Accelerated 65-95 HW 14 (R 5.1) Radical Expressions 1 Name: _____

Concepts and Vocabulary:

1. What are the square roots of 9?

3. What is the cube root of 8?

5. If $b^n = a$ and $b > 0$, then $\sqrt[n]{a} =$ _____.

Radical Expressions:

In exercises 15 - 37 odd, evaluate the expression by hand. Use complex numbers when appropriate. Variables represent any real number.

15. $\sqrt{9}$

17. $\sqrt{0.36}$

19. $\sqrt{\frac{16}{25}}$

21. $\sqrt{x^2}$

23. $\sqrt[3]{27}$

25. $\sqrt[3]{-64}$

27. $\sqrt[3]{\frac{8}{27}}$

29. $-\sqrt[3]{x^9}$

31. $\sqrt[3]{(2x)^6}$

33. $\sqrt[4]{81}$

35. $\sqrt[5]{-243}$

37. $\sqrt[4]{-16}$

In exercises 39 - 43 odd, use your calculator to approximate to the nearest hundredth.

39. $-\sqrt{5}$

41. $\sqrt[3]{5}$

43. $\sqrt[5]{-7}$

In exercises 45 - 57 odd, simplify the expression assuming all variables are real numbers.

45. $\sqrt{(-4)^2}$

51. $\sqrt{x^2 - 2x + 1}$

57. $\sqrt[5]{x^5}$

47. $\sqrt{y^2}$

53. $\sqrt[4]{y^4}$

49. $\sqrt{(x-5)^2}$

55. $\sqrt[4]{x^{12}}$

Square and Cube Root Functions:

In exercise 59 - 71, evaluate the function at the given value(s) of the variable.

59. $f(x) = \sqrt{x-1}$ $x = 10, 0$

67. $f(x) = \sqrt[3]{x-9}$ $x = 1, 10$

63. $f(x) = \sqrt{x^2 - x}$ $x = -4, 3$

71. $T(h) = \frac{1}{2}\sqrt{h}$ $h = 64$

In exercises 75 - 87, find the domain of f. Write your answer in interval notation.

75. $f(x) = \sqrt{x+2}$

79. $f(x) = \sqrt{2x-4}$

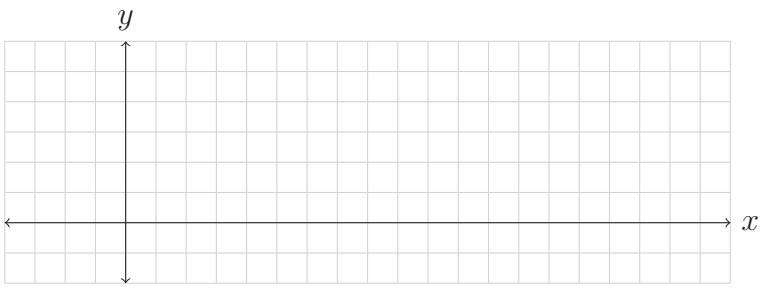
83. $f(x) = \sqrt{8-5x}$

87. $f(x) = \dfrac{1}{\sqrt{2x+1}}$

In exercises 89 - 93 odd, complete the table choosing values for x which allow you to take the square or cube root easily and then use the table to graph the function.

89. $f(x) = \sqrt{x+2}$

x	$f(x)$

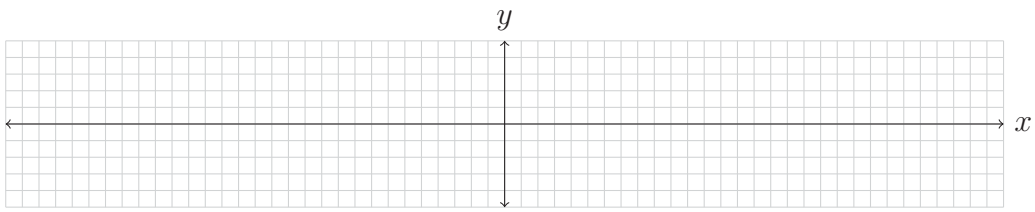


91. $f(x) = \sqrt{x} + 2$

x	$f(x)$

93. $f(x) = \sqrt[3]{x+2}$

x	$f(x)$



Representations of Root Functions:

In exercises 95 - 101, give symbolic, numerical, and graphical representations for the function f.

95. Function f takes the square root of x and then adds 1 to the result.

Symbolic:

Numerical:

x	$f(x)$

Graphical:

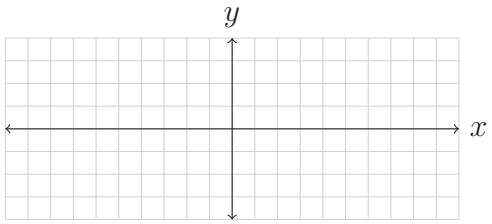
101. Function f takes the cube root of the quantity x minus 1.

Symbolic:

Numerical:

x	$f(x)$

Graphical:



Supplemental Problems:

S1. Let $Y(x) = \sqrt{x-5} + 3$.

a. Determine algebraically the domain of Y. State your conclusion using interval notation.

b. Graph $y = Y(x)$ on your calculator and use it to determine the range of Y. State your conclusion using interval notation.

S2. Let $Z(x) = \sqrt{7-2x} - 5$.

a. Determine algebraically the domain of Z. State your conclusion using interval notation.

b. Graph $y = Z(x)$ on your calculator and use it to determine the range of Z. State your conclusion using interval notation.

S3. Let $U(t) = 2 - \sqrt{3+2t}$.

a. Determine algebraically the domain of U. State your conclusion using interval notation.

b. Graph $y = U(t)$ on your calculator and use it to determine the range of U. State your conclusion using interval notation.

S4. Let $V(x) = \sqrt[3]{x+2}$.

a. Determine algebraically the domain of V. State your conclusion using interval notation.

b. Graph $y = V(x)$ on your calculator and use it to determine the range of V. State your conclusion using interval notation.

S5. Let $T(k) = 3 - \sqrt[4]{3k-7}$.

a. Determine algebraically the domain of T. State your conclusion using interval notation.

b. Graph $y = T(k)$ on your calculator and use it to determine the range of T. State your conclusion using interval notation.

Solutions to Supplemental Problems:

S1. a. The domain of Y is $[-5, \infty)$. b. The range of Y is $[3, \infty)$.

S2. a. The domain of Z is $\left(-\infty, \frac{7}{2}\right]$. b. The range of Z is $[-5, \infty)$.

S3. a. The domain of U is $\left[-\frac{3}{2}, \infty\right)$. b. The range of U is $(-\infty, 2]$.

S4. a. The domain of V is $(-\infty, \infty)$. b. The range of V is $(-\infty, \infty)$.

S5. a. The domain of T is $\left[\frac{7}{3}, \infty\right)$. b. The range of T is $(-\infty, 3]$.