Math 95 HW 8 Linear Equations and Inequalities Name: _____

Taken from § 3.5 in the text.

In exercises 9 - 13 odd, determine whether the given values of x are solutions to the absolute value equation or inequality.

9. $|2x - 5| = 1$ $x = -3$, $x = 3$

11. $|7 - 4x| \leq 5$ $x = 1$, $x = 0$

13. $|7x + 4| > -1$ $x = -\frac{4}{7}$, $x = 2$

For exercise 15, use the graph on page 209 to solve the equation.

15. $y_1(x) = 2$

In exercises 17 - 39 odd, solve the absolute value equation.

17. $|x| = 7$

19. $|x| = -6$

21. $|4x| = 9$

23. $|-2x|-6=2$

25. $|2x+1|=11$

27. $|-2x+3|+3=4$

29. $|\frac{1}{2}x-1|=5$

31. $|2x-6|=-7$

33. $|\frac{2}{3}z-1|-3=8$

35. $|z-1|=|2z|$

37. $|3t+1|=|2t-4|$

39. $|\frac{1}{4}x| = |3 + \frac{1}{4}x|$

In exercises 41 and 43, solve each equation or inequality.

41. a) $|2x| = 8$

b) $|2x| < 8$

c) $|2x| > 8$

43. a) $|5 - 4x| = 3$

b) $|5 - 4x| \leq 3$

c) $|5 - 4x| \geq 3$

In exercises 45 - 75 odd, solve the absolute value inequality. Write your answer in interval notation.

45. $|x| \leq 3$

47. $|k| > 4$

49. $|t| \leq -3$

51. $|z| > 0$

53. $|2x| > 7$

55. $|-4x + 4| < 16$

57. $2|x + 5| \geq 8$

59. $|8 - 6x| - 1 \leq 2$

61. $5 + \left|\frac{2-x}{3}\right| \leq 9$

63. $|2x - 1| \leq -3$

65. $|x + 1| - 1 > -3$

67. $|2z - 4| \leq -1$

69. $|3z - 1| > -3$

71. $\left|\frac{2-t}{3}\right| \geq 5$

73. $|t - 1| \leq 0.1$

75. $|b - 10| > 0.5$

In exercise 79, use the graph of $y_1(x)$ shown on page 210 to solve each equation or inequality. Write your answers in interval notation for parts (b) and (c). Write your answers in set notation for all parts.

79. a) $y_1(x) = 1$

b) $y_1(x) \leq 1$

c) $y_1(x) \geq 1$

In exercises 81 - 89 odd, solve the inequality graphically. Write your answer in interval and set notation. Make sure and define your functions. A calculator may be handy for these.

81. $|x| \geq 1$

83. $|x - 1| \leq 3$

85. $|4 - 2x| > 2$

87. $|10 - 3x| < 4$

89. $|8.1 - x| > -2$

111. Products are often manufactured to be a given size or shape to within a certain tolerance. For instance, if an aluminum can is supposed to have a diameter of 2.5 inches, either 2.501 inches or 2.499 inches might be acceptable. If the maximum error in the diameter of the can is restricted to 0.002 inch, an acceptable diameter d must satisfy the absolute value inequality

$$|d - 2.5| \leq 0.002.$$

Solve this inequality for d and interpret the result.