

Exercise 8

In Exercises 7–10, the augmented matrix of a linear system has been reduced by row operations to the form shown. In each case, continue the appropriate row operations and describe the solution set of the original system.

$$\left[\begin{array}{cccc} 1 & -4 & 9 & 0 \\ 0 & 1 & 7 & 0 \\ 0 & 0 & 2 & 0 \end{array} \right]$$

Solution

Divide the third row by 2.

$$\left[\begin{array}{ccc|c} 1 & -4 & 9 & 0 \\ 0 & 1 & 7 & 0 \\ 0 & 0 & 1 & 0 \end{array} \right]$$

Multiply the third row by -7 and add it to the second row.

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

Multiply the third row by -9 and add it to the first row.

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

Multiply the second row by 4 and add it to the first row.

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

Therefore,

$$x_1 = 0$$

$$x_2 = 0$$

$$x_3 = 0$$

and the solution set is $\{0, 0, 0\}$.