

1.1 Evaluate Expressions

Before

You used whole numbers, fractions, and decimals.

Now

You will evaluate algebraic expressions and use exponents.

Why

So you can calculate sports statistics, as in Ex. 50.



A **variable** is a letter used to represent one or more numbers. The numbers are the values of the variable. *Expressions* consist of numbers, variables, and operations. An **algebraic expression**, or *variable expression*, is an expression that includes at least one variable.

Algebraic expression	Meaning	Operation
$5(n)$ $5 \cdot n$ $5n$	5 times n	Multiplication
$\frac{14}{y}$ $14 \div y$	14 divided by y	Division
$6 + c$	6 plus c	Addition
$8 - x$	8 minus x	Subtraction

To **evaluate an algebraic expression**, substitute a number for each variable, perform the operation(s), and simplify the result, if necessary.

EXPRESSIONS USING EXPONENTS A **power** is an expression that represents repeated multiplication of the same factor. For example, 81 is a power of 3 because $81 = 3 \cdot 3 \cdot 3 \cdot 3$. A power can be written in a form using two numbers, a **base** and an **exponent**. The exponent represents the number of times the base is used as a factor, so 81 can be written as 3^4 .

The diagram shows the expression $3^4 = 3 \cdot 3 \cdot 3 \cdot 3$. A blue circle is drawn around the 3^4 part of the expression. A green arrow points from the word "base" to the number 3 in 3^4 . Another green arrow points from the word "exponent" to the number 4 in 3^4 . A bracket is placed under the 3^4 with the word "power" written below it. Another bracket is placed under the four 3s on the right side of the equation with the text "4 factors of 3" written below it.

7⁵

LESSON
1.1**Practice A***For use with the lesson "Evaluate Expressions"***Name the operation indicated by the expression.**

1. $19x$

2. $5 - b$

3. $14 \div m$

4. $a + 24$

mult

Div

Evaluate the expression.

5. $y + 7$ when $y = 5$

$$\begin{array}{r} 5 + 7 \\ 12 \end{array}$$

6. $13 - x$ when $x = 2$

7. $4a$ when $a = 2.1$

$$4 \cdot 2.1$$

$$8.4$$

8. $9 + m$ when $m = 8.2$

9. $h + 6$ when $h = 1.7$

10. $42 \div g$ when $g = 2$

11. $\frac{x}{5}$ when $x = 100$

12. $\frac{52}{d}$ when $d = 13$

13. $\frac{2}{3} \cdot t$ when $t = 6$

$$\frac{52}{13} = 4$$

14. $r(8.3)$ when $r = 10$

15. $w + \frac{1}{4}$ when $w = \frac{3}{4}$

16. $\frac{n}{14}$ when $n = 28$

$$\frac{3}{4} + \frac{1}{4}$$

1

Write the power in words and as a product.

17. 7^2

Seven to the 2nd power
Seven squared

$7 \cdot 7$

18. 4^5

19. 2^8

Two to the 8th power

$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

Write the power represented by the words or product.

20. $5 \cdot 5 \cdot 5$

$$5^3$$

21. six squared

22. $x \cdot x \cdot x \cdot x$

$$x^4$$

Evaluate the power.

23. 3^2

24. 2^4

25. 1^5

$2 \cdot 2 \cdot 2 \cdot 2$
 $\textcircled{16}$

1

Evaluate the expression.

26. x^2 when $x = 5$

27. y^3 when $y = 3$

28. m^8 when $m = 1$

$$3^3$$

$$27$$

29. Window Treatments You are ordering custom blinds for your bedroom windows. The ordering instructions are to measure the width of the window in inches and add a half-inch to this measurement. So, the blind width you order is given by the expression $w + 0.5$ where w is the width of your window.

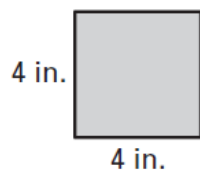
- a. One of your windows measures 27 inches wide. What width blind should you order?
- b. The other window measures 28.5 inches wide. What width blind should you order?

27.5

29

- 30. Skateboarding** A skate park charges \$10 per person for an all-day admission to the park. The total cost for n people to go to the park all day is $10n$. Eight friends go to the park on Saturday. What is the total cost of admission?

- 31. Geometry** The area of a square with a side length of s is given by the expression s^2 . What is the area of the square shown?



$$4^2$$
$$16$$

12, 9-14, 15 - Name	
1.1	
1 ~	6 ~
2 ~	7 ~
3 ~	8 ~
4 ~	9 ~
5 ~	10 ~