Swift — Day 2
Lesson 2
8th Gr Math

Lesson 2 Reteach

Powers and Exponents

The product of repeated factors can be expressed as a **power**. A power consists of a **base** and an **exponent**. The exponent tells how many times the base is used as a factor.

Example 1

Write each expression using exponents.

a. $7 \cdot 7 \cdot 7 \cdot 7$

$$7 \cdot 7 \cdot 7 \cdot 7 = 7^4 \qquad \text{The number 7 is a factor 4 times. So, 7 is the base and 4 is the exponent.}$$

b. $y \cdot y \cdot x \cdot y \cdot x$

$$y \cdot y \cdot x \cdot y \cdot x = y \cdot y \cdot y \cdot x \cdot x \qquad \text{Commutative Property}$$
$$= (y \cdot y \cdot y) \cdot (x \cdot x) \qquad \text{Associative Property}$$
$$= y^3 \cdot x^2 \qquad \text{Definition of exponents}$$

To evaluate a power, perform the repeated multiplication to find the product.

Example 2

Evaluate $(-6)^4$.

$$(-6)^4 = (-6) \cdot (-6) \cdot (-6) \cdot (-6) \qquad \text{Write the power as a product.}$$
$$= 1,296 \qquad \text{Multiply.}$$

The order of operations states that exponents are evaluated before multiplication, division, addition, and subtraction.

Example 3

Evaluate $m^2 + (n - m)^3$ if $m = -3$ and $n = 2$.

$$m^2 + (n - m)^3 = (-3)^2 + (2 - (-3))^3 \qquad \text{Replace } m \text{ with } -3 \text{ and } n \text{ with } 2.$$
$$= (-3)^2 + (5)^3 \qquad \text{Perform operations inside parentheses.}$$
$$= (-3 \cdot -3) + (5 \cdot 5 \cdot 5) \qquad \text{Write the powers as products.}$$
$$= 9 + 125 \text{ or } 134 \qquad \text{Add.}$$

Exercises

Write each expression using exponents.

1. $8 \cdot 8 \cdot 8 \cdot 8 \cdot 8$ 2. $a \cdot a \cdot a \cdot a \cdot a \cdot a$ 3. $5 \cdot 5 \cdot 9 \cdot 9 \cdot 5 \cdot 9 \cdot 5 \cdot 5$

Evaluate each expression.

4. 2^4 5. $(-3)^5$ 6. $\left(\dfrac{3}{4}\right)^3$

ALGEBRA Evaluate each expression if $a = 5$ and $b = -4$.

7. $a^2 + b^2$ 8. $(a + b)^2$ 9. $a + b^2$

Course 3 · Chapter 1 Real Numbers

Lesson 2 Skills Practice

Powers and Exponents

Write each expression using exponents.

1. $2 \cdot 2 \cdot 2 \cdot 2$

2. $9 \cdot 9$

3. $7 \cdot 7 \cdot 5 \cdot 5 \cdot 5 \cdot 5$

4. $\frac{3}{8} \cdot \frac{3}{8} \cdot \frac{3}{8}$

5. $c \cdot \frac{1}{4} \cdot c \cdot \frac{1}{4} \cdot \frac{1}{4}$

6. $s \cdot 6 \cdot s \cdot s \cdot 6 \cdot 6 \cdot s$

7. $8 \cdot x \cdot 2 \cdot 2 \cdot 2 \cdot x \cdot 8$

8. $a \cdot (-4) \cdot b \cdot a \cdot b \cdot (-4) \cdot (-4)$

9. $\frac{1}{3} \cdot n \cdot 4 \cdot n \cdot \frac{1}{3} \cdot n \cdot 4 \cdot 4$

10. $9 \cdot 9 \cdot x \cdot w \cdot x \cdot y \cdot w \cdot 9 \cdot y$

Evaluate each expression.

11. 4^3

12. 2^5

13. $(-8)^3$

14. $\left(\frac{3}{5}\right)^4$

15. $2^8 - 3^2$

16. $2^3 \cdot 5^2$

17. $3^4 - (-4)^2$

18. $6 + 2^6$

19. $(-3)^3 \div 3^2$

ALGEBRA Evaluate each expression if $g = 2$ and $h = -3$.

20. g^4

21. $(g + h)^3$

22. $h^4 - h^3$

23. $g^3 + h^2$

24. $(g - h)^2 + h^2$

25. $h^4 - (h - g)^3$