

# Algebra 1

## Chapter 7

### Section 7-2

Review: Evaluate the expressions with exponents

$$\begin{array}{c} \underline{4^3} \cdot \underline{4^2} \\ 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \end{array}$$

$$\begin{array}{c} \underline{4^5} \\ 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \end{array}$$

### Multiplying Powers With the Same Base

**Words** To multiply powers with the same base, add the exponents.

**Algebra**  $\underline{a}^m \cdot \underline{a}^n = \underline{a}^{m+n}$ , where  $\underline{a} \neq 0$  and  $\underline{m}$  and  $\underline{n}$  are rational numbers

Rewrite the expressions using each base only once.

$$(5^3)(5^8)$$

$$5^{11}$$

$$2^2 \cdot 2^{19}$$

$$2^{21}$$

$$(x^4)(x^{-6})(x^8)$$

$$x^6$$

Simplify each exponential expression completely

$h^3 \cdot h^8$

$h^{11}$

$13^5 \cdot 13^{-4}$

$13^1 = 13$

$\underline{(k-1)^{31}} \underline{(k-1)^9}$

$(k-1)^{40}$

Simplify each exponential expression completely

$a^1 \cdot b^3 \cdot a^4 \cdot b^8$

$\underline{a} \underline{b^3} \cdot \underline{a^4} \underline{b^8}$

$a^5 b^{11}$

$9 \underline{h} \underline{j^{12}} \cdot 5 \underline{k} \underline{j^3}$

$45 h k j^{15}$

$\underline{(m^{10} d^3)} \underline{(4 m^5)}$

$4 m^{15} d^3$

Simplify each expression using only positive exponents

$$(x^4y^{-11}z^1)(x^5y^3z^{-1})$$

Simplify each expression using only positive exponents

$$\frac{1}{x^3x^{-5}}$$

$$\frac{y^{-2}}{y^9}$$

How can you relate the numbers 4 and 16 using exponents?

$$4^2 = 16$$

$$16^{\square} = 4$$

$$16^{1/2} = 4$$

Recall that  $3^2$  means  $3 \cdot 3$ , which equals 9. You can write the same expression using rational exponents:  $9^{1/2}$ . The equation  $9^{1/2} = b$  indicates that  $b$  is the positive number that when multiplied by itself, equals 9.

$$9^{1/2} = 3 \text{ since } 3 \cdot 3 = 9.$$

In general,  $a^{1/m} = b$  means that  $b$  multiplied as a factor  $m$  times equals  $a$ .

$$9^{1/2} = \sqrt{9} = 3$$

Simplify each exponential expression completely

$4^{\frac{1}{2}}$

2

$125^{\frac{1}{3}}$

5

$(5 \cdot 5 \cdot 5 = 125)$

$64^{\frac{3}{2}}$

$8^3$

$8 \cdot 8 \cdot 8$

$64 \cdot 8$

$64 \cdot 2 \cdot 2 \cdot 2$

512

Simplify each exponential expression completely

$9^{\frac{5}{2}}$

$3^5$

243

$10000^{\frac{3}{4}}$

$10^3$

1000