

## 1.4A - Operations with Radicals

Simplify.

$$\sqrt{64x} = 8\sqrt{x}$$

$$\sqrt{48x^2} = 4x\sqrt{3}$$

$$\sqrt{112x^2} = 2 \cdot 2 \cdot x \sqrt{7} = 4x\sqrt{7}$$

$$\sqrt{32x} = 4\sqrt{2x}$$

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An expression is not simplified if a radical is in the denominator

**rationalizing the denominator** – Getting a square root out of the denominator

“multiply top and bottom by a number that produces a perfect square under the radical sign in the denominator.”

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Simplify.

$$\frac{3\sqrt{5}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{3\sqrt{10}}{2}$$

$$\frac{\sqrt{2}}{\sqrt{8}} = \frac{\sqrt{1}}{\sqrt{4}} = \frac{1}{2}$$

$$\frac{3\sqrt{5}}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{3\sqrt{35}}{7}$$

$$\frac{5}{\sqrt{10}} \cdot \frac{\sqrt{10}}{\sqrt{10}} = \frac{5\sqrt{10}}{10} = \frac{\sqrt{10}}{2}$$

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

$$\frac{10\sqrt{3}}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{10\sqrt{15}}{5} = 2\sqrt{15}$$

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Square roots that have the same radicand are called **like radical terms**.

Like Radicals	$\sqrt{2}$ and $3\sqrt{2}$	$-6\sqrt{15}$ and $7\sqrt{15}$	$\sqrt{ab^2}$ and $4\sqrt{ab^2}$
Unlike Radicals	$2\sqrt{5}$ and $\sqrt{2}$	$\sqrt{x}$ and $\sqrt{3x}$	$\sqrt{xy^2}$ and $\sqrt{x^2y}$

To add or subtract square roots, first simplify each radical term and then combine like radical terms by adding or subtracting their coefficients.

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Simplify each expression.

$$9\sqrt{3} + 7\sqrt{3} = 16\sqrt{3}$$

$$6\sqrt{5} - \sqrt{20} = 6\sqrt{5} - 2\sqrt{5} = 4\sqrt{5}$$

$$\begin{array}{c} \sqrt{4} \sqrt{5} \\ \downarrow \\ \sqrt{2} \sqrt{2} \end{array}$$

$$3\sqrt{5} + 10\sqrt{5} = 13\sqrt{5}$$

$$\sqrt{80} - 5\sqrt{5} = 4\sqrt{5} - 5\sqrt{5} = -1\sqrt{5}$$

$$\begin{array}{c} \sqrt{4} \sqrt{20} \\ \downarrow \\ \sqrt{4} \sqrt{5} \end{array}$$

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Homework:

WS Operations with Radicals

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