

## HW Answers Lesson 8 p. 589 #51 – 63 ODD

$$51. A = \begin{bmatrix} 3 & 4 \\ 5 & 3 \end{bmatrix}$$

$$A^{-1} = \frac{1}{9 - 20} \begin{bmatrix} 3 & -4 \\ -5 & 3 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = -\frac{1}{11} \begin{bmatrix} 3 & -4 \\ -5 & 3 \end{bmatrix} \begin{bmatrix} -2 \\ 4 \end{bmatrix} = -\frac{1}{11} \begin{bmatrix} -22 \\ 22 \end{bmatrix} \\ = \begin{bmatrix} 2 \\ -2 \end{bmatrix}$$

Answer: (2, -2)

$$55. A = \begin{bmatrix} -\frac{1}{4} & \frac{3}{8} \\ \frac{3}{2} & \frac{3}{4} \end{bmatrix}$$

$$A^{-1} = \begin{bmatrix} -1 & \frac{1}{2} \\ 2 & \frac{1}{3} \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = A^{-1}b = \begin{bmatrix} -1 & \frac{1}{2} \\ 2 & \frac{1}{3} \end{bmatrix} \begin{bmatrix} -2 \\ -12 \end{bmatrix} = \begin{bmatrix} -4 \\ -8 \end{bmatrix}$$

Answer: (-4, -8)

$$59. A = \begin{bmatrix} 5 & -3 & 2 \\ 2 & 2 & -3 \\ -1 & 7 & -8 \end{bmatrix}$$

$A^{-1}$  does not exist. [The system actually has an infinite number of solutions of the form

$$x = 0.3125t + 0.8125$$

$$y = 1.1875t + 0.6875$$

$$z = t$$

where  $t$  is any real number.]

$$53. A = \begin{bmatrix} -0.4 & 0.8 \\ 2 & -4 \end{bmatrix}$$

$$A^{-1} = \frac{1}{1.6 - 1.6} \begin{bmatrix} -4 & -0.8 \\ -2 & -0.4 \end{bmatrix} \Rightarrow A^{-1} \text{ does not exist}$$

[The system actually has no solution.]

$$57. A = \begin{bmatrix} 4 & -1 & 1 \\ 2 & 2 & 3 \\ 5 & -2 & 6 \end{bmatrix}$$

$$A^{-1} = \frac{1}{55} \begin{bmatrix} 18 & 4 & -5 \\ 3 & 19 & -10 \\ -14 & 3 & 10 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \frac{1}{55} \begin{bmatrix} 18 & 4 & -5 \\ 3 & 19 & -10 \\ -14 & 3 & 10 \end{bmatrix} \begin{bmatrix} -5 \\ 10 \\ 1 \end{bmatrix} = \frac{1}{55} \begin{bmatrix} -55 \\ 165 \\ 110 \end{bmatrix} \\ = \begin{bmatrix} -1 \\ 3 \\ 2 \end{bmatrix}$$

Answer: (-1, 3, 2)

$$61. A = \begin{bmatrix} 3 & -2 & 1 \\ -4 & 1 & -3 \\ 1 & -5 & 1 \end{bmatrix}$$

$$A^{-1} = \begin{bmatrix} 0.56 & 0.12 & -0.2 \\ -0.04 & -0.08 & -0.2 \\ -0.76 & -0.52 & 0.2 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = A^{-1} \begin{bmatrix} -29 \\ 37 \\ -24 \end{bmatrix} = \begin{bmatrix} -7 \\ 3 \\ -2 \end{bmatrix}$$

63. Solution: (5, 0, -2, 3)