

## Solving equations using multiple steps

## Solving Linear Equations

When solving equations for a particular variable, sometimes you need to use more than one of the properties of equality.

$$3x - 2 = 7$$

$$3x - 2 + 2 = 7 + 2$$

$$\frac{3x}{3} = \frac{9}{3}$$

$$x = 3$$

Add 2 to both sides of the equation.

Now, divide both sides of the equation by 3.

Check  $3(3) - 2 = 7$

$$9 - 2 = 7$$

$$7 = 7 \quad \text{true statement}$$

Thus, the solution is 3.

Here are some steps to follow when solving multi-step equations.

1. Simplify both sides of the equation (if needed).
2. Use the addition or subtraction property of equality to isolate terms containing the variable.
3. Use the multiplication or the division property of equality to further isolate the variable.
4. Check the solution.

Solve each equation for  $x$ . Check your answers.

1.  $6x - 3 = 21$

2.  $6 + \frac{x}{4} = -1$

3.  $18 - 3x = -12$

4.  $7 + 2x = -13$

5.  $-4 = 7x + 8 - 8x$

6.  $13 = 9 - \frac{x}{5}$

7.  $-7 - x = -5$

8.  $5x + 9 - 4x = 12$

9.  $-8x - 13 = 19$

10.  $-3 = -5 - 2x$

11.  $\frac{1}{3}x + 9 = 15$

12.  $-7 = 3x - 15 - 7x$

Translate each problem into an equation. Solve each equation.

13. Thirty-two is 7 less than 3 times a number. Find the number.
14. Negative twenty-five is 4 times a number increased by 7. Find the number.
15. Twelve pounds less than twice Jane's weight is 270 pounds. What is Jane's weight?