

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 $2x - 4 \geq 4$

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

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

$$55. -x < 1 \text{ or } 5x + 1 < -10$$

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

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

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

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

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

Numerical and Graphical Solutions:

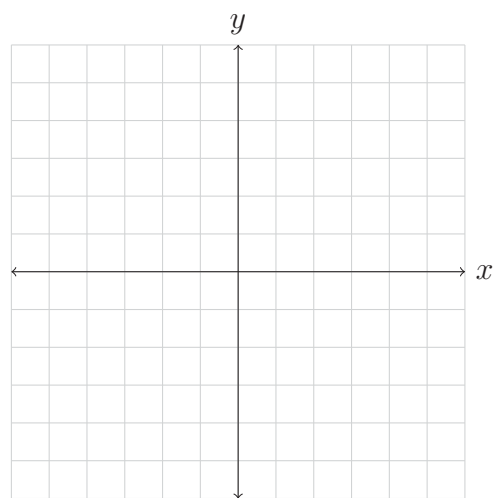
In exercises 81 and 83, solve the three-part inequality numerically. State your conclusion using interval and set notation.

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

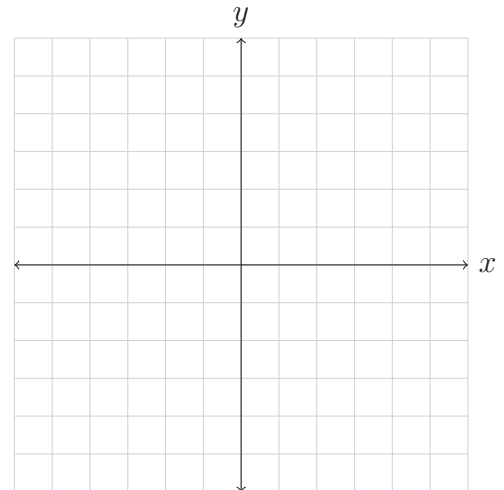
83. $-1 < 1 - x < 2$

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.

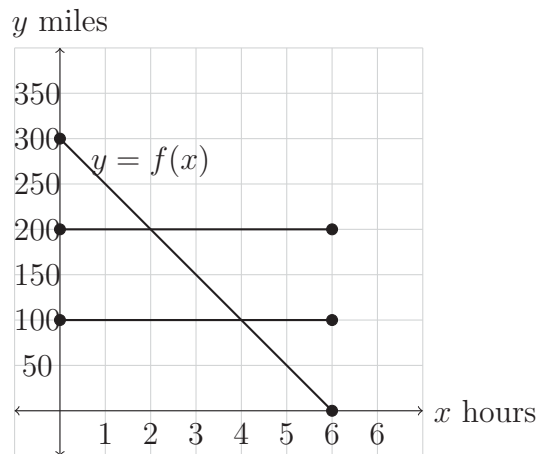
85. $-2 \leq x + 1 \leq 2$



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



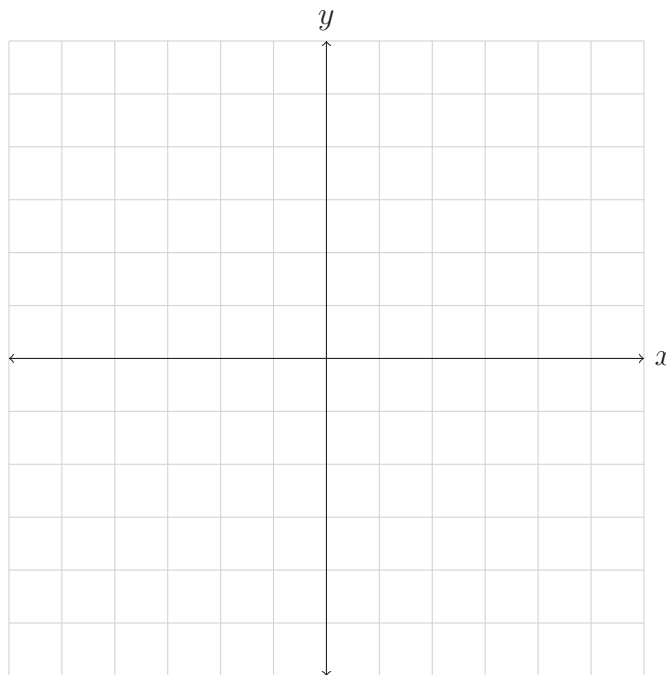
89. The function f shown in the figure below gives the distance y in miles between a car and Omaha, Nebraska, after x hours, where $0 \leq x \leq 6$.



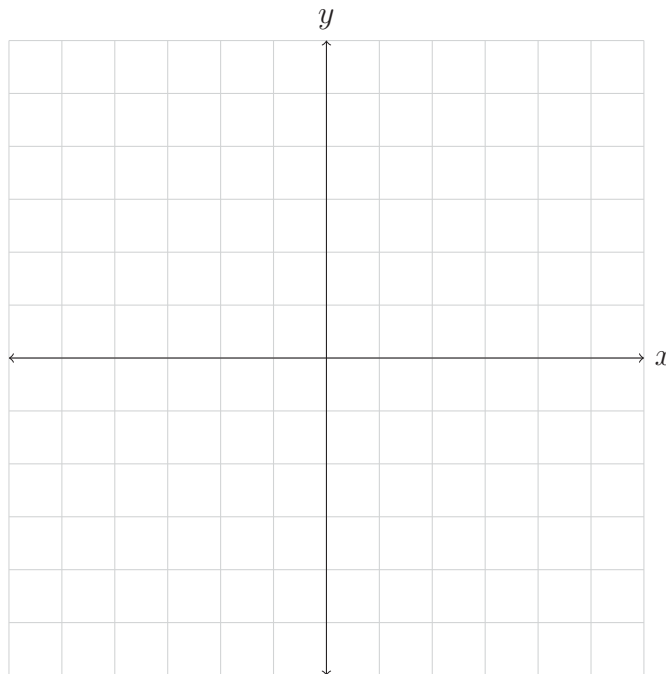
- a. Is the car moving toward or away from Omaha?
- b. Determine the time when the car is 100 miles from Omaha and the time when the car is 200 miles from Omaha.
- c. When is the car from 100 to 200 miles from Omaha?
- d. When is the car's distance from Omaha greater than or equal to 200 miles?

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.

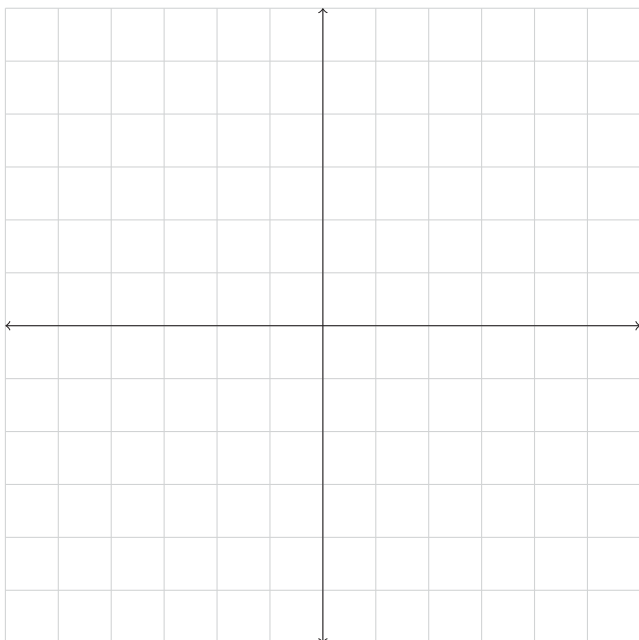
105. $4 \leq 5x - 1 \leq 14$

a. Numerically:

b. Symbolically:

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

c. Graphically:



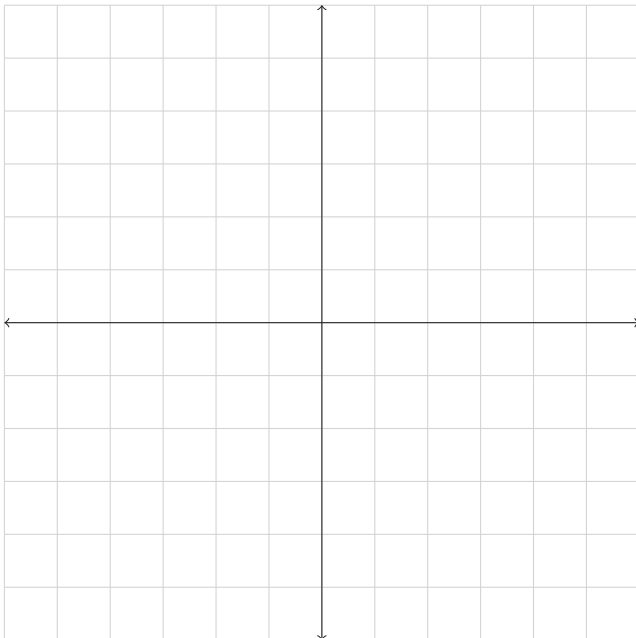
109. $2x + 1 < 3$ or $2x + 1 \geq 7$

a. Numerically:

b. Symbolically:

$$2x + 1 < 3 \text{ or } 2x + 1 \geq 7$$

c. Graphically:



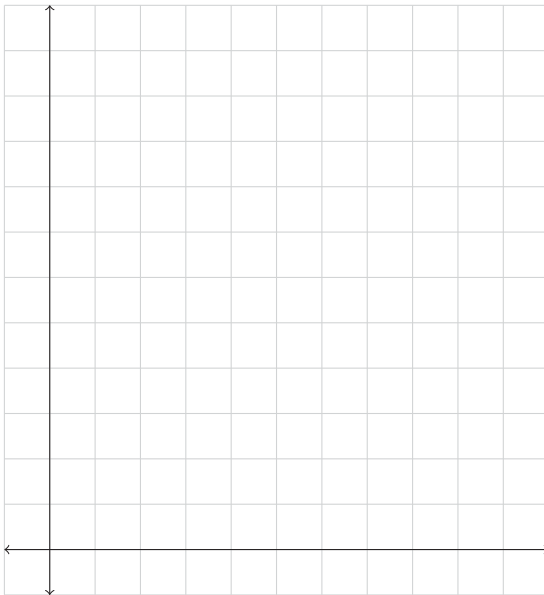
Applications:

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.