

Name: _____

Date: _____ # _____

Section 6-2 Multiplying and Dividing Radical Expressions

Learning Goal: To understand how to multiply and divide radical expressions.

Essential Questions: How can you simplify the n th root of an expression that contains an n th 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:

Simplify each algebraic expression.

1. $\frac{14x^7y^9}{7x^4y^6}$

2. $\frac{3abc}{9b}$

3. $\frac{20x}{5x^3}$

4. $(3x^5y)^2(5xy^7z)^3$

Add or Subtract.

5. $\frac{2}{7} + \frac{4}{9}$

6. $\frac{3}{4} + \frac{8}{9} - \frac{11}{3} + 5$

Vocabulary:

Combining Radical Expressions: Products –

If $\sqrt[n]{a}$ and $\sqrt[n]{b}$ are real numbers, then $\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab}$.

Try some:

Can you simplify the product of the radical expressions? Explain.

1. $\sqrt[3]{6} \cdot \sqrt{2}$

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

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

4. $\sqrt[5]{-5} \cdot \sqrt[5]{-2}$

5. $\sqrt[4]{125} \cdot \sqrt[4]{405}$

*Note – Always write your radicals in simplest form.

What is the simplest form of:

6. $\sqrt[3]{54x^5}$

7. $\sqrt[3]{128x^7}$

8. $\sqrt[3]{135x^5}$

Simplifying a product.

9. $\sqrt{72x^3y^2} \cdot \sqrt{10xy^3}$

10. $\sqrt{45x^5y^3} \cdot \sqrt{35xy^4}$

11. $\sqrt{45x^5y^2} \cdot \sqrt{50x^2y^4}$

Combining Radical Expressions: Quotients

If $\sqrt[n]{a}$ and $\sqrt[n]{b}$ are real numbers and $b \neq 0$, then $\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$.

You try:

12. $\frac{\sqrt{18x^5}}{\sqrt{2x^3}}$

13. $\frac{\sqrt[3]{162y^5}}{\sqrt[3]{3y^2}}$

14.
$$\frac{\sqrt{50x^6}}{\sqrt{2x^4}}$$

15.
$$\frac{\sqrt[3]{189x^7}}{\sqrt[3]{7x^2}}$$

Rationalize the denominator – To rationalize the denominator of an expression, rewrite it so that there are no radicals in any denominator and no denominators in any radical.

Recall:
$$\frac{1}{\sqrt{2}} = \frac{1}{\sqrt{2}} \cdot \frac{(\sqrt{2})}{(\sqrt{2})} = \frac{\sqrt{2}}{2}$$

You Try:

Write the expression in simplest form.

16.
$$\sqrt[3]{\frac{4x^4}{32yz^3}}$$

17.
$$\sqrt[3]{\frac{5x^2}{12y^2z}}$$

18. $\frac{\sqrt[3]{7x}}{\sqrt[3]{5y^2}}$

19. $\frac{\sqrt{26}}{\sqrt{3}}$

20. $\frac{\sqrt[3]{x}}{\sqrt[3]{2}}$

21. $\frac{\sqrt{7x^4y}}{\sqrt{5xy}}$

Closure: How do you know if your radical expression is simplified?
