



MATH CONTENT TOPICS: Q.2.a, Q.2.e, A.1.a, A.1.c, A.1.g  
MATH PRACTICES: MP.1.a, MP.1.b, MP.1.e, MP.2.a, MP.2.c, MP.3.a, MP.4.a, MP.4.b, MP.5.c

## 1 Learn the Skill

A **variable** is a letter used to represent a number. Variables are used in algebraic expressions. An **algebraic expression** has numbers and variables, sometimes connected by an operation sign.

A variable may change in value, which allows the expression itself to have different values. When you evaluate an algebraic expression, you substitute a number for the variable and solve. For example, if  $b = 3$ , then  $b + 12 = 15$ . If  $b = -1$ , then  $b + 12 = 11$ .

## 2 Practice the Skill

By practicing the skills of using variables and simplifying and evaluating algebraic expressions, you will improve your study and test-taking abilities, especially as they relate to the GED® Mathematical Reasoning Test. Study the example and strategies below. Then answer the question that follows.

**a** Order is important for division and subtraction. For example, "6 less than 3" is  $3 - 6$ , but "the difference between 6 and 3" is  $6 - 3$ .

**b** To simplify an expression, add like terms. Like terms have the same variable or variables raised to the same power. For example,  $2x$  and  $4x$  are like terms.

If an expression has parentheses, use the distributive property to simplify.

To evaluate an expression, substitute the given values for the variables, and then follow the order of operations.

Words	Symbols
4 more than a number	$4 + x$
5 less than a number	$x - 5$
3 times a number	$3x$
A number times itself	$x^2$
The product of 8 and a number	$8x$
The product of 6 and $x$ added to the difference between 5 and $x$	$6x + (5 - x)$
The quotient of 6 and $x$	$\frac{6}{x}$ or $6 \div x$
One-third of a number increased by 5	$\frac{1}{3}x + 5$

**Simplify**  $4x(5x + 7) - 2x$

$$\begin{aligned} &(4x)(5x) + (4x)7 - 2x \\ &20x^2 + 28x - 2x \\ &20x^2 + 26x \end{aligned}$$

### TEST-TAKING TIPS

Multiplication can be written in several ways. In algebraic expressions, a number next to a variable means multiplication. The expression  $3y$  is the same as 3 times  $y$ . Parentheses and a dot also indicate multiplication:  $3(y)$  and  $3 \cdot y$  are the same as  $3y$ .

1. Gabe's current age is 3 times his sister's current age. If  $x$  is his sister's current age, which expression represents Gabe's current age?

- A.  $3x$
- B.  $\frac{x}{3}$
- C.  $x - 3$
- D.  $x + 3$

### 3 Apply the Skill

#### ★ Spotlighted Item: **FILL-IN-THE-BLANK**

**DIRECTIONS:** Read each question. Then fill in your answer in the box below.

2. A plumber charges \$55 per hour and spends \$20 a day on gasoline. Write an algebraic expression to represent his net earnings for one day.

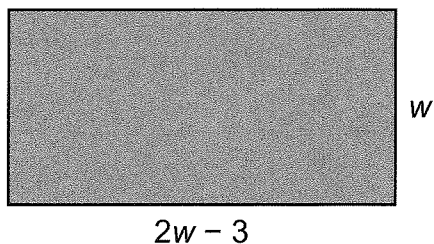
3. The length of a football field is approximately 30 yards more than its width. Express the length of the football field in terms of its width,  $w$ .

4. Write and simplify the following expression: The product of 5 and  $x$  multiplied by 6 less than the product of 3 and  $x$ .

5. Write and simplify the following expression: A number times itself added to the product of 5 and  $x$  and subtracted from the difference of 6 and  $x$ .

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

The rectangle below has a length and width defined in terms of a variable,  $w$ , as shown.



6. Which expression represents the perimeter of the rectangle?

- A.  $3w - 3$
- B.  $w(2w - 3)$
- C.  $5w - 3$
- D.  $6w - 6$

7. Which expression represents the area of the rectangle?

- A.  $w + 2w - 3$
- B.  $w(2w - 3)$
- C.  $w^2$
- D.  $w + 2w - 3 + w + 2w - 3$

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

8. The width of Kevin's yard is 10 feet more than twice the width of his garage. Which expression below describes the width of his yard if  $g$  represents the width of the garage?

- A.  $2g(10)$
- B.  $\frac{2g}{10}$
- C.  $2g + 10$
- D.  $2g - 10$

9. Michael's score on a math quiz was 8 more than one-half of his score on his science quiz. If  $s$  is his score on the science quiz, which expression below describes Michael's score on his math quiz?

- A.  $\frac{s}{2} + 8$
- B.  $\frac{s}{8} + 2$
- C.  $\frac{1}{2}s - 8$
- D.  $\frac{1}{2}(8) + s$