MA 162 Recitation Worksheet Thursday September 18

1. Fill in the missing entries by performing the indicated row operations to obtain the row-reduced matrices.

   (a)

$$\left[\begin{array}{cc|c} 3 & 9 & 6 \\ 2 & 1 & 4 \end{array}\right] \xrightarrow{\frac{1}{3}R_1} \left[\begin{array}{cc|c} \cdot & \cdot & \cdot \\ 2 & 1 & 4 \end{array}\right] \xrightarrow{R_2-2R_1} \left[\begin{array}{cc|c} 1 & 3 & 2 \\ \cdot & \cdot & \cdot \end{array}\right] \xrightarrow{-\frac{1}{5}R_2} \left[\begin{array}{cc|c} 1 & 3 & 2 \\ \cdot & \cdot & \cdot \end{array}\right] \xrightarrow{R_1-3R_2} \left[\begin{array}{cc|c} 1 & 0 & 2 \\ 0 & 1 & 0 \end{array}\right]$$

   (b)

$$\left[\begin{array}{cc|c} 1 & 2 & 1 \\ 2 & 3 & -1 \end{array}\right] \xrightarrow{R_2-2R_1} \left[\begin{array}{cc|c} 1 & 2 & 1 \\ \cdot & \cdot & \cdot \end{array}\right] \xrightarrow{-R_2} \left[\begin{array}{cc|c} 1 & 2 & 1 \\ \cdot & \cdot & \cdot \end{array}\right] \xrightarrow{R_1-2R_2} \left[\begin{array}{cc|c} 1 & 0 & -5 \\ 0 & 1 & 3 \end{array}\right]$$

2. Solve The system of linear equations using the Gauss-Jordan elimination method.

   (a)

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

   (b)

$$\begin{aligned} 2x + 3y - 2z &= 10 \\ 3x - 2y + 2z &= 0 \\ 4x - y + 3z &= -1 \end{aligned}$$

3. Determine the value(s) of k such that the following system of linear equations has no solution:

$$\begin{aligned} 3x - 2y + 4z &= 12 \\ -9x + 6y - 12z &= k \end{aligned}$$

4. Find a matrix X that satisfies the matrix equation $2A + X = B$ where

$$A = \begin{bmatrix} -2 & 1 \\ 0 & 3 \end{bmatrix} \text{ and } B = \begin{bmatrix} 2 & -3 \\ 1 & -2 \end{bmatrix}.$$

5. Figures for life expectancy at birth of Massachusetts residents in 2008 are $82.6, 80.5$ and 91.2 years for white, black and Hispanic women, respectively, and $70.8, 73.9$ and 84.8 years for white, black and Hispanic men, respectively. Express this information using a 2×3 matrix and 3×2 matrix.