

Name _____ Date _____

Working the System

Systems of Linear Inequalities

Vocabulary

Define each term in your own words.

1. constraints

2. solution of a system of linear inequalities

Problem Set

Write a system of linear inequalities that represents each problem situation. Remember to define your variables.

1. Jamal runs the bouncy house at a festival. The bouncy house can hold a maximum of 1200 pounds at one time. He estimates that adults weigh approximately 200 pounds and children under 16 weigh approximately 100 pounds. For 1 four-minute session of bounce time, Jamal charges adults \$3 each and children \$2 each. Jamal hopes to charge at least \$24 for each session.

x = the number of adults

y = the number of children

$$\begin{cases} 3x + 2y \geq 24 \\ 200x + 100y \leq 1200 \end{cases}$$

2. Carlos works at a movie theater selling tickets. The theater has 300 seats and charges \$7.50 for adults and \$5.50 for children. The theater expects to make at least \$2000 for each showing.

3. The maximum capacity for an average passenger elevator is 15 people and 3000 pounds. It is estimated that adults weigh approximately 200 pounds and children under 16 weigh approximately 100 pounds.

4. Pablo's pickup truck can carry a maximum of 1000 pounds. He is loading his truck with 20-pound bags of cement and 80-pound bags of cement. He hopes to load at least 10 bags of cement into his truck.

5. Eiko is drawing caricatures at a fair for 8 hours. She can complete a small drawing in 15 minutes and charges \$10 for the drawing. She can complete a larger drawing in 45 minutes and charges \$25 for the drawing. Eiko hopes to make at least \$200 at the fair.

6. Sofia is making flower arrangements to sell in her shop. She can complete a small arrangement in 30 minutes that sells for \$20. She can complete a larger arrangement in 1 hour that sells for \$50. Sofia hopes to make at least \$350 during her 8-hour workday.



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Determine whether each given point is a solution to the system of linear inequalities.

7.
$$\begin{cases} 2x - y > 4 \\ -x + y \leq 7 \end{cases}$$

Point: $(-2, -10)$

$$2x - y > 4$$

$$2(-2) - (-10) > 4$$

$$-4 + 10 > 4$$

$$6 > 4 \quad \checkmark$$

$$-x + y \leq 7$$

$$-(-2) + (-10) \leq 7$$

$$2 - 10 \leq 7$$

$$-8 \leq 7 \quad \checkmark$$

Yes. The point $(-2, -10)$ is a solution to the system of inequalities.

8.
$$\begin{cases} x + 5y < -1 \\ 2y \geq -3x - 2 \end{cases}$$

Point: $(0, -1)$

9.
$$\begin{cases} 4x + y < 21 \\ \frac{1}{2}x \leq 36 - 5y \end{cases}$$

Point: $(3, 7)$

10.
$$\begin{cases} 5x + 3y > 6 \\ -2x + 2y < 20 \end{cases}$$

Point: (-2, 6)

11.
$$\begin{cases} 15x + 25y \geq 300 \\ 20x + 30y \leq 480 \end{cases}$$

Point: (14, 8)

12.
$$\begin{cases} -2.1x + 7y \geq -49.5 \\ -y \leq -6.3x + 78 \end{cases}$$

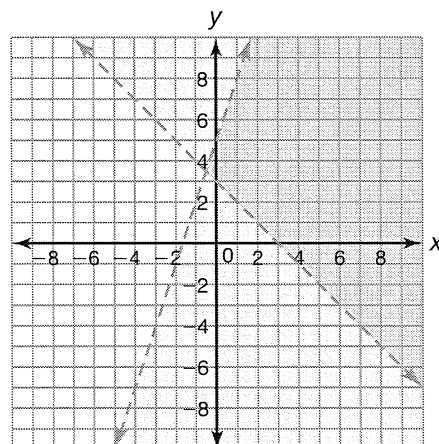
Point: (10, -8)

Graph each system of linear inequalities and identify two solutions.

13.
$$\begin{cases} y - 3x < 5 \\ y + x > 3 \end{cases}$$

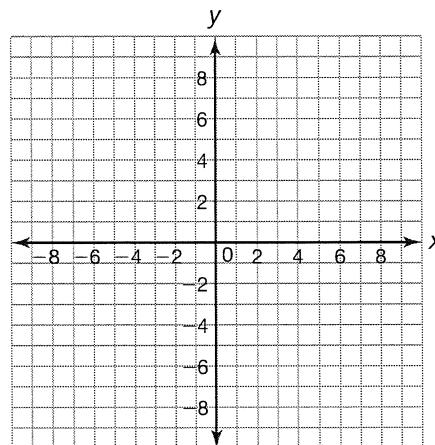
Answers will vary.

(2, 3) and (6, 0)

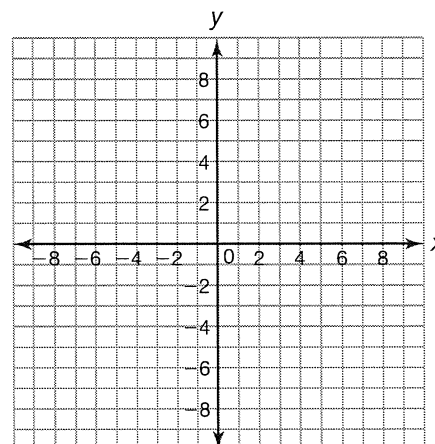


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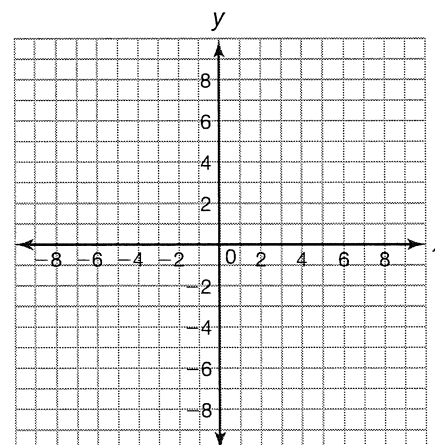
14.
$$\begin{cases} y > 2x + 3 \\ y < 2x - 5 \end{cases}$$



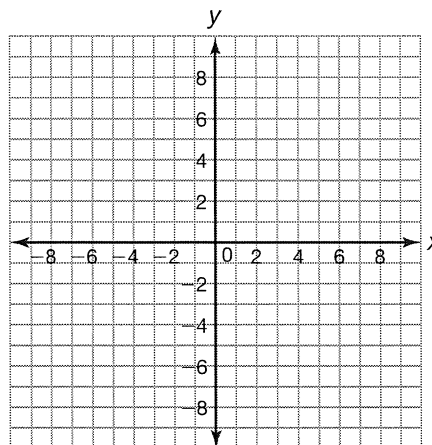
15.
$$\begin{cases} y \leq -\frac{2}{3}x + 3 \\ y \geq 3x - 4 \end{cases}$$



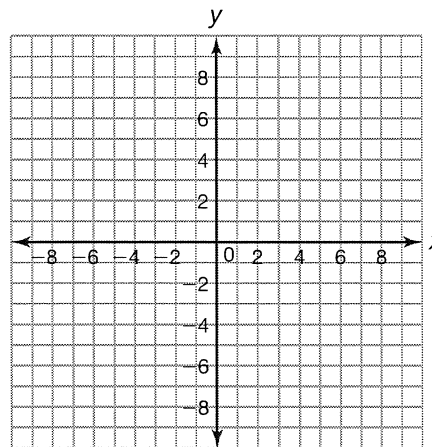
16.
$$\begin{cases} y < -\frac{1}{2}x + 6 \\ y < 2x + 1 \end{cases}$$



17.
$$\begin{cases} y \geq -\frac{1}{3}x + 4 \\ y \geq 2x + 5 \end{cases}$$



18.
$$\begin{cases} y > -4x + 8 \\ y < -4x - 2 \end{cases}$$



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Our Biggest Sale of the Season!

Systems with More Than Two Linear Inequalities

Problem Set

Write a system of linear inequalities that represents each problem situation. Remember to define your variables.

1. Ronna is shopping for a winter coat. The regular price of a winter coat is between \$65 and \$180. The store is running a special promotion where all coats are up to 35% off the regular price. Write a system of linear inequalities that represents the amount Ronna could spend.

Let r represent the regular price.

Let s represent the amount Ronna could spend.

$$\begin{cases} r \geq 65 \\ r \leq 180 \\ s \leq 0.65r \end{cases}$$

2. Stephen is shopping for a snowboard. The regular price of a snowboard is between \$120 and \$425. The store is running a special promotion where all snowboards are between 25% and 75% off the regular price. Write a system of linear inequalities that represents the amount Stephen could spend.

3. Ling is shopping for a gold necklace. The regular price of a necklace is between \$55 and \$325. The store is running a special promotion where all necklaces are between 20% and 40% off the regular price. Write a system of linear inequalities that represents the amount Ling could spend.