5. No, the leftmost 1 in the second row is not to the right of the leftmost 1 in the first row.

6. Yes.

7. Yes.

9. There are infinitely many solutions represented by the system

$$\begin{cases} x = 2z + 6 \\ y = -3z + 1 \end{cases}$$

where z is the parameter, can be assigned any value, and used to compute values of x and y.

11. The system has one solution. It is $x = -1$, $y = 3$, and $z = 4$ or, written as an ordered triple, (–1, 3, 4).

17. Write the system as the augmented matrix, $\left[\begin{array}{cc|c} 3 & -3 & 12 \\ 3 & 2 & -3 \\ 2 & 1 & 4 \end{array}\right]$.

Then use row operations to find the reduced row-echelon form.

$$\left[\begin{array}{cc|c} 3 & -3 & 12 \\ 3 & 2 & -3 \\ 2 & 1 & 4 \end{array}\right] \xrightarrow[R_1 = \frac{1}{3}r_1]{} \left[\begin{array}{cc|c} 1 & -1 & 4 \\ 3 & 2 & -3 \\ 2 & 1 & 4 \end{array}\right] \xrightarrow[\substack{R_2 = -3r_1 + r_2 \\ R_3 = -2r_1 + r_3}]{} \left[\begin{array}{cc|c} 1 & -1 & 4 \\ 0 & 5 & -15 \\ 0 & 3 & -4 \end{array}\right]$$

$$\xrightarrow[R_2 = \frac{1}{5}r_2]{} \left[\begin{array}{cc|c} 1 & -1 & 4 \\ 0 & 1 & -3 \\ 0 & 3 & -4 \end{array}\right] \xrightarrow[\substack{R_1 = r_2 + r_1 \\ R_3 = -3r_2 + r_3}]{} \left[\begin{array}{cc|c} 1 & 0 & 1 \\ 0 & 1 & -3 \\ 0 & 0 & 5 \end{array}\right] \xrightarrow[R_3 = \frac{1}{5}r_3]{} \left[\begin{array}{cc|c} 1 & 0 & 1 \\ 0 & 1 & -3 \\ 0 & 0 & 1 \end{array}\right]$$

There is no solution. The system is inconsistent.

19. Write the system as the augmented matrix, $\left[\begin{array}{rr|r} 2 & -4 & 8 \\ 1 & -2 & 4 \\ -1 & 2 & -4 \end{array}\right]$.

Then use row operations to find the reduced row-echelon form.

$$\left[\begin{array}{rr|r} 2 & -4 & 8 \\ 1 & -2 & 4 \\ -1 & 2 & -4 \end{array}\right] \xrightarrow[\text{rows 1 and 2}]{\text{Interchange}} \left[\begin{array}{rr|r} 1 & -2 & 4 \\ 2 & -4 & 8 \\ -1 & 2 & -4 \end{array}\right] \xrightarrow[\substack{R_2 = -2r_1 + r_2 \\ R_3 = r_1 + r_3}]{} \left[\begin{array}{rr|r} 1 & -2 & 4 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{array}\right]$$

The system has an infinite number of solutions. They are $x = 2y + 4$, where y is the parameter and can be assigned any real number.

23. Write the system as the augmented matrix, $\left[\begin{array}{rrrr|r} 1 & 1 & 0 & 0 & 7 \\ 0 & 1 & -1 & 1 & 5 \\ 1 & -1 & 1 & 1 & 6 \\ 0 & 1 & 0 & -1 & 10 \end{array}\right]$.

Then use row operations to find the reduced row-echelon form.

$$\left[\begin{array}{rrrr|r} 1 & 1 & 0 & 0 & 7 \\ 0 & 1 & -1 & 1 & 5 \\ 1 & -1 & 1 & 1 & 6 \\ 0 & 1 & 0 & -1 & 10 \end{array}\right] \xrightarrow[R_3 = -r_1 + r_3]{} \left[\begin{array}{rrrr|r} 1 & 1 & 0 & 0 & 7 \\ 0 & 1 & -1 & 1 & 5 \\ 0 & -2 & 1 & 1 & -1 \\ 0 & 1 & 0 & -1 & 10 \end{array}\right] \xrightarrow[\substack{R_1 = -r_2 + r_1 \\ R_3 = 2r_2 + r_3 \\ R_4 = -r_2 + r_4}]{} \left[\begin{array}{rrrr|r} 1 & 0 & 1 & -1 & 2 \\ 0 & 1 & -1 & 1 & 5 \\ 0 & 0 & -1 & 3 & 9 \\ 0 & 0 & 1 & -2 & 5 \end{array}\right]$$

$$\xrightarrow[R_3 = -r_3]{} \left[\begin{array}{rrrr|r} 1 & 0 & 1 & -1 & 2 \\ 0 & 1 & -1 & 1 & 5 \\ 0 & 0 & 1 & -3 & -9 \\ 0 & 0 & 1 & -2 & 5 \end{array}\right] \xrightarrow[\substack{R_1 = -r_3 + r_1 \\ R_2 = r_3 + r_2 \\ R_4 = -r_3 + r_4}]{} \left[\begin{array}{rrrr|r} 1 & 0 & 0 & 2 & 11 \\ 0 & 1 & 0 & -2 & -4 \\ 0 & 0 & 1 & -3 & -9 \\ 0 & 0 & 0 & 1 & 14 \end{array}\right] \xrightarrow[\substack{R_1 = -2r_4 + r_1 \\ R_2 = 2r_4 + r_2 \\ R_3 = 3r_4 + r_3}]{} \left[\begin{array}{rrrr|r} 1 & 0 & 0 & 0 & -17 \\ 0 & 1 & 0 & 0 & 24 \\ 0 & 0 & 1 & 0 & 33 \\ 0 & 0 & 0 & 1 & 14 \end{array}\right]$$

There is one solution, $x_1 = -17$, $x_2 = 24$, $x_3 = 33$, and $x_4 = 14$ or $(-17, 24, 33, 14)$.