Math 95 HW 17 (R 7.2) Rational Exponents

Name: _____

Concepts and Vocabulary:

5. Use a rational exponent to write $\sqrt{x}$.

6. Use a rational exponent to write $\sqrt[3]{a^4}$.

7. Write $a^{1/n}$ in radical notation.

8. Write $a^{m/n}$ in radical notation.

Converting Forms:

In exercises 17 - 25 odd, use radical notation to write each expression.

17. $7^{1/2}$

21. $x^{5/6}$

19. $a^{1/3}$

23. $(x+5)^{1/2}$

In exercises 27 - 35, use rational exponents to write each expression.

27. $\sqrt{t}$

29. $\sqrt[3]{(x+1)}$

33. $\sqrt{a^2-b^2}$

Rational Exponents:

In exercises 37 and 41, approximate to the nearest hundredth.

37. $16^{1/5}$

41. $9^{3/5}$

In exercises 45 - 63 odd, write each expression in radical notation. Evaluate the expression by hand when possible.

45. $9^{1/2}$

51. $(-8)^{2/3}$

47. $8^{1/3}$

59. $z^{1/4}$

49. $\left(\frac{4}{9}\right)^{1/2}$

63. $(3x)^{1/3}$

In exercises 65 - 71 odd, use a rational exponent to write the expression. Simplify if possible.

65. $\sqrt{y}$

67. $\sqrt{x} \cdot \sqrt{x}$

69. $\sqrt[3]{8x^2}$

In exercises 75 - 97 odd, use positive rational exponents to simplify the expression. Assume that all variables are positive.

75. $(x^2)^{3/2}$

77. $\sqrt[3]{x^3y^6}$

79. $\sqrt{y^3} \cdot \sqrt[3]{y^2}$

81. $\left(\frac{x^6}{27}\right)^{2/3}$

85. $\sqrt{\sqrt{y}}$

91. $\sqrt{b} \cdot \sqrt[4]{b}$

93. $p^{1/2}\left(p^{3/2} + p^{1/2}\right)$

95. $\sqrt[3]{x}\left(\sqrt{x} - \sqrt[3]{x^2}\right)$

Applications:

99. The function given by $A(x) = 7.3x^{7/16}$ computes the percentage of viewers who abandon an online video after x seconds for $0 \leq x \leq 120$.

    a. Make a table of values for $x = 0, 20, 40, 60$, and 80. Round values to the nearest percent.

    b. Interpret the table in terms of how people watch online videos.

106. One octave on a piano contains 12 keys (including both the black and white keys). The frequency of each successive key increases by a factor of $2^{1/12}$. For example, middle C is two keys below the first D above it. Therefore the frequency of this D is

$$2^{1/12} \cdot 2^{1/12} = 2^{1/6} \approx 1.12$$

    times the frequency of middle C.

    a. If two tones are one octave apart, how do their frequencies compare?

    b. The A tone below middle C on a piano has a frequency of 220 cycles per second. Middle C is 3 keys above this A note. Estimate the frequency of middle C.