

6.2 Multiplying And Dividing Radical Expressions

RECALL: $\sqrt{18} = \sqrt{9} \cdot \sqrt{2} = 3\sqrt{2}$

PROPERTY: $\sqrt{a} \cdot \sqrt{b} = \sqrt{ab}$

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

EX: $\sqrt{2} \cdot \sqrt{18} = \sqrt{36} = 6$

$$\sqrt[3]{2} \cdot \sqrt[3]{-4} = \sqrt[3]{-8} = -2$$

$\sqrt{-4} \cdot \sqrt{2}$ IS NOT REAL

EX: SIMPLIFY

$$\sqrt[3]{54} = \sqrt[3]{27} \cdot \sqrt[3]{2} = 3\sqrt[3]{2}$$

$$\sqrt[3]{270x^4y^5z^6} = \sqrt[3]{27x^3y^3z^6} \sqrt[3]{10xy^2}$$

ALL PERFECT
CUBES

$$= 3xyz^2 \sqrt[3]{10xy^2}$$

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

EX: $\frac{\sqrt[3]{-40}}{\sqrt[3]{5}} = \sqrt[3]{\frac{-40}{5}} = \sqrt[3]{-8} = -2$

$$\frac{\sqrt[4]{32x^{10}y^7}}{\sqrt[4]{2x^2y^2}} = \sqrt[4]{\frac{32x^{10}y^7}{2x^2y^2}} = \sqrt[4]{16x^8y^5}$$

$$= \sqrt[4]{16x^8y^4} \sqrt[4]{y} = 2x^2y \sqrt[4]{y}$$

RATIONALIZING THE DENOMINATOR

EX: $\frac{\sqrt{5}}{\sqrt{3}} = \frac{\sqrt{5}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{15}}{\sqrt{9}} = \frac{\sqrt{15}}{3}$

$\frac{\sqrt{7}}{\sqrt{8x}} = \frac{\sqrt{7}}{\sqrt{8x}} \cdot \frac{\sqrt{2x}}{\sqrt{2x}} = \frac{\sqrt{14x}}{\sqrt{16x^2}} = \frac{\sqrt{14x}}{4x}$

EX: $\sqrt[3]{\frac{5}{4y}} = \frac{\sqrt[3]{5}}{\sqrt[3]{4y}} \cdot \frac{\sqrt[3]{2y^2}}{\sqrt[3]{2y^2}} = \frac{\sqrt[3]{10y^2}}{\sqrt[3]{8y^3}} = \frac{\sqrt[3]{10y^2}}{2y}$