Name _____ Date _____

Adding & Subtracting Radicals

Notes: Lesson 3

When adding/subtracting radical expressions, the type of radical AND what's underneath it must be exactly the same.

Example 1... **If possible, add or subtract each radical expression.**

a. $2\sqrt{7} + 3\sqrt{7}$

$5\sqrt{7}$

b. $7\sqrt[4]{x} - 2\sqrt[4]{x}$

not possible to subtract

c. $14\sqrt[3]{2} + 3\sqrt[3]{4}$

not possible to add

d. $4\sqrt{xy} + 5\sqrt{xy}$

$9\sqrt{xy}$

Example 2... **Simplify each radical, then add/subtract if possible.**

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

$\sqrt{4}^{\wedge}5 \quad \sqrt{9}^{\wedge}5 \quad \sqrt{16}^{\wedge}5$

$3 \cdot 2\sqrt{5} - 3\sqrt{5} + 4 \cdot 4\sqrt{5}$

$6\sqrt{5} - 3\sqrt{5} + 16\sqrt{5}$

$\boxed{19\sqrt{5}}$

b. $3\sqrt[3]{16} - 4\sqrt[3]{54} + \sqrt[3]{128}$

$\sqrt[3]{8}^{\wedge}2 \quad \sqrt[3]{27}^{\wedge}2 \quad \sqrt[3]{64}^{\wedge}2$

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

$6\sqrt[3]{2} - 12\sqrt[3]{2} + 4\sqrt[3]{2}$

$\boxed{-2\sqrt[3]{2}}$

c. $\sqrt{50} + 2\sqrt{72} - \sqrt{12}$

$25^{\wedge}2 \quad 36^{\wedge}2 \quad 4^{\wedge}3$

$5\sqrt{2} + 2 \cdot 6\sqrt{2} - 2\sqrt{3}$

$5\sqrt{2} + 12\sqrt{2} - 2\sqrt{3}$

$\boxed{17\sqrt{2} - 2\sqrt{3}}$

d. $\sqrt[3]{135} - \sqrt[3]{48}$

$27^{\wedge}5 \quad 8^{\wedge}6$

$\boxed{3\sqrt[3]{5} - 2\sqrt[3]{6}}$

Example 3... **Use the distributive property to multiply the following binomial expressions.**

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

$2 - 10\sqrt{3} + 4\sqrt{3} - 20\sqrt{9}$

$-20(3)$

-60

$-58 - 6\sqrt{3}$

b. $(3 + \sqrt{7})(3 - \sqrt{7})$ ← conjugates

$9 - 3\sqrt{7} + 3\sqrt{7} - \sqrt{49}$

-7

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Remember...