Compound Functions Worksheet Answer Key PDF

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Part 1: Building a Foundation

What is the notation for a compound function?

undefined. A) f(x) + g(x)

undefined. B) f(x) × g(x)

undefined. C) (f ∘ g)(x) ✓

undefined. D) f(x) - g(x)

The correct notation for a compound function is (f ∘ g)(x).

Which of the following statements are true about compound functions?

undefined. A) They are formed by adding two functions.

undefined. B) They are formed by applying one function to the results of another. ✓

undefined. C) The order of functions does not matter.

undefined. D) They can be expressed as (f ∘ g)(x) = f(g(x)). ✓

Compound functions are formed by applying one function to the results of another and can be expressed as (f ∘ g)(x) = f(g(x)).

Explain why the order of operations is important in compound functions.

The order of operations is crucial because it determines how the input is transformed through the functions, leading to different outputs.

List the two main components needed to form a compound function.

1. First component

f(x)

2. Second component

g(x)

The two main components are the two functions that are being composed.

If f(x) = 2x + 3 and g(x) = x^2, what is (f ∘ g)(x)?

undefined. A) 2x^2 + 3
undefined. B) 2x + 3x^2
undefined. C) 2(x^2) + 3 ✓
undefined. D) 2x^2 - 3

The correct answer is (f ∘ g)(x) = 2(x^2) + 3.

Part 2: comprehension and Application

Describe how the domain of the function g(x) affects the domain of the compound function (f ∘ g)(x).

The domain of g(x) directly affects the domain of (f ∘ g)(x) because g(x) must produce valid inputs for f(x).

If g(x) = √x and f(x) = x + 5, what is the domain of (f ∘ g)(x)?

undefined. A) x ≥ 0 ✓
undefined. B) x > 0
undefined. C) All real numbers
undefined. D) x ≤ 0

The domain of (f ∘ g)(x) is x ≥ 0 due to the square root function.

Given f(x) = 3x - 4 and g(x) = x^2 + 1, find (f ∘ g)(2).

First, calculate g(2) = 5, then f(5) = 11, so (f ∘ g)(2) = 11.

For the functions f(x) = x^3 and g(x) = 2x + 1, calculate (g ∘ f)(1) and (f ∘ g)(1).

1. (g ◦ f)(1)

3

2. (f ◦ g)(1)

2

(g ◦ f)(1) = 3 and (f ◦ g)(1) = 2.

Part 3: Analysis, Evaluation, and Creation

Analyze the function (f ◦ g)(x) = sin(ln(x)). Discuss the domain of this compound function.

The domain is x > 0 due to the logarithm, as it cannot take non-positive values.

Which of the following transformations occur when graphin (f ◦ g)(x) = |x^2 - 4|?

undefined. A) Vertical reflection ✓
undefined. B) Horizontal shift
undefined. C) Vertical stretch ✓
undefined. D) Horizontal reflection

The graph undergoes vertical reflection and vertical stretch due to the absolute value.

Evaluate the compound function (f ◦ g)(x) = √(x^2 - 1) for its potential applications in physics. Discuss any limitations based on its domain.

The function can model certain physical scenarios, but its domain limits its applicability to x ≥ 1.

Create a compound function using f(x) = x^2 + 2x and g(x) = 1/x. Identify its domain and range.

1. Domain

x ≠ 0

2. Range

y > 0

The compound function is (f ◦ g)(x) = (1/x)^2 + 2(1/x), with domain x ≠ 0.

If f(x) = cos(x) and g(x) = 2x, what is the period of the compound function (f ∘ g)(x)?

undefined. A) π

undefined. B) 2π ✓

undefined. C) π/2

undefined. D) 4π

The period of (f ∘ g)(x) is 2π, as the cosine function has a period of 2π.