

## Practice with Finding Solutions

In each problem, you are given the original system, the corresponding augmented matrix, and the equivalent matrix in reduced row echelon form. In each case, write the general solution to the system.

$$1. \quad \left. \begin{array}{r} 3y + 2z = 1 \\ -x - 2y - 3z = 0 \\ 2x + 3z = 0 \end{array} \right\} \rightarrow \begin{bmatrix} 0 & 3 & 2 & 1 \\ -1 & -2 & -3 & 0 \\ 2 & 0 & 3 & 0 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 0 & 0 & 6 \\ 0 & 1 & 0 & 3 \\ 0 & 0 & 1 & -4 \end{bmatrix} \rightarrow \left\{ \right.$$

$$2. \quad \left. \begin{array}{r} x + 3y + 2z = 1 \\ -x - 3y - 3z = 0 \end{array} \right\} \rightarrow \begin{bmatrix} 1 & 3 & 2 & 1 \\ -1 & -3 & -3 & 0 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 3 & 0 & 3 \\ 0 & 0 & 1 & -1 \end{bmatrix} \rightarrow \left\{ \right.$$

$$3. \quad \left. \begin{array}{r} x + 2y + 3z = 1 \\ -x - 3y - 2z = 0 \\ y - z = -1 \end{array} \right\} \rightarrow \begin{bmatrix} 1 & 2 & 3 & 1 \\ -1 & -3 & -2 & 0 \\ 0 & 1 & -1 & -1 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 0 & 5 & 3 \\ 0 & 1 & -1 & -1 \\ 0 & 0 & 0 & 0 \end{bmatrix} \rightarrow \left\{ \right.$$

$$4. \quad \left. \begin{array}{r} 3x + 2y + z = 3 \\ -w - 2x - 3y = -1 \\ 2w + 3y - z = 2 \end{array} \right\} \rightarrow \begin{bmatrix} 0 & 3 & 2 & 1 & 3 \\ -1 & -2 & -3 & 0 & -1 \\ 2 & 0 & 3 & -1 & 2 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 0 & 0 & 1 & 19 \\ 0 & 1 & 0 & 1 & 9 \\ 0 & 0 & 1 & -1 & -12 \end{bmatrix} \rightarrow \left\{ \right.$$

$$5. \quad \left. \begin{array}{r} w + x + 2y + z = -3 \\ -3w - 3x - y + 2z = -1 \\ 3w + 3x + y - 2z = 1 \end{array} \right\} \rightarrow \begin{bmatrix} 1 & 1 & 2 & 1 & -3 \\ -3 & -3 & -1 & 2 & -1 \\ 3 & 3 & 1 & -2 & 1 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 1 & 0 & -1 & 1 \\ 0 & 0 & 1 & 1 & -2 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix} \rightarrow \left\{ \right.$$

### More Practice!

In each problem, you are given the general solution to a system. Find the reduced matrix that would have indicated that solution.

$$1. \quad \left. \right\} \rightarrow \begin{cases} x = 3z + 1 \\ y = -z - 7 \\ z \text{ is free} \end{cases}$$

$$2. \quad \left. \right\} \rightarrow \begin{cases} x = 3z \\ y = 2z \\ z \text{ is free} \end{cases}$$

$$3. \quad \left. \right\} \rightarrow \begin{cases} x = 3 \\ y = 2 \\ z \text{ is free} \end{cases}$$

$$4. \quad \left. \right\} \rightarrow \begin{cases} x = 5y + z \\ y \text{ is free} \\ z \text{ is free} \end{cases}$$

$$5. \quad \left. \right\} \rightarrow \begin{cases} x = 0 \\ y \text{ is free} \\ z = 0 \end{cases}$$

$$6. \quad \left. \right\} \rightarrow \begin{cases} x \text{ is free} \\ y = 2z \\ z \text{ is free} \end{cases}$$