

Algebra 1 2.4

$$\begin{aligned} 2 \cdot 72 + 6 &= 2(72 + 3) \\ 144 + 6 &= 2(75) \\ 150 &= 150 \end{aligned}$$

Solve equations with the variable on each side.

Solve equations with grouping symbols.

identity

no solution

all real numbers

$$2x + 6 = 2(x + 3)$$

$$\begin{array}{r} 2x + 6 = 2x + 6 \\ -2x \quad -2x \end{array}$$

$$6 = 6$$

$$\begin{aligned} 2 \cdot 32 + 6 &= 2(32 + 3) \\ 64 + 6 &= 2(35) \\ 70 &= 70 \end{aligned}$$

Algebra tiles

$$\begin{array}{r} 3x + 5 = 2x + 4 \\ -2x \quad -2x \\ \hline x + 5 = 4 \\ -5 \quad -5 \\ \hline x = -1 \end{array}$$

Example 1 Solve an Equation with Variables on Each Side

Solve $2 + 5k = 3k - 6$. Check your solution.

Solve each equation. Check your solution.

1A. $3w + 2 = 7w$

1C. $\left(\frac{x}{2}\right) + 1 = \frac{1}{4}x - 6$

$$\begin{array}{r} \frac{1}{2}x + 1 = \frac{1}{4}x - 6 \\ -\frac{1}{2}x \quad -\frac{1}{2}x \end{array}$$

$$\begin{array}{r} 1 = -\frac{1}{4}x - 6 \\ +6 \quad +6 \end{array}$$

$$\begin{array}{r} 7 = -\frac{1}{4}x \\ \frac{-1}{4} \quad \frac{-1}{4} \end{array}$$

$x = -28$

1B. $5a + 2 = 6 - 7a$

1D. $1.3c = 3.3c + 2.8$
 $-1.3c \quad -1.3c$

$$\begin{array}{r} 0 = 2c + 2.8 \\ -2.8 \quad -2.8 \\ \hline -2.8 = \frac{2c}{2} \\ 2 \end{array}$$

$-1.4 = c$

$$\begin{array}{r} 4 = 8 - 12a \\ -8 \quad -8 \\ \hline -4 = -12a \\ \frac{-4}{-12} \quad \frac{-12}{-12} \end{array}$$

$a = \frac{1}{3}$

DAMEG

Solve each equation. Check your solution.

2A. $8x - 10 = 3(6 - 2x)$

$$\begin{array}{r} 8x - 10 = 18 - 6x \\ +10 \quad +10 \end{array}$$

$$\begin{array}{r} 8x = 28 - 6x \\ +6x \quad +6x \end{array}$$

$$\frac{14x}{14} = \frac{28}{14} \quad x = 2$$

2B. $7(n - 1) = -2(3 + n)$

$$\begin{array}{r} 7n - 7 = -6 - 2n \\ +7 \quad +7 \end{array}$$

$$\begin{array}{r} 7n = 1 - 2n \\ +2n \quad +2n \end{array}$$

$$\frac{9n}{9} = \frac{1}{9} \quad n = \frac{1}{9}$$

TBW

Example 3 Find Special Solutions

Solve each equation.

a. $5x + 5 = 3(5x - 4) - 10x$

$$5x + 5 = \boxed{15x - 12 - 10x}$$

$$\begin{array}{rcl} 5x + 5 & = & 5x - 12 \\ +5 & & +5 \end{array}$$

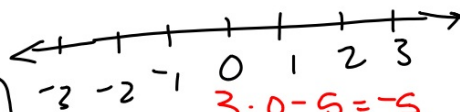
$$\begin{array}{rcl} 5x & = & 5x - 17 \\ -5x & & -5x \end{array}$$

$$0 = -17$$

b. $3(2b - 1) - 7 = 6b - 10$

NS

\emptyset



$$\begin{array}{rcl} 3n - 5 & = & -5 \\ +5 & & +5 \end{array}$$

$$\frac{3n}{3} = \frac{0}{3}$$

$$n = 0$$

~~no sol.~~
~~0~~

3A. $7x + 5(x - 1) = -5 + 12x$

3B. $6(y - 5) = 2(10 + 3y)$

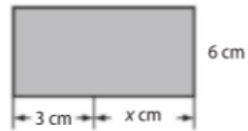
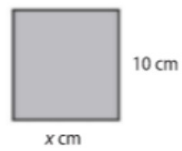
ConceptSummary Steps for Solving Equations



- Step 1** Simplify the expressions on each side. Use the Distributive Property as needed.
- Step 2** Use the Addition and/or Subtraction Properties of Equality to get the variables on one side and the numbers without variables on the other side. Simplify.
- Step 3** Use the Multiplication or Division Property of Equality to solve.

Standardized Test Example 4 Write an Equation

Find the value of x so that the figures have the same area.



A 3

B 4.5

C 6.5

D 7