

Review Problems are on website.

22

$$a) \begin{bmatrix} 1 & 2 & -3 & | & 1 & 0 & 0 \\ 2 & 3 & -4 & | & 0 & 1 & 0 \\ 3 & 0 & 1 & | & 0 & 0 & 1 \end{bmatrix}$$

$$\begin{array}{l} R_2 - 2R_1 \\ R_3 - 3R_1 \end{array} \begin{bmatrix} 1 & 2 & -3 & | & 1 & 0 & 0 \\ 0 & -1 & 2 & | & -2 & 1 & 0 \\ 0 & -6 & 10 & | & -3 & 0 & 1 \end{bmatrix}$$

$$\frac{R_2}{-1} \begin{bmatrix} 1 & 2 & -3 & | & 1 & 0 & 0 \\ 0 & 1 & -2 & | & 2 & -1 & 0 \\ 0 & -6 & 10 & | & -3 & 0 & 1 \end{bmatrix}$$

$$\begin{array}{l} R_1 - 2R_2 \\ R_3 + 6R_2 \end{array} \begin{bmatrix} 1 & 0 & 1 & | & -3 & 2 & 0 \\ 0 & 1 & -2 & | & 2 & -1 & 0 \\ 0 & 0 & -2 & | & 9 & -6 & 1 \end{bmatrix}$$

$$\frac{R_3}{-2} \begin{bmatrix} 1 & 0 & 1 & | & -3 & 2 & 0 \\ 0 & 1 & -2 & | & 2 & -1 & 0 \\ 0 & 0 & 1 & | & -\frac{9}{2} & 3 & -\frac{1}{2} \end{bmatrix}$$

$$\begin{array}{l} R_1 - R_3 \\ R_2 + 2R_3 \end{array} \begin{bmatrix} 1 & 0 & 0 & | & \frac{3}{2} & -1 & \frac{1}{2} \\ 0 & 1 & 0 & | & -7 & 5 & -1 \\ 0 & 0 & 1 & | & -\frac{9}{2} & 3 & -\frac{1}{2} \end{bmatrix}$$

$$\underbrace{\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}}_I \quad \underbrace{\begin{bmatrix} \frac{3}{2} & -1 & \frac{1}{2} \\ -7 & 5 & -1 \\ -\frac{9}{2} & 3 & -\frac{1}{2} \end{bmatrix}}_{A^{-1}}$$

$$b) \quad X = A^{-1}B$$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} \frac{3}{2} & -1 & \frac{1}{2} \\ -7 & 5 & -1 \\ -\frac{9}{2} & 3 & -\frac{1}{2} \end{bmatrix} \begin{bmatrix} -11 \\ -14 \\ 9 \end{bmatrix}$$

$$= \begin{bmatrix} 2 \\ -2 \\ 3 \end{bmatrix}$$

23

$$\begin{array}{cccc} x & y & z & \# \\ \left[\begin{array}{ccc|c} 1 & 2 & -3 & -11 \\ 2 & 3 & -4 & -14 \\ 3 & 0 & 1 & 9 \end{array} \right] \end{array}$$

$$\begin{array}{l} R_2 - 2R_1 \\ R_3 - 3R_1 \end{array} \left[\begin{array}{ccc|c} 1 & 2 & -3 & -11 \\ 0 & -1 & 2 & 8 \\ 0 & -6 & 10 & 42 \end{array} \right]$$

$$\frac{R_2}{-1} \left[\begin{array}{ccc|c} 1 & 2 & -3 & -11 \\ 0 & 1 & -2 & -8 \\ 0 & -6 & 10 & 42 \end{array} \right]$$

$$\begin{array}{l} R_1 - 2R_2 \\ R_3 + 6R_2 \end{array} \left[\begin{array}{ccc|c} 1 & 0 & 1 & 5 \\ 0 & 1 & -2 & -8 \\ 0 & 0 & -2 & -6 \end{array} \right]$$

$$\frac{R_3}{-2} \left[\begin{array}{ccc|c} 1 & 0 & 1 & 5 \\ 0 & 1 & -2 & -8 \\ 0 & 0 & 1 & 3 \end{array} \right]$$

$$\begin{array}{l} R_1 - R_3 \\ R_2 + 2R_3 \end{array} \begin{array}{cccc} x & y & z & \# \\ \left[\begin{array}{ccc|c} 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 1 & 3 \end{array} \right] \end{array}$$

$$(x, y, z) = (2, -2, 3)$$