

# Powers of Integers

The exponent in an expression indicates the number of times the base is used as a factor. Sometimes the exponent is called the **power**. For example, the expression  $a^2$  can be read as  $a$  to the *second power*.

If a non-zero number is written to the zero power, the value is 1. For example,  $27^0 = 1$ .

**RULE:** Any number, except zero, to the zero power is 1.

## EXAMPLE 1

**Simplify:**  $(-2)^4$

$$\begin{aligned} (-2)^4 &= (-2)(-2)(-2)(-2) \\ &= 4 \cdot 4 \\ &= 16 \end{aligned}$$

## EXAMPLE 2

**Simplify:**  $(8)^0$

$$(8)^0 = 1$$

## EXAMPLE 3

**Simplify:**  $-2^4 \cdot 3^2$

$$\begin{aligned} -2^4 \cdot 3^2 &= -(2 \cdot 2 \cdot 2 \cdot 2)(3 \cdot 3) \\ &= -16 \cdot 9 \\ &= -144 \end{aligned}$$

## PRACTICE

Simplify.

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>
1. $(-4)^3 =$ $(-4)(-4)(-4) =$ $(16)(-4) = -64$	$7^2 =$	$(-1)^2 =$	$5^2 =$
2. $3^3 =$	$-6^3 =$	$(-5)^3 =$	$1^5 =$
3. $-8^2 =$	$0^3 =$	$(-10)^2 =$	$9^2 =$
4. $2^5 =$	$(-3^4) =$	$4^0 =$	$-3^5 =$
5. $2^2 \cdot 3^2 =$	$7^0 \times 5^2 =$	$(-3)^3 \cdot 4^2 =$	$8^2 \times 2^3 =$
6. $10^2 \times 5^3 =$	$(-9)^2 \cdot 3^2 =$	$-6^2 \times 7^3 =$	$(-1)^2 \cdot 5 =$
7. $(-3^4)(2^2) =$	$(4^3)(7^2) =$	$(6^2)(4^2) =$	$(8^2)(-8^3) =$