

6.2 Matrices

Perform the row operations on the given matrix.

$$\left[\begin{array}{ccc|c} 3 & -3 & -1 & 6 \\ 8 & -5 & 5 & -1 \\ 0 & -6 & -9 & -3 \end{array} \right]$$

1. $R2 \leftrightarrow R3$

2. $\left(\frac{1}{3}\right) \cdot R1$

3. $R2: (-1) \cdot R3 + R2$

Solve each system.

$$\begin{aligned} 4) \quad & -6x + y = 28 \\ & -z = 6 \\ & 4x + 5y - 3z = 22 \end{aligned}$$

$$\begin{aligned} 5) \quad & y = -1 \\ & 4x + 2y - 3z = 27 \\ & -x - 6y + z = -2 \end{aligned}$$

$$\begin{aligned} 6) \quad & z = 5x - 3y - 5 \\ & x = -y + 7 \\ & -6x + 5y + 3z = 9 \end{aligned}$$

$$\begin{aligned} 7) \quad & x = 4y - 2z - 14 \\ & z = 6y - 14 \\ & 6x + 6z = -24 \end{aligned}$$

$$\begin{aligned} 8) \quad & -x + y + 2z = 5 \\ & -2x + 2y - 5z = 1 \\ & 5x - 5y - 3z = -18 \end{aligned}$$

$$\begin{aligned} 9) \quad & -5x + 6y + 6z = 16 \\ & 4x + y + z = -7 \\ & 4x - 3y - 3z = -11 \end{aligned}$$

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$$\begin{aligned}
 10) \quad & 5x + 6y - 4z = -9 \\
 & -6x + 6y + 6z = -12 \\
 & 5x - 5y - 5z = 30
 \end{aligned}$$

$$\begin{aligned}
 11) \quad & x - 5y + 4z = -8 \\
 & -6x + 5y + 6z = -7 \\
 & -x + 2z = -3
 \end{aligned}$$

Find the inverse of the following matrices.

$$\begin{aligned}
 12) \quad & \begin{bmatrix} -1 & -1 & -1 \\ 4 & 5 & 0 \\ 0 & 1 & -3 \end{bmatrix}
 \end{aligned}$$

$$\begin{aligned}
 13) \quad & \begin{bmatrix} 1 & -1 & 1 \\ 0 & -2 & 1 \\ -2 & -3 & 0 \end{bmatrix}
 \end{aligned}$$

$$\begin{aligned}
 14) \quad & \begin{bmatrix} 1 & 2 & -1 \\ 2 & -1 & 3 \\ -1 & 0 & 1 \end{bmatrix}
 \end{aligned}$$

$$\begin{aligned}
 15) \quad & \begin{bmatrix} 2 & 3 & -1 \\ -1 & 0 & 4 \\ 0 & 1 & 1 \end{bmatrix}
 \end{aligned}$$

Solve using the inverse matrix.

$$\begin{aligned}
 16) \quad & 2x + 6y + 6z = 8 \\
 & 2x + 7y + 6z = 10 \\
 & 2x + 7y + 7z = 9
 \end{aligned}$$

$$\begin{aligned}
 17) \quad & x + 2y + 5z = 2 \\
 & 2x + 3y + 8z = 3 \\
 & -x + y + 2z = 3
 \end{aligned}$$

$$\begin{aligned}
 18) \quad & x - 6y + 3z = 11 \\
 & 2x - 7y + 3z = 14 \\
 & 4x - 12y + 5z = 25
 \end{aligned}$$

$$\begin{aligned}
 19) \quad & x - y + z = -6 \\
 & 4x + 2y + z = 9 \\
 & 4x - 2y + z = -3
 \end{aligned}$$