

Sections 8.1 – 8.3 Review

1. Determine the order of A.

$$A = \begin{bmatrix} 1 & 2 & 0 & 6 \\ 3 & 1 & 2 & -8 \\ -1 & -5 & -3 & 0 \end{bmatrix} \quad 3 \times 4$$

2. Write the system as an augmented matrix.

$$\begin{aligned} x - y - 4z &= 14 \\ -x + y + 2z &= -10 \\ 3x - 2y + z &= 15 \end{aligned} \quad \left[\begin{array}{ccc|c} 1 & -1 & -4 & 14 \\ -1 & 1 & 2 & -10 \\ 3 & -2 & 1 & 15 \end{array} \right]$$

3. Replace row 2 of the augmented matrix from question 2 with row 1 + row 2. (R1 + R2)

$$\left[\begin{array}{ccc|c} 1 & -1 & -4 & 14 \\ 0 & 0 & -2 & 4 \\ 3 & -2 & 1 & 15 \end{array} \right]$$

4. Replace row 3 of the augmented matrix in questions 2 and 3 with -3R1 + R3.

$$\left[\begin{array}{ccc|c} 1 & -1 & -4 & 14 \\ 0 & 0 & -2 & 4 \\ 0 & 1 & 13 & -27 \end{array} \right]$$

For exercises 5 – 8 use the following matrices to find the following if possible.

$$A = \begin{bmatrix} 1 & -1 & 3 \\ 0 & 6 & 9 \end{bmatrix} \quad B = \begin{bmatrix} -2 & 0 & 5 \\ -3 & 4 & -7 \end{bmatrix} \quad C = \begin{bmatrix} 3 & 0 \\ 2 & 1 \\ -1 & -2 \end{bmatrix}$$

5. A + B

$$\begin{bmatrix} -1 & -1 & -8 \\ -3 & 10 & 2 \end{bmatrix}$$

6. 3A

$$\begin{bmatrix} 3 & -3 & 9 \\ 0 & 18 & 27 \end{bmatrix}$$

7. A - C

not possible

8. BC

$$\begin{bmatrix} -1 & 10 \\ -6 & 18 \end{bmatrix}$$

Write the system of linear equations as a matrix equation, AX = B. Use Gauss-Jordan elimination on [A : I] to solve the matrix X.

9. $-x_1 + x_2 = 4$
 $-2x_1 + x_2 = 0$

$$\begin{bmatrix} -1 & 1 \\ -2 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 4 \\ 0 \end{bmatrix}$$

Write the system of linear equations as a matrix equation, AX = B. Use the inverse matrix below to solve the system.

10. $x_1 - 2x_2 + 3x_3 = 9$
 $-x_1 + 3x_2 - x_3 = -6$
 $2x_1 - 5x_2 + 5x_3 = 17$

$$A^{-1} = \begin{bmatrix} 10 & -5 & -7 \\ 3 & -1 & -2 \\ -1 & 1 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -2 & 3 \\ -1 & 3 & -1 \\ 2 & -5 & 5 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 9 \\ -6 \\ 17 \end{bmatrix}$$

$$\begin{bmatrix} 1 \\ -1 \\ 2 \end{bmatrix}$$

Find the inverse of the matrix if it exists.

11. $\begin{bmatrix} 1 & -2 \\ 2 & -3 \end{bmatrix}$

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

12. $\begin{bmatrix} 2 & -3 \\ 3 & -4 \end{bmatrix}$

$$\begin{bmatrix} -4 & 3 \\ -3 & 2 \end{bmatrix}$$