

Name: _____

Course/Section: _____

Instructor: _____

Chapter 7 Radical Expressions and Functions

7.2 Rational Exponents

Basic Concepts ~ Properties of Rational Exponents

STUDY PLAN

Read: Read Section 7.2 on pages 503-509 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 1-10: Use the expressions listed below to complete each statement.

Note that some expressions may not be used.

$$\begin{array}{llll} \frac{1}{a^p} & \left(\frac{b}{a}\right)^p & \frac{1}{a^{m/n}} = \frac{1}{\sqrt[n]{a^m}} & \sqrt[n]{a^m} = (\sqrt[n]{a})^m & a^{p+q} \\ \sqrt[n]{a} & a^{pq} & & a^p b^p & a^p \\ |a| & \left(\frac{a}{b}\right)^p & \frac{a^p}{b^p} & & \\ & & a^{p-q} & & \end{array}$$

1. If n is an integer greater than 1 and a is a real number, then $a^{1/n} =$ _____.
2. If m and n are positive integers with $\frac{m}{n}$ in lowest terms, then $a^{m/n} =$ _____.
3. If m and n are positive integers with $\frac{m}{n}$ in lowest terms, then $a^{-m/n} =$ _____,
 $a \neq 0$.
4. $a^p \cdot a^q =$ _____
5. $a^{-p} =$ _____
6. $\left(\frac{a}{b}\right)^{-p} =$ _____
7. $\frac{a^p}{a^q} =$ _____
8. $(a^p)^q =$ _____
9. $(ab)^p =$ _____
10. $\left(\frac{a}{b}\right)^p =$ _____

Basic Concepts

Exercises 1-14: Refer to Examples 1-6 on pages 504-507 in your text and the Section 7.2 lecture video.

Write each expression in radical notation. Then evaluate the expression and round to the nearest hundredth when appropriate.

1. $49^{1/2}$ 1. _____

2. $15^{1/3}$ 2. _____

3. $x^{1/4}$ 3. _____

4. $(3z)^{1/2}$ 4. _____

Write each expression in radical notation. Evaluate the expression by hand when possible.

5. $(-64)^{2/3}$ 5. _____

6. $32^{3/5}$ 6. _____

7. The function A , given by $A(x) = 7.3x^{7/16}$, computes the percentage of viewers who abandon an online video after x seconds. 7. _____
 Find $A(20)$ and $A(60)$. Interpret your answers. _____

Write each expression in radical notation and then evaluate.

8. $16^{-3/4}$

8. _____

9. $-27^{-2/3}$

9. _____

Use rational exponents to write each radical expression.

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

10. _____

11. $\frac{1}{\sqrt{a^7}}$

11. _____

12. $\sqrt[4]{(x+4)^3}$

12. _____

13. $\sqrt[4]{s^4 - t^4}$

13. _____

14. When smaller (four-legged) animals walk, they tend to take faster, shorter steps, whereas larger animals tend to take slower, longer steps. If an animal is h feet high at the shoulder, then the number N of steps per second that the animal takes while walking can be estimated by $N(h) = 1.6h^{-1/2}$. Estimate the stepping frequency for Gibson, one of the tallest dogs in the world, measuring 42 inches at the shoulder.

14. _____

Properties of Rational Exponents

Exercises 15-22: Refer to Examples 7-8 on page 508 in your text and the Section 7.2 lecture video.

Write each expression using rational exponents and simplify. Write the answer with a positive exponent. Assume that all variables are positive numbers.

15. $\sqrt{x} \cdot \sqrt[4]{x}$ 15. _____

16. $\sqrt[4]{32x^6}$ 16. _____

17. $\frac{\sqrt[3]{27x}}{\sqrt{x}}$ 17. _____

18. $\left(\frac{49}{y^2}\right)^{-1/2}$ 18. _____

Write each expression with positive rational exponents and simplify, if possible.

19. $\sqrt{\sqrt[4]{z+3}}$ 19. _____

20. $\sqrt[4]{y^{12}}$ 20. _____

21. $\frac{a^{-1/3}}{b^{-1/4}}$ 21. _____

22. $\sqrt{x}(1+\sqrt{x})$ 22. _____