

Given $F(x) = 3x+5$ Work Out The Value For $F(2)$

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Understanding how to evaluate functions is a fundamental skill in mathematics, especially in algebra. When given a function such as $F(x) = 3x + 5$, the goal is to find the output value of the function for a specific input, in this case, $x = 2$. This process involves substituting the given value into the function and simplifying the expression to find the result. In this article, we will explore this process in detail, explain the concepts involved, and provide step-by-step guidance to help you master similar problems.

Understanding the Function $F(x) = 3x + 5$

Before diving into calculations, it's essential to understand what the function $F(x) = 3x + 5$ represents.

What is a Function?

- A function is a rule that assigns each input exactly one output.
- It is often written as $F(x)$, where "x" is the input, and " $F(x)$ " is the output.
- In this case, for any value of x, the output is obtained by multiplying x by 3 and then adding 5.

Interpreting $F(x) = 3x + 5$

- The function is a linear function, meaning its graph is a straight line.
- The coefficient 3 indicates the slope of the line, showing how much $F(x)$ changes for each unit increase in x.
- The constant 5 is the y-intercept, representing where the line crosses the y-axis when $x = 0$.

How to Work Out $F(2)$: Step-by-Step Guide

Now, let's focus on calculating $F(2)$. The process involves a straightforward substitution and simplification.

Step 1: Write Down the Function and the Given Input

- Function: $F(x) = 3x + 5$
- Given input: $x = 2$

Step 2: Substitute the Given Value into the Function

- Replace every occurrence of x with 2:

$$F(2) = 3(2) + 5$$

Step 3: Simplify the Expression

- Multiply 3 by 2:

$$3 \cdot 2 = 6$$

- Add 5 to the result:

$$6 + 5 = 11$$

Step 4: Write the Final Answer

- The value of $F(2)$ is 11.

Additional Examples and Practice Problems

To reinforce the concept, here are some additional problems similar to the one we've just solved.

Example 1: Find $F(5)$ when $F(x) = 3x + 5$

- Substitute $x = 5$:

$$F(5) = 3(5) + 5 = 15 + 5 = 20$$

Example 2: Find $F(0)$ when $F(x) = 3x + 5$

- Substitute $x = 0$:

$$F(0) = 3(0) + 5 = 0 + 5 = 5$$

Practice Problems

- Find $F(3)$ when $F(x) = 3x + 5$.
- Find $F(-1)$ when $F(x) = 3x + 5$.
- Find $F(10)$ when $F(x) = 3x + 5$.

Understanding the Significance of the Result

Knowing how to calculate the value of a function at a specific point is crucial in many areas of mathematics and real-world applications.

Applications of Function Evaluation

- Physics: Calculating displacement, velocity, or acceleration at specific times.
- Economics: Determining cost or revenue at certain production levels.
- Biology: Modeling population growth at different time points.
- Computer Science: Evaluating algorithms or functions at specific inputs.

Interpreting the Result $F(2) = 11$

- The output value, 11, indicates that when x is 2, the function outputs 11.
- This could represent, for example, the total cost when the number of items produced is 2, assuming the cost function is $F(x) = 3x + 5$.

Key Takeaways for Working Out $F(2)$

- Always start by writing down the function and the specific value of x .
- Substitute the value directly into the function.
- Follow the order of operations: multiplication before addition.
- Simplify step-by-step to avoid mistakes.
- Verify your answer by double-checking the substitution.

Summary: How to Find $F(2)$ in a Linear Function

1. Identify the function: $F(x) = 3x + 5$.
2. Substitute $x = 2$ into the function:

$$F(2) = 3(2) + 5.$$

3. Calculate:

$$3 \times 2 = 6, \text{ then } 6 + 5 = 11.$$

4. Result: $F(2) = 11$.

Mastering this process helps build a strong foundation for more complex algebraic functions and prepares you for advanced topics such as calculus and mathematical modeling.

Final Tips for Success

- Practice with different functions to become comfortable with substitution.
- Always double-check your calculations.
- Understand the meaning of the function to interpret results meaningfully.
- Use visual aids like graphing the function to see the relationship between x and $F(x)$.

Conclusion

Calculating the value of a function at a specific point, such as $F(2)$ in the function $F(x) = 3x + 5$, is a fundamental skill in algebra. By understanding how to substitute values and simplify expressions correctly, you can confidently evaluate functions for any input. Remember to practice regularly, understand the underlying concepts, and apply these techniques to real-world problems to enhance your mathematical proficiency.

Frequently Asked Questions

What is the function given in the problem?

The function given is $F(x) = 3x + 5$.

How do you find $F(2)$ for the function $F(x) = 3x + 5$?

To find $F(2)$, substitute $x = 2$ into the function: $F(2) = 3(2) + 5$.

What is the value of $F(2)$ for the function $F(x) = 3x + 5$?

$$F(2) = 3 \times 2 + 5 = 6 + 5 = 11.$$

Why do we substitute $x = 2$ into the function to find $F(2)$?

Because $F(2)$ represents the value of the function when x is 2, so substituting $x = 2$ helps find that specific value.

Is the process of calculating $F(2)$ the same for any linear function?

Yes, for any linear function $F(x) = mx + c$, substituting $x = 2$ (or any value) follows the same process.

Can you explain step-by-step how to work out $F(2)$ for $F(x) = 3x + 5$?

Sure! First, replace x with 2: $F(2) = 3(2) + 5$. Next, multiply 3 by 2 to get 6. Then, add 5 to get the final answer, which is 11.

What concept does this problem illustrate in algebra?

It illustrates evaluating a function at a specific input by substitution.

If the function was different, say $F(x) = 4x - 1$, how would you find $F(2)$?

You would substitute $x = 2$ into the new function: $F(2) = 4(2) - 1 = 8 - 1 = 7$.

Additional Resources

Given $F(x) = 3x + 5$ Work Out The Value For $F(2)$

Understanding how to work out the value of a function at a specific input is a fundamental skill in algebra and mathematics as a whole. When given the function $F(x) = 3x + 5$, the task is to determine $F(2)$ — that is, the value of the function when the input x is 2. This process involves substituting the input value into the function and simplifying to find the output. In this guide, we will explore step-by-step how to evaluate $F(2)$, clarify common misconceptions, and provide tips for tackling similar problems.

What is a Function?

Before diving into calculations, it's important to understand what a function is. In mathematics, a function is a rule that assigns to each input exactly one output. The notation $F(x)$ indicates a function named F with an input x . For example, in $F(x) = 3x + 5$, the rule is to multiply x by 3 and then add 5.

Breaking Down the Problem

The problem statement is:

> Given $F(x) = 3x + 5$, work out $F(2)$.

This means:

- The function $F(x)$ is defined as $3x + 5$.
- The goal is to find the value of the function when $x = 2$.

Step-by-Step Guide to Calculating $F(2)$

1. Identify the Function and the Input

- Function: $F(x) = 3x + 5$
- Input: $x = 2$

2. Substitute the Input into the Function

Replace every occurrence of x in the function with 2:

$$F(2) = 3(2) + 5$$

3. Simplify the Expression

Calculate $3(2)$:

$$3 \times 2 = 6$$

Then add 5:

$$6 + 5 = 11$$

4. Write the Final Answer

Thus, $F(2) = 11$.

Understanding the Process

This simple substitution process is fundamental in algebra. It allows us to evaluate functions at specific points, which can be essential in many areas such as graphing, solving equations, and modeling real-world situations.

Common Mistakes to Avoid

- Forgetting to substitute the input value: Always replace the variable x with the specific number

given.

- Miscalculating the multiplication or addition: Double-check arithmetic to avoid simple errors.
- Ignoring parentheses: If the function has parentheses, ensure to follow the order of operations correctly.

Extending the Concept: Other Function Evaluations

While this example uses a linear function, the same principles apply to more complex functions:

- Quadratic functions: $F(x) = ax^2 + bx + c$
- Cubic functions: $F(x) = ax^3 + bx^2 + cx + d$
- Trigonometric functions: $F(x) = \sin(x)$, $\cos(x)$, etc.

For each, substitution involves replacing x with the specific value and simplifying accordingly.

Practice Problems

To reinforce understanding, try evaluating the following:

1. Given $G(x) = 2x^2 - 4$, find $G(3)$.
2. If $H(x) = (x + 1) / 2$, work out $H(4)$.
3. For $K(x) = 5x - 7$, determine $K(-1)$.

Tips for Working with Functions

- Write down the function clearly before substitution.
- Always perform substitution carefully, ensuring all instances of the variable are replaced.
- Simplify step-by-step to avoid mistakes.
- Double-check your calculations after each step.
- Use parentheses when necessary to clarify order of operations.

Summary

In conclusion, evaluating $F(2)$ for the function $F(x) = 3x + 5$ involves a straightforward substitution process. By replacing x with 2, performing the multiplication, and then addition, we find that $F(2) = 11$. Mastering this simple yet crucial skill opens the door to understanding more complex functions and their applications across mathematics and science.

Final Thoughts

Whether you're a student mastering algebra or a professional working with mathematical models,

being comfortable with evaluating functions at specific points is essential. Practice regularly with different types of functions to build confidence and deepen your comprehension. Remember, the key steps are always substitution, careful calculation, and verification. With these in mind, you'll approach similar problems with clarity and precision.

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