

Name:

Course/Section:

Instructor:

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**Chapter 7 Radical Expressions and Functions**  
**7.5 More Radical Functions**

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Root Functions ~ Power Functions ~ Modeling with Power Functions (Optional)

**STUDY PLAN**

**Read:** Read Section 7.5 on pages 533-537 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**

*Exercise 1: Use the vocabulary terms listed below to complete each statement.*

*Note that some terms or expressions may not be used.*

**root function**

**radical function**

**power function**

**rational function**

1. If a function  $f$  can be represented by  $f(x) = x^p$ , where  $p$  is a rational number, then  $f$  is a(n) \_\_\_\_\_. If  $p = \frac{1}{n}$ , where  $n \geq 2$  is an integer, then  $f$  is also a(n) \_\_\_\_\_, which is given by  $f(x) = \sqrt[n]{x}$ .

**Root Functions**

*Exercises 1-4: Refer to Example 1 on page 534 in your text and the Section 7.5 lecture video.*

*If possible, evaluate each root function  $f$  at the given  $x$ -values.*

1.  $f(x) = \sqrt{x+4}$ ,  $x = -5$ ,  $x = 5$  1. \_\_\_\_\_

2.  $f(x) = \sqrt[3]{3-x}$ ,  $x = -5$ ,  $x = 30$  2. \_\_\_\_\_

3.  $f(x) = \sqrt[4]{x-5}$ ,  $x = 1$ ,  $x = 21$  3. \_\_\_\_\_

4.  $f(x) = \sqrt[5]{x}$ ,  $x = -243$ ,  $x = 1$  4. \_\_\_\_\_

**Power Functions**

*Exercises 5-8: Refer to Examples 2-4 on pages 535-536 in your text and the Section 7.5 lecture video.*

*If possible, evaluate  $f(x)$  at the given value of  $x$ .*

5.  $g(x) = x^{0.75}$  at  $x = -81$  5. \_\_\_\_\_

6.  $g(x) = x^{\frac{2}{3}}$  at  $x = -27$  6. \_\_\_\_\_

7. The surface area of a person who is 70 inches tall and weighs  $w$  pounds can be estimated by  $S(w) = 342w^{0.425}$ , where  $S$  is in square inches.

(a) Find  $S$  if this person weighs 190 pounds.

7.(a) \_\_\_\_\_

(b) If the person gains 20 pounds, by how much does the person's surface area increase?

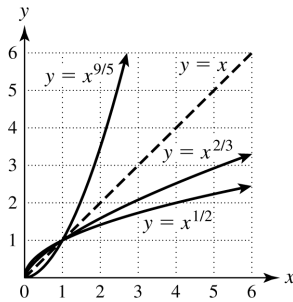
(b) \_\_\_\_\_

8. The graphs of three power functions,

$$f(x) = x^{0.5}, \quad g(x) = x^{1.8}, \quad \text{and} \quad h(x) = x^{2/3},$$

are shown below, where the two decimal exponents have been written as fractions. Discuss how the value of  $p$  affects the graph of  $y = x^p$  when  $x > 1$  and when  $0 < x < 1$ .

8. \_\_\_\_\_



**Modeling with Power Functions (Optional)**

*Exercise 8: Refer to Example 5 on pages 536-537 in your text and the Section 7.5 lecture video.*

9. Biologists have found that the weight  $W$  of a bird and the length  $L$  of its wing span are related by the equation  $L = kW^{1/3}$ , where  $k$  is constant. The following table lists  $L$  and  $W$  for one species of bird.

$W$ (kilograms)	0.2	0.3	0.5	0.8
$L$ (meters)	0.498	0.569	0.676	0.789

(a) Use the data to approximate the value of  $k$ .

9. (a) \_\_\_\_\_

(b) Find the wing span of a 0.6-kilogram bird.

(b) \_\_\_\_\_