

keep scrolling to get
a sneak peek!

Help your Algebra 1 students
practice **solving systems of
equations by substitution** given
points. Students will be eager to
get the self-checking benefits
from this circuit activity!

SYSTEMS OF EQUATIONS BY SUBSTITUTION

Differentiated Circuit Worksheet

Math with Ms. Rivera

2 versions + Answer key included

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SYSTEMS OF EQUATIONS BY SUBSTITUTION CIRCUIT

is a route that starts and ends at the same place. Start in the first box labeled 1 and solve the problem. Search through the remaining boxes for the answer you got for question 1. Now complete that question. Continue until you have completed the questions and you are back to the original question. Record your path below.

9 → 6 → 10 → 2 → 7 → 4 → 3 → 8 → 1

Previous Answer: $(0, -3)$

8

2. Solve the system of equations by substitution

$$\begin{aligned} y &= -x + 1 & -x + 1 &= -x + 4 \\ y &= -x + 4 & +x &= +x \\ & & \cancel{1} & \cancel{4} \end{aligned}$$

Solution: **NO SOLUTION**

Previous Answer: $(4, -2)$

4

4. Solve the system of equations by substitution

$$4x - 2(-2x + 3) = 2$$

SOLVING SYSTEMS OF EQUATIONS BY SUBSTITUTION

Directions: A circuit is a route that starts and ends at the same place. Start in the first box labeled 1 and solve the problem. Search through the remaining boxes for the answer you got for question 1. Now complete that question. Continue until you have completed the questions and you are back to the original question. Record your path below.

1 → _____ → _____ → _____ → _____ → _____ → _____ → _____

Previous Answer: $(0, -3)$

1. Solve the system of equations by substitution.

$$\begin{aligned} 3y - 2x &= 6 \\ 3x - y &= 5 \end{aligned}$$

Solution: _____

Previous Answer: $(1, 1)$

3. Solve the system of equations by substitution.

$$\begin{aligned} 2x &= y - 12 \\ x + y &= -3 \end{aligned}$$

Solution: _____

Previous Answer: **Infinite Solutions**

2. Solve the system of equations by substitution.

$$\begin{aligned} x - y &= 1 \\ x + y &= 5 \end{aligned}$$

Solution: _____

Previous Answer: $(4, -2)$

4. Solve the system of equations by substitution.

Why do you need this?

Solving Systems of Equations by Substitution Circuit



It's self-checking! Your students will know if they are correct or not.



2 differentiated versions for all students practice this essential math skill.

Name: _____ Date: _____

SOLVING SYSTEMS OF EQUATIONS BY SUBSTITUTION CIRCUIT

Directions: A circuit is a route that starts and ends at the same place. Start in the first box labeled 1 and solve the problem. Search through the remaining boxes for the answer you got for question 1. Now complete that question. Continue until you have completed the questions and you are back to the original question. Record your path below.

1 → _____ → _____ → _____ → _____

Previous Answer: (0, -3)	# _____	Previous
1. Solve the system of equations by substitution. $3y - 2x = 6$ $3x - y = 5$		2. Solve $x - y = 1$ $x + y = 5$
Solution: _____		Solution: _____
Previous Answer: (1, 1)	# _____	Previous
3. Solve the system of equations by substitution. $2x = y - 12$ $x + y = -3$		4. Solve the system of equations by substitution. $2y = -4x - 3$ $3x - 2y = 5$
Solution: _____		Solution: _____
Previous Answer: (3, 4)	# _____	Previous
5. Solve the system of equations by substitution. $x - y = -8$ $2x + 3y = 17$		6. Solve the system of equations by substitution. $x - 2y = 4$ $3x + y = 5$
Solution: _____		Solution: _____
Previous Answer: No Solution	# _____	Previous Answer: (-5, 2)
7. Solve the system of equations by substitution. $x = 3y + 10$ $2x - y = 10$		8. Solve the system of equations by substitution. $y = x - 3$ $y = -x - 3$
Solution: _____		Solution: _____
Previous Answer: (1, 5)	# _____	Previous Answer: (-2, -3)
9. Solve the system of equations by substitution. $x = 2y + 4$ $x = -2y - 4$		10. Solve the system of equations by substitution. $y = -2x + 4$ $2y = -4x + 8$
Solution: _____		Solution: _____

Helpful Hints: Use these hints to help you solve the problems.

Step 1: Look for a variable that is already isolated ($y = \dots$ or $x = \dots$).

Step 2: Substitute that expression into the other equation.

Step 3: Solve for one variable first, then plug it back into the original equation with BOTH equations to verify that it is the solution.

Systems of Equations by Substitution Circuit *includes:*

Challenge: Without solving, determine what type of solution the system below has. Justify your answer.

$$\begin{aligned}ax + by &= c \\ 2ax + 2by &= 2c\end{aligned}$$

Hint: Consider how the two equations are related. Would solving one help with the other?

How are you feeling about this topic? Circle one:

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Helpful Hints: Use these hints to help you solve the problems.

Step 1: Look for a variable that is already isolated ($y = \dots$ or $x = \dots$).

Step 2: Substitute that expression into the other equation.

Step 3: Solve for one variable first, then plug it back into the original to find the other variable.

Step 4: Check your point with BOTH equations to verify that it is the solution of the system.

How are you feeling about this topic? Circle one:

- ✓ 10 self-checking problems
- ✓ a detailed answer key
- ✓ a standard version with an extension question
- ✓ a basic version with helpful hints section
- ✓ student self assessment

Systems of Equations by Substitution Circuit

standards covered:

CCSS: 8.EE.C.8.ab

TEKs: A1.5.C

VA SOLs: EI.A.4.d

SOLVING SYSTEMS OF EQUATIONS BY SUBSTITUTION CIRCUIT

Previous Answer: No Solution # 2

7. Solve the system of equations by substitution.

$$\begin{array}{l} x = 3y + 10 \\ 2x - y = 10 \end{array}$$
$$\begin{array}{l} 2(3y + 10) - y = 10 \\ 6y + 20 - y = 10 \\ 5y + 20 = 10 \\ 5y - 20 = -10 \\ \frac{5y}{5} = \frac{-10}{5} \\ y = -2 \end{array}$$
$$\begin{array}{l} x = 3(-2) + 10 \\ x = -6 + 10 \\ x = 4 \end{array}$$

Solution: (4, -2)

Previous Answer: (-5, 2) # 3

8. Solve the system of equations by substitution.

$$\begin{array}{l} y = x - 3 \\ y = -x - 3 \end{array}$$
$$\begin{array}{l} x - 3 = -x - 3 \\ +x \quad +x \\ 2x - 3 = -3 \\ +3 \quad +3 \\ \frac{2x}{2} = \frac{0}{2} \quad x = 0 \end{array}$$
$$\begin{array}{l} y = 0 - 3 \\ y = -3 \end{array}$$

Solution: (0, -3)

Previous Answer: (1, 5) # 5

9. Solve the system of equations by substitution.

$$\begin{array}{l} x = 2y + 4 \\ x = -2y - 4 \end{array}$$
$$\begin{array}{l} 2y + 4 = -2y - 4 \\ +2y - 4 \quad +2y - 4 \\ 4y = -8 \\ \frac{4y}{4} = \frac{-8}{4} \\ y = -2 \end{array}$$
$$\begin{array}{l} x = 2(-2) + 4 \\ x = -4 + 4 \\ x = 0 \end{array}$$

Solution: (0, -2)

Previous Answer: (-2, -3) # 6

10. Solve the system of equations by substitution.

$$\begin{array}{l} y = -2x + 4 \\ 2y = -4x + 8 \end{array}$$
$$\begin{array}{l} 2(-2x + 4) = -4x + 8 \\ -4x + 8 = -4x + 8 \\ +4x \quad +4x \\ 8 = 8 \checkmark \end{array}$$

Solution: Infinite solutions

Helpful Hints: Use these hints to help you solve the problems.

Step 1: Look for a variable that is already isolated (y = ...)

Step 2: Substitute that expression into the other equation.

how this circuit resource works

Then search for their answer on the worksheet. Once the answer is found, students complete the problem below it.

Students can track their path at the top.

Name: _____ Date: _____

SOLVING SYSTEMS OF EQUATIONS BY SUBSTITUTION CIRCUIT

Directions: A circuit is a route that starts and ends at the same place. Start in the first box labeled 1 and solve the problem. Search through the remaining boxes for the answer you got for question 1. Now complete that question. Continue until you have completed the questions and you are back to the original question. Record your path below.

1 → _____ → _____ → _____ → _____ → _____ → _____ → _____ → _____ → 1

Previous Answer: (0, -3) # _____	Previous Answer: Infinite Solutions # _____
1. Solve the system of equations by substitution. $3y - 2x = 6$ $3x - y = 5$ Solution: _____	2. Solve the system of equations by substitution. $x - y = 1$ $x + y = 5$ Solution: _____
Previous Answer: (1, 1) # _____	Previous Answer: (4, -2) # _____
3. Solve the system of equations by substitution. $2x = y - 12$ $x + y = -3$ Solution: _____	4. Solve the system of equations by substitution. $2y = -4x + 6$ $3x - 2y = 1$ Solution: _____

Students start with the first question.

The last question they answer should lead back to problem #1 to “close” the circuit.

how to use this resource

SOLVING SYSTEMS OF EQUATIONS BY SUBSTITUTION CIRCUIT

<p>Previous Answer: No Solution # 2</p> <p>7. Solve the system of equations by substitution.</p> $\begin{array}{l} x = 3y + 10 \\ 2x - y = 10 \end{array}$ $\begin{array}{l} 2(3y + 10) - y = 10 \\ 6y + 20 - y = 10 \\ 5y + 20 = 10 \\ 5y - 20 = -10 \\ \frac{5y}{5} = \frac{-10}{5} \\ y = -2 \end{array}$ $\begin{array}{l} x = 3(-2) + 10 \\ x = -6 + 10 \\ x = 4 \end{array}$ <p>Solution: (4, -2)</p>	<p>Previous Answer: (-5, 2) # 3</p> <p>8. Solve the system of equations by substitution.</p> $\begin{array}{l} y = x - 3 \\ y = -x - 3 \end{array}$ $\begin{array}{l} x - 3 = -x - 3 \\ +x \quad +x \\ 2x - 3 = -3 \\ +3 \quad +3 \\ 2x = 0 \\ \frac{2x}{2} = \frac{0}{2} \\ x = 0 \end{array}$ $\begin{array}{l} y = 0 - 3 \\ y = -3 \end{array}$ <p>Solution: (0, -3)</p>
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Name: **Answer Key** Date: _____

SOLVING SYSTEMS OF EQUATIONS BY SUBSTITUTION CIRCUIT

Directions: A circuit is a route that starts and ends at the same place. Start in the first box labeled 1 and solve the problem. Search through the remaining boxes for the answer you got for question 1. Now complete that question. Continue until you have completed the questions and you are back to the original question. Record your path below.

1 → **5** → **9** → **6** → **10** → **2** → **7** → **4** → **3** → **8** → 1

<p>Previous Answer: (0, -3) # 8</p> <p>1. Solve the system of equations by substitution.</p> $\begin{array}{l} 3y - 2x = 6 \\ 3x - y = 5 \end{array}$ $\begin{array}{l} 3(3x - 5) - 2x = 6 \\ 9x - 15 - 2x = 6 \\ 7x - 15 = 6 \\ +15 \quad +15 \\ 7x = 21 \\ \frac{7x}{7} = \frac{21}{7} \\ x = 3 \end{array}$ $\begin{array}{l} 3(3) - y = 5 \\ 9 - y = 5 \\ -9 \quad -9 \\ -y = -4 \\ -y = -4 \\ y = 4 \end{array}$ <p>Solution: (3, 4)</p>	<p>Previous Answer: Infinite Solutions # 10</p> <p>2. Solve the system of equations by substitution.</p> $\begin{array}{l} x - y = 1 \\ x + y = 5 \end{array}$ $\begin{array}{l} x = y + 1 \\ y + 1 + y = 5 \\ 2y + 1 = 5 \\ -1 \quad -1 \\ 2y = 4 \\ \frac{2y}{2} = \frac{4}{2} \\ y = 2 \end{array}$ $\begin{array}{l} x = 2 + 1 \\ x = 3 \end{array}$ <p>Solution: (3, 2)</p>
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Helpful Hints: Use these hints

- Step 1: Look for a variable to solve for.
- Step 2: Substitute that expression into the other equation.
- Step 3: Solve for one variable.
- Step 4: Check your point with both equations.

<p>Previous Answer: (1, 1) # 4</p> <p>3. Solve the system of equations by substitution.</p> $\begin{array}{l} 2x = y - 12 \\ x + y = -3 \end{array}$ $\begin{array}{l} 2(-y - 3) = y - 12 \\ -2y - 6 = y - 12 \\ +2y \quad +2y \\ -4 = 3y - 12 \\ -4 + 12 = 3y - 12 + 12 \\ 8 = 3y \\ \frac{8}{3} = \frac{3y}{3} \\ y = \frac{8}{3} \end{array}$ $\begin{array}{l} x + \frac{8}{3} = -3 \\ x = -3 - \frac{8}{3} \\ x = -\frac{9}{3} - \frac{8}{3} \\ x = -\frac{17}{3} \end{array}$ <p>Solution: (-17/3, 8/3)</p>	<p>Previous Answer: (4, -2) # 7</p> <p>4. Solve the system of equations by substitution.</p> $\begin{array}{l} 2y = -4x + 6 \\ 3x - 2y = 1 \end{array}$ $\begin{array}{l} 2y = -4x + 6 \\ 3x - 2(-4x + 6) = 1 \\ 3x + 8x - 12 = 1 \\ 11x - 12 = 1 \\ +12 \quad +12 \\ 11x = 13 \\ \frac{11x}{11} = \frac{13}{11} \\ x = \frac{13}{11} \end{array}$ $\begin{array}{l} 2y = -4(\frac{13}{11}) + 6 \\ 2y = -\frac{52}{11} + \frac{66}{11} \\ 2y = \frac{14}{11} \\ \frac{2y}{2} = \frac{14}{11} \\ y = \frac{7}{11} \end{array}$ <p>Solution: (13/11, 7/11)</p>
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This is a great activity to use when reviewing how to solve systems of equations using the substitution method.

It can be used right after teaching the concept or as homework.

This is also a **substitute-friendly** assignment!

You may also enjoy ...

SYSTEMS OF EQUATIONS BY SUBSTITUTION Choice Board

Date: _____ Period: _____ Name: _____ **ANSWER KEY** Date: _____

Equations Choice Board
Solve each system using substitution. Show your work in the boxes.

$-12x - 3y = -57$ $y = -4x + 19$	$y = -9x + 10$ $2x - 11y = -9$
$x - 2y = 2$ $-11x - 11y = 11$	$x - 11y = -11x + 6y$
$x - 7y = 17$	$9x - 27x =$

Systems of Equations Choice Board
Directions: Choose _____ problems from each column. Solve. Show your work in the boxes.

$y = -5x + 7$ $-12x + 9y = 6$ $-12x + 9(-5x + 7) = 6$ $-12x - 45x + 63 = 6$ $-57x + 63 = 6$ $-57x = -57$ $x = 1$ $y = -5(1) + 7$ $y = -5 + 7$ $y = 2$ $(1, 2)$	$y = -4x + 19$ $-12x - 3y = -57$ $-12x - 3(-4x + 19) = -57$ $-12x + 12x - 57 = -57$ $-57 = -57$ Infinitely many solutions
$-16x - 2y = -1$ $8x + y = 0$ $y = -8x$ $-16x - 2(-8x) = -1$ $-16x + 16x = -1$ $0 = -1$ No solution	$x - 2y = 2$ $-11x - 11y = 11$ $x = 2y + 2$ $-11(2y + 2) - 11y = 11$ $-22y - 22 - 11y = 11$ $-33y - 22 = 11$ $-33y = 33$ $y = -1$ $x = 2(-1) + 2$ $x = -2 + 2$ $x = 0$ $(0, -1)$
$24x + 3y = -5$ $8x + y = -2$	$x - 2y = 2$ $6x - 2y = 16$ $2x - 5y = -16$

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SYSTEM OF EQUATIONS Color by Number worksheet

Date: _____

SYSTEMS OF EQUATIONS COLOR BY NUMBER
Directions: Solve each system. Circle the answer from the given choices. Your answers will tell you how to color the grid.

$3. 3x + 2y = 10$ $4x - 3y = 8$	$2. 3x + 2y = 8$ $6x + 9y = 4$
$(-1, 4)$ red	$(2, 4)$ yellow
$(4, 1)$ black	no solution light gray
$(-1, 4)$ pink	$(-1, 4)$ purple
$(0, -2)$ orange	$(2, 0)$ purple
$(-2, 8)$ black	$(-1, -7)$ dark blue

ANSWER KEY INCLUDED

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SYSTEMS OF EQUATIONS BY SUBSTITUTION

Directions: Solve each system of equations using substitution. Type your answer as an ordered pair with no spaces and the picture will

#	Question	Answer	#	Questions	Answer
1	$y = -2x + 13$ $y = 4x - 11$	<input type="text"/>	6	$y = 2x - 9$ $-x - 6y = -11$	<input type="text"/>
2	$y = -3x - 3$ $y = 7x + 17$	<input type="text"/>	7	$4x - 5y = 21$ $x - 3y = 21$	<input type="text"/>
3	$y = 5x - 22$ $7x - 7y = 14$	<input type="text"/>	8	$2x + y = 25$ $3x - 2y = 13$	<input type="text"/>
4	$-9x - 4y = 0$ $y = -5x + 11$	<input type="text"/>	9	$-2x - 7y = 7$ $-8x + y = -1$	<input type="text"/>
5	$-6x + 2y = -4$ $y = -9x + 10$	<input type="text"/>	10	$2x + 10y = -20$ $x + 8y = -10$	<input type="text"/>

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Self-Checking

Math with Ms. Rivera

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Rational Expression Operations - Addition & Subtraction

Directions: Answer each question and type the question number with the matching answer in the answer column to the right.

#	Question	Answer	Type the matching question numbers here
1	$\frac{5}{x} + \frac{3}{x+1}$	$\frac{2x+1}{x+2}$	
2	$\frac{2}{x+4} - \frac{x^2}{x^2-16}$	$-\frac{1}{x^2-1}$	
3	$\frac{x+2}{x^2+4x+4} + \frac{2x}{x+2}$	$\frac{2x^2+2x+5}{x^2+x-2}$	
4	$\frac{x}{x-2} + \frac{3}{x-1}$	$\frac{-x^2+2x-8}{x^2-16}$	
5	$\frac{x}{4x+8} - \frac{1}{x^2+2x}$	$\frac{8x+5}{x^2+1}$	
6	$\frac{x+2}{x-1} + \frac{x-1}{x+2}$	$\frac{x^2-3x+7}{x^2-4}$	
7	$\frac{2x+1}{x^2-4} + \frac{x-3}{x+2}$	$\frac{x^2+2x-6}{x^2-3x+2}$	
8	$\frac{x^2+2x}{x^2-1} - \frac{x+1}{x-1}$	$\frac{x-2}{4x}$	

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hey there!

My name is Malia and I'm passionate about making learning and practicing math fun. I love creating engaging math resources for my students and I hope your students enjoy this activity too!

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