Name: _____ Date: _____ # ____

Section 6-3 Binomial Radical Expressions

Learning Goal: To understand how to add and subtract radical expressions.

Essential Questions: How can you simplify the nth root of an expression that contains an nth root as a factor?
When you square each side of an equation, is the resulting equation equivalent to the original?
How are function and its inverse function related?

Warm Up:

1. Can you simplify the product $\sqrt[4]{64} \cdot \sqrt[4]{32}$? Explain.

2. What is the simplest form of $\sqrt[4]{162x^6}$?

3. What is the simplest form of $\sqrt{54x^4y^3} \cdot \sqrt{72xy^6}$?

4. What is the simplest form of $\dfrac{\sqrt{64x^7}}{\sqrt{4x^3}}$?

5. What is the simplest form of $\sqrt[3]{\dfrac{7x^2}{15yz^2}}$?

Vocabulary:

Like Radicals– radical expression that have the same index and radicand

Examples: $\sqrt{2}+3\sqrt{2}=$

$\sqrt[3]{7}-5\sqrt[3]{7}=$

$\sqrt{5xy}+8\sqrt{5xy}=$

$\sqrt[3]{9x^2y}-8\sqrt[3]{9x^2y}=$

Combining Radical Expressions: Sums and Differences- Use the distributive property to add or subtract like radicals.

$$a\sqrt[n]{x}+b\sqrt[n]{x}=(a+b)\sqrt[n]{x} \qquad a\sqrt[n]{x}-b\sqrt[n]{x}=(a-b)\sqrt[n]{x}$$

Try some:

What is the simplified form of each expression?

1. $3\sqrt{5x}-2\sqrt{5x}$

2. $6x^2\sqrt{7}+4x\sqrt{5}$

3. $12\sqrt[3]{7xy}-8\sqrt[5]{7xy}$

4. $7\sqrt[3]{5}-4\sqrt{5}$

5. $3x\sqrt{xy}+4x\sqrt{xy}$

6. $17\sqrt[5]{3x^2}-15\sqrt[5]{3x^2}$

*Note: You must simplify radicals first, you might be able to combine radicals.

7. $\sqrt{12}+\sqrt{75}-\sqrt{3}$

8. $\sqrt[3]{250}+\sqrt[3]{54}-\sqrt[3]{16}$

9. $\sqrt{28}-\sqrt{175}+\sqrt{63}$

You can multiply two binomials with radical expressions (FOIL).

10. $\left(4+2\sqrt{2}\right)\left(5+4\sqrt{2}\right)$

11. $\left(3-\sqrt{7}\right)\left(5+\sqrt{7}\right)$

12. $\left(3-2\sqrt{5}\right)\left(2-4\sqrt{5}\right)$

13. $\left(1+2\sqrt{7}\right)\left(4-3\sqrt{7}\right)$

14. $\left(5-\sqrt{7}\right)\left(5+\sqrt{7}\right)$

15. $\left(6-\sqrt{12}\right)\left(6+\sqrt{12}\right)$

16. What do you notice about #14 & #15?

Rationalizing the Denominator

17. $\dfrac{3\sqrt{2}}{\sqrt{5}-\sqrt{2}}$

18. $\dfrac{2\sqrt{7}}{\sqrt{3}-\sqrt{5}}$

19. $\dfrac{4x}{3-\sqrt{6}}$

20. $\dfrac{11}{6+\sqrt{3}}$

Closure: What process do you use to identify like radicals?

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Assignment: section 6.3 # 10,12,14,17,20,21,23,25,27,31,32,34,35,39,40,41,42,45,51(19 problems)