

Lesson 5.1 • Solving Systems of Equations

Name _____ Period _____ Date _____

1. Verify whether or not the given ordered pair is a solution to the system.

If it is not a solution, explain why not.

a. $(4, 3)$

$$\begin{cases} y = 0.5x + 1 \\ y = 0.6x + 0.6 \end{cases}$$

b. $(-4, 0)$

$$\begin{cases} y = 0.5x + 2 \\ y = -\frac{4}{3}x + 2 \end{cases}$$

c. $(5, -3)$

$$\begin{cases} y = -0.75x + 0.75 \\ y = -\frac{2}{3}x + \frac{1}{3} \end{cases}$$

d. $(3, -2)$

$$\begin{cases} y = -5x + 13 \\ y = \frac{7}{3}x - 9 \end{cases}$$

e. $(-3.5, -1.5)$

$$\begin{cases} y = 2.5x + 7.25 \\ y = -2.5x - 10.25 \end{cases}$$

f. $(\frac{1}{2}, -\frac{2}{3})$

$$\begin{cases} y = 4x - 2\frac{2}{3} \\ y = 6x - \frac{5}{3} \end{cases}$$

2. Graph each system using the window $[-9.4, 9.4, 1, -6.2, 6.2, 1]$. Use the trace function to find the point of intersection.

a. $\begin{cases} y = 3x - 3 \\ y = -3x + 9 \end{cases}$

b. $\begin{cases} y = -x + 4 \\ y = -\frac{2}{3}x + 3 \end{cases}$

c. $\begin{cases} y = -2x + 2 \\ y = -1.5x + 2.5 \end{cases}$

d. $\begin{cases} y = \frac{1}{2}x - 3.5 \\ y = 3x - 11 \end{cases}$

e. $\begin{cases} y = \frac{3}{4}x - 4 \\ y = x - 5 \end{cases}$

f. $\begin{cases} y = 2x - 5 \\ y = -3x + 15 \end{cases}$

g. $\begin{cases} y = 2.5x + 4 \\ y = 5x + 9 \end{cases}$

h. $\begin{cases} y = \frac{3}{2}x + 3 \\ y = -3x - 15 \end{cases}$

i. $\begin{cases} y = -6x + 5 \\ y = 4x - 5 \end{cases}$

3. Use the calculator table function to find the solution to each system of equations. (You'll need to solve some of the equations for y first.)

a. $\begin{cases} y = -4x + 5 \\ y = 3x - 9 \end{cases}$

b. $\begin{cases} y = x + 6 \\ y = -2x \end{cases}$

c. $\begin{cases} 3x - 2y = 4 \\ 2x + y = 5 \end{cases}$

d. $\begin{cases} y = \frac{2}{3}x - 6 \\ y = -3x + 16 \end{cases}$

e. $\begin{cases} y = 3x + 8 \\ 2x + 3y = 2 \end{cases}$

f. $\begin{cases} y = -3x - 6 \\ y = 4x + 8 \end{cases}$

Lesson 5.2 • Solving Systems of Equations Using Substitution

Name _____ Period _____ Date _____

1. Verify whether or not the given ordered pair is a solution to the system. If it is not a solution, explain why not.

a. $(4, 8)$

$$\begin{cases} y = 2x \\ y = -4x + 12 \end{cases}$$

b. $(2, -6)$

$$\begin{cases} 3.5x + 2.5y = -8 \\ 1.5x - 3.5y = 22 \end{cases}$$

c. $(2, -1)$

$$\begin{cases} y = -0.75x + 0.5 \\ y = -1.5x + 5 \end{cases}$$

d. $(-3, -2)$

$$\begin{cases} 2x - 5y = 4 \\ x - 3y = 3 \end{cases}$$

2. Solve each equation by symbolic manipulation.

a. $7 - 5x = 28 + 2x$

b. $3x - 9 = x - 1$

c. $5 - 2y = -3y - 2$

3. Substitute $2 + 5x$ for y to rewrite each expression in terms of one variable. Combine like terms.

a. $3x - y$

b. $2y - 10x$

c. $-4x + 3y$

4. Solve each system of equations using the substitution method, and check your solutions.

a. $\begin{cases} y = -2x + 3 \\ y = 1.5x - 0.5 \end{cases}$

b. $\begin{cases} 3x - 11y = 2 \\ x - 5y = 2 \end{cases}$

c. $\begin{cases} y = 6x - 3 \\ y = -3x + 6 \end{cases}$

d. $\begin{cases} x + 2y = 7 \\ 2x - 3y = -21 \end{cases}$

e. $\begin{cases} y = 4x - 3 \\ y = -2x + 9 \end{cases}$

f. $\begin{cases} 4x - 3y = 1 \\ y + 2x = 3 \end{cases}$

g. $\begin{cases} x + y = 6 \\ x - y = 12 \end{cases}$

h. $\begin{cases} 3x - y = 1 \\ 2x - 5y = 18 \end{cases}$

i. $\begin{cases} y = 7x + 1 \\ 7x + 3y = 3 \end{cases}$

5. Frank's Specialty Coffees makes a house blend from two types of coffee beans, one selling for \$9.05 per pound, and the other selling for \$6.25 per pound. His house blend sells for \$7.37 per pound. If he is using 9 lb of the \$6.25/lb beans, how many pounds of the \$9.05/lb beans does he need to make his house blend?

Lesson 5.3 • Solving Systems of Equations Using Elimination

Name _____ Period _____ Date _____

1. Use the equation $6x - 4y = 8$ to find the missing coordinate of each point.

- a. $(6, y)$ b. $(-3, y)$ c. $(x, -2)$ d. $(x, -12.5)$

2. Use the equation $-2x + 3y = 0$ to find the missing coordinate of each point.

- a. $(5, y)$ b. $(-5, y)$ c. $(x, -3)$ d. $\left(x, 5\frac{1}{3}\right)$

3. Solve each system of equations by elimination. Show your work.

a.
$$\begin{cases} x + y = -2 \\ x - y = 0 \end{cases}$$

b.
$$\begin{cases} 5x - 4y = 14 \\ 3y + 3x = 3 \end{cases}$$

c.
$$\begin{cases} x - 2y = 4 \\ 2x - 3y = 5 \end{cases}$$

d.
$$\begin{cases} 2x - 5y = -1 \\ 4x - 5y = -7 \end{cases}$$

e.
$$\begin{cases} 2x - 6y = 16 \\ 3x + 18y = -30 \end{cases}$$

f.
$$\begin{cases} 2x = 10 - y \\ y - x = -2 \end{cases}$$

g.
$$\begin{cases} 3x - 3y = -18 \\ 2y - x = 10 \end{cases}$$

h.
$$\begin{cases} 3x - 4y = -2 \\ 3y - 2x = 1 \end{cases}$$

i.
$$\begin{cases} 2x + 6y = -1 \\ 4x - 3y = 3 \end{cases}$$

j.
$$\begin{cases} 3x - 2y = 2 \\ 7x + 2y = 18 \end{cases}$$

k.
$$\begin{cases} 2x - 7y = 3 \\ 5x - 4y = -6 \end{cases}$$

l.
$$\begin{cases} 5x + 3y = 4 \\ 4x = 3y + 14 \end{cases}$$

m.
$$\begin{cases} 3x + 3y = -6 \\ 2x - 4y = 14 \end{cases}$$

n.
$$\begin{cases} 2y - 3x = -6 \\ 2x - 2y = 4 \end{cases}$$

o.
$$\begin{cases} 3x - 5y = 11 \\ 5x - 3y = -3 \end{cases}$$

4. Given the system

$$\begin{cases} 4x - 6y - 10 = 0 \\ 15y = 10x - 25 \end{cases}$$

- a. Solve the system by elimination.
b. Explain your answer to 4a.

5. Given the system

$$\begin{cases} 3x + 2y = 9 \\ -9x - 6y = 12 \end{cases}$$

- a. Solve the system by elimination.
b. Explain your answer to 5a.

Lesson 5.4 • Solving Systems of Equations Using Matrices

Name _____ Period _____ Date _____

1. Write a system of equations whose matrix is

a. $\begin{bmatrix} 2.5 & -7 & 3 \\ 4 & -3.25 & 17 \end{bmatrix}$

b. $\begin{bmatrix} 4 & 2 & 0 \\ -3 & 5 & 11 \end{bmatrix}$

c. $\begin{bmatrix} \frac{3}{5} & -2 & \frac{7}{5} \\ \frac{1}{5} & \frac{4}{5} & -3 \end{bmatrix}$

2. Write the matrix for each system.

a. $\begin{cases} x - 2y = 11 \\ 3x - y = 7 \end{cases}$

b. $\begin{cases} 0.9x + 1.2y = 2.4 \\ -1.5x + 2.4y = 1.8 \end{cases}$

c. $\begin{cases} -x + y = 4 \\ x + y = 1 \end{cases}$

3. Write each solution matrix as an ordered pair.

a. $\begin{bmatrix} 1 & 0 & -1 \\ 0 & 1 & 1 \end{bmatrix}$

b. $\begin{bmatrix} 1 & 0 & 13.5 \\ 0 & 1 & 9.25 \end{bmatrix}$

c. $\begin{bmatrix} 1 & 0 & -\frac{12}{19} \\ 0 & 1 & -\frac{21}{38} \end{bmatrix}$

4. Use row operations to transform the matrix $\begin{bmatrix} 1 & 3 & -2 \\ -1 & 7 & 6 \end{bmatrix}$ into the form $\begin{bmatrix} 1 & 0 & a \\ 0 & 1 & b \end{bmatrix}$. Write the solution as an ordered pair.

5. Consider the system

$$\begin{cases} y = -5 + 3(x + 1) \\ y = 6 - 5x \end{cases}$$

- Convert each equation to the standard form $ax + by = c$.
- Write a matrix for the system.
- Find the solution matrix using matrix row operations. Show the steps.
- Write the solution as an ordered pair.

Lesson 5.5 • Inequalities in One Variable

Name _____ Period _____ Date _____

1. Tell what operation on the first inequality gives the second inequality, and give the answer using the correct inequality symbol.

a. $4 < 8$

$$4 + 3 \square 8 + 3$$

c. $5 > -9$

$$5(-2) \square (-9)(-2)$$

e. $m \leq 6$

$$-2m \square 6(-2)$$

b. $-3 < -2$

$$-3 - 5 \square -2 - 5$$

d. $-4 > -7$

$$5(-4) \square 5(-7)$$

f. $w > -1$

$$w - 8 \square -1 - 8$$

2. Find three values of the variable that satisfy each inequality.

a. $x - 2 > -5$

b. $x + 4 \leq 11$

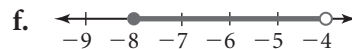
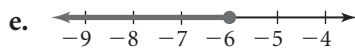
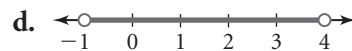
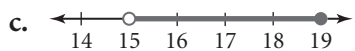
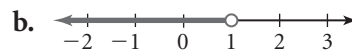
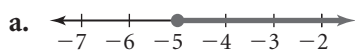
c. $x + 5 \geq -2.7$

d. $7 - x < 6$

e. $9 - x \geq 6.2$

f. $-x - 3 > 2$

3. Give the inequality graphed on each number line.



4. Translate each phrase into symbols.

a. x is no more than 11

b. y is at least -3

c. t is at most 27

d. m is not less than 6

5. Solve each inequality and graph the solution on a number line.

a. $10x + 3.3 \leq -1$

b. $17.2 - 2.6x > 3$

c. $6 + 3(x - 5) > 18$

d. $8(5 - x) + 12.5 < 16$

e. $6x - (4 - 3x) < 9x - 8$

f. $-3.4(x - 1) + 1.2 \geq 4.8x + 0.5$

Lesson 5.6 • Graphing Inequalities in Two Variables

Name _____ Period _____ Date _____

1. Match each inequality with its graph.

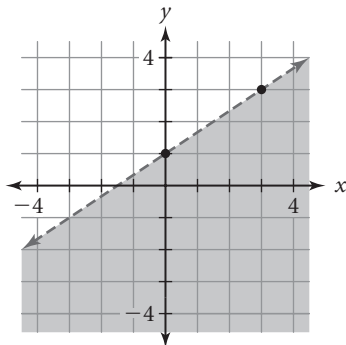
a. $y < \frac{2}{3}x + 1$

b. $y \geq -\frac{5}{2}x + \frac{1}{2}$

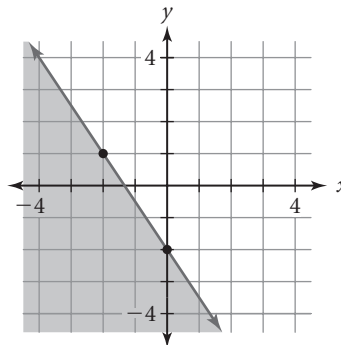
c. $y \leq -\frac{3}{2}x - 2$

d. $y < \frac{3}{4}x - \frac{9}{4}$

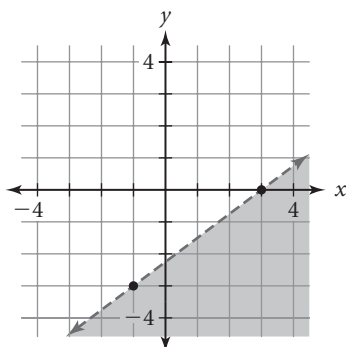
i.



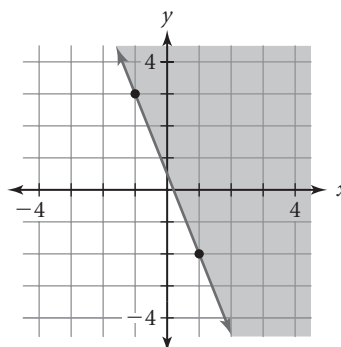
ii.



iii.



iv.



2. Solve each inequality for y .

a. $-2x + 3y > 9$

b. $1.5x - y \geq -4$

c. $-3x + 4y < 0$

3. Consider the inequality $y > 1.5x - 2$.

a. Graph the boundary line for the inequality on axes with scales from -6 to 6 .

b. Determine whether each given point satisfies the inequality. Plot each point on the graph you drew in 3a. Label the point T (true) if it is part of the solution region or F (false) if it is not part of the solution region.

i. $(0, 0)$

ii. $(2, 1)$

iii. $(-3, -1)$

iv. $(4, -4)$

v. $(1, 0.5)$

c. Use your results from 3b to shade the half-plane that represents the inequality.

4. Sketch each inequality.

a. $y \geq 3 - 2.5x$

b. $-4x - 3y > 12$

Lesson 5.7 • Systems of Inequalities

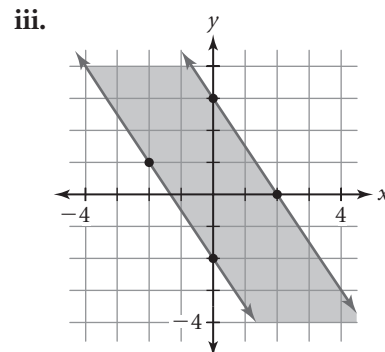
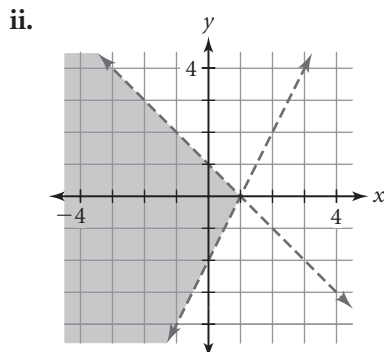
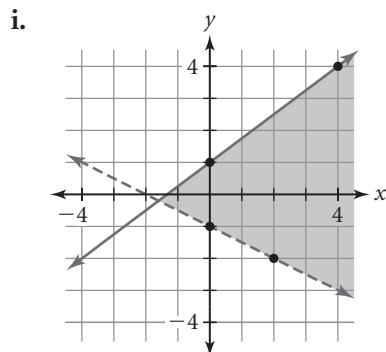
Name _____ Period _____ Date _____

1. Match each system of inequalities with its graph.

a.
$$\begin{cases} y \geq -1.5x - 2 \\ y \leq -1.5x + 3 \end{cases}$$

b.
$$\begin{cases} y > -0.5x - 1 \\ y \leq 0.75x + 1 \end{cases}$$

c.
$$\begin{cases} y < -x + 1 \\ y > 2x - 2 \end{cases}$$



2. Tell whether each point is a solution to the system
$$\begin{cases} y - 3x < 1 \\ 2y - x \geq 3 \end{cases}$$

a. (1, 0)

b. (-3, -3)

c. (4, 4)

d. (0, -0.5)

e. (2, 5)

f. (1, 1)

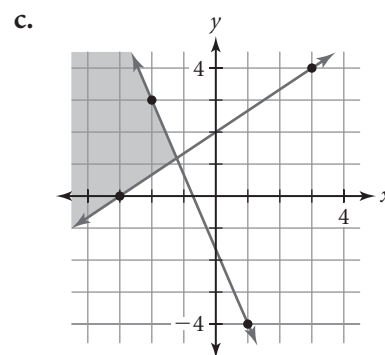
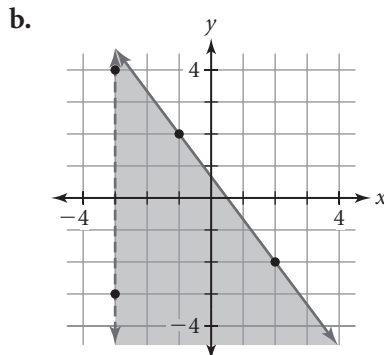
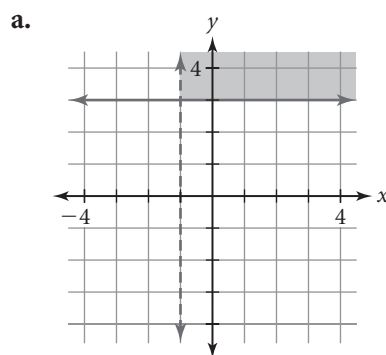
3. Sketch a graph showing the solution to each system.

a.
$$\begin{cases} y < \frac{2}{5}x - 1 \\ y < -\frac{4}{5}x \end{cases}$$

b.
$$\begin{cases} y \geq \frac{1}{2}x + 3 \\ y < 3x + 1 \end{cases}$$

c.
$$\begin{cases} x + y \leq 3 \\ 2x - 3y < 6 \end{cases}$$

4. Write a system of inequalities for the solution shown on each graph.



Lesson 5.7 • Mixture, Rate, and Work Problems

Name _____ Period _____ Date _____

For each problem below, define the variable(s), write an equation or system of equations, and solve.

1. Claudia and Helen meet in San Jose, California for a class reunion. At 10:00 P.M., they both leave the reunion and head home. Claudia drives south at 65 mi/h. Helen drives north; due to heavy traffic, she averages only 35 mi/h. After how many hours will the two friends be 325 mi apart?
2. Frank works at a bookstore. Some days he works in the store as a salesperson and is paid \$9.25/h. Other days he works in the warehouse doing inventory and is paid \$11.50/h. This week he worked a total of 36 hours and was paid \$378.00. How many hours did he work as a salesperson, and how many hours did he do inventory?
3. A steamboat cruise down the Mississippi River takes 1 hour and 30 minutes (1.5 h). The cruise back up the river takes 1 hour and 48 minutes (1.8 h) because the boat goes 6 mi/h slower against the current. The distance on either trip is the same. At what speed does the boat travel in each direction?
4. Ning mixes snack mix with mixed nuts to make trail mix for her hike. The snack mix is 10% peanuts. The mixed nuts are 35% peanuts. How many ounces of each should she combine to make 8 ounces of trail mix that is 20% peanuts?
5. Jennifer Aroulis receives an income tax refund of \$1,272.00. She decides to invest the money in the stock market. Idea Software stock costs \$2.32 per share. Good Foods stock costs \$1.36 per share. Jennifer buys twice as many shares of Idea Software as Good Foods and spends all of her refund. How many shares of each stock does she buy?
6. Mr. Moss can tile a kitchen floor in 8 h. Ms. Senglin can tile the same floor in 6 h. If they work together, how long will it take to tile the floor?
7. Chenani and Matthew work in a donut shop. When Chenani works alone overnight, she makes all of the donuts for the next day in 6 h. When Matthew works alone overnight, he makes all of the donuts in 5 h. On Friday night, Chenani starts making the donuts by herself. After 2 h, Matthew arrives and they begin making donuts together. From the time that Chenani started, how long will it take to finish all of the donuts for the next day?