





**Study Guide and Intervention**

7AF2.2

***Powers of Monomials*****Rule:** To find the power of a power, multiply the exponents.**Rule:** To find the power of a product, find the power of each factor and multiply.**EXAMPLE 1** Simplify to find the power of the power:

$$\begin{aligned}(5^3)^6 \\ (5^3)^6 &= 5^3 \cdot 6 \\ &= 5^{18}\end{aligned}$$

**EXAMPLE 2** Simplify to find the power of each factor.

$$\begin{aligned}(-3m^2n^4)^3 \\ (-3m^2n^4)^3 &= (-3)^3 \cdot m^{2 \cdot 3} \cdot n^{4 \cdot 3} \\ &= -27m^6n^{12}\end{aligned}$$

**Exercise****Simplify to find the power of the power.**

1.  $(4^3)^5$

$4^{15}$  or 1,073,741,824

2.  $(4^2)^7$

$4^{14}$  or 268,435,456

3.  $(9^2)^4$

$9^8$  or 4,3046,721

4.  $(k^4)^2$

$k^8$

5.  $[(6^3)^2]^2$

$6^{12}$  or 2,176,782,336

6.  $[(3^2)^2]^3$

$3^{12}$  or 531,441

**Simplify to find the power of each product.**

7.  $(5q^4r^2)^5$

$3,125q^{20}r^{10}$

8.  $(3y^2z^2)^6$

$729y^{12}z^{12}$

9.  $(7a^4b^3c^7)^2$

$49a^8b^6c^{14}$

10.  $(-4d^3e^5)^2$

$16d^6e^{10}$

11.  $(-5g^4h^9)^7$

$78,125g^{28}h^{63}$

12.  $(0.2k^8)^2$

$0.008k^{16}$

**Study Guide and Intervention**

7AF2.2

**Roots of Monomials**

The **square root** of a monomial is one of the two equal factors of the monomial.

**Example 1** Simplify  $\sqrt{25a^4}$ .

$$\begin{aligned}\sqrt{25a^4} &= \sqrt{25} \cdot \sqrt{a^4} \\ &= 5 \cdot a^2\end{aligned}$$

Product Property of Square Roots

Absolute value is not necessary since the value of  $a^2$  will never be negative.

**Example 2** Simplify  $\sqrt{49y^6z^8}$ .

$$\begin{aligned}\sqrt{49y^6z^8} &= \sqrt{49} \cdot \sqrt{y^6} \cdot \sqrt{z^8} \\ &= 7 \cdot |y^3| \cdot z^4\end{aligned}$$

Product Property of Square Roots

Use absolute value to indicate the positive value of  $y^3$ .

The **cube root** of a monomial is one of the three equal factors of the monomial.

**Example 3** Simplify  $\sqrt[3]{d^6}$ .

$$\sqrt[3]{d^6} = d^2$$

$$(d^2)^3 = d^6$$

**Example 4** Simplify  $\sqrt[3]{125m^9n^{12}}$ .

$$\begin{aligned}\sqrt[3]{125m^9n^{12}} &= \sqrt[3]{125} \cdot \sqrt[3]{m^9} \cdot \sqrt[3]{n^{12}} \\ &= 5 \cdot m^3 \cdot n^4\end{aligned}$$

Product Property of Cube Roots

$$(5)^3 = 125; (m^3)^3 = m^9; \text{ and } (n^4)^3 = n^{12}$$

**Exercises****Simplify.**

1.  $\sqrt{c^2}$   $|c|$

2.  $\sqrt{4s^6}$   $2|s^3|$

3.  $\sqrt{16a^8b^{12}}$   $4a^4b^6$

4.  $\sqrt{64g^8h^{10}}$   $8g^4|h^5|$

5.  $\sqrt{36r^2s^6}$   $6|rs^3|$

6.  $\sqrt{121d^4e^{10}}$   $11d^2|e^5|$

7.  $\sqrt[3]{p^6}$   $p^2$

8.  $\sqrt[3]{27m^{15}}$   $3m^5$

9.  $\sqrt[3]{216a^9b^{21}}$   $6a^3b^7$

10.  $\sqrt[3]{64y^{12}z^{24}}$   $4y^4z^8$

11.  $\sqrt[3]{343t^{18}u^6}$   $7t^6u^2$

12.  $\sqrt[3]{125p^{15}q^{27}}$   $5p^5q^9$