

Exercise 1

Solve each system in Exercises 1–4 by using elementary row operations on the equations or on the augmented matrix. Follow the systematic elimination procedure described in this section.

$$\begin{aligned}x_1 + 5x_2 &= 7 \\ -2x_1 - 7x_2 &= -5\end{aligned}$$

Solution

Write the implied augmented matrix of this system of equations.

$$\left[\begin{array}{cc|c} 1 & 5 & 7 \\ -2 & -7 & -5 \end{array} \right]$$

To make the bottom left entry 0, multiply the first row by 2 and add it to the second row.

$$\left[\begin{array}{cc|c} 1 & 5 & 7 \\ 0 & 3 & 9 \end{array} \right]$$

Divide the second row by 3.

$$\left[\begin{array}{cc|c} 1 & 5 & 7 \\ 0 & 1 & 3 \end{array} \right]$$

Now that the augmented matrix is in triangular form, write the corresponding system of equations.

$$\begin{aligned}x_1 + 5x_2 &= 7 \\ x_2 &= 3\end{aligned}$$

Since x_2 is known now, x_1 can be found.

$$x_1 + 5(3) = 7 \quad \rightarrow \quad x_1 = -8$$

Therefore, $x_1 = -8$ and $x_2 = 3$.