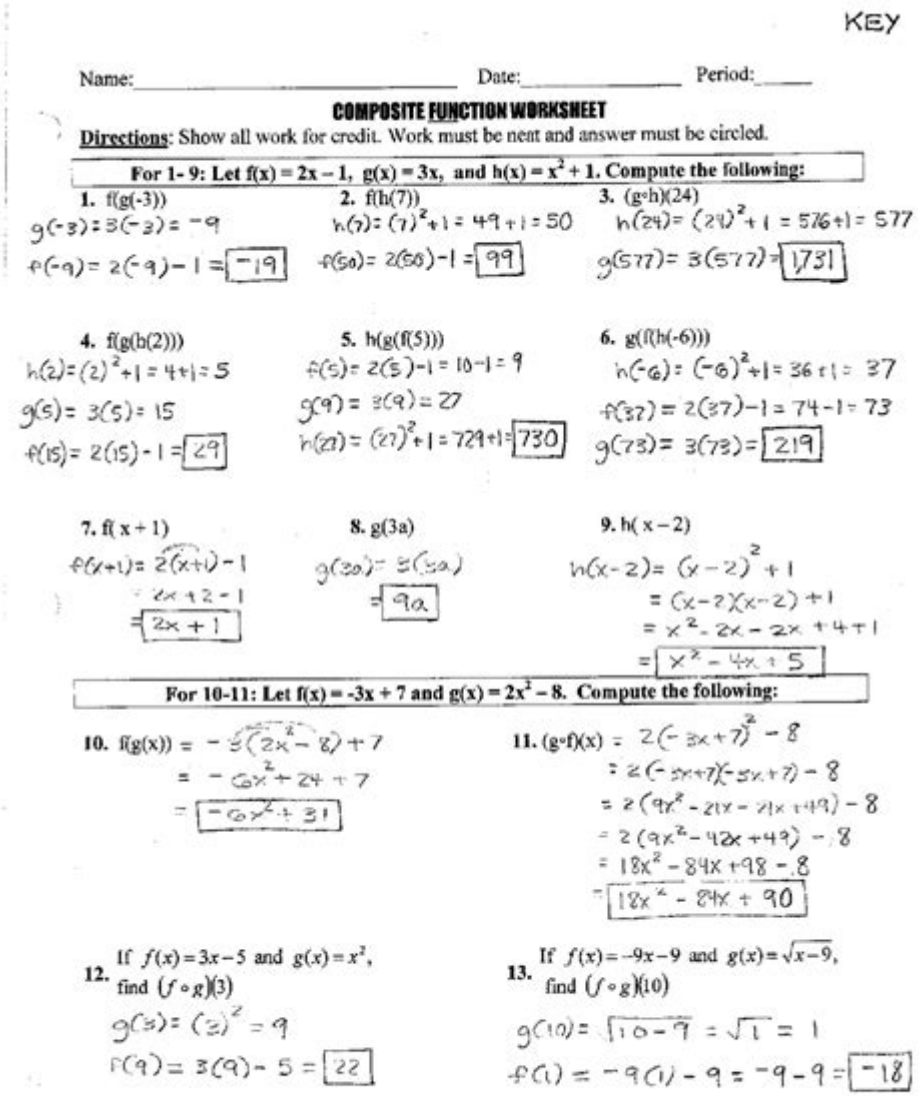
Composition Of Two Functions Worksheet Answers



KEY

Name:_____ Date:_____ Period:_____

COMPOSITE FUNCTION WORKSHEET

Directions: Show all work for credit. Work must be neat and answer must be circled.

For 1- 9: Let f(x) = 2x – 1, g(x) = 3x, and h(x) = x² + 1. Compute the following:

1. f(g(-3))
g(-3) = 3(-3) = -9
f(-9) = 2(-9) - 1 = -19

2. f(h(7))
h(7) = (7)² + 1 = 49 + 1 = 50
f(50) = 2(50) - 1 = 99

3. (g∘h)(24)
h(24) = (24)² + 1 = 576 + 1 = 577
g(577) = 3(577) = 1731

4. f(g(h(2)))
h(2) = (2)² + 1 = 4 + 1 = 5
g(5) = 3(5) = 15
f(15) = 2(15) - 1 = 29

5. h(g(f(5)))
f(5) = 2(5) - 1 = 10 - 1 = 9
g(9) = 3(9) = 27
h(27) = (27)² + 1 = 729 + 1 = 730

6. g(f(h(-6)))
h(-6) = (-6)² + 1 = 36 + 1 = 37
f(37) = 2(37) - 1 = 74 - 1 = 73
g(73) = 3(73) = 219

7. f(x + 1)
f(x+1) = 2(x+1) - 1
= 2x + 2 - 1
= 2x + 1

8. g(3a)
g(3a) = 3(3a)
= 9a

9. h(x – 2)
h(x-2) = (x-2)² + 1
= (x-2)(x-2) + 1
= x² - 2x - 2x + 4 + 1
= x² - 4x + 5

For 10-11: Let f(x) = -3x + 7 and g(x) = 2x² – 8. Compute the following:

10. f(g(x)) = -3(2x² - 8) + 7
= -6x² + 24 + 7
= -6x² + 31

11. (g∘f)(x) = 2(-3x + 7)² - 8
= 2(-3x+7)(-3x+7) - 8
= 2(9x² - 21x - 21x + 49) - 8
= 2(9x² - 42x + 49) - 8
= 18x² - 84x + 98 - 8
= 18x² - 84x + 90

12. If f(x) = 3x – 5 and g(x) = x², find (f∘g)(3)
g(3) = (3)² = 9
f(9) = 3(9) - 5 = 22

13. If f(x) = -9x – 9 and g(x) = √(x – 9), find (f∘g)(10)
g(10) = √(10 - 9) = √1 = 1
f(1) = -9(1) - 9 = -9 - 9 = -18

Composition of two functions worksheet answers is a crucial aspect of understanding function operations in mathematics. Composing functions allows students to grasp how different functions interact and how the output of one function can serve as the input for another. This article will delve into the composition of functions, provide examples, and explore the answers to typical worksheet problems that students may encounter.

Understanding Function Composition

Function composition involves combining two functions to create a new

function. If we have two functions, f(x) and g(x), the composition of these functions is denoted as (f ∘ g)(x), which is read as "f of g of x." This means that you first apply the function g to x and then apply the function f to the result of g(x). Mathematically, this is expressed as:

(f ∘ g)(x) = f(g(x))

Why is Function Composition Important?

Function composition is significant for several reasons:

1. Modeling Real-World Situations: Many real-world scenarios can be modeled using composite functions, allowing for a deeper understanding of complex systems.
2. Building Complexity: Composing functions can create more complex functions from simpler ones, which is essential in calculus and higher mathematics.
3. Mathematical Relationships: It helps in exploring relationships between different mathematical entities, enhancing problem-solving skills.

Steps to Compose Functions

To compose functions, follow these steps:

1. Identify the Functions: Determine the functions f(x) and g(x) you will be working with.
2. Substitute: Replace the variable in f with the entire function g(x).
3. Simplify: Simplify the resulting expression, if possible.

Example of Function Composition

Let’s consider two functions:
- f(x) = 2x + 3
- g(x) = x^2

To find the composition (f ∘ g)(x), follow these steps:

1. Substitute g(x) into f:
- f(g(x)) = f(x^2)
2. Replace x in f(x) with x^2:
- f(x^2) = 2(x^2) + 3
3. Simplify:
- 2x^2 + 3

Thus, (f ∘ g)(x) = 2x^2 + 3.

Common Worksheet Problems on Function Composition

Worksheets on function composition typically include various types of problems. Here are a few common types:

1. Direct Composition: Students are asked to find $(f \circ g)(x)$ given specific functions.
2. Inverse Composition: Problems may involve finding the composition of inverse functions.
3. Evaluating Compositions: Some worksheets ask students to evaluate compositions at specific points, such as $(f \circ g)(2)$.
4. Graphical Interpretation: Students may be asked to graph the functions and their compositions.

Sample Problems and Solutions

Let’s consider some sample problems along with their answers.

Problem 1: Given the functions:
- $f(x) = x + 1$
- $g(x) = 3x$

Find $(f \circ g)(x)$.

Solution:
1. Substitute $g(x)$ into f:
- $f(g(x)) = f(3x)$
2. Replace x in $f(x)$:
- $f(3x) = 3x + 1$
3. Therefore, $(f \circ g)(x) = 3x + 1$.

Problem 2: If $f(x) = x^2$ and $g(x) = x - 4$, find $(g \circ f)(x)$.

Solution:
1. Substitute $f(x)$ into g:
- $g(f(x)) = g(x^2)$
2. Replace x in $g(x)$:
- $g(x^2) = x^2 - 4$
3. Hence, $(g \circ f)(x) = x^2 - 4$.

Problem 3: Evaluate $(f \circ g)(2)$ for $f(x) = 2x + 3$ and $g(x) = x^2$.

Solution:
1. First, find $(f \circ g)(x)$:
- $(f \circ g)(x) = 2x^2 + 3$ (as derived earlier).
2. Now substitute $x = 2$:

- (f ∘ g)(2) = 2(2^2) + 3 = 2(4) + 3 = 8 + 3 = 11.

Thus, (f ∘ g)(2) = 11.

Common Mistakes in Function Composition

Students often face challenges when learning function composition. Here are some common mistakes:

1. Incorrect Order: Students sometimes confuse the order of functions, applying f before g, which leads to incorrect results.
2. Neglecting Parentheses: Not using parentheses correctly can result in misinterpretation of the function’s structure.
3. Failing to Simplify: Some students leave their answer unsimplified, which can be misleading.

Tips for Success in Function Composition

To avoid common pitfalls and enhance understanding, here are some tips:

- Practice Regularly: Consistent practice with different functions helps solidify the concept.
- Check Your Work: Always review your steps to ensure you applied the functions in the correct order.
- Use Graphs: Visualizing functions and their compositions can aid in understanding how they interact.

Conclusion

The composition of two functions is a fundamental concept in mathematics that serves as a building block for more advanced topics. Understanding how to properly compose functions, evaluate them, and interpret the results is crucial for success in algebra and beyond. By practicing and engaging with various problems, students can master function compositions and apply this knowledge effectively in their studies. Whether it’s for homework, exams, or real-world applications, mastering the composition of functions will enhance mathematical understanding and problem-solving capabilities.

Frequently Asked Questions

What is the composition of two functions?

The composition of two functions, denoted as (f ∘ g)(x), is the application of one function to the result of another function. Specifically, it means you first apply g to x and then apply f to the result of g.

How do you find the composition of two functions algebraically?

To find the composition of two functions f(x) and g(x), you substitute g(x) into f. For example, if f(x) = x^2 and g(x) = 2x, then (f ∘ g)(x) = f(g(x)) = f(2x) = (2x)^2 = 4x^2.

What is the notation for the composition of functions?

The notation for the composition of functions is written as (f ∘ g)(x) or f(g(x)). This indicates that function g is applied first, followed by function f.

Can the composition of functions be commutative?

No, the composition of functions is generally not commutative. That is, (f ∘ g)(x) is not necessarily equal to (g ∘ f)(x). Each function must be applied in the specified order.

What are the domain restrictions when composing functions?

The domain of the composition (f ∘ g)(x) requires that g(x) is in the domain of f. Therefore, you must consider the domains of both functions when determining the overall domain of the composition.

How do you solve a worksheet with function composition problems?

To solve a worksheet with function composition problems, identify the functions involved, substitute the inner function into the outer function, and simplify the result step by step.

What is an example of a real-world application of function composition?

An example of a real-world application of function composition is in calculating total cost, where one function represents the price per item and another function represents the number of items sold.

How can you verify your answers for function compositions?

You can verify your answers for function compositions by checking if the output of your composed function matches the expected values for given inputs or by substituting known values back into the original functions.

What should you do if you encounter complex functions in composition?

If you encounter complex functions, break them down into simpler parts, apply composition step-by-step, and simplify at each stage to avoid errors.

Where can I find practice worksheets for function composition?

You can find practice worksheets for function composition on educational websites, math resources, and online platforms that offer worksheets and exercises for various math topics.

Composition Of Two Functions Worksheet Answers

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Abby/Relationships | KPop Demon Hunters Wiki | Fandom
Abby Abby appears to be Jinu's right hand man as he frequently stands next to him and leans on his shoulder, and typically occupies one of the leading spots next to Jinu during performances. Abby was seated next to Mira at a fan meet and interacted briefly, after which they were shipped by their fans in a throuple along with Romance. During the confrontation at the bathhouse …

Abby & Romance (KPop Demon Hunters) - Works | Archive of …
First on the agenda is to come to an understanding with the girls, then find Jinu, defeat Gwi-Ma and maybe get their careers back on track as they balance being idols and demons.

KPop Demon Hunters | Shipping Wiki | Fandom
Plot Singers Rumi, Mira, and Zoey, the members of K-Pop group HUNTR/X, live double lives as demon hunters.

Abby (KPop Demon Hunters) - Works | Archive of Our Own
The Saja Boys, Jinu, Abby, Mystery, Romance, and Baby, aren’t evil demons sent to bring ruin, but escapees from Gwi-Ma’s cruel grasp, longing for freedom and a chance to live as humans.

Saja Boys' Romance: Full Profile & Backstory | KPop Demon Hunters
Deep dive into Saja Boys' Romance from KPop Demon Hunters. Explore his abilities, powers, full backstory, relationships, and his ultimate fate in the film.

Full Profile of Saja Boys from “KPop Demon Hunters … - KPOPPOST
Jun 24, 2025 · We have compiled an extensive profile of all the names, members, as well as voice actors of the Saja Boys from “KPop Demon Hunters” so join us and get to know these demon idols with perfect visuals.

Exploring ABby and Romance in K-Pop Demon Hunters | TikTok
200 aprecieri,Videoclip TikTok de la hrtlvettee (@hrtlvettee): „Join us as we delve into the unique ABby romance within K-Pop Demon Hunters, uncovering rare ships and character dynamics! #kpopdemonhunters #romance #rareship”.

Abby - Kpop Demon Hunters
Jun 22, 2025 · When it faded, Abby was left more broken than before. Transformed into a demon, he now hunts for the love he can never keep— a predator born of longing and loss.

Saja Boys | Kpop Wiki | Fandom
On April 24, 2025, Netflix unveiled a glimpse of the animation KPop Demon Hunters and its K-Pop trio (later revealed to be HUNTR/X), who sells out stadiums by day and secretly fight as demon hunters by night.

Romance/Relationships | KPop Demon Hunters Wiki | Fandom
Romance He appears to have a good relationship with the rest of the group because all of them except Jinu want to free Gwi-Ma. He finds Mira attractive, looking at her longingly at the fan event.