From The Textbook: Let F(x)=x^2+x5. Let G(x)=2x+1. Find The Following: (a) F(8)+g(8)= (b) F(6)g(6)= (c)

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Understanding the Problem: Functions and Their Calculations

When working with functions in algebra, it's essential to understand how to evaluate them at specific points and perform operations such as addition and multiplication. The problem involves two functions:

- F(x) = x^2 + x5
- G(x) = 2x + 1

Our goal is to evaluate these functions at specific values of x, namely 8 and 6, and then perform the specified operations.

Clarifying the Functions: Interpreting the Expressions

Before we perform any calculations, it's important to clarify the functions as given:

1. Interpreting F(x) = x^2 + x5

The notation "x5" could be ambiguous. Commonly, in algebra, "x5" might be read as "x times 5," i.e., 5x. Alternatively, it might be a typo or formatting error, meant to be "x 5" or "x + 5."

Most likely interpretation:

- F(x) = x^2 + 5x

This is a standard quadratic function with a linear term.

2. Interpreting G(x) = 2x + 1

This is straightforward: a linear function where the output is twice the input plus 1.

Step-by-Step Calculation of Each Part

Let's now proceed to evaluate the functions at the specified points and perform the required operations.

Part (a): F(8) + G(8)

Step 1: Evaluate F(8)

Assuming F(x) = x^2 + 5x, then:

F(8) = (8)^2 + 5 8
F(8) = 64 + 40
F(8) = 104

Step 2: Evaluate G(8)

G(8) = 2 8 + 1
G(8) = 16 + 1
G(8) = 17

Step 3: Sum F(8) + G(8)

104 + 17 = 121

Answer for (a):
\[
\boxed{F(8) + G(8) = 121}
\]

Part (b): F(6) G(6)

Step 1: Evaluate F(6)

F(6) = 6^2 + 5 6
F(6) = 36 + 30
F(6) = 66

Step 2: Evaluate G(6)

G(6) = 2 6 + 1
G(6) = 12 + 1
G(6) = 13

Step 3: Multiply F(6) G(6)

66 13 = 858

Answer for (b):
\[
\boxed{F(6) \times G(6) = 858}
\]

Part (c): Additional Calculation or Clarification

The problem statement provides only parts (a) and (b), but mentions "(c)" without further instructions. Usually, in such problems, part (c) might involve evaluating a different combination or a new expression.

Potential Part (c) possibilities:

- Evaluate F at a different point, e.g., F(0)
- Evaluate G at a different point, e.g., G(0)
- Find F(8) G(6) or other mixed operations
- Derive a combined expression such as F(x) + G(x), then evaluate at certain points

Assuming the most common scenario:

Let's suppose part (c) asks to evaluate F(8) G(8), similar to the previous parts, or perhaps to find F(8) - G(8).

Hypothetical Part (c): Calculate F(8) G(8)

Step 1: Use previously calculated values

F(8) = 104
G(8) = 17

Step 2: Multiply

104 17 = 1768

Answer for (c):
$$
\boxed{F(8) \times G(8) = 1768}
$$

Summary of Results

Part	Expression	Calculation	Result
(a)	F(8) + G(8)	104 + 17	121
(b)	F(6) G(6)	66 13	858
(c)	F(8) G(8)	104 17	1768

Additional Tips for Solving Similar Problems

- Always clarify ambiguous notation: When encountering expressions like "x5," verify whether it means "x 5" or some other operation.

- Evaluate step-by-step: Break down each function evaluation separately before combining.
- Use parentheses for clarity: When substituting values, write expressions fully to avoid mistakes.
- Double-check calculations: Arithmetic errors are common, so verify each step.
- Understand the context: Recognize the pattern of the problem to anticipate possible parts or operations.

Conclusion: Mastering Function Evaluations and Operations

Understanding how to evaluate functions at specific points and perform operations like addition and multiplication is fundamental in algebra. This problem demonstrates the importance of:

- Correctly interpreting function notation
- Carefully calculating each value
- Combining results to solve the given parts

By mastering these skills, students can confidently approach more complex problems involving functions, their evaluations, and operations, which are essential in higher-level mathematics such as calculus, algebra, and applied mathematics.

Remember: Always verify the interpretation of the functions and perform calculations carefully to ensure accuracy in your solutions.

Frequently Asked Questions

What is the value of F(8) if F(x) = x^2 + x5?

F(8) = 8^2 + 85 = 64 + 40 = 104.

How do you compute G(8) if G(x) = 2x + 1?

G(8) = 28 + 1 = 16 + 1 = 17.

What is the sum of F(8) and G(8)?

F(8) + G(8) = 104 + 17 = 121.

Calculate F(6) given F(x) = x^2 + x5.

F(6) = 6^2 + 65 = 36 + 30 = 66.

What is G(6) if G(x) = 2x + 1?

G(6) = 26 + 1 = 12 + 1 = 13.

How do you find the product of F(6) and G(6)?

F(6) G(6) = 66 13 = 858.

What is the value of F(8) + G(8)?

F(8) + G(8) = 104 + 17 = 121.

What is the value of F(6) G(6)?

F(6) G(6) = 66 13 = 858.

If F(x) = x^2 + x5 and G(x) = 2x + 1, what are the combined results for x=8 and x=6?

For x=8: F(8)+G(8)=121; for x=6: F(6)G(6)=858.

Additional Resources

Mathematics in Focus: Analyzing Function Operations through a Textbook Exercise

Mathematics, often regarded as the universal language of logic and problem-solving, plays a crucial role in developing analytical skills and fostering critical thinking. One of the fundamental concepts in mathematics is the study of functions—rules that assign each input exactly one output. Understanding how to evaluate functions at specific points and perform operations such as addition and multiplication on these functions is essential for learners aiming to master algebraic concepts.

In this article, we delve into a textbook exercise that offers a comprehensive look at these operations, specifically focusing on two functions: $F(x)$ and $G(x)$. We will explore the problem's components in detail, providing insights into the underlying principles, step-by-step calculations, and the significance of each operation. Whether you're a student seeking clarity or an educator aiming to reinforce key concepts, this review aims to enhance your understanding of function evaluation and combination.

Understanding the Functions: Definitions and Significance

Defining $F(x)$ and $G(x)$

The exercise introduces two functions:

- Function $F(x)$: Defined as $F(x) = x^2 + x5$.
- Function $G(x)$: Defined as $G(x) = 2x + 1$.

At first glance, $F(x)$ appears to be a quadratic expression with an added term, while $G(x)$ is a linear function. Clarifying the notation is essential; the expression $x5$ is typically interpreted as $x \times 5$, i.e., $5x$. Therefore, the function $F(x)$ simplifies to:

$$
F(x) = x^2 + 5x
$$

This form is familiar as a quadratic function with coefficients 1 (for x^2) and 5 (for the x term). Understanding this structure is fundamental because it influences how the function behaves graphically and algebraically.

Similarly, $G(x)$ is a straightforward linear function:

$$
G(x) = 2x + 1
$$

This function has a slope of 2, indicating the rate of change of $G(x)$ with respect to x, and a y-intercept at 1.

Importance of Function Evaluation

Calculating the value of functions at specific points—such as $x=8$ or $x=6$—is a core skill in algebra. It allows us to understand the behavior of functions at particular inputs, which can be useful in applications ranging from physics to economics. Moreover, combining functions through addition or multiplication provides deeper insights into how different mathematical relationships interact.

Part (a): Calculating $F(8) + G(8)$

Step-by-Step Calculation

Let's examine the task of evaluating and summing the functions at $x=8$.

Step 1: Compute $F(8)$

Using the simplified form:

$$
F(8) = 8^2 + 5 \times 8
$$

Calculations:

- $8^2 = 64$
- $5 \times 8 = 40$

Adding these:

$$
F(8) = 64 + 40 = 104
$$

Step 2: Compute $G(8)$

Using the function:

$$
G(8) = 2 \times 8 + 1
$$

Calculations:

- $2 \times 8 = 16$
- Add 1:

$$
G(8) = 16 + 1 = 17
$$

Step 3: Sum $F(8)$ and $G(8)$

$$
F(8) + G(8) = 104 + 17 = 121
$$

Result:

$$
\boxed{
F(8) + G(8) = 121
}
$$

This operation exemplifies the straightforward nature of evaluating functions at specific points and then performing basic arithmetic.

Part (b): Calculating $F(6) \times G(6)$

Step-by-Step Calculation

Next, the task involves evaluating both functions at $x=6$ and multiplying the results.

Step 1: Compute $F(6)$

Using the quadratic form:

$$
F(6) = 6^2 + 5 \times 6
$$

Calculations:

- $6^2 = 36$
- $5 \times 6 = 30$

Add:

$$
F(6) = 36 + 30 = 66
$$

Step 2: Compute $G(6)$

Using the linear function:

$$
G(6) = 2 \times 6 + 1
$$

Calculations:

- $2 \times 6 = 12$
- Add 1:

$$
G(6) = 12 + 1 = 13
$$

Step 3: Multiply $F(6)$ and $G(6)$

$$
F(6) \times G(6) = 66 \times 13
$$

Calculations:

- Multiply directly:

$$
66 \times 13 = (60 + 6) \times 13 = (60 \times 13) + (6 \times 13) = 780 + 78 = 858
$$

Result:

$$
\boxed{
F(6) \times G(6) = 858
}
$$

This operation demonstrates how evaluating functions at given points can be combined through multiplication, often revealing more complex relationships between the functions.

Part (c): Extending the Analysis

The original exercise hints at further exploration, possibly involving additional operations or evaluations. While the exact expression for part (c) isn't provided, we can infer that it might involve concepts such as:

- Function composition, e.g., $F(G(x))$ or $G(F(x))$,
- Additional evaluations at different points,
- Or perhaps differences or ratios of the functions.

Let's briefly analyze these possibilities to deepen understanding.

Possible Extension: Function Composition

Suppose part (c) asks for $F(G(4))$, which involves composing F with G.

- First, evaluate $G(4)$:

$$
G(4) = 2 \times 4 + 1 = 8 + 1 = 9
$$

- Next, substitute 9 into F:

$$
F(9) = 9^2 + 5 \times 9 = 81 + 45 = 126
$$

Thus,

$$
F(G(4)) = 126
$$

This illustrates the concept of composition and how it allows us to evaluate functions in nested manners, highlighting the interconnectedness of functions.

Alternative: Ratios or Differences

Alternatively, if part (c) involves calculating the ratio $\frac{F(8)}{G(8)}$:

$$
\frac{F(8)}{G(8)} = \frac{104}{17} \approx 6.12
$$

Or perhaps the difference $F(6) - G(6)$:

$$
66 - 13 = 53
$$

Each operation provides different insights into the relationships between the functions.

Analytical Insights and Broader Significance

Understanding Function Behavior

Evaluating functions at specific points reveals their behavior and growth patterns. For instance, $F(x) = x^2 + 5x$ is quadratic, exhibiting a parabolic shape, while $G(x) = 2x + 1$ is linear. At larger x, $F(x)$ grows faster than $G(x)$, a fact observable through direct computation or graphing.

Operations on Functions: Addition and Multiplication

The exercise underscores two fundamental operations:

- Addition: Combining functions by summation, useful in modeling combined effects or cumulative quantities.
- Multiplication: Producing a new function that represents joint variations, often used in probability and physics contexts.

Understanding these operations enhances the ability to manipulate and interpret functions in diverse mathematical scenarios.

Implications for Mathematical Literacy

Mastering these evaluations and operations contributes to developing mathematical literacy, critical for advanced studies in calculus, algebra, and applied mathematics. They form building blocks for understanding more complex concepts such as derivatives, integrals, and functional transformations.

Conclusion: The Significance of Function Evaluation and Operations

The exercise from the textbook exemplifies core algebraic skills that are foundational to higher mathematics. Evaluating $F(x)$ and $G(x)$ at specific points and performing operations like addition and multiplication not only reinforce procedural proficiency but also deepen conceptual understanding of how functions behave and interact.

By systematically dissecting each component, from defining functions to performing calculations, learners can build confidence in their problem-solving abilities. Moreover,

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