Algebra 1 2.4

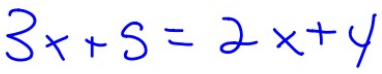
Solve equations with the variable on each side.
Solve equations with grouping symbols.

identity
no solution
all real numbers

$$3x+5=2x+4$$
$$-2x \qquad -2x$$
$$x+5=4$$
$$-5 \quad -5$$
$$x=-1$$

Algebra tiles

3x + 5 = 2x + 4



Example 1 Solve an Equation with Variables on Each Side

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

$$2+5k=3k-6$$
$$-3k \quad -3k$$
$$2+2k=-6$$
$$-2 \qquad -2$$
$$\frac{2k}{2}=\frac{-8}{2}$$
$$k=-4$$

Solve each equation. Check your solution.

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

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

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

1D. $1.3c = 3.3c + 2.8$

$3w + 2 = 7w$

$-3w \quad -3w$

$2 = 4w$

$\frac{2}{4} = \frac{4w}{4}$ $\quad w = \frac{1}{2}$

$5a + 2 = 6 - 7a$

$-5a \quad -5a$

$2 = 6 - 12a$

$-6 \quad -6$

$-4 = -12a$

$\frac{-4}{-12} = \frac{-12a}{-12}$ $\quad \frac{1}{3} = a$

$1.3c = 3.3c + 2.8$

$-1.3c \quad -1.3c$

$0 = 2c + 2.8$ $\quad 0 = 2c + 2.8$

$-2.8 \quad -2.8$

$-2.8 = 2c$

$\frac{-2.8}{2} = \frac{2c}{2}$

$c = -1.4$

Solve each equation. Check your solution.

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

$8s - 10 = 18 - 6s$

$+6s \qquad +6s$

$14s - 10 = 18$

$+10 \quad +10$

$14s = 28$

$\frac{14s}{14} = \frac{28}{14}$

$s = 2$

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

$7n - 7 = -6 - 2n$

$2n \qquad 2n$

$9n - 7 = -6$

$+7 \quad +7$

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

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

Example 3 Find Special Solutions

Solve each equation.

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

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

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

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

ConceptSummary Steps for Solving Equations

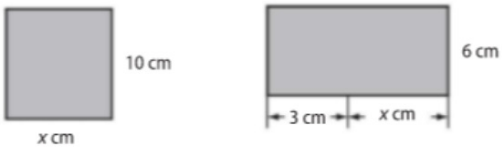
Step 1 Simplify the expressions on each side. Use the Distributive Property as needed.

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