

Chapter 1

Solving Linear Equations

1.1 Solving One-Step Equations

VOCABULARY

Equation

Solution

Linear Equation In One Variable

Inverse Operations

Expression

Equivalent Equations

Core Concept: Properties of Equality

Addition Property of equality <i>if $a = b$, then</i>	Subtraction property of equality <i>if $a = b$, then</i>	Multiplication Property of equality <i>if $a = b$, then</i>	Division Property of equality <i>if $a = b$, then</i>

1.1: Solving Simple Equations

Solve the equation. Check your solution.

1. $w + 4 = 16$

2. $x + 7 = -12$

3. $-15 + w = 6$

4. $z - 5 = 8$

5. $-2 = y - 9$

6. $7q = 35$

7. $4b = -52$

8. $3 = \frac{q}{11}$

9. $\frac{n}{-2} = -15$

Key words Used in Math Word Problems

Addition Words

- Add
- All together or altogether
- And
- Both
- Combined
- How many in all
- How much
- In all
- Increased by
- Plus
- Sum
- Together
- Total
- _____
- _____
- _____

Subtraction Words

- Change
- Decreased by
- Difference
- Fewer
- Fewer than
- How many are left (or have left)
- How many did not have
- How many (or much) more
- How much longer (shorter, taller, heavier, etc.)
- Less or less than
- Lost
- Minus
- Need to
- Reduce
- Remain
- Subtract
- Take away
- _____
- _____
- _____

Multiplication Words

- By (dimension)
- Double
- Each group
- Every
- Factor of
- Increased by
- Multiplied by
- Of
- product
- Times
- Triple
- _____
- _____
- _____

Division Words

- As much
- Cut up
- Each group has
- Equal sharing
- Half (or any other fractions)
- How many in each
- Parts
- Per
- Percent
- Quotient of
- Ratio of
- Separated
- Share something equally
- _____
- _____
- _____

10. A coupon subtracts \$17.95 from the price p of a pair of headphones. You pay \$71.80 for the headphones after using the coupon. Write and solve an equation to find the original price of the headphones.

11. After a party, you have $\frac{2}{5}$ of the brownies you made left over. There are 16 brownies left. How many brownies did you make for the party?

Translate the following into algebraic equations.

12. Two more than a number is ten.

13. Eight less than a number is greater than nine.

14. The product of two and an number is 22.

15. The difference of a number and two is seven.

16. The quotient of a number and three is less than eight.

17. Four less than the product of six and a number is nine.

1.2 Solving multi-step Equations

Solving multi-step equations--Six Steps to Solving Equations

1.

2.

3.

4.

5.

6.

1.2: Solving Multi-Step Equations

Solve the equation. Check your solution.

1. $3x + 4 = 19$

2. $5z - 13 = -3$

3. $17 = z - (-9)$

4. $15 = 2 + 4 - d$

5. $\frac{f}{4} - 5 = -9$

6. $\frac{q + (-5)}{3} = 8$

7. $5x + 3x = 28$

8. $5z - 2z - 4 = -7$

9. $12x + 4 + 2x = 39$

10. $9z - 5 - 4z = -5$

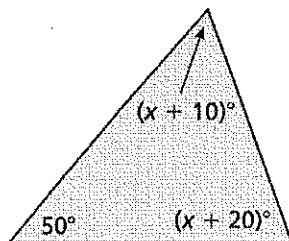
11. $3(z + 7) = 21$	12. $-4(z - 12) = 42$
13. $33 = 12r - 3(9 - r)$	14. $7 + 3(2g - 6) = -29$

15. Write and solve an equation to find three consecutive odd integers that have a sum of 63.

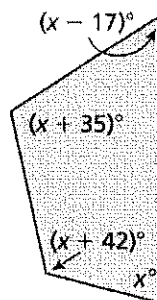
16. One angle of a triangle has a measure of 60° . The measure of the third angle is 40° more than twice the measure of the second angle. The sum of the angle measures of a triangle is 180° . What is the measure of the second angle? What is the measure of the third angle?

17. Write and solve an equation to find the value of x . Then find the angle measures of each polygon.

a. The sum S of the angle measures of a quadrilateral is 180° .



b. The sum S of the angle measures of a quadrilateral is 360° .



1.3: Solving Equations with Variables on Both Sides

Solve the equation. Check your solution.

1. $12 - 3x = -6x$

2. $7 - 5z = 17 + 5z$

3. $3k + 45 = 8k + 25$

4. $\frac{3}{4}(48 - 16x) = 4(4 + 2x)$

5. $5q + 6 = 2q - 2 + q$

6. $8 + 6x - 10x = 16 - 8x$

7. $6a - 4 = 3a + 5$

8. $2(4b - 6) = 4(3b - 7)$

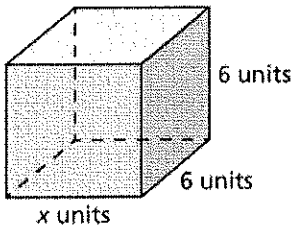
9. $8(2r - 3) - r = 3(3r + 2)$

10. $3x - 8(2x + 3) = -6(2x + 5)$

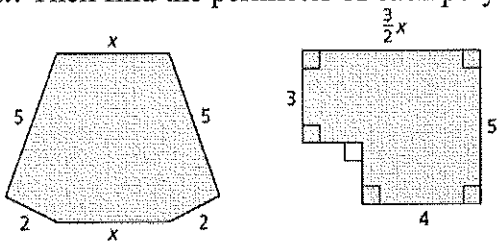
Solve the equation. Determine whether the equation has *one solution*, *no solution*, or *infinitely many solutions*.

<p>11. $6(4s + 12) = 8(3s - 14)$</p>	<p>12. $16f + 24 = 8(2f + 3)$</p>
<p>13. $\frac{1}{2}(10 + 12n) = \frac{1}{3}(15n + 15)$</p>	<p>14. $\frac{2}{3}(6j + 9) = 3j + 7$</p>

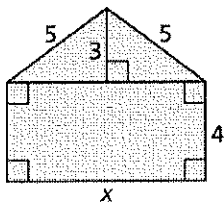
15. The value of the surface area of a rectangular prism is equal to the value of the volume of the rectangular prism. Write and solve an equation to find the value of x .



16. The two polygons have the same perimeter. Use this information to write and solve an equation involving x . Then find the perimeter of each polygon.



17. This figure has the unusual property that the value of its perimeter (in feet) is equal to the value of its area (in square feet). Use this information to write an equation for the figure. Solve the equation for x . Then find the perimeter and area of the figure.



1.4: Solving Absolute Value Equations

absolute value equation:

extraneous solution:

Solving Absolute Value Equations

To solve $|ax + b| = c$ when $c \geq 0$, solve the related linear equations

$$ax + b = c \quad \text{or} \quad ax + b = -c.$$

When $c < 0$, the absolute value equation $|ax + b| = c$ has no solution because absolute value always indicates a number is not negative.

Book Here

1.5: Rewriting Equations and Formulas

literal equation:

formula:

Common Formulas

Temperature F = degrees Fahrenheit, C = degrees Celsius

$$C = \frac{5}{9}(F - 32)$$

Simple Interest I = interest, P = principal,

r = annual interest rate (decimal form),

t = time (years)

$$I = Prt$$

Distance d = distance traveled, r = rate, t = time

$$d = rt$$

Solve the literal equation for y .

1. $y - 2x = 15$

2. $4x + y = 2$

3. $5x - 2 = 8 + 5y$

4. $y + x = 11$

5. $3x - y = -4$

6. $3x + 1 = 7 - 4y$

Solve the formula for the indicated variable.

<p>13. Area of a triangle: $A = \frac{1}{2}bh$; Solve for b.</p>	<p>14. Volume of a cone: $V = \frac{1}{3}\pi r^2 h$; Solve for h.</p>
<p>15. Ohm's Law: $I = \frac{V}{R}$; Solve for R.</p>	<p>16. Ideal Gas Law: $PV = nRT$; Solve for R.</p>

<p>17. The amount A of money in an account after simple interest has been earned is given by the formula $A = P + Prt$ where P is the principal, r is the annual interest rate in decimal form, and t is the time in years.</p>	
<p>a. Solve the formula for r.</p>	<p>b. Solve the formula for P.</p>