

**Study Guide and Intervention**

7NS1.2, 7NS2.1, 7AF2.1

**Powers and Exponents**

Expressions containing repeated factors can be written using exponents.

**Example 1** Write  $7 \cdot 7 \cdot 7 \cdot 7 \cdot 7$  using exponents.Since 7 is used as a factor 5 times,  $7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 = 7^5$ .**Example 2** Write  $p \cdot p \cdot p \cdot q \cdot q$  using exponents.Since  $p$  is used as a factor 3 times and  $q$  is used as a factor 2 times,  $p \cdot p \cdot p \cdot q \cdot q = p^3 \cdot q^2$ .Any nonzero number to the zero power is 1. Any nonzero number to the negative  $n$  power is the multiplicative inverse of  $n$ th power.**Example 3** Evaluate  $6^2$ .

$$\begin{aligned} 6^2 &= 6 \cdot 6 && \text{Definition of exponents} \\ &= 36 && \text{Simplify.} \end{aligned}$$

**Example 4** Evaluate  $5^{-3}$ .

$$\begin{aligned} 5^{-3} &= \frac{1}{5^3} && \text{Definition of negative exponents} \\ &= \frac{1}{125} && \text{Simplify.} \end{aligned}$$

**Exercises**

Write each expression using exponents.

1.  $8 \cdot 8 \cdot 8 \cdot 8 \cdot 8$   $8^5$

2.  $4 \cdot 4 \cdot 4 \cdot 4$   $4^4$

3.  $a \cdot a \cdot a \cdot a \cdot a \cdot a$   $a^6$

4.  $g \cdot g \cdot g \cdot g \cdot g \cdot g \cdot g$   $g^7$

5.  $5 \cdot 5 \cdot 9 \cdot 9 \cdot 5 \cdot 9 \cdot 5 \cdot 5$   $5^5 \cdot 9^3$

6.  $s \cdot w \cdot w \cdot s \cdot s \cdot s$   $s^4 \cdot w^2$

Evaluate each expression.

7.  $4^2$   $16$

8.  $5^3$   $125$

9.  $13^2$   $169$

10.  $2^3 \cdot 3^2$   $72$

11.  $8^{-2}$   $\frac{1}{64}$

12.  $2^4 \cdot 5^2$   $400$

13.  $3^{-4}$   $\frac{1}{81}$

14.  $3^4 \cdot 7^2$   $3,969$