

# 5.5

## Multiplicative Law of Exponents and Negative Exponents

### • Example 1

Simplify each expression.

$$(a) (x^4)^5 = x^{4 \cdot 5} = x^{20}$$

$$(b) (2^3)^4 = 2^{3 \cdot 4} = 2^{12}$$

$$(c) (2x^4)^{-3} = \frac{1}{(2x^4)^3}$$

$$= \frac{1}{2^3(x^4)^3}$$

$$= \frac{1}{8x^{12}}$$

### • • • CHECK YOURSELF 1

Simplify each expression.

$$\mathbf{a.} \frac{x^5}{x^{-3}}$$

$$\mathbf{b.} \frac{m^3n^{-5}}{m^{-2}n^3}$$

$$\mathbf{c.} (3a^3)^{-4}$$

$$\mathbf{d.} \frac{(r^3)^{-2}}{(r^{-4})^2}$$

### • • • CHECK YOURSELF ANSWER

$$1. \mathbf{(a)} x^8; \mathbf{(b)} \frac{m^5}{n^8}; \mathbf{(c)} \frac{1}{81a^{12}}; \mathbf{(d)} r^2.$$

# 5.5 Exercises

Name \_\_\_\_\_

Section \_\_\_\_\_

Date \_\_\_\_\_

## A N S W E R S

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_

Use the Multiplicative Law of Exponents to simplify each of the following expressions.

1.  $(x^2)^3$

2.  $(a^5)^3$

3.  $(m^4)^4$

4.  $(p^7)^2$

5.  $(2^4)^2$

6.  $(3^3)^2$

7.  $(5^3)^5$

8.  $(7^2)^4$

9.  $(2a^{-3})^4$

10.  $(3x^2)^{-3}$