Math 95, HW 5 Section 3.1 Solving Linear Equations Numerically and Graphically

Name: _____

Concepts and Vocabulary:

8. Name three methods for solving a linear equation.

9. If a graphical solution to a linear equation results in the point of intersection (3,4), then the solution to the equation is _____.

In exercises 13 - 16, classify each statement as true or false.

13. The equation $2x - 1 = 2x$ is a contradiction.

14. The equation $3(x - 5) = 3x - 15$ is an identity.

15. The equation $x + 7 = 9$ is an identity.

16. The equation $4x - 6 = x$ is a contradiction.

In exercises 17 and 21, decide whether the given value for the variable is a solution to the equation.

17. $x - 6 = -2$ $x = 5$

21. $-(2z - 3) + 2z = 1 - z$ $z = -2$

Supplemental:

S1. What is the definition of a solution to an equation?

Symbolic Solutions:

In exercises 23 - 65 odd, solve the equation symbolically. Check your solutions to problems 37, 45, 57, .

27. $\frac{1}{2} - x = 2$

39. $3x - 1 = 11(1 - x)$

31. $-\frac{1}{3}x = 4$

41. $x + 4 = 2 - \frac{1}{3}x$

37. $2x = 8 - \frac{1}{2}x$

45. $\frac{2x+1}{3} = \frac{2x-1}{2}$

Check:

Check:

49. $\frac{1}{2}x - \frac{3}{2} = 4$

59. $\frac{3k}{4} - \frac{2k}{3} = \frac{1}{6}$

57. $\frac{2}{3}(t-3) + \frac{1}{2}t = 5$

61. $0.2(n-2) + 0.4n = 0.05$

Check:

Check:

Numerical Solutions:

In exercises 67 and 69, complete the table. Then use the table to solve the equation. State your solution using a complete sentence and set notation.

67. $-4x + 8 = 0$

x	1	2	3	4
$-4x + 8$	4			

69. $4 - 2x = x + 7$

x	-2	-1	0	1	2
$4 - 2x$	8				
$x + 7$	5				

In exercises 73 and 75, solve the linear equation numerically. Set up the table yourself and state a conclusion using a complete sentence and using set notation.

71. $x - 3 = 7$

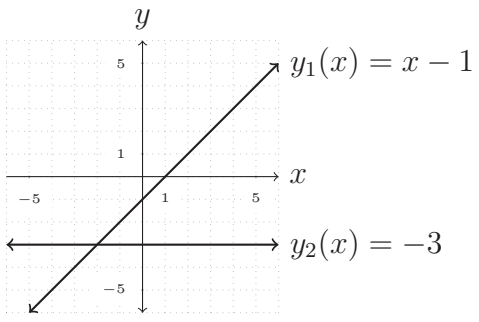
75. Use your calculators table features to solve numerically. Please show your table in the provided space.

$3(z - 1) + 1.5 = 2z$

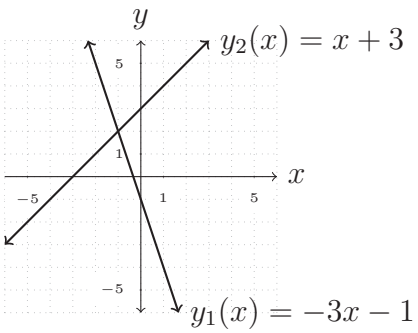
Graphical Solutions:

In exercises 77 and 79, a linear equation is solved graphically by letting y_1 equal the left side of the equation and y_2 equal the right side of the equation. State the linear equation the graphical solution is depicting and then state the solution to the equation using a complete sentence and set notation. Check your solution in the linear equation you determined.

77.

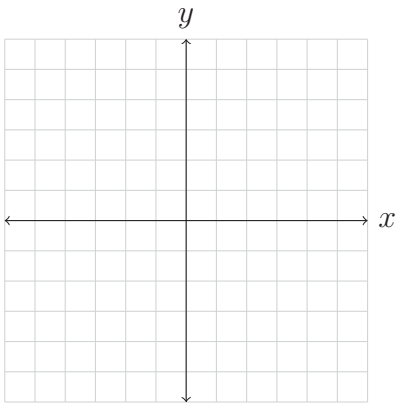


79.

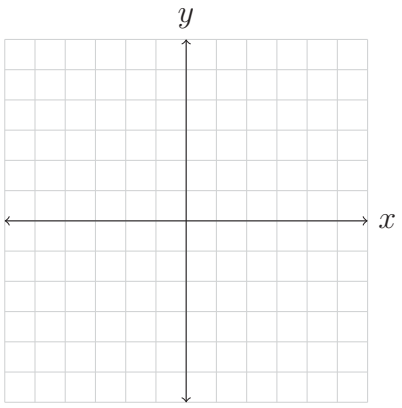


In exercises 81 - 89 odd, solve the equations graphically. State the functions $y_1(x)$ and $y_2(x)$ which you are graphing to determine the solution to the equation. For the calculator problems, 87 and 89, you do not need to draw the graph.

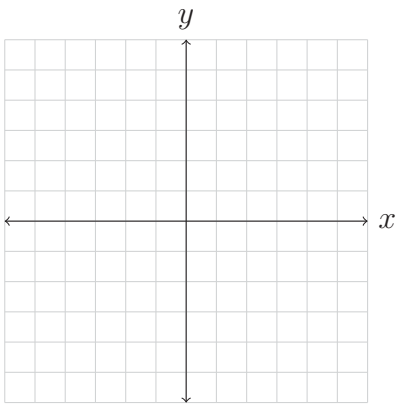
81. $5 - 2x = 7$



83. $2x - (x + 2) = -2$



85. $3(x + 2) + 1 = x + 1$



In problem 87, use your calculator to solve the equations graphically. You do not need to draw the graph.

87. $5(x - 1990) + 15 = 100$

Solving Linear Equations By More Than One Method:

In exercise 91, solve the equation numerically, graphically, and symbollically.

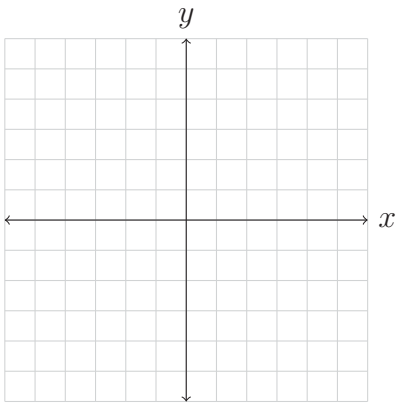
91. $2x - 1 = 13$

a. Numerically:

b. Symbolically:

$2x - 1 = 13$

c. Graphically:



Identities and Contradictions:

In exercises 95 - 101 odd, determine the set of solutions to the given equations. State your conclusion using a complete sentence and set notation.

95. $2x + 3 = 2x$

99. $2(x - 1) = 2x - 2$

97. $2x + 3x = 5x$

101. $5 - 7(4 - 3x) = x - 4(2 - 4x)$

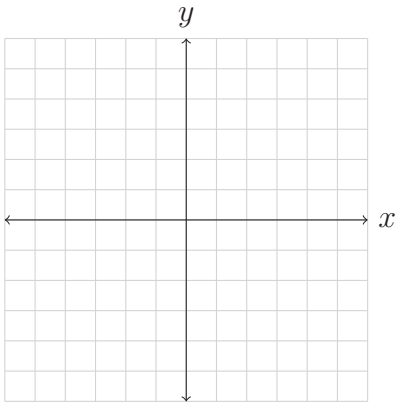
Applications:

119. From 1995 to 2009 the number of state and federal prison inmates in millions can be modeled by $f(x) = 0.0338x - 66.5$ during year x. Determine numerically, symbolically, and graphically when there were 1.3 million inmates.

a. Numerically:

b. Symbolically:

c. Graphically:



127. From 1985 to 1990, sales of CDs in the U.S. can be modeled by the equation $y_1 = 51.6(x - 1985) + 9.1$ and sales of LPs can be modeled by the equation $y_2 = -31.9(x - 1985) + 167.7$. All sales are in millions. Determine the year when sales of CDs and LPs were about equal.