

1. (4 points) If the reduced row echelon form for the augmented matrix corresponding to a specific system is

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

write the general solution to the system.

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

Solution  $\begin{cases} x = 3 + 2z \\ y = -z \\ z \text{ is free} \end{cases}$

2. (6 points) Find the reduced row echelon form for the augmented matrix corresponding to following the system of equations. Use the back of this page if necessary, but at every step write which elementary row operation you use, starting from the original augmented matrix and ending with the matrix in reduced row echelon form.

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

$$\begin{bmatrix} 2 & -4 & 0 & 10 \\ 0 & 2 & 2 & -2 \\ 1 & 0 & 2 & 3 \end{bmatrix} \xrightarrow{\frac{1}{2}R_1} \begin{bmatrix} 1 & -2 & 0 & 5 \\ 0 & 2 & 2 & -2 \\ 1 & 0 & 2 & 3 \end{bmatrix} \xrightarrow{\frac{1}{2}R_2} \begin{bmatrix} 1 & -2 & 0 & 5 \\ 0 & 1 & 1 & -1 \\ 1 & 0 & 2 & 3 \end{bmatrix}$$

$$\xrightarrow{-1 \cdot R_1 + R_3} \begin{bmatrix} 1 & -2 & 0 & 5 \\ 0 & 1 & 1 & -1 \\ 0 & 2 & 2 & -2 \end{bmatrix} \xrightarrow{-2R_2 + R_3} \begin{bmatrix} 1 & -2 & 0 & 5 \\ 0 & 1 & 1 & -1 \\ 0 & 0 & 0 & 0 \end{bmatrix} \xrightarrow{2R_2 + R_1} \begin{bmatrix} 1 & 0 & 2 & 3 \\ 0 & 1 & 1 & -1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

R.R.E.F.