

6-2 Multiplying and Dividing Radical Expressions

Property: Combining Radical Expressions

$\sqrt[n]{a}, \sqrt[n]{b} \rightarrow$ real numbers

Product

$$\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab}$$

Quotient

$$\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$$

Can you simplify?

a. $\sqrt[3]{4} \cdot \sqrt{2}$ no, because the indexes are different

b. $\sqrt[3]{4} \cdot \sqrt[3]{5} \stackrel{\text{same}}{=} \sqrt[3]{4 \cdot 5} = \sqrt[3]{20}$

Simplify.

a. $\sqrt[3]{135x^5}$

$\begin{matrix} \textcircled{5} & 27 & \text{---} & x \\ \textcircled{3} & 9 & & \\ \textcircled{3} & 3 & & \textcircled{3} \end{matrix}$

$= 3x \sqrt[3]{5x}$

① Factor

Take out groups of $n \rightarrow 3$.

Leave extra factors under radical.
Write abs. value signs.

b. $\sqrt{50x^5}$

$\begin{matrix} \textcircled{2} & 25 \\ \textcircled{5} & \end{matrix}$

$\frac{\cancel{x} \cancel{x} \cancel{x} \cancel{x} x}{5x^2 \sqrt{2x}}$

c. $\sqrt[3]{-250x^6y^5}$

$\begin{matrix} \textcircled{5} & 25 & 10 \\ \textcircled{5} & 5 & 2 \end{matrix}$

$-5x^2y \sqrt[3]{2y^2}$

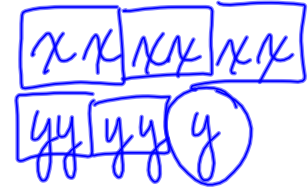
$\sqrt[3]{x \cdot x \cdot x} \sqrt[3]{x \cdot x \cdot x}$

$x \cdot x$

~~$y \cdot y \cdot y$~~

Warm up.

Simplify



a. $\sqrt[{\text{even}}]{75x^6y^5} = 5|x^3|y^2\sqrt{3y}$

b. $\sqrt[{\text{3 odd}}]{108x^9y^5} = 3x^3y\sqrt[3]{4y^2}$

c. $\sqrt[{\text{2 even}}]{72x^7y^{21}} = 3 \cdot 2x^3y^{10}\sqrt{2xy}$
 $6|x^3|y^{10}\sqrt{2xy}$

	<p>Multiply</p> $\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab}$
<p>Divide</p> $\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$	

$$x \cdot x^5 = x \cdot x \cdot x \cdot x \cdot x \cdot x = x^6$$

$\frac{\sqrt[3]{189x^7}}{\sqrt[3]{7x^2}} = \sqrt[3]{\frac{189x^7}{7x^2}}$ <p>Simplify. Divide numbers Subtract exp.</p> $= \sqrt[3]{27x^5} = 3x\sqrt[3]{x^2}$ <p>(3) 9 (3) 3</p>	$\sqrt[3]{45x^5y^3} \cdot \sqrt[3]{35xy^4}$ <p>Rewrite numbers Add exponents</p> $\sqrt[3]{45 \cdot 35 x^6 y^7}$ <p>9 5 7 3 3 3</p> $3 \cdot 5 x^3 y^3 \sqrt[3]{7y}$ <p>Consider II.</p> $15 x^3y^3 \sqrt[3]{7y}$