① Learn the Skill

As you recall, an algebraic expression uses numbers and variables, sometimes connected by an operation sign. However, expressions do not include equal signs. An **equation,** though, is a mathematical statement that shows an algebraic expression on each side of an equal sign. An equation may or may not contain variables.

To solve an equation, find the value of the variable that makes the statement true. To do this, isolate the variable on one side of the equation. Perform inverse operations to isolate the variable. Remember, addition and subtraction are inverse operations, as are multiplication and division.

② Practice the Skill

By practicing the skill of solving equations, you will improve your study and test-taking abilities, especially as they relate to the GED® Mathematical Reasoning Test. Study the information below. Then answer the question that follows.

ⓐ Perform inverse operations on *both* sides of the equation. When performing an operation on one side of an equation, do the same to the other side. Perform the inverse operations for addition and subtraction first and then for multiplication and division. When finished, substitute your solution for the variable into the equation to check your answer.

ⓑ Notes on solving equations:
- Some equations can be simplified before you solve. Combine like terms on either side of the equation.
- Some equations have two variables on both sides. In this case, group all of the variables on one side.

Expressions

$4x + 8x$
$6(x + 3) + 1$
4

Equations

$4x + 8x = 36$
$3 = 6(x + 3) + 1$
$4 = 3 + 1$

Solve an Equation

$$\frac{x}{-2} + 4 = 8$$

$$\frac{x}{-2} + 4 - 4 = 8 - 4$$

$$\frac{x}{-2} = 4$$

$$(-2)\frac{x}{-2} = (-2)\,4$$

$$x = -8$$

Check

$$\frac{-8}{-2} + 4 = 8$$

$$4 + 4 = 8$$

$$8 = 8$$

CONTENT TOPICS

If a situation has two unknown quantities or variables, you will need two equations to solve the problem. Solve one of the equations to find one of the variables, then substitute for that variable in the second equation.

1. Levi paid two bills. The cost of the two bills was $157. The second bill was $5 more than twice the amount of the first bill. Which of the following equations could be used to find the amount of the first bill?

A. $5 - 2x = 157$
B. $2x - 5 = 157$
C. $x - (2x + 5) = 157$
D. $x + (2x + 5) = 157$

DIRECTIONS: Read each question, and choose the **best** answer.

2. The sum of two consecutive integers is 15. Which equation could be used to find the first number?

   A. $x + 2x = 15$
   B. $2x + 1 = 15$
   C. $x - 1 = 15$
   D. $\frac{1}{2}x - 1 = 15$

3. The cost of an adult ticket to the ballet is $4 less than 2 times the cost of a child's ticket. If an adult ticket is $20, how much is a child's ticket?

   A. $8
   B. $10
   C. $12
   D. $14

4. Stephanie's age is 3 years greater than half of her sister's current age. If her sister is 24 years old, what is Stephanie's age?

   A. 12
   B. 15
   C. 17
   D. 21

5. The number of cellos in an orchestra is equal to 2 more than one-third of the number of violins. If there are 24 violins in the orchestra, how many cellos are there?

   A. 6
   B. 8
   C. 9
   D. 10

6. Caroline has twice as many yoga classes as aerobics classes. If she is taking 3 yoga and aerobics classes, which of the following equations could be used to find the number of aerobics classes she is taking?

   A. $3x = 3$
   B. $3x - 1 = 3$
   C. $2x - 1 = 3$
   D. $x = 3$

DIRECTIONS: Study the information, read the question, and choose the **best** answer.

The perimeter of the triangle is 16.5 feet.
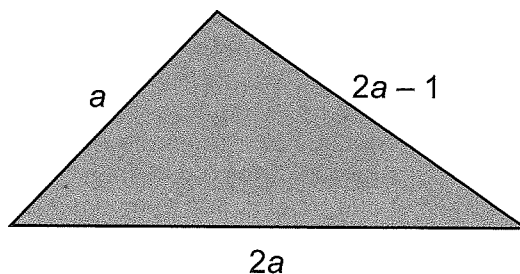
7. Which equation can be used to find the value of a?

   A. $5a - 1 = 16.5$
   B. $2a - 1 - a - 2a = 16.5$
   C. $a(2a - 1)(2a) = 16.5$
   D. $4a - 1 = 16.5$

DIRECTIONS: Read each question, and choose the **best** answer.

8. Four times a number is four less than two times the number. What is the number?

   A. -4
   B. -2
   C. 2
   D. 4

9. Julian collects rare political party convention pins. The number of Democratic Party pins he has is 14 less than 3 times the number of Republican Party pins he has. If he has 98 pins in all, how many Republican Party pins does he have?

   A. 14
   B. 28
   C. 42
   D. 70

10. If $y = 2.5$, what does x equal in the equation $10y - 4(y + 2) + 3x = 5(3 - x)$?

    A. 2
    B. 1
    C. -1
    D. -2