

Lesson 10-5

Example 1 Multiply Powers

Find $3^3 \cdot 3$. Express using exponents.

$$\begin{aligned} 3^3 \cdot 3 &= 3^3 \cdot 3^1 \\ &= 3^{3+1} \\ &= 3^4 \end{aligned}$$

$3 = 3^1$
The common base is 3.
Add the exponents.

Check $3^3 \cdot 3 = (3 \cdot 3 \cdot 3) \cdot 3$
 $= 3 \cdot 3 \cdot 3 \cdot 3$
 $= 3^4 \checkmark$

Example 2 Multiply Monomials

Find $-2x^3(3x^4)$. Express using exponents.

$$\begin{aligned} -2x^3(3x^4) &= (-2 \cdot 3)(x^3 \cdot x^4) \\ &= (-6)(x^{3+4}) \\ &= -6x^7 \end{aligned}$$

Commutative and Associative Properties
The common base is x .
Add the exponents.

Example 3 Real-World Example

The area of the country of Luxembourg is about 10^3 square miles. The area of the country of Argentina is 10^3 times as great. What is the approximate area of Argentina in square miles?

To find the area of Argentina, multiply 10^3 by 10^3 .

$$10^3 \cdot 10^3 = 10^{3+3} \text{ or } 10^6$$

The area of Argentina is 10^6 or 1,000,000 square miles.

Example 4 Multiply Negative Powers

Find $x^{-3} \cdot x^7$. Express using exponents.

METHOD 1

$$\begin{aligned} x^{-3} \cdot x^7 &= x^{-3+7} \\ &= x^4 \end{aligned}$$

The common base is x .
Add the exponents.

METHOD 2

$$\begin{aligned} x^{-3} \cdot x^7 &= \frac{1}{\cancel{x} \cdot \cancel{x} \cdot \cancel{x}} \cdot \frac{1}{\cancel{x}} \cdot \frac{1}{\cancel{x}} \cdot \frac{1}{\cancel{x}} \cdot x \cdot x \cdot x \cdot x \\ &= x^4 \end{aligned}$$

$x^{-3} = \frac{1}{x^3}$
Simplify.