + 3 &= y^2 \end{aligned} \qquad (b) \begin{aligned} x \quad + 2z &= y \\ 3x - y \quad &= y \end{aligned} \qquad (c) \begin{aligned} x + y &= -3y \\ 2x \quad &= xy \end{aligned}$$

4. Exhibit the augmented matrix of each system and give its size. Then use Gaussian elimination to reduce the augmented matrix to echelon form.

$$\begin{aligned} 3x_1 + 6x_2 - x_3 &= -4 \\ -2x_1 - 4x_2 + x_3 &= 3 \\ x_3 &= 1 \end{aligned}$$

5. Use Gaussian elimination to reduce the augemented matrix to reduced echelon form

$$\begin{aligned} x_1 + \quad x_2 &= 1 \\ 5x_1 + 2x_2 &= 5 \\ x_1 + 2x_2 &= -7 \end{aligned}$$