

Composite Functions Worksheet Questions and Answers PDF

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Part 1: Building a Foundation

What is the notation for a composite function where f is applied to g ?

Hint: Think about the symbols used for function composition.

- A) $f + g$
- B) $f \times g$
- C) $f \circ g$ ✓
- D) $f - g$

■ The correct notation for a composite function is $f \circ g$.

Which of the following statements are true about composite functions? (Select all that apply)

Hint: Consider the properties of function composition.

- A) $f \circ g$ means g is applied first, then f . ✓
- B) The order of composition does not matter.
- C) The domain of $f \circ g$ depends on the domain of g . ✓
- D) Composite functions are always commutative.

■ The correct statements are A and C.

Explain in your own words what a composite function is and provide an example.

Hint: Think about how two functions can be combined.

A composite function is formed when one function is applied to the result of another function. For example, if $f(x) = x + 1$ and $g(x) = 2x$, then $f \circ g(x) = f(g(x)) = f(2x) = 2x + 1$.

List the two properties of composite functions discussed in the worksheet.

Hint: Recall the key properties mentioned earlier.

1. What is the first property?

The order of functions matters.

2. What is the second property?

The domain of the composite function depends on the domain of the inner function.

The two properties are: 1) The order of functions matters, and 2) The domain of the composite function depends on the domain of the inner function.

Part 2: Understanding and Interpretation

If $f(x) = 3x + 2$ and $g(x) = x - 1$, what is $(f \circ g)(x)$?

Hint: Substitute $g(x)$ into $f(x)$.

- A) $3x + 1$
- B) $3(x - 1) + 2$ ✓
- C) $3x - 1$
- D) $3(x + 1) + 2$

The correct answer is $\sqrt{3(x - 1) + 2}$.

Which of the following are necessary to determine the domain of a composite function $(f \circ g)$? (Select all that apply)

Hint: Consider the domains of both functions involved.

- A) The range of f
- B) The domain of g ✓
- C) The domain of f ✓
- D) The range of g

The necessary components are the domain of g and the domain of f .

Describe how the associative property applies to composite functions with an example.

Hint: Think about how functions can be grouped.

The associative property states that the way in which functions are grouped does not affect the outcome. For example, $(f \circ (g \circ h)) = ((f \circ g) \circ h)$.

Part 3: Application and Analysis

Given $f(x) = x^2$ and $g(x) = \sqrt{x}$, find $(g \circ f)(x)$.

Hint: Substitute $f(x)$ into $g(x)$.

- A) x
- B) x^2
- C) $\sqrt{x^2}$ ✓
- D) $x^{1/4}$

The correct answer is $\sqrt{x^2}$.

If $f(x) = 2x + 1$ and $g(x) = x^3$, which of the following are true about $(f \circ g)(x)$? (Select all that apply)

Hint: Consider the characteristics of the resulting function.

- A) It is a linear function.
- B) It is a cubic function. ✓
- C) The domain is all real numbers. ✓
- D) The range is all real numbers.

The correct statements are B and C.

Apply the concept of composite functions to describe a real-world scenario where one process depends on the outcome of another.

Hint: Think about processes that are interconnected.

An example could be calculating the total cost of an item after tax, where the first function calculates the price and the second applies the tax rate.

Part 4: Evaluation and Creation

If $f(x) = x + 5$ and $g(x) = 2x$, what is the inverse of $(f \circ g)(x)$?

Hint: Consider how to reverse the operations of the composite function.

- A) $\frac{x}{2} - 5$
- B) $\frac{x - 5}{2}$ ✓
- C) $2x - 5$
- D) $x - 10$

The correct answer is $\left(\frac{x-5}{2}\right)$.

Analyze the following statements about $(f \circ g)(x)$ and $(g \circ f)(x)$. Which are true? (Select all that apply)

Hint: Consider the properties of function composition.

- A) They are always equal.
- B) They can have different domains. ✓
- C) They can have different ranges. ✓
- D) They are both associative.

The correct statements are B and C.

Which of the following best evaluates the impact of domain restrictions on $(f \circ g)(x)$ when $f(x) = \ln(x)$ and $g(x) = x^2$?

Hint: Consider the domain of the logarithmic function.

- A) Domain is all real numbers.
- B) Domain is $(x > 0)$. ✓
- C) Domain is $(x \neq 0)$.
- D) Domain is $(x \geq 0)$.

The correct answer is $(x > 0)$.

Create a composite function using $f(x) = 1/x$ and $g(x) = x - 3$. Which of the following properties does it have? (Select all that apply)

Hint: Think about the characteristics of rational functions.

- A) It is undefined for $(x = 3)$. ✓
- B) It is a rational function. ✓
- C) It is undefined for $(x = 0)$. ✓
- D) It has a horizontal asymptote.

The correct properties are A, B, and C.

Propose a new composite function using any two functions of your choice. Explain its domain, range, and potential applications in a real-world context.

Hint: Think creatively about how functions can interact.

An example could be $f(x) = x^2$ and $g(x) = \sin(x)$, where the domain is all real numbers and the range is from 0 to 1.