April 2, 2018

Sect. 7-4b

Simplifying Radical Expressions

Add / Subt.

Mult. (FOIL)

Rationalize Denoms

Add / Subt

Like Radicals

same index, same argument

add/subt coeffs.

$$a\sqrt[b]{c} \pm d\sqrt[b]{c} = (a \pm d)\sqrt[b]{c}$$

$$5x + 8x = 13x$$

$$5\sqrt[2]{3} + 8\sqrt[2]{3} = 13\sqrt[2]{3}$$

$$4\sqrt[3]{5} - 1\sqrt[3]{5} = 3\sqrt[3]{5}$$

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

can't do

$$3\sqrt{12} + 4\sqrt{27} + 5\sqrt{48}$$

$$3\sqrt{4 \cdot 3} + 4\sqrt{9 \cdot 3} + 5\sqrt{16 \cdot 3}$$

$$6\sqrt{3} + 12\sqrt{3} + 20\sqrt{3}$$

$$38\sqrt{3}$$

$$\sqrt{20} + \sqrt{125} - \sqrt{45}$$

$$\sqrt{4 \cdot 5} + \sqrt{25 \cdot 5} - \sqrt{9 \cdot 5}$$

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

$$4\sqrt{5}$$

Mult.

Last Time: $\sqrt[2]{5} \cdot \sqrt[2]{3} = \sqrt[2]{15}$

$$(3+\sqrt{5})(2+\sqrt{3})$$

$$6 + 3\sqrt{3} + 2\sqrt{5} + \sqrt{15}$$

Can't simplify any more

$$\frac{(6+\sqrt{7})(2-\sqrt{5})}{(3+\sqrt{2})(5+\sqrt{2})}$$

$$\frac{12-6\sqrt{5}+2\sqrt{7}-\sqrt{35}}{15+3\sqrt{2}+5\sqrt{2}+\sqrt{4}\,2}$$

$$17+8\sqrt{2}$$

$$(-2+\sqrt{3})(3+\sqrt{3})$$

$$-6-2\sqrt{3}+3\sqrt{3}+\sqrt{9}$$ 3

$$-3+1\sqrt{3}$$

$$(6+\sqrt{2})(6-\sqrt{2})$$

$$36 - 6\sqrt{2} + 6\sqrt{2} - \sqrt{4}\,2$$

$$0$$

$$34$$

Radical disappears — Conjugate Pairs

Division (Rationalize the Denom)

Last Time: $\frac{5}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{5\sqrt{2}}{\sqrt{4}} = \frac{5\sqrt{2}}{2}$

$$\frac{5}{(2+\sqrt{3})} \cdot \frac{(2-\sqrt{3})}{(2-\sqrt{3})} = \frac{10-5\sqrt{3}}{4-2\sqrt{3}+2\sqrt{3}-\sqrt{9}}$$

$$= \frac{10-5\sqrt{3}}{1} = 10-5\sqrt{3}$$

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

$$\frac{4-1\sqrt{2}-4\sqrt{3}+\sqrt{6}}{16-\cancel{4\sqrt{2}+4\sqrt{2}}-\cancel{\sqrt{4}}\,2}$$

$$\frac{4-\sqrt{2}-4\sqrt{3}+\sqrt{6}}{14}$$