Name: **Course/Section:** **Instructor:**

Chapter 7 Radical Expressions and Functions
7.3 Simplifying Radical Expressions

Product Rule for Radical Expressions ~ Quotient Rule for Radical Expressions

STUDY PLAN

Read: Read Section 7.3 on pages 512-519 in your textbook or eText.

Practice: Do your assigned exercises in your ☐ Book ☐ MyMathLab ☐ Worksheets

Review: Keep your corrected assignments in an organized notebook and use them to review for the test.

Key Terms

Exercises 1-5: Use the vocabulary terms and expressions listed below to complete each statement. Note that some terms or expressions may not be used.

perfect cube
perfect square
perfect *n*th power

$\sqrt[n]{a \cdot b}$

$\dfrac{\sqrt[n]{a}}{\sqrt[n]{b}}$

1. An integer a is a(n) _____ if there exists an integer b such that $b^n = a$.

2. Let a and b be real numbers, where $\sqrt[n]{a}$ and $\sqrt[n]{b}$ are both defined and $b \neq 0$.
Then $\sqrt[n]{\dfrac{a}{b}}$ = _____.

3. An integer a is a(n) _____ if there exists an integer b such that $b^3 = a$.

4. Let a and b be real numbers, where $\sqrt[n]{a}$ and $\sqrt[n]{b}$ are both defined. Then
$\sqrt[n]{a} \cdot \sqrt[n]{b}$ = _____.

5. An integer a is a(n) _____ if there exists an integer b such that $b^2 = a$.

Product Rule for Radical Expressions

Exercises 1-19: Refer to Examples 1-6 on pages 513-516 in your text and the Section 7.3 lecture video.

Multiply each radical expression.

1. $\sqrt{2} \cdot \sqrt{50}$ **1.** _____

2. $\sqrt[3]{-5} \cdot \sqrt[3]{25}$ **2.** _____

3. $\sqrt[4]{\frac{1}{2}} \cdot \sqrt[4]{\frac{1}{4}} \cdot \sqrt[4]{\frac{1}{2}}$ **3.** _____

Multiply each radical expression. Assume that all variables are positive.

4. $\sqrt{x^3} \cdot \sqrt{x^5}$ **4.** _____

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

6. $\sqrt{6a} \cdot \sqrt{b}$ **6.** _____

7. $\sqrt[5]{\frac{9s}{t}} \cdot \sqrt[5]{\frac{27t}{s}}$ **7.** _____

Simplify each expression.

8. $\sqrt{75}$ **8.** _____

9. $\sqrt[3]{81}$ **9.** _____

10. $\sqrt{24}$ **10.** _____

11. $\sqrt[4]{162}$ **11.** _____

12. A circular curve without any banking has a radius of 900 feet. The formula $L = \sqrt{2.25R}$ calculates the speed limit L in miles per hour for a curve with radius R feet.

(a) Simplify this formula. **12.(a)**_____

(b) Determine the speed limit for the curve. **(b)**_____

Simplify each expression. Assume that all variables are positive.

13. $\sqrt{16y^6}$ **13.** _____

14. $\sqrt{8x^5}$ **14.** _____

15. $\sqrt[3]{-54a^4b^6}$ **15.** _____

16. $\sqrt[3]{16m^2} \cdot \sqrt[3]{4mn}$ **16.** _____

Simplify each expression. Write your answer in radical notation.

17. $\sqrt{6} \cdot \sqrt[3]{6}$ **17.** _____

18. $\sqrt{3} \cdot \sqrt[4]{9}$ **18.** _____

19. $\sqrt[4]{b} \cdot \sqrt[5]{b}$ **19.** _____

Quotient Rule for Radical Expressions

Exercises 20-29: Refer to Examples 7-10 on pages 516-518 in your text and the Section 7.3 lecture video.

Simplify each radical expression. Assume that all variables are positive.

20. $\sqrt[3]{\frac{3}{8}}$ **20.** _____

21. $\sqrt[4]{\frac{x}{81}}$ **21.** _____

22. $\sqrt{\frac{25}{t^2}}$ **22.** _____

23. $\frac{\sqrt{45}}{\sqrt{5}}$ **23.** _____

24. $\dfrac{\sqrt[3]{2}}{\sqrt[3]{250}}$ **24.** _____

25. $\dfrac{\sqrt{m^3 n}}{\sqrt{mn}}$ **25.** _____

26. $\sqrt[4]{\dfrac{y^5}{16x^4}}$ **26.** _____

27. $\sqrt{\dfrac{3x}{5}} \cdot \sqrt{\dfrac{12x^3}{5}}$ **27.** _____

Simplify each expression. Assume all radicands are positive.

28. $\sqrt{x+4} \cdot \sqrt{x-4}$ **28.** _____

29. $\dfrac{\sqrt[3]{x^2+7x+6}}{\sqrt[3]{x+6}}$ **29.** _____