Worksheet 1

Sections 306 and 310
MATH 54

August 23, 2018

Exercise 1. Which of the following matrices are in row echelon form? For each matrix, write a corresponding system of linear equations.

$$\begin{bmatrix} 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & 3 \\ 0 & 0 & 1 & 0 \end{bmatrix} \qquad \begin{bmatrix} 0 & 1 & 0 & 1 \\ 1 & 3 & 2 & 2 \\ 0 & 0 & 1 & 3 \end{bmatrix} \qquad \begin{bmatrix} 1 & 0 & 0 & 4 \\ 0 & 0 & 3 & 5 \\ 0 & 0 & 0 & 6 \end{bmatrix}$$

Exercise 2. The following three matrices are already in row echelon form. Which represent a consistent system of equations?

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \end{bmatrix} \qquad \begin{bmatrix} 1 & 1 & 0 & 1 & 1 \\ 0 & 2 & 0 & 2 & 2 \\ 0 & 0 & 0 & 3 & 3 \\ 0 & 0 & 0 & 0 & 4 \end{bmatrix} \qquad \begin{bmatrix} 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

Exercise 3. Put the following in row echelon form.

$$\begin{bmatrix} 1 & 4 & 0 & 7 \\ 2 & 7 & 0 & 10 \end{bmatrix} \qquad \begin{bmatrix} 1 & -7 & 0 & 6 & 5 \\ 0 & 0 & 1 & -2 & -3 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

Exercise 4. Describe the possible echelon fomrs of a nonzero 3×2 matrix. Use the symbols $\square$, $*$, and 0, where $\square$ means a nonzero number and $*$ means any number.

Exercise 5. Determine the values of h such that the matrix is the augmented matrix of a consistent linear system.

$$\begin{bmatrix} 3 & 6 & 6 \\ 1 & h & 4 \end{bmatrix}$$