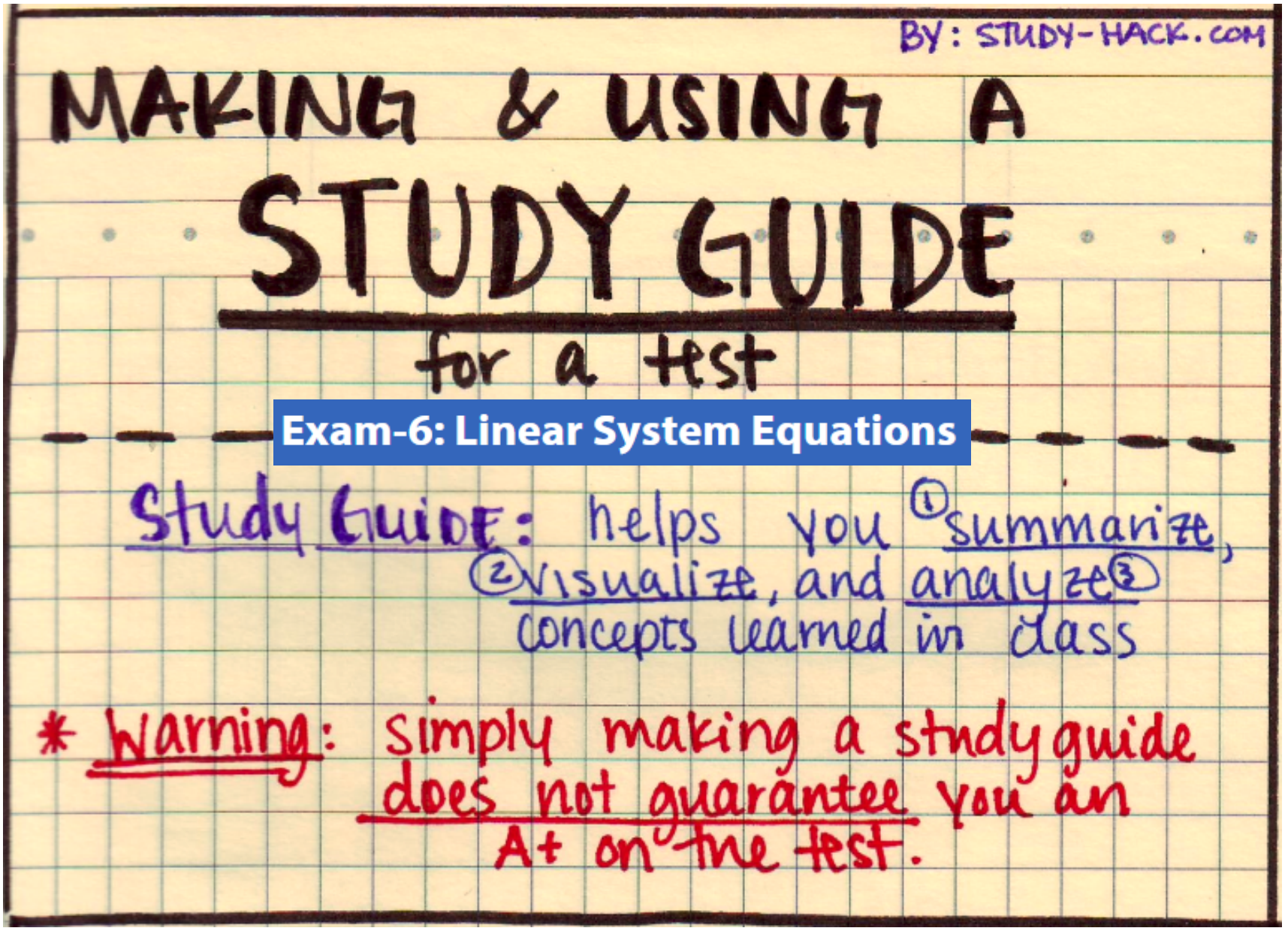

BY: STUDY-HACK.COM
MAKING & USING A
STUDY GUIDE
for a test
Exam-6: Linear System Equations
Study Guide: helps you ① summarize, ② visualize, and analyze ③ concepts learned in class
* Warning: simply making a study guide does not guarantee you an A+ on the test.

1

One equation of a system of two equations is $y = \frac{2}{5}x - 3$. If the second equation is one of the following, is the given number of solutions correct? Select Yes or No for each pair.

A. $y = \frac{2}{5}x + 1$; no solutions — A Yes B No

$-y = -\frac{2}{5}x + 3$

$0 = 0 + 4$

$0 \neq 4$ False, so no solutions.

B. $y = -2x - 3$; 1 solution — A Yes B No

$-y = -\frac{2}{5}x + 3$

$0 = -\frac{12}{5}x + 0$

$0 = x$

$\frac{5}{5} \cdot \frac{-2}{1} - \frac{2}{5}x \Rightarrow -\frac{10}{5} - \frac{2}{5}x = -\frac{12}{5}x$

$y = -2x - 3, \quad y = -3$

So, $(0, -3)$

(0, -3)

C. $y = \frac{2}{5}x - 3$; infinite solutions — A Yes B No

$-y = -\frac{2}{5}x + 3$

$0 = 0$ True, so many solutions.

Typo on my.hrw.com "say no"

2

Solve the system of equations $\begin{cases} 2x + 3y = 18 \\ x + y = 6 \end{cases}$

$-2(x + y = 6)(-2)$

$2x + 3y = 18$

$+ \quad -2x - 2y = -12$

$y = 6$

Find x when $y = 6$

$x + y = 6$

$x + 6 = 6$

$-6 \quad -6$

$x = 0$

Solution

$(0, 6)$

Determine if the given statement below is True or False.

A. $x = 0$. A True B False

B. $y = 6$. A True B False

C. The only solution is (0, 6). A True B False

3

Asif spent $745.10 on 13 new file cabinets for his office. Small file cabinets cost $43.50 and large file cabinets cost $65.95. Write and solve a system of equations to find the number of small cabinets and large cabinets he purchased. Determine if each statement is True or False.

x = Small y = large

$-43.50(x + y) = 13(43.50)$

$\$43.50x + \$65.95y = \$745.10$ $\Rightarrow$ $-43.50x - 43.50y = 565.50$

$+\ 43.50x + 65.95y = 745.10$

$22.45y = 179.60$

$\frac{22.45y}{22.45} = \frac{179.60}{22.45}$

$y = 8$

Find x, if $y = 8$.

$x + 8 = 13$

$-8 \quad -8$

$x = 5$

Solution: $(5, 8)$

A. He purchased 5 small cabinets. — A: True B: False

B. He purchased 7 large cabinets. — A: True B: False

C. He spent $527.60 on large cabinets. — A: True B: False

$8(65.95) = 527.60$

4 **Solve the system of equations using the given method.**

$$\begin{cases} 7x + 3y = -20 \\ -5x - 3y = 4 \end{cases} \text{; addition}$$

Solve the system of linear equations by adding.

$$\begin{array}{rl} 7x + 3y = & -20 \\ -5x - 3y = & 4 \\ \hline 2x = & -16 \end{array}$$

Solve for x.

$$\begin{aligned} 2x &= -16 \\ x &= -8 \end{aligned}$$

Solve the first equation for y when $x = -8$.

$$\begin{aligned} 7x + 3y &= -20 \\ 7(-8) + 3y &= -20 \\ -56 + 3y &= -20 \\ +3y &= 36 \\ y &= 12 \end{aligned}$$

So, $(-8, 12)$ is the solution to the system.

5

Solve the system of equations using the given method.

$$\begin{cases} 6x - 18y = 21 \\ 2x - 6y = 8 \end{cases}$$; multiplication

(select) ▼

- (select)
- Solution : (0, 1)
- Solution : (21, 8)
- No Solution
- Solution : (9, 6)

Multiply the first equation by -2 and multiply the second equation by 6 so the x-terms in the system have coefficients of -12 and 12 respectively.

$$\begin{matrix} -2(6x - 18y = 21) \\ 6(2x - 6y = 8) \end{matrix} \Rightarrow \begin{matrix} -12x + 36y = -42 \\ 12x - 36y = 48 \end{matrix}$$

Add the resulting equations.

$$\begin{array}{r} -12x + 36y = -42 \\ 12x - 36y = 48 \\ \hline 0 \neq 6 \end{array}$$

So, the system has no solution.

6 Solve the system of equations using the given method.

$$\begin{cases} 5x - 7y = -11 \\ 7x - y = 11 \end{cases}$$; ~~graphing~~ Addition

$5x - 7y = -11$

$-7(7x - y) = 11(-7)$ ⇒

$5x - 7y = -41$

$-49x + 7y = -77$

$-44x = 88$

$\frac{-44x}{-44} = \frac{88}{-44}$

$x = 2$

$(x, y) = (2, 3)$

Find y, if $x = 2$

$7(2) - y = 11$

$14 - y = 11$

$-14 \quad -14$

$-y = -3$

$\frac{-y}{-1} = \frac{-3}{-1}$

$y = 3$ So, the solution is (2, 3).

7 **Solve the system of equations using the given method.**

$$\begin{cases} -7x - 2y = 12 \\ 5x + 2y = -4 \end{cases}$$; addition

$(x, y) = (-4, 8)$

Solve the system of linear equations by adding.

$$\begin{array}{rcl} -7x - 2y & = & 12 \\ 5x + 2y & = & -4 \\ \hline -2x & = & 8 \end{array}$$

Solve for x.

$$\begin{aligned} -2x &= 8 \\ x &= -4 \end{aligned}$$

Solve the first equation for y when $x = -4$.

$$\begin{aligned} -7x - 2y &= 12 \\ -7(-4) - 2y &= 12 \\ 28 - 2y &= 12 \\ -2y &= -16 \\ y &= 8 \end{aligned}$$

So, $(-4, 8)$ is the solution to the system.

8

Consider the lines and solution set of the system of equations $\begin{cases} -8x - 6y = 8 \\ 4x + 3y = 2 \end{cases}$.

Rewrite in $y = mx + b$ form.

$-8x - 6y = 8$

$+8x \quad +8x$

$-6y = 8x + 8$

$\frac{-6y}{-6} = \frac{8x}{-6} + \frac{8}{-6}$

$y = -\frac{4}{3}x - \frac{4}{3}$

$4x + 3y = 2$

$-4x \quad -4x$

$3y = -4x + 2$

$\frac{3y}{3} = \frac{-4x}{3} + \frac{2}{3}$

$y = -\frac{4}{3}x + \frac{2}{3}$

Determine if each of the following statements is True or False.

A. The lines have the same y-intercept.

$-\frac{4}{3} \neq \frac{2}{3}$

A True B False

B. The lines have the same slope.

$-\frac{4}{3} = -\frac{4}{3}$

A True B False

C. The system has no solutions.

A True B False

9

Solve the system of equations by multiplying. Check the answer by graphing the system of equations.

$$\begin{cases} 3x + 2y = -4 \\ 5x - 3y = -13 \end{cases}$$

The solution is (-2,1)

Multiply the first equation by 3 and the second equation by 2 so the y-terms in the system have coefficients of 6 and −6 respectively.

$$3(3x + 2y = -4) \longrightarrow 9x + 6y = -12$$

$$2(5x - 3y = -13) \longrightarrow 10x - 6y = -26$$

Add the resulting equation.

$$\begin{aligned} 9x + 6y &= -12 \\ 10x - 6y &= -26 \\ \hline 19x + 0y &= -38 \end{aligned}$$

Solve for x.

$$\begin{aligned} 19x &= -38 \\ x &= -2 \end{aligned}$$

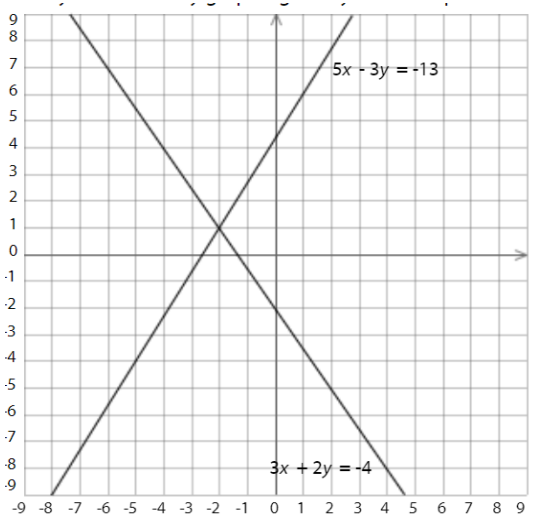
Solve the second equation for y when $x = -2$.

$$\begin{aligned} 5x - 3y &= -13 \\ 5(-2) - 3y &= -13 \\ -10 - 3y &= -13 \\ -3y &= -3 \end{aligned}$$

Solve for y.

$$y = 1$$

The solution to the system is (−2, 1).



Make T-table to graph.

10

Jacob's family bought 4 adult tickets and 3 student tickets to the school play for \$81. Tatianna's family bought 5 adult tickets and 5 students tickets for \$110. The system of equations $\begin{cases} 4a + 3s = 81 \\ 5a + 5s = 110 \end{cases}$ models this situation, where a is the cost of an adult ticket, and s is the cost of a student ticket. How much does each type of ticket cost?

Adult tickets cost \$ 15 each and student tickets cost \$ 7 each.

Multiply the first equation by 5 and the second equation by -3 to eliminate s from each equation

$$5(4a + 3s = 81) \rightarrow 20a + 15s = 405$$

$$\underline{-3(5a + 5s = 110)} \rightarrow \underline{-15a - 15s = -330}$$

Add the resulting equation.

$$\begin{aligned} 20a + 15s &= 405 \\ \underline{-15a - 15s} &= \underline{-330} \\ 5a + 0s &= 75 \end{aligned}$$

Solve for a.

$$\begin{aligned} 5a &= 75 \\ a &= 15 \end{aligned}$$

Solve the second equation for s when $a = 15$.

$$\begin{aligned} -15a - 15s &= -330 \\ -15(15) - 15s &= -330 \\ -225 - 15s &= -330 \\ -15s &= -105 \end{aligned}$$

Solve for s.

$$s = 7$$

Adult tickets cost \$15 each and student tickets cost \$7 each.

11

For the linear system, multiply the first equation by 2 and add the new equation to the second equation. Then, graph this new equation along with both of the original equations.

$$\begin{cases} 4x + 3y = 36 \\ -11x + 4y = -50 \end{cases}$$

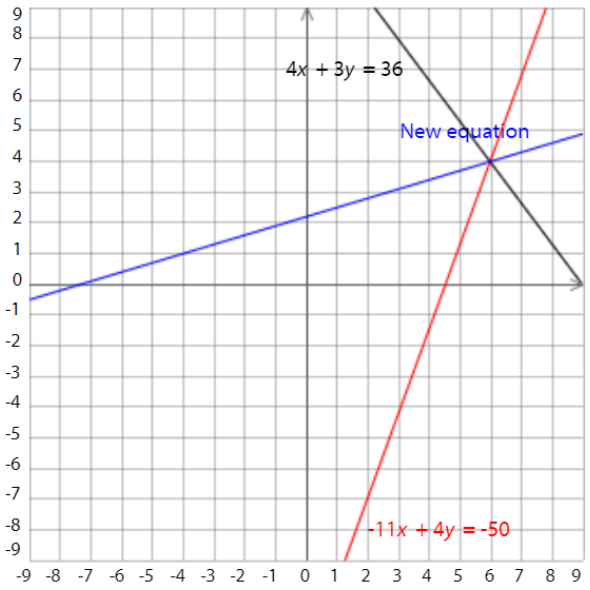
Multiply the first equation by 2.

$$2(4x + 3y = 36) \longrightarrow 8x + 6y = 72$$

Add the new equation to the second equation.

$$\begin{array}{rcl} 8x + 6y & = & 72 \\ \underline{-11x + 4y} & = & \underline{-50} \\ -3x + 10y & = & 22 \end{array}$$

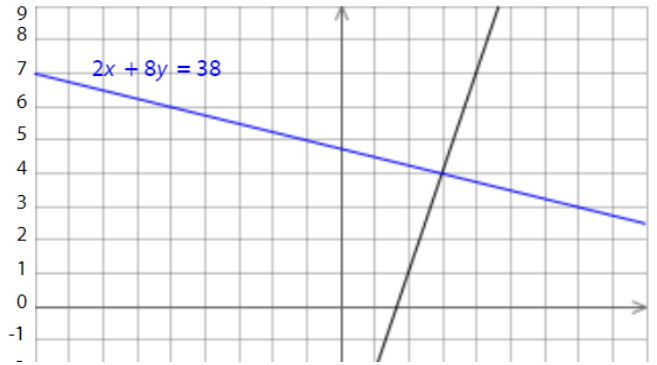
Graph this new equation along with both of the original equations.



12

Solve the system of linear equations by multiplying. Check the answer by graphing the system of equations.

$$\begin{cases} 9x - 3y = 15 \\ 2x + 8y = 38 \end{cases}$$



The solution is (3, 4) .

Multiply the first equation by 8 and the second equation by 3, so the y-terms in the system have coefficients of -24 and 24 respectively.

$$8(9x - 3y = 15) \rightarrow 72x - 24y = 120$$

$$\underline{3(2x + 8y = 38)} \rightarrow \underline{6x + 24y = 114}$$

Add the resulting equation.

$$\begin{aligned} 72x - 24y &= 120 \\ \underline{6x + 24y} &= \underline{114} \\ 78x + 0y &= 234 \end{aligned}$$

Solve for x.

$$\begin{aligned} 78x &= 234 \\ x &= 3 \end{aligned}$$

Solve the second equation for y when $x = 3$.

$$\begin{aligned} 2x + 8y &= 38 \\ 2(3) + 8y &= 38 \\ 6 + 8y &= 38 \\ 8y &= 32 \end{aligned}$$

Solve for y.

$$y = 4$$

The solution to the system is (3, 4).

13

Solve the system of linear equations by multiplying. Check the answer by graphing the system of equations.

$$\begin{cases} -2x + 2y = 2 \\ -4x + 9y = 34 \end{cases}$$

Multiply the first equation by -2, so the x-terms in the system have coefficients of 4 and -4 respectively.

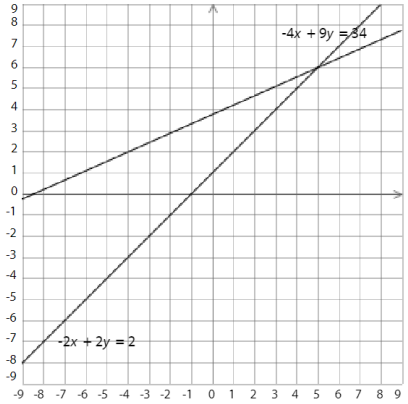
$$-2(-2x + 2y = 2) \longrightarrow 4x - 4y = -4$$

Add the resulting equation.

$$\begin{aligned} 4x - 4y &= -4 \\ -4x + 9y &= 34 \\ \hline 0x + 5y &= 30 \end{aligned}$$

Solve for y.

$$\begin{aligned} 5y &= 30 \\ y &= 6 \end{aligned}$$



Solve the second equation for x when $y = 6$.

$$\begin{aligned} -4x + 9y &= 34 \\ -4x + 9(6) &= 34 \\ -4x + 54 &= 34 \\ -4x &= -20 \end{aligned}$$

Solve for x.

$$x = 5$$

The solution to the system is (5, 6).

14 Solve the system of linear equations using multiplication.

$$\begin{cases} -4x + 3y = -5 \\ 5x - 2y = 43 \end{cases}$$

Multiply the first equation by 5 and the second equation by 4, so the x-terms in the system have coefficients of -20 and 20 respectively.

$5(-4x + 3y = -5) \longrightarrow -20x + 15y = -25$

$\underline{4(5x - 2y} = \underline{43)} \longrightarrow \underline{20x - 8y} = \underline{172}$

Add the resulting equation.

$$\begin{aligned} -20x + 15y &= -25 \\ \underline{20x - 8y} &= \underline{172} \\ 0x + 7y &= 147 \end{aligned}$$

Solve for y.

$$\begin{aligned} 7y &= 147 \\ y &= 21 \end{aligned}$$

Solve the second equation for x when $y = 21$.

$$\begin{aligned} 5x - 2y &= 43 \\ 5x - 2(21) &= 43 \\ 5x - 42 &= 43 \\ 5x &= 85 \end{aligned}$$

Solve for x.

$$x = 17$$

The solution to the system is (17, 21).

15 Solve the system of linear equations using multiplication.

$$\begin{cases} 2x + 2y = 6 \\ 4x + 11y = -2 \end{cases}$$

Multiply the first equation by -2, so the x-terms in the system have coefficients of -4 and 4 respectively.

$$-2(2x + 2y = 6) \rightarrow -4x - 4y = -12$$

Add the resulting equation.

$$\begin{aligned} -4x - 4y &= -12 \\ \underline{4x + 11y} &= \underline{-2} \\ 0x + 7y &= -14 \end{aligned}$$

Solve for y.

$$\begin{aligned} 7y &= -14 \\ y &= -2 \end{aligned}$$

Solve the second equation for x when $y = -2$.

$$\begin{aligned} 4x + 11y &= -2 \\ 4x + 11(-2) &= -2 \\ 4x - 22 &= -2 \\ 4x &= 20 \end{aligned}$$

Solve for x.

$$x = 5$$

The solution to the system is $(5, -2)$.

16

Solve the problem by multiplying first.

The sum of two angles is 180°. The difference between four times the larger angle and five times the smaller angle is 369°. The system of equations $\begin{cases} x + y = 180 \\ 4x - 5y = 369 \end{cases}$ models this situation, where x is the measure of the larger angle and y is the measure of the smaller angle. What is the measure of each angle?

The measure of the larger angle is 141 ° and the measure of the smaller angle is 39 °.

Multiply the first equation by 5 so that y can be eliminated from both equations.

$$5(x + y = 180) \longrightarrow 5x + 5y = 900$$

Add the resulting equation.

$$\begin{aligned} 5x + 5y &= 900 \\ 4x - 5y &= 369 \\ \hline 9x + 0y &= 1{,}269 \end{aligned}$$

Solve for x.

$$\begin{aligned} 9x &= 1{,}269 \\ x &= 141 \end{aligned}$$

Solve the second equation for y when $x = 141$.

$$\begin{aligned} 4x - 5y &= 369 \\ 4(141) - 5y &= 369 \\ 564 - 5y &= 369 \\ -5y &= -195 \end{aligned}$$

Solve for y.

$$y = 39$$

The measure of the larger angle is 141° and the measure of the smaller angle is 39°.

17

Solve the problem by multiplying first.

The perimeter of a rectangular swimming pool is 132 feet. The difference between the length and the width is 36 feet. The system of equations $\begin{cases} 2x + 2y = 132 \\ x - y = 36 \end{cases}$ models this situation, where x is the length of the pool and y is the width of the pool. Find the dimensions of the swimming pool.

The length of the pool is 51 feet and the width of the pool is 15 feet.

Multiply the second equation by 2 so that y can be eliminated from both equations.

$$2(x - y = 36) \longrightarrow 2x - 2y = 72$$

Add the resulting equation.

$$\begin{aligned} 2x + 2y &= 132 \\ \underline{2x - 2y} &= \underline{72} \\ 4x + 0y &= 204 \end{aligned}$$

Solve for x.

$$\begin{aligned} 4x &= 204 \\ x &= 51 \end{aligned}$$

Solve the second equation for y when $x = 51$.

$$\begin{aligned} x - y &= 36 \\ 51 - y &= 36 \end{aligned}$$

Solve for y.

$$y = 15$$

The length of the pool is 51 feet and the width of the pool is 15 feet.

18

Solve the problem by multiplying first.

A clothing store is having a sale on shirts and jeans. Four shirts and two pairs of jeans cost \$70. Five shirts and five pairs of jeans cost \$135. The system of equations $\begin{cases} 4s + 2j = 70 \\ 5s + 5j = 135 \end{cases}$ models this situation, where s is the cost of a shirt and j is the cost of a pair of jeans. How much does one shirt and one pair of jeans cost?

One shirt costs \$ 8 and one pair of jeans cost \$ 19 .

Multiply the first equation by 5 and the second equation by 2, so that j can be eliminated from both equations.

$5(4s + 2j = 70) \rightarrow 20s + 10j = 350$

$2(5s + 5j = 135) \rightarrow 10s + 10j = 270$

Subtract the resulting equations.

$$\begin{array}{rcl} 20s + 10j & = & 350 \\ -(10s + 10j) & = & -(270) \\ \hline 10s + 0j & = & 80 \end{array}$$

Solve for s.

$$\begin{array}{rcl} 10s & = & 80 \\ s & = & 8 \end{array}$$

Solve the second equation for j when $s = 8$.

$$\begin{array}{rcl} 5s + 5j & = & 135 \\ 5(8) + 5j & = & 135 \\ 40 + 5j & = & 135 \\ 5j & = & 95 \end{array}$$

Solve for j.

$$j = 19$$

One shirt costs \$8 and one pair of jeans cost \$19.

19

Solve the problem by multiplying first.

Jayce bought 6 bath towels and returned 2 hand towels. His sister Jayna bought 3 bath towels and returned 4 hand towels. Jayce paid a total of $152 and Jayna paid a total of $25. The system of equations

$$\begin{cases} 6b - 2h = 152 \\ 3b - 4h = 25 \end{cases}$$

models this situation, where b is the price of a bath towel and h is the price of a hand towel. How much does each kind of towel cost?

Bath towels cost $\$31$ each and hand towels cost $\$17$ each.

Multiply the first equation by 2 so that h can be eliminated from both equations.

$$2(6b - 2h = 152) \rightarrow 12b - 4h = 304$$

Subtract the second equation.

$$\begin{array}{rcl} 12b - 4h & = & 304 \\ \underline{-(3b - 4h)} & = & \underline{-(25)} \\ 9b + 0h & = & 279 \end{array}$$

Solve for b.

$$\begin{aligned} 9b &= 279 \\ b &= 31 \end{aligned}$$

Solve the first equation for h when $b = 31$.

$$\begin{aligned} 6b - 2h &= 152 \\ 6(31) - 2h &= 152 \\ 186 - 2h &= 152 \\ -2h &= -34 \end{aligned}$$

Solve for h.

$$h = 17$$

Bath towels cost $31 each and hand towels cost $17 each.

20

Suppose you want to use elimination to solve this system.

$$\begin{cases} 4x + 13y = -1 \\ 3x + 9y = 8 \end{cases}$$

By what numbers would you need to multiply the two equations in order to eliminate y? By what numbers would you need to multiply the two equations in order to eliminate x instead? Drag and drop the correct numbers and words into the boxes to complete the explanation.

You could multiply the first equation by [9] and the second equation by [-13], and then [add] the resulting equations to eliminate y. You might choose to eliminate x instead. To do this, you would multiply the first equation by [3] and the second equation by [4] and then [ ] the equations.

21

The school store is running a promotion on school supplies. Different supplies are placed on two shelves. You can purchase 3 items from shelf A and 2 from shelf B for \$26. Or you can purchase 5 items from shelf A and 3 from shelf B for \$42. This can be represented by the following system of equations.

$$\begin{cases} 3A + 2B = 26 \\ 5A + 3B = 42 \end{cases}$$

Solve the system of equations by multiplying first.

The price is \$ 6 on shelf A and \$ 4 on shelf B.

If the supplies on shelf A are normally \$9 each and the supplies on shelf B are normally \$5 each, how much will you save on each package plan?

You save \$ 11 when buying the first package and \$ 18 for buying the second package.

Multiply the first equation by -5 and the second equation by 3, so the A-terms in the system have coefficients of -15 and 15, respectively.

$$-5(3A + 2B = 26) \rightarrow -15A - 10B = -130$$

$$3(5A + 3B = 42) \rightarrow 15A + 9B = 126$$

Add the resulting equation.

$$\begin{aligned} -15A - 10B &= -130 \\ 15A + 9B &= 126 \\ 0A - 1B &= -4 \end{aligned}$$

Solve for B.

$$\begin{aligned} -1B &= -4 \\ B &= 4 \end{aligned}$$

Solve the first equation for A when $B = 4$.

$$\begin{aligned} 3A + 2B &= 26 \\ 3A + 2(4) &= 26 \\ 3A + 8 &= 26 \\ 3A &= 18 \end{aligned}$$

Solve for A.

$$A = 6$$

The price is \$6 on shelf A and \$4 on shelf B.

Find the normal price of the the supplies in the first and second packages.

$$\begin{aligned} \text{First package: } 3(9) + 2(5) &= 37 \\ \text{Second package: } 5(9) + 3(5) &= 60 \end{aligned}$$

Subtract to find how much you save.

$$\begin{aligned} \text{First package: } 37 - 26 &= 11 \\ \text{Second package: } 60 - 42 &= 18 \end{aligned}$$

So, you save \$11 when buying the first package and \$18 for buying the second package.

22 Solve the system of linear equations by adding or subtracting.

$$\begin{cases} 3x + 7y = -17 \\ 4x - 7y = 10 \end{cases}$$

Enter your answer as an ordered pair.

(-1 , -2)

Add the equations.

$$\begin{array}{rcl} 3x + 7y & = & -17 \\ 4x - 7y & = & 10 \\ \hline 7x + 0 & = & -7 \\ 7x & = & -7 \\ x & = & -1 \end{array}$$

Substitute the value of x into one of the equations and solve for y.

$$\begin{aligned} 3(-1) + 7y &= -17 \\ -3 + 7y &= -17 \\ 7y &= -14 \\ y &= -2 \end{aligned}$$

Enter the solution as an ordered pair.

$(-1, -2)$

23 Solve the system of linear equations by adding or subtracting.

$$\begin{cases} 3x + 4y = 7 \\ x + 4y = -3 \end{cases}$$

Enter the solution as an ordered pair.

The solution is $(5, -2)$.

Subtract the equations.

$$\begin{array}{r} 3x + 4y = 7 \\ -(x + 4y = -3) \\ \hline 2x + 0 = 10 \\ x = 5 \end{array}$$

Substitute the value of x into one of the equations and solve for y.

$$\begin{aligned} 5 + 4y &= -3 \\ 4y &= -8 \\ y &= -2 \end{aligned}$$

Enter the solution as an ordered pair.

$(5, -2)$

24

Solve each system of linear equations by adding or subtracting.

How many solutions does this system have?

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

The system has (select) ▼ solutions.

(select)
no
two
infinitely many

Add the equations.

$$\begin{array}{r} x - 2y = 2 \\ -x + 2y = -2 \\ \hline 0 + 0 = 0 \end{array}$$

The resulting equation is true, so the system has infinitely many solutions.

25

Solve each system of linear equations by adding or subtracting.

$$\begin{cases} 3x + 4y = 15 \\ 3x - y = 30 \end{cases}$$

Enter the solution as an ordered pair.

The solution is (9, -3) .

Subtract the equations.

$$\begin{array}{rl} 3x + 4y &= 15 \\ -(3x - y &= 30) \\ \hline 0 + 5y &= -15 \end{array}$$

$$y = -3$$

Substitute the value of x into one of the equations and solve for y.

$$3x - (-3) = 30$$

$$3x + 3 = 30$$

$$3x = 27$$

$$x = 9$$

Enter the solution as an ordered pair.

(9, −3)