

Name: _____

Course/Section: _____

Instructor: _____

Chapter 17 Radical Expressions and Functions
17.4 Operations on Radical Expressions

Addition and Subtraction ~ Multiplication ~ Rationalizing the Denominator

STUDY PLAN

Read: Read Section 17.4 on pages 1099-1108 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 1-3: Use the vocabulary terms listed below to complete each statement.

Note that some terms or expressions may not be used.

conjugate
radicand
like radical
radical expression
rationalizing the denominator

1. _____(s) have the same index and the same radicand.
2. The process of removing any radical expressions from the denominator is called _____.
3. The _____ of $\sqrt{a} - \sqrt{b}$ is $\sqrt{a} + \sqrt{b}$.

Addition and Subtraction

Exercises 1-24: Refer to Examples 1-9 on pages 1100-1104 in your text and the Section 17.4 lecture video.

If possible, add the expressions and simplify.

1. $5\sqrt{7} + 8\sqrt{7}$ 1. _____

2. $4\sqrt[3]{5} + \sqrt[3]{5}$ 2. _____

3. $3 + 2\sqrt{3}$ 3. _____

4. $\sqrt{6} + \sqrt{10}$ 4. _____

Write each pair of terms as like radicals, if possible.

5. $\sqrt{75}, \sqrt{48}$ 5. _____

6. $\sqrt{8}, \sqrt{4}$ 6. _____

7. $7\sqrt[3]{24}, 2\sqrt[3]{81}$ 7. _____

Add the expressions and simplify.

8. $\sqrt{18} + 4\sqrt{2}$

8. _____

9. $\sqrt[3]{24} + \sqrt[3]{3}$

9. _____

10. $5\sqrt{2} + \sqrt{8} + \sqrt{18}$

10. _____

Add the expressions and simplify. Assume that all variables are positive.

11. $\sqrt[4]{32} + 3\sqrt[4]{2}$

11. _____

12. $-4\sqrt{9x} + \sqrt{x}$

12. _____

13. $2\sqrt{5b} + 8\sqrt{20b} + 3\sqrt{45b}$

13. _____

Simplify the expressions.

14. $6\sqrt{5} - 2\sqrt{5}$

14. _____

15. $4\sqrt[3]{7} - 3\sqrt[3]{7} + \sqrt[3]{10}$

15. _____

16. $6\sqrt{t} + \sqrt[3]{t} - 3\sqrt{t}$

16. _____

Subtract and simplify. Assume that all variables are positive.

17. $5\sqrt[3]{m^2n} - \sqrt[3]{m^2n}$ 17. _____

18. $\sqrt{9y^3} - \sqrt{y^3}$ 18. _____

19. $\sqrt[3]{\frac{7x}{8}} - \frac{\sqrt[3]{7x}}{4}$ 19. _____

20. The functions given by $N(x) = 650\sqrt{x} + 5000$ (new technology) and $O(x) = 225\sqrt{x} + 1700$ (old technology) approximate the increase in revenue resulting from investing x dollars in equipment (per worker).

(a) Find their difference $D(x) = N(x) - O(x)$. Simplify your answer. 20.(a) _____

(b) Evaluate $D(40,000)$ and interpret the result. (b) _____

Subtract and simplify. Assume that all variables are positive.

21. $\frac{7\sqrt{2}}{4} - \frac{2\sqrt{2}}{3}$ 21. _____

22. $\sqrt[4]{81x^6y^9} - \sqrt[4]{16x^2y}$ 22. _____

23. $2\sqrt[3]{\frac{t^4}{8}} - 4\sqrt[3]{t}$ 23. _____

24. Find the exact perimeter of a rectangle with length $\sqrt{75}$ feet and width $\sqrt{12}$ feet. Then approximate your answer to the nearest hundredth of a foot. 24. _____

Multiplication

Exercises 25-26: Refer to Example 10 on pages 1104-1105 in your text and the Section 17.4 lecture video.

Multiply and simplify.

25. $(\sqrt{a} + 6)(\sqrt{a} - 2)$ 25. _____

26. $(2 - \sqrt{5})(2 + \sqrt{5})$ 26. _____

Rationalizing the Denominator

Exercises 27-35: Refer to Examples 11-15 on pages 1105-1108 in your text and the Section 17.4 lecture video.

Rationalize each denominator. Assume that all variables are positive.

27. $\frac{1}{\sqrt{3}}$ 27. _____

28. $\frac{2}{7\sqrt{2}}$ 28. _____

29. $\sqrt{\frac{y}{50}}$ 29. _____

30. $\frac{x^2y}{\sqrt{x^3}}$ 30. _____

31. An equilateral triangle has sides of length $\frac{x}{\sqrt{3}}$. Find the perimeter and rationalize the denominator.

31. _____

Rationalize the denominator.

32. $\frac{3}{\sqrt{5}+2}$

32. _____

33. $\frac{2-\sqrt{3}}{3+\sqrt{3}}$

33. _____

34. $\frac{\sqrt{x}}{\sqrt{x}-4}$

34. _____

35. Rationalize the denominator of $\frac{4}{\sqrt[3]{y}}$.

35. _____