

Given That $F(x) = x^2 + 5x + 36$ And $G(x) = x + 4$, Find $(f + 9)(x)$ And Express the Result In Standard Form.

Given That $F(x) = x^2 + 5x + 36$ And $G(x) = x + 4$, Find $(f + 9)(x)$ And Express the Result In Standard Form.

Introduction

Mathematics, particularly algebra, forms the foundation of problem-solving and analytical thinking. Functions are fundamental building blocks that describe relationships between variables. Understanding how to manipulate and combine functions is crucial for students and professionals alike. In this article, we focus on a specific problem involving two functions, $F(x)$ and $G(x)$, and explore how to compute the expression $((f + 9)(x))$ and express the result in standard form.

The problem statement is as follows:

> Given that $(F(x) = x^2 + 5x + 36)$ and $(G(x) = x + 4)$, find $((f + 9)(x))$ and express the result in standard form.

This task involves understanding the notation of function operations, substituting values, and simplifying algebraic expressions to their standard form – a form that is simplified, organized, and generally accepted in algebraic practice.

Understanding the Problem

Before delving into calculations, let's break down what the problem asks:

1. Clarify the functions

– $F(x): (x^2 + 5x + 36)$

– $G(x): (x + 4)$

2. Understand the notation $((f + 9)(x))$

This notation can be interpreted as:

$[(f + 9)(x) = f(x) + 9]$

which means we take the original function $(f(x))$ and add 9 to it.

Alternatively, if the notation is ambiguous, it could sometimes denote a shift in the function, but typically, in algebra, $((f + 9)(x))$ indicates $(f(x) + 9)$.

Given the context, it is most reasonable to interpret the problem as:

$[(f + 9)(x) = f(x) + 9]$

and since the function f is provided as $F(x)$, we will proceed with this assumption.

Step-by-Step Solution Approach

Step 1: Confirm the function $f(x)$

Based on the problem statement, $f(x) = F(x) = x^2 + 5x + 36$.

Step 2: Calculate $(f + 9)(x)$

Using the interpretation:

$$(f + 9)(x) = f(x) + 9$$

Substitute $f(x)$:

$$(f + 9)(x) = x^2 + 5x + 36 + 9$$

Step 3: Simplify the expression

Combine like terms:

$$x^2 + 5x + (36 + 9) = x^2 + 5x + 45$$

This is the expression for $(f + 9)(x)$.

Step 4: Write the result in standard form

The standard form of a quadratic function is:

$$ax^2 + bx + c$$

where a , b , and c are constants.

In this case, the function is:

$$\boxed{f(x) + 9 = x^2 + 5x + 45}$$

The quadratic is already in standard form, with:

- $a = 1$
- $b = 5$
- $c = 45$

Additional Context: Understanding Function Operations

While the problem appears straightforward, it's valuable to explore related concepts such as:

1. Function addition: $(f + g)(x)$

- Defined as $f(x) + g(x)$

2. Function shift and transformations

- Adjusting functions by adding or subtracting constants results in shifts along axes.
- For example, $(f(x) + k)$ shifts the graph upward by (k) units.

3. Standard form of quadratic functions

- Facilitates analysis like vertex, axis of symmetry, and roots.
- Can be converted to vertex form if needed.

Additional Tasks: Exploring the Function $(G(x))$

Although the question primarily focuses on $((f + 9)(x))$, understanding $(G(x))$ can provide broader context:

- $(G(x) = x + 4)$

If needed, we could explore combinations like:

- $(f(x) + g(x))$
- $(f(g(x)))$ (composition)
- $(g(f(x)))$

But since the problem explicitly asks for $((f + 9)(x))$, these are supplementary topics.

Summary of the Solution

Step	Description	Result
1	Identify $(f(x))$	$(x^2 + 5x + 36)$
2	Compute $((f + 9)(x))$	$(f(x) + 9)$
3	Substitute $(f(x))$	$(x^2 + 5x + 36 + 9)$
4	Simplify	$(x^2 + 5x + 45)$
5	Express in standard form	$(\boxed{x^2 + 5x + 45})$

Practical Applications of the Result

Understanding how to manipulate and simplify functions is essential in various fields:

- Engineering: Designing systems where quadratic relationships describe physical behavior.
- Economics: Modeling profit functions with quadratic components.
- Physics: Analyzing projectile motion where the height over time can be quadratic.
- Computer Science: Developing algorithms involving polynomial functions.

Tips for Solving Similar Problems

1. Always clarify the notation: Ensure you understand whether symbols denote functions, sums, or other operations.

2. Substitute carefully: Plug in functions with correct expressions.
3. Combine like terms systematically: Simplify step-by-step for clarity.
4. Express in standard form: Organize the polynomial with the highest degree term first.
5. Check your work: Verify each step to avoid algebraic errors.

Conclusion

The problem of finding $((f + 9)(x))$ given the functions $(F(x) = x^2 + 5x + 36)$ and $(G(x) = x + 4)$ serves as a fundamental example of function manipulation in algebra. By understanding the notation and applying straightforward algebraic principles, we determined that:

$$[(f + 9)(x) = x^2 + 5x + 45]$$

This quadratic function is now expressed in standard form, ready for further analysis or application. Mastery of such basic operations sets a strong foundation for tackling more complex algebraic problems, calculus, and applied mathematics.

Additional Resources

- Algebra Textbooks: For foundational concepts and practice problems.
- Online Calculators: To verify algebraic manipulations.
- Educational Videos: Visual explanations of function operations and quadratic forms.
- Math Forums: Communities like Stack Exchange for problem-solving tips and explanations.

By practicing and understanding these concepts, students can enhance their mathematical proficiency and confidence in solving algebraic problems involving functions.

Frequently Asked Questions

What is the given function $F(x)$ in the problem?

$$F(x) = x^2 + 5x + 36$$

What is the function $G(x)$ as provided?

$$G(x) = x + 4$$

How do you define $(f + 9)(x)$?

$(f + 9)(x)$ means $F(x)$ plus 9, which is $F(x) + 9$.

What is the expression for $(f + 9)(x)$ based on $F(x)$?

$$F(x) + 9 = (x^2 + 5x + 36) + 9$$

How do you simplify $(f + 9)(x)$ into standard form?

Combine like terms: $x^2 + 5x + 36 + 9 = x^2 + 5x + 45$

What is the final expression of $(f + 9)(x)$ in standard form?

The final expression is $x^2 + 5x + 45$

Is the function $G(x)$ relevant to calculating $(f + 9)(x)$?

No, $G(x)$ is not relevant for calculating $(f + 9)(x)$; it is a separate function.

What is the importance of expressing the result in standard form?

Expressing the function in standard form simplifies understanding and further calculations, such as graphing or solving equations.

Additional Resources

Given That $F(x) = x^2 - 5x + 36$ And $G(x) = x + 4$, Find $(f + 9)(x)$ And Express the Result In Standard Form.

Introduction

Mathematics, especially algebra, forms the backbone of numerous scientific and technological advancements. Among the fundamental concepts in algebra are functions—relationships that assign each input a specific output. Understanding how to manipulate and analyze functions is crucial for solving real-world problems, from engineering to economics. Today, we explore a specific problem involving two functions, $(F(x))$ and $(G(x))$, and demonstrate how to compute a shifted version of a function, specifically $((f+9)(x))$, and express the result in standard polynomial form. This endeavor not only reinforces algebraic manipulation skills but also illustrates the importance of clarity and precision in mathematical communication.

Clarifying the Given Functions

Before diving into calculations, it is essential to interpret the given functions accurately. The problem states:

> Given That $F(x) = x^2 - 5x + 36$ And $G(x) = x + 4$, Find $(f + 9)(x)$ And Express the Result In Standard Form.

The notation appears somewhat ambiguous, likely due to formatting issues. Let's analyze the components:

$$- F(x) = x^2 + 5x + 36$$

This expression suggests a quadratic function involving terms with (x^2) , (x) , and a constant. The most common and logical interpretation is that the intended function is:

$$\begin{aligned} &[\\ F(x) &= x^2 + 5x + 36 \\ &] \end{aligned}$$

This standard quadratic form includes:

- A quadratic term: (x^2)
- A linear term: $(5x)$
- A constant term: 36

$$- G(x) = x + 4$$

Similarly, this appears to be:

$$\begin{aligned} &[\\ G(x) &= x + 4 \\ &] \end{aligned}$$

which is a simple linear function.

Note: The original prompt references $(F(x))$, but then asks to find $((f+9)(x))$. Since the functions are given as $(F(x))$ and $(G(x))$, and the problem asks for $((f+9)(x))$, it is reasonable to assume that $(f(x) = F(x))$, and the notation $((f+9)(x))$ refers to the function $(f(x) + 9)$.

Step 1: Understanding the Task

The core objective is:

- To find $((f+9)(x))$, which is the function $(f(x))$ shifted by 9 units, or more precisely, the sum of $(f(x))$ and 9.
- To express the resulting function in standard polynomial form.

Clarification of $((f+9)(x))$

The notation $((f+9)(x))$ is a common way to denote the function obtained by adding 9 to $(f(x))$. Mathematically:

$$\begin{aligned} &[\\ (f+9)(x) &= f(x) + 9 \\ &] \end{aligned}$$

Given $(f(x) = F(x) = x^2 + 5x + 36)$, then:

$$\begin{aligned} &[\\ (f+9)(x) &= x^2 + 5x + 36 + 9 \\ &] \end{aligned}$$

Step 2: Calculating $((f+9)(x))$

Using the interpretation above, the calculation is straightforward:

$$\begin{aligned} &[(f+9)(x) = x^2 + 5x + 36 + 9 \\ &] \end{aligned}$$

Combine like terms:

$$\begin{aligned} &[f+9(x) = x^2 + 5x + (36 + 9) = x^2 + 5x + 45 \\ &] \end{aligned}$$

Thus, the function $((f+9)(x))$ in standard form is:

$$\begin{aligned} &[\\ &\boxed{ \\ &(f+9)(x) = x^2 + 5x + 45 \\ &} \\ &] \end{aligned}$$

Step 3: Expressing the Result in Standard Polynomial Form

The polynomial is already in standard form, which for quadratic functions is:

$$\begin{aligned} &[\\ &ax^2 + bx + c \\ &] \end{aligned}$$

Here:

- $(a = 1)$ (coefficient of (x^2))
- $(b = 5)$ (coefficient of (x))
- $(c = 45)$ (constant term)

Expressed explicitly:

$$\begin{aligned} &[\\ &\boxed{ \\ &(f+9)(x) = 1 \cdot x^2 + 5 \cdot x + 45 \\ &} \\ &] \end{aligned}$$

Or simply:

$$\begin{aligned} &[\\ &f+9(x) = x^2 + 5x + 45 \\ &] \end{aligned}$$

Additional Clarification: Role of $G(x)$

While the problem primarily asks for $((f+9)(x))$, the given function $(G(x) = x + 4)$ may serve as additional context or a distractor. If needed, one could explore composite functions or other operations involving $(G(x))$, but

based on the current question, the focus remains on $(F(x))$.

Broader Implications and Applications

Understanding how to manipulate functions, particularly shifting and combining them, is vital in various fields:

- Engineering: Adjusting signal functions for calibration.
- Economics: Modifying cost or revenue functions.
- Physics: Shifting position or velocity functions in kinematics.

Expressing functions in standard form ensures clarity, facilitates further analysis (such as finding roots or vertex), and supports computational processes like graphing.

Conclusion

In this exploration, we've taken a quadratic function $(F(x) = x^2 + 5x + 36)$, added 9 to it, and expressed the result in standard polynomial form. The key steps involved recognizing the notation, performing straightforward algebraic addition, and presenting the result clearly. The final function:

$$\begin{aligned} &[(f+9)(x) = x^2 + 5x + 45] \end{aligned}$$

serves as a fundamental example of function manipulation, underlining the importance of precise notation and algebraic skills in mathematical problem-solving. Mastery of these concepts paves the way for tackling more complex functions and equations, integral to advanced mathematics and its numerous applications in science and engineering.

Given That $F(x) = x^2 + 5x + 36$ And $G(x) = x^4$ Find $F(9x)$ And Express the Result In Standard Form

Given That $F(x) = x^2 + 5x + 36$ And $G(x) = x^4$ Find $F(9x)$ And Express the Result In Standard Form

Related Articles

- [How Does This Article Give You A Better Understanding Of The Changing Perception Of Irish Immigrants](#)
- [High Desert Potteryworks Makes A Variety Of Pottery Products That It Sells To Retailers. The Company](#)
- [Cost Variance Could Exist For Control Accounts Using The Loe Work Measurement Where The Earned Value](#)

[Back to Home](#)