

Solving a System of Linear Equations using Augmented Matrices.

Rules:

1. Any 2 rows may be interchanged.
2. Any non-zero constant may be multiplied to any row.
3. Any 2 rows may be added together and the sum may replace either of the 2.

Solve the following system using augmented matrices.

$$\begin{cases} x + y + z = 6 \\ -x + 2y - z = 3 \\ -x + 3y = 0 \end{cases}$$

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 6 \\ -1 & 2 & -1 & 3 \\ -1 & 3 & 0 & 0 \end{array} \right]$$

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 6 \\ 0 & 3 & 0 & 9 \\ 0 & 4 & 1 & 6 \end{array} \right]$$

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 6 \\ 0 & 1 & 0 & 3 \\ 0 & 4 & 1 & 6 \end{array} \right]$$

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

$$\boxed{(9, 3, -6)}$$

Solve each system, using Augmented Matrices. Show each matrix.

$$1. \begin{cases} 3x + 3y + 5z = 1 \\ 3x + 5y + 9z = 0 \\ 5x + 9y + 17z = 0 \end{cases}$$

$$2. \begin{cases} w - x + 2y - z = 0 \\ 2w + x + y - z = 0 \\ w + x - z = -1 \\ w + x - y + z = 1 \end{cases}$$

$$3. \begin{cases} x + y + z = 6 \\ 2x - y + z = 3 \\ 3x - z = 0 \end{cases}$$

$$4. \begin{cases} 6y + 4z = -18 \\ 3x + 3y = 9 \\ 2x - 3z = 12 \end{cases}$$

$$5. \begin{cases} 4x + y - 3z = 11 \\ 2x - 3y + 2z = 9 \\ x + y + z = -3 \end{cases}$$