

Dividing Radical Expressions

Big Property: $\frac{\sqrt[n]{A}}{\sqrt[n]{B}} = \sqrt[n]{\frac{A}{B}}$

or

$$\sqrt[n]{\frac{A}{B}} = \frac{\sqrt[n]{A}}{\sqrt[n]{B}}$$

Assume variables ≥ 0

Ⓧ Simplify.

a) $\sqrt{\frac{|21|}{x^2}}$

$$= \frac{\sqrt{|21|}}{\sqrt{x^2}}$$

$$= \frac{11}{x}$$

$$b) \sqrt[4]{\frac{x^9 y^{12}}{z^6}}$$

$$= \frac{\sqrt[4]{x^9 y^{12}}}{\sqrt[4]{z^6}}$$

$$= \frac{x^2 y^3 \sqrt[4]{x} (x)}{z \sqrt[4]{z^4 z^2}}$$

$$= \frac{x^2 y^3 \sqrt[4]{x}}{z \sqrt{z}}$$

$$\sqrt[4]{z^2} = z^{\frac{2}{4}} = z^{\frac{1}{2}}$$

ex Divide and simplify

$$a) \frac{\sqrt{800x}}{\sqrt{8x}}$$

$$= \sqrt{100}$$

$$= 10$$

$$\frac{\sqrt{100x}}{\sqrt{100x}}$$

$$= \sqrt{\frac{\cancel{100} \cancel{800} x}{\cancel{8} x}}$$

$$\begin{aligned}
 \text{b) } & \frac{\sqrt[3]{135x^6y^7}}{\sqrt[3]{5x^3y^2}} \\
 & = \sqrt[3]{\frac{\cancel{27} \cancel{135} x^{\cancel{6}} y^{\cancel{6}} \cancel{y}}{\cancel{5} x^{\cancel{3}} y^{\cancel{2}}}} \\
 & = \sqrt[3]{27x^3y^5} \\
 & = \sqrt[3]{\cancel{27} \cancel{x^3} \cancel{y^3} y^2} \\
 & = 3xy \sqrt[3]{y^2}
 \end{aligned}$$

ⓐ Rationalize the denominator
 ↳ get rid of $\sqrt{\quad}$ in DEN

$$\begin{aligned}
 \text{a) } & \left(\frac{3}{\sqrt{8}} \right) \\
 & = \frac{3}{\cancel{2} \sqrt{\cancel{2}} \cdot 2} \\
 & = \frac{3}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} \\
 & = \frac{3\sqrt{2}}{2 \cdot 2}
 \end{aligned}$$

$$\begin{aligned}
 \sqrt{A} \sqrt{A} &= \sqrt{A^2} \\
 &= \textcircled{A}, A > 0
 \end{aligned}$$

$$\begin{aligned}
 & \frac{1}{\sqrt{2}} \\
 & \sqrt{2} \approx 1.41
 \end{aligned}$$

$$= \frac{3\sqrt{2}}{2 \cdot 2}$$

$$= \frac{3\sqrt{2}}{4}$$

$$\sqrt{2} \approx 1.41$$

b) $\sqrt{\frac{5}{6x}}$

$$= \frac{\sqrt{5} \cdot \sqrt{6x}}{\sqrt{6x} \cdot \sqrt{6x}}$$

$$= \frac{\sqrt{30x}}{6x}$$

$$\sqrt{\frac{5 \cdot 6x}{6x \cdot 6x}}$$

$$= \frac{\sqrt{30x}}{\sqrt{36x^2}}$$

$$= \frac{\sqrt{30x}}{6x}$$

c) $\sqrt[3]{\frac{7x}{4y}}$

$$\frac{\sqrt[3]{7x}}{\sqrt[3]{2^2 y}} \cdot \frac{\sqrt[3]{2y^2}}{\sqrt[3]{2y^2}}$$

$$\frac{\sqrt[3]{14xy^2}}{\sqrt[3]{2^3 y^3}}$$

$$\sqrt[3]{\frac{14xy^2}{2^3 y^3}}$$

$$\sqrt{A} \sqrt{A} = A$$

~~$$\sqrt[3]{A} \sqrt[3]{A} = \sqrt[3]{A^2}$$~~

$$\sqrt[3]{A} \cdot \sqrt[3]{A^2} = A$$

$$\sqrt[A]{A^n} = A$$

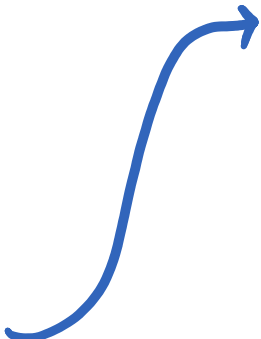
$$2y \sqrt[3]{\cancel{2^2} \cancel{y^2} \cdot 1}$$

$$= \frac{\sqrt[3]{14xy^2}}{2y}$$

$$\sqrt[3]{\frac{14xy^2}{2y}}$$

$$d) \frac{\sqrt[5]{7}}{\sqrt[5]{32x^5y}}$$

$$= \frac{\sqrt[5]{7}}{2 \times \sqrt[5]{\cancel{32} \times \cancel{x^5} y}}$$



$$= \frac{\sqrt[5]{7}}{2 \times \sqrt[5]{y}} \cdot \frac{\sqrt[5]{y^4}}{\sqrt[5]{y^4}}$$

$$= \frac{\sqrt[5]{7y^4}}{2 \times \sqrt[5]{y \cdot y^4}}$$

$$= \frac{\sqrt[5]{7y^4}}{2 \times \sqrt[5]{y^5}}$$

$$= \frac{\sqrt[5]{7y^4}}{2 \times y}$$