

## #10 ~ Sect. 7.3: Binomial Radical Expressions

Like Radicals: Radical expressions that have the same index and the same radicand.

Ex. 1: Add or subtract if possible.

a)  $5\sqrt[3]{x} - 3\sqrt[3]{x}$

b)  $4\sqrt{2} + 5\sqrt{3}$

Ex. 2: Simplify.

a)  $3\sqrt{20} - \sqrt{45} + 4\sqrt{80}$

b)  $\sqrt{50} + 3\sqrt{32} - 5\sqrt{18}$

Ex. 3: Multiply and simplify.

$$(2 + 4\sqrt{3})(1 - 5\sqrt{3})$$

**Conjugates:** Expressions that differ only in the sign of the second terms.

$$\sqrt{a} + \sqrt{b} \quad \text{and} \quad \sqrt{a} - \sqrt{b}$$

When you multiply conjugates, the middle terms will always cancel each other out, leaving you with the first term squared minus the last terms squared (which will be NOT be a radical).

$$\begin{aligned} & (\sqrt{a} + \sqrt{b})(\sqrt{a} - \sqrt{b}) \\ &= \sqrt{a} \cdot \sqrt{a} + \sqrt{a} \cdot -\sqrt{b} + \sqrt{b} \cdot \sqrt{a} + \sqrt{b} \cdot -\sqrt{b} \\ &= (\sqrt{a})^2 + -\sqrt{ab} + \sqrt{ab} + -(\sqrt{b})^2 \\ &= (\sqrt{a})^2 - (\sqrt{b})^2 \end{aligned}$$

Ex. 4: Multiply each pair of conjugates.

a)  $(3 + \sqrt{7})(3 - \sqrt{7})$

b)  $(\sqrt{8} - 4)(\sqrt{8} + 4)$

Ex. 5: Rationalize the denominator.

$$\frac{2 - \sqrt{3}}{4 + \sqrt{3}}$$