4.2 Properties of Rational Exponents and Radicals

Essential Question How can you use properties of exponents to simplify products and quotients of radicals?

EXPLORATION 1 Reviewing Properties of Exponents

Work with a partner. Let *a* and *b* be real numbers. Use the properties of exponents to complete each statement. Then match each completed statement with the property it illustrates.



EXPLORATION 2

Simplifying Expressions with Rational Exponents

Work with a partner. Show that you can apply the properties of integer exponents to rational exponents by simplifying each expression. Use a calculator to check your answers.

a.	5 ^{2/3} • 5 ^{4/3}	b.	3 ^{1/5} • 3 ^{4/5}	c.	$(4^{2/3})^3$
d.	$(10^{1/2})^4$	e.	$\frac{8^{5/2}}{8^{1/2}}$	f.	$\frac{7^{2/3}}{7^{5/3}}$

EXPLORATION 3

Simplifying Products and Quotients of Radicals

Work with a partner. Use the properties of exponents to write each expression as a single radical. Then evaluate each expression. Use a calculator to check your answers.

a.
$$\sqrt{3} \cdot \sqrt{12}$$
b. $\sqrt[3]{5} \cdot \sqrt[3]{25}$
c. $\sqrt[4]{27} \cdot \sqrt[4]{3}$

d. $\frac{\sqrt{98}}{\sqrt{2}}$
e. $\frac{\sqrt[4]{4}}{\sqrt[4]{1024}}$
f. $\frac{\sqrt[3]{625}}{\sqrt[3]{5}}$

Communicate Your Answer

- **4.** How can you use properties of exponents to simplify products and quotients of radicals?
- **5.** Simplify each expression.

a. $\sqrt{2}$

$$\overline{7} \cdot \sqrt{6}$$
 b. $\frac{\sqrt[3]{240}}{\sqrt[3]{15}}$ **c.** $(5^{1/2} \cdot 16^{1/4})^2$

USING TOOLS STRATEGICALLY

> To be proficient in math, you need to consider the tools available to help you check your answers. For instance, the following calculator screen shows that $\sqrt[3]{4} \cdot \sqrt[3]{2}$ and $\sqrt[3]{8}$ are equivalent.

