Accelerated 65 - 95 HW 28 (R 5.6) Radical Equations Name: ________________________

Concepts and Vocabulary:

3. Can an equation involving rational exponents have more than one solution?

4. When you square each side of an equation to solve for an unknown, what must you do with any answers?

7. What formula can you use to find the distance between two points?

Simplifying Radicals:

In exercises 9 - 15 odd, simplify assuming radicands of square roots are positive.

9. $\sqrt{2} \cdot \sqrt{2}$

13. $(\sqrt{2x+1})^2$

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

15. $\left(\sqrt[3]{5x^2}\right)^3$

Symbolic Solutions:

In exercises 17 - 67 odd, solve the equation symbolically. Check problems 19, 23, 33, 43, 53, and 63.

19. $\sqrt[4]{x} = 3$ **Check:**

23. $\sqrt{x+1} - 3 = 4$ **Check:**

25. $2\sqrt{x-2}+1=5$

35. $\sqrt{5z-1}=\sqrt{z+1}$

29. $\sqrt[3]{x}=3$

39. $\sqrt{b^2-4}=b-2$

33. $\sqrt[4]{t+1}=2$ **Check:**

43. $\sqrt{x}=\sqrt{x-5}+1$ **Check:**

49. $2z^2 = 200$

55. $b^3 = 64$

51. $(t + 1)^2 = 16$

61. $(2 - 5z)^3 = -125$

53. $(4 - 2x)^2 = 100$ **Check:**

63. $x^4 = 16$ **Check:**

65. $x^5 = 12$

67. $2(x+2)^4 = 162$

Graphical Solutions:

In exercises 69 - 77 odd, solve the equations graphically using your calculators graphing capabilities. Define $y_1(x)$ and $y_2(x)$ for each and then state the solution(s) in set notation. Approximate solutions to the nearest hundredth when appropriate.

69. $\sqrt[3]{x+5} = 2$

$y_1(x) =$

$y_2(x) =$

The set of solutions is:

71. $\sqrt{2x-3} = \sqrt{x} - \frac{1}{2}$

$y_1(x) =$

$y_2(x) =$

The set of solutions is:

75. $z^{1/3} - 1 = 2 - z$

$y_1(x) =$

$y_2(x) =$

The set of solutions is:

77. $\sqrt{y+2} + \sqrt{3y+2} = 2$

$y_1(x) =$

$y_2(x) =$

The set of solutions is:

Applications:

129. When sky divers initially fall from an airplane, their velocity ν in miles per hour after free falling d feet can be approximated by $\nu = \frac{60}{11}\sqrt{d}$. (Because of air resistance, they will eventually reach a terminal velocity.) How far do sky divers need to fall to attain the following velocities?

a. 60 miles per hour

b. 100 miles per hour

133. If a wind powered generator has blades that create a circular path with a diameter of 10 feet, then the wattage W generated by a wind velocity of ν miles per hour is modeled by $W(\nu) = 3.8\nu^3$.

a. If the wind velocity doubles, what happens to the wattage generated?

c. If the wind generator is producing 30,400 watts, find the wind speed.

b. Solve $W = 3.8\nu^3$ for ν.

135. Suppose that the legs of a right triangle with angles of 45° and 45° both have length a, as depicted in the figure. Determine a function $H(a)$ which outputs the length of the hypotenuse in terms of a.