Accelerated 65 - 95, HW 8 (R 2.4) Compound Inequalities

Name: _____

Concepts and Vocabulary:

In exercises 7 and 9, determine whether the given values of x are solutions to the compound inequality.

7. $x - 1 < 5$ and $2x > 3$

   a. $x = 2$

   b. $x = 6$

9. $3x < -5$ or $2x \geq 3$

   a. $x = 0$

   b. $x = 3$

Symbolic Solutions:

In exercises 43 - 79, solve the compound inequality symbolically. State a conclusion using interval **and** set notation.

43. $x + 2 > 5$ and $3 - x < 10$

48. $1 - 2x > 3$ or $2x - 4 \geq 4$

51. $3t - 1 > -1$ and $2t - \frac{1}{2} > 6$

55. $-x < 1$ or $5x + 1 < -10$

61. $-\frac{5}{8} \leq y - \frac{3}{8} < 1$

65. $\frac{1}{2} < -2y \leq 8$

69. $3 \leq 4 - n \leq 6$

73. $-2 \leq 5 - \frac{1}{3}m < 2$

77. $-3 < \frac{3z + 1}{4} < 1$

79. $-\frac{5}{2} \leq \frac{2 - m}{4} \leq \frac{1}{2}$

Numerical and Graphical Solutions:

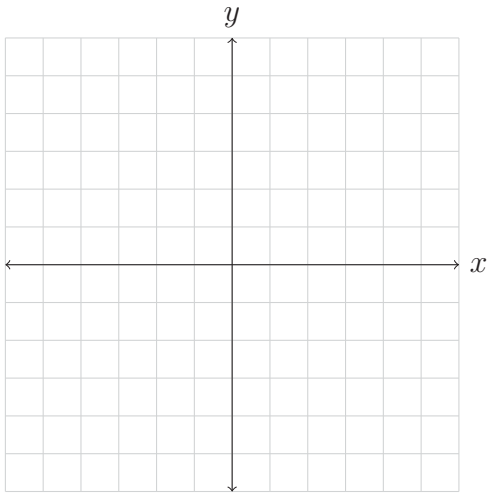
In exercises 81 and 83, solve the three-part inequality numerically. State your conclusion using interval and set notation.

81. $-3 \leq 3x \leq 6$

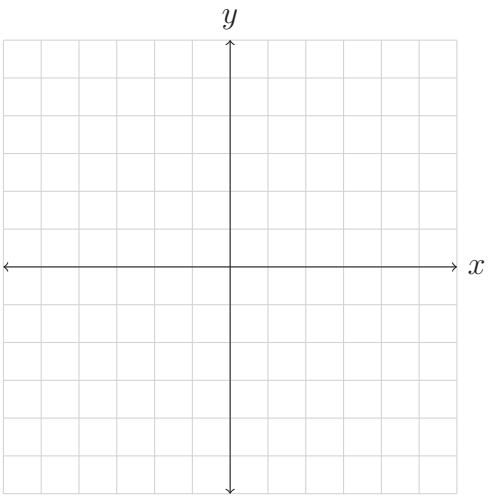
83. $-1 < 1 - x < 2$

In exercises 85 and 87, solve the inequality graphically. Set up a function to represent each side of the inequality and then properly label your graphs with the proper function. State your solutions using interval and set notation.

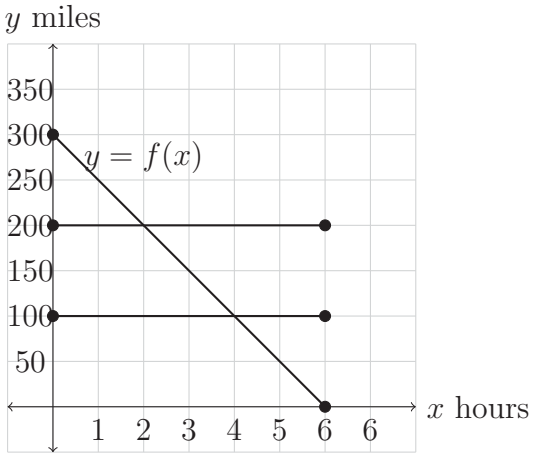
85. $-2 \leq x + 1 \leq 2$



87. $2x + 2 < -2$ or $2x + 2 > 2$



89. The function f shown in the figure below gives the distance y in miles between a car and Omaha, Nebraska, after x hours, where $0 \leq x \leq 6$.



a. Is the car moving toward or away from Omaha?

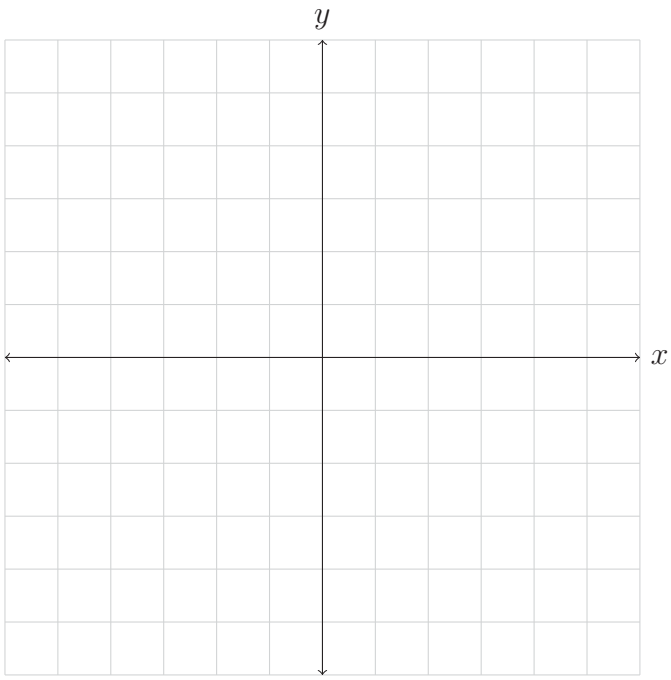
b. Determine the time when the car is 100 miles from Omaha and the time when the car is 200 miles from Omaha.

c. When is the car from 100 to 200 miles from Omaha?

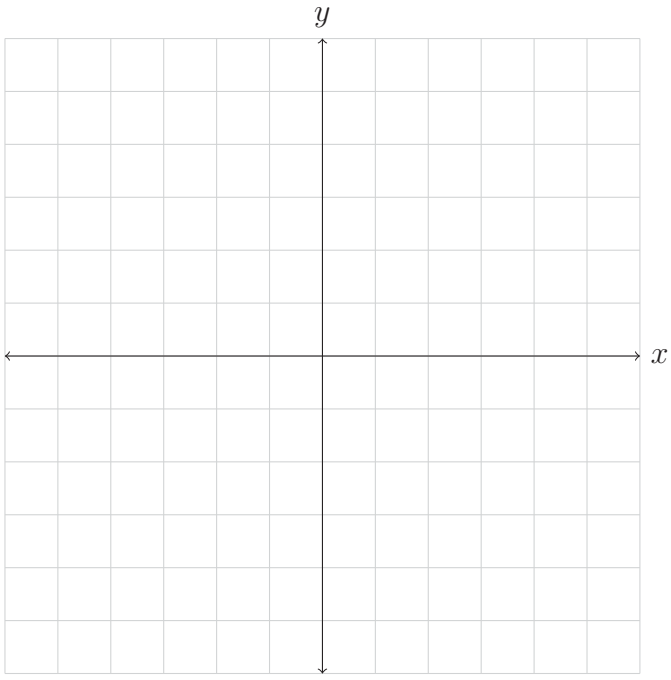
d. When is the car's distance from Omaha greater than or equal to 200 miles?

In exercises 93 and 95 odd, solve the inequality graphically. Set up a function to represent each side of the inequality and then properly label your graphs with the proper function. State your solutions using interval and set notation.

93. $-2 \leq 2x - 4 \leq 4$



95. $x + 1 < -1$ or $x + 1 > 1$



In exercises 105 and 109, set up a function to represent each side of the inequality and then solve the inequality numerically, symbolically, and graphically. State your solutions using interval and set notation.

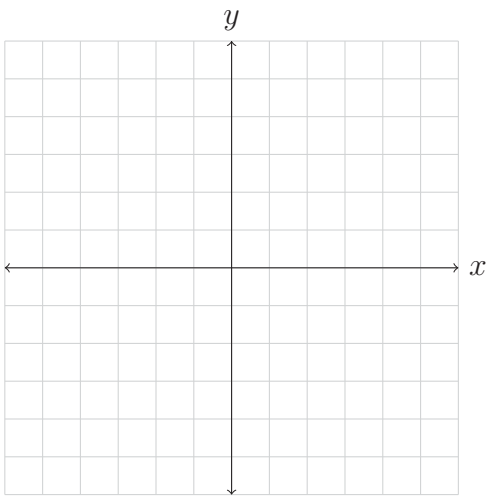
105. $4 \leq 5x - 1 \leq 14$

a. Numerically:

b. Symbolically:

$4 \leq 5x - 1 \leq 14$

c. Graphically:



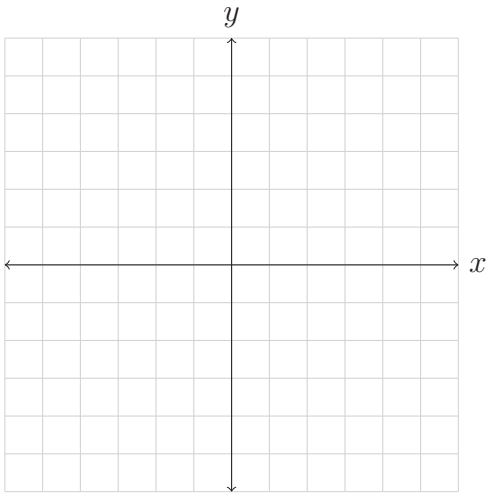
109. $2x + 1 < 3$ or $2x + 1 \geq$

a. Numerically:

b. Symbolically:

$2x + 1 < 3$ or $2x + 1 \geq$

c. Graphically:



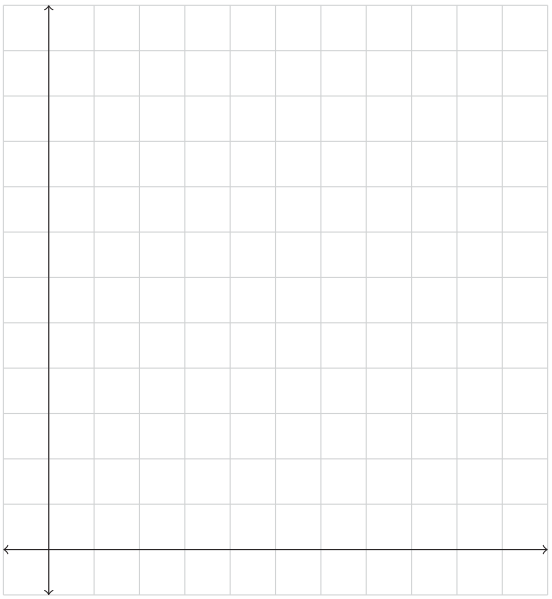
Applications:

114. From 1980 to 2000, college tuition and fees at private colleges could be modeled by the linear function $f(x) = 575(x - 1980) + 3600$. Use each method to estimate when the average tuition and fees ranged from \$8200 to \$10,500. For the graphical solution make sure to set up an appropriate scale and properly label your axes.

a. Numerically:

b. Symbolically:

c. Graphically:



Solutions to even numbered problems:

48. The solutions are in the interval $(-\infty, -1) \cup [4, \infty)$. The set of solutions is $\{x | x < -1 \text{ or } x \geq 4\}$.

114. The average tuition and fees at private colleges ranged from \$8200 to \$10,500 from about 1988 to 1992.