

keep scrolling to get
a sneak peek!

Help your Algebra 2
students practice
composing functions.
Students will be eager to
get the self-checking
benefits from this circuit
activity!

COMPOSITION OF FUNCTIONS

Differentiated circuit worksheet

COMPOSITION OF FUNCTIONS 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 to your question. Continue until you have completed the questions and you are back at the original question. Record your path below.

9 → 2 → 7 → 3 → 10 → 4 → 5 → 8 →

$x^2 - 6x + 9$	# 8	Previous Answer: $x^2 - 2x + 1$
1. Let $f(x) = x^2 - 6x + 9$ and $g(x) = x^2$. Find $f(g(x))$.		2. Let $f(x) = x + 4$ and $g(x) = 3x - 2$. Find $(g \circ f)(x)$.
$+1$ $+1$		$3(x+4) - 2$ $3x + 12 - 2$ $3x + 10$
Previous Answer: $x^2 - 2x + 1$	# 7	Previous Answer: $4x^2 + 1$
3. Let $f(x) = x^2 - 6x + 9$ and $g(x) = x^2$. Find $(f \circ g)(x)$.		4. Let $f(x) = 5x$ and $g(x) = x^2 + 1$. Find $(f \circ g)(x)$.

COMPOSITION OF FUNCTIONS

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 to your question. Continue until you have completed the questions and you are back at the original question. Record your path below.

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

Previous Answer: $3x^2 + 13x + 13$	# _____	Previous Answer: $x^2 + 3x - 1$
1. Let $f(x) = x^2 + 2x$ and $g(x) = x - 1$. Find $(f \circ g)(x)$.		2. Let $f(x) = 3x + 4$ and $g(x) = x^2 - 2x - 5$. Find $(g \circ f)(x)$.
Previous Answer: $x^3 - 2x^2$	# _____	Previous Answer: $2x^2 + 2x - 5$
3. Let $f(x) = x^2 - 2x$. Find $(f \circ f)(x)$.		4. Let $f(x) = x + 1$ and $g(x) = x^2 - 2x - 5$. Find $(g \circ f)(x)$.



2 versions + answer key included

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Why do you need this?



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.

Composition of Functions Circuit Worksheet

Name: _____ Date: _____

COMPOSITION OF FUNCTIONS 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: $3x^2 + 13x + 13$ # _____	Previous Answer: $2x + 1$
1. Let $f(x) = x^2 + 2x$ and $g(x) = x - 1$. Find $(f \circ g)(x)$.	2. Let $f(x) = x^2 + 2x + 1$ and $g(x) = x - 1$. Find $(f \circ g)(x)$.
Previous Answer: $x^4 - 2x^2$ # _____	Previous Answer: $3x + 10$ # _____
3. Let $f(x) = x^2 - 2x$. Find $(f \circ f)(x)$.	4. Let $f(x) = x^2 + 2x + 1$ and $g(x) = x - 1$. Find $(f \circ g)(x)$.
Previous Answer: $x^2 + 2x + 4$ # _____	Previous Answer: $16x - 35$ # _____
5. Let $f(x) = x + 2$ and $g(x) = x^2 - 1$. Find $(f \circ g)(x)$.	6. Let $f(x) = x^2 + 2x + 4$ and $g(x) = x - 1$. Find $(f \circ g)(x)$.
Previous Answer: $x^2 + 6x + 8$ # _____	Previous Answer: $x^2 + 10$ # _____
7. Let $g(x) = x + 1$. Find $(g \circ g)(x)$.	8. Let $f(x) = x^2$ and $g(x) = x - 3$. Find $(f \circ g)(x)$.
Previous Answer: $x^2 + 6x + 8$ # _____	Previous Answer: $x^2 + 10$ # _____
9. Let $f(x) = 3x + 1$ and $g(x) = x^2$. Find $(g \circ f)(x)$.	10. Let $f(x) = -2x$ and $g(x) = x^2 + 1$. Find $(g \circ f)(x)$.

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

$(f \circ g)(x) = f(g(x))$ $(g \circ f)(x) = g(f(x))$

Steps: Identify the "inner" and "outer" functions. Substitute the "inner" function into the "outer" function.

Composition of Functions Circuit includes:

Challenge: Let $f(x) = x^2 - 3$ and $g(x) = 2x + 1$. Find $(f \circ g)(x)$ and $(g \circ f)(x)$. Are they equivalent?

How are you feeling about this topic? Circle one:

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

$$(f \circ g)(x) = f(g(x)) \quad (g \circ f)(x) = g(f(x))$$

Steps:

1. Identify the "inner" and "outer" functions.
2. Replace every x in the "outer" function with it.
3. Simplify the final expression.

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

Composition of Functions

standards aligned:

CCSS: HSF-BF.A.1.c

TEKs: A2.2.D

VA SOLs: F.AII.7.k

COMPOSITION OF FUNCTIONS CIRCUIT

Previous Answer: $9x^2 + 24x + 16$ # <u>2</u>	Previous Answer: $x^2 + 1$ # <u>5</u>
7. Let $g(x) = x^2 - 1$. Find $(g \circ g)(x)$. $\rightarrow g(g(x))$ $(x^2 - 1)^2 - 1$ $(x^2 - 1)(x^2 - 1) - 1$ $x^4 - 2x^2 + 1 - 1$ $x^4 - 2x^2$	8. Let $f(x) = 3x^2 + x - 1$ and $g(x) = x + 2$. Find $(f \circ g)(x)$. $3(x + 2)^2 + (x + 2) - 1$ $3(x + 2)(x + 2) + x + 2 - 1$ $3(x^2 + 4x + 4) + x + 1$ $3x^2 + 12x + 12 + x + 1$ $3x^2 + 13x + 13$
Previous Answer: $8x^4 - 24x^3 + 4x^2 + 21x + 4$ # <u>6</u>	Previous Answer: $x^4 - 4x^3 + 2x^2 + 4x$ # <u>3</u>
9. Let $f(x) = x^2 + 3x - 1$ and $g(x) = x - 2$. Find $(g \circ f)(x)$. $\rightarrow g(f(x))$ $x^2 + 3x - 1 - 2$ $x^2 + 3x - 3$	10. Let $f(x) = 2x - 5$ and $g(x) = x^2 + x$. Find $(f \circ g)(x)$. $\rightarrow f(g(x))$ $2(x^2 + x) - 5$ $2x^2 + 2x - 5$
Challenge: Let $f(x) = x^2 - 3$ and $g(x) = 2x + 1$. Find $(f \circ g)(x)$ and $(g \circ f)(x)$. Are they equivalent?	
$(f \circ g)(x) = f(g(x))$ $(2x + 1)^2 - 3$ $(2x + 1)(2x + 1) - 3$ $4x^2 + 4x + 1 - 3$	$(g \circ f)(x) = g(f(x))$ $2(x^2 - 3) + 1$

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.

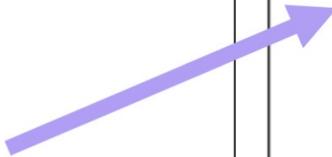
Name: _____ Date: _____

COMPOSITION OF FUNCTIONS 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: $x^2 - 6x + 9$ # _____	Previous Answer: $x^2 - 2x + 1$ # _____
1. Let $f(x) = 2x + 1$ and $g(x) = x^2$. Find $(f \circ g)(x)$.	2. Let $f(x) = x + 4$ and $g(x) = 3x - 2$. Find $(g \circ f)(x)$.
Previous Answer: $x + 2$ # _____	Previous Answer: $4x^2 + 1$ # _____
3. Let $f(x) = x^2 - 1$ and $g(x) = x + 3$. Find $(f \circ g)(x)$.	4. Let $f(x) = 5x$ and $g(x) = x^2 + 2$. Find $(f \circ g)(x)$.



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

Name: **Answer Key** Date: _____

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

Previous Answer: $x^2 - 6x + 9$ # 8	Previous Answer: $x^2 - 2x + 1$ # 9
1. Let $f(x) = 2x + 1$ and $g(x) = x^2$. Find $(f \circ g)(x)$. → $f(g(x))$	2. Let $f(x) = x + 4$ and $g(x) = 3x - 2$. Find $(f \circ g)(x)$. → $f(g(x))$

Handwritten work for question 1:

$$2(x^2) + 1$$

$$\boxed{2x^2 + 1}$$

Previous Answer: $x + 2$

3. Let $f(x) = x^2 - 1$ and $g(x) = x + 3$. Find $(f \circ g)(x)$. → $f(g(x))$

$$(x+3)^2 - 1$$

$$(x+3)(x+3) - 1$$

$$x^2 + 6x + 9 - 1$$

$$\boxed{x^2 + 6x + 8}$$

Previous Answer: $5x^2 + 10$

5. Let $f(x) = x - 2$ and $g(x) = 2x$. Find $(f \circ g)(x)$.

$$2x + 3 - 2$$

$$\boxed{2x + 1}$$

COMPOSITION OF FUNCTIONS CIRCUIT

Previous Answer: $9x^2 + 24x + 16$ # 2	Previous Answer: $x^2 + 1$ # 5
7. Let $g(x) = x^2 - 1$. Find $(g \circ g)(x)$. → $g(g(x))$	8. Let $f(x) = 3x^2 + x - 1$ and $g(x) = x + 2$. Find $(f \circ g)(x)$.
$(x^2 - 1)^2 - 1$ $(x^2 - 1)(x^2 - 1) - 1$ $x^4 - 2x^2 + 1 - 1$ $\boxed{x^4 - 2x^2}$	$3(x+2)^2 + (x+2) - 1$ $3(x+2)(x+2) + x+2 - 1$ $3(x^2 + 4x + 4) + x + 2 - 1$ $3x^2 + 12x + 12 + x + 2 - 1$ $\boxed{3x^2 + 13x + 13}$
Previous Answer: $8x^4 - 24x^3 + 4x^2 + 21x + 4$ # 6	Previous Answer: $x^4 - 4x^3 + 2x^2 + 4x$ # 3
9. Let $f(x) = x^2 + 3x - 1$ and $g(x) = x - 2$. Find $(g \circ f)(x)$. → $g(f(x))$	10. Let $f(x) = 2x - 5$ and $g(x) = x^2 + x$. Find $(f \circ g)(x)$. → $f(g(x))$
$x^2 + 3x - 1 - 2$ $\boxed{x^2 + 3x - 3}$	$2(x^2 + x) - 5$ $\boxed{2x^2 + 2x - 5}$

This is a great activity to use when reviewing how compose functions.

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

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

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Answer Key
Name: _____ Date: _____
ADDING & SUBTRACTING RATIONAL EXPRESSIONS
Directions: Add or subtract the rational expressions. Show your work.

Solving Systems of Equations
Date: _____
Solve systems of equations using substitution or elimination. Check your solution.
 $2x - 6y = -18$
 $x = 3y - 9$
 $2(3y - 9) - 6y = -18$
 $6y - 18 - 6y = -18$
 $-18 = -18$
infinitely many solutions

Answer Key
Name: _____ Date: _____
SOLVING SYSTEMS OF EQUATIONS
Solve systems of equations using substitution or elimination. Check your solution.
 $2x - 6y = -18$
 $x = 3y - 9$
 $2(3y - 9) - 6y = -18$
 $6y - 18 - 6y = -18$
 $-18 = -18$
infinitely many solutions

Multiplying & Dividing Rational Expressions
Date: _____
Directions: Multiply or divide the rational expressions. Show your work.

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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