We know from the problem that there are 74 total feet. We can now set the expression we developed equal to 74 and solve for x.

$$\begin{aligned} 2x + 52 &= 74 \\ 2x &= 22 \\ x &= 11 \end{aligned}$$

Solve this linear equation of the form $ax + b = c$.

Since x represents the total number of pigs, we need only subtract 11 from the total number of heads, 26, to determine the number of chickens. Using this information, we see that there are 11 pigs and 15 chickens.

4. Look Back

The final step in the problem solving process is to make sure our answer is feasible. In order to be feasible, 11 pigs and 15 chickens must have 26 heads and 74 feet.

To check for heads, we notice that $11 + 15 = 26$. To check that the number of feet is correct, we see that $4 \cdot 11 + 2 \cdot 15 = 74$. Therefore, our solution is feasible and accurate.

1.R.6 Exercises

Concept Check

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

1. If an equation of the form $ax + b = c$ uses decimal or fractional coefficients, the addition and multiplication principles of equality cannot be used.

2. The first step in solving $2x + 3 = 9$ is to add 3 to both sides.

3. To solve an equation that has been simplified to $4x = 12$, you need to multiply both sides by $\frac{1}{4}$, or divide both sides by 4.

4. When solving a linear equation with decimal coefficients, one approach is to multiply both sides in such a way to give integer coefficients before solving.

Practice

Solve each equation.

5. $3x + 11 = 2$

6. $-5x + 2.9 = 3.5$

7. $\frac{2}{5} - \frac{1}{2}x = \frac{7}{4}$

8. $\frac{y}{3} - \frac{2}{3} = 7$

Applications

Solve.

9. The tickets for a concert featuring the new hit band, Flying Sailor, sold out in 2.5 hours. If there were 35,000 tickets sold, solve the equation $35,000 - 2.5x = 0$ to find the number of tickets sold per hour.

10. All snacks (candy, popcorn, and soda) cost \$3.50 each at the local movie theater. Admission tickets cost \$7.50 each. After a long week, Carlos treats himself to a night at the movies. His movie night budget is \$25 and he spends all his movie money. Solve the equation $\$3.50x + \$7.50 = \$25.00$ to determine how many snacks Carlos can buy.

11. In probability, the probability of all possible outcomes of an event must add to 1. Suppose there are 6 possible outcomes of an event. One of the outcomes has a probability of 0.25. The other five outcomes all have the same probability. Solve the equation $5p + 0.25 = 1$ to find the probability of each of the other five outcomes.

Writing & Thinking

12. Find the error(s) made in solving each equation and give the correct solution.

a.

$$\frac{1}{3}x + 4 = 9$$

$$\mathbf{3} \cdot \frac{1}{3}x + 4 = \mathbf{3} \cdot 9$$

$$x + 4 = 27$$

$$x + 4 - \mathbf{4} = 27 - \mathbf{4}$$

$$x = 23$$

b.

$$5x + 3 = 11$$

$$(5x - \mathbf{3}) + (3 - \mathbf{3}) = 11 - \mathbf{3}$$

$$2x + 0 = 8$$

$$\frac{2x}{\mathbf{2}} = \frac{8}{\mathbf{2}}$$

$$x = 4$$