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Understanding how to evaluate functions like $F(x) = 10x + 8$ is fundamental in algebra and forms the basis for more complex mathematical concepts. In this article, we will explore step-by-step methods to compute the values of the function at specific points, specifically for $x=7$, $x=-8$, and $x=0$. Whether you're a student preparing for exams or someone interested in mastering basic algebraic functions, this comprehensive guide will clarify the process and help you become confident in evaluating linear functions.

Understanding the Function $F(x) = 10x + 8$

Before diving into calculations, it's essential to understand what the function $F(x) = 10x + 8$ represents.

Definition of a Linear Function

A linear function is a function that graphs as a straight line on the coordinate plane. Its general form is:

$$F(x) = mx + b$$

where:

- m is the slope (rate of change)
- b is the y-intercept (value of $F(x)$ when $x=0$)

In our case:

- $m = 10$
- $b = 8$

This means for every increase of 1 in x , the value of $F(x)$ increases by 10, starting from 8 when $x=0$.

Key Characteristics of $F(x) = 10x + 8$

- The slope is positive, indicating the function increases as x increases.
- The y-intercept is 8, meaning the graph crosses the y-axis at $(0,8)$.

- Evaluating $F(x)$ at specific points involves substituting the given x -value into the function and simplifying.

How to Evaluate the Function at Specific Points

Evaluating $F(x)$ at specific points involves a straightforward substitution process:

1. Identify the x -value to evaluate.
2. Substitute the x -value into the function in place of x .
3. Simplify the expression to find the corresponding y -value.

Let's apply this process to the given points: $x=7$, $x=-8$, and $x=0$.

Calculating $F(7)$: Step-by-Step

Step 1: Substitute $x=7$ into the function

$$F(7) = 10(7) + 8$$

Step 2: Perform the multiplication

$$F(7) = 70 + 8$$

Step 3: Add the results

$$F(7) = 78$$

Result: When $x=7$, $F(7) = 78$

Calculating $F(-8)$: Step-by-Step

Step 1: Substitute $x=-8$ into the function

$$F(-8) = 10(-8) + 8$$

Step 2: Perform the multiplication

$$F(-8) = -80 + 8$$

Step 3: Add the results

$$F(-8) = -72$$

Result: When $x=-8$, $F(-8) = -72$

Calculating $F(0)$: Step-by-Step

Step 1: Substitute $x=0$ into the function

$$F(0) = 10(0) + 8$$

Step 2: Perform the multiplication

$$F(0) = 0 + 8$$

Step 3: Add the results

$$F(0) = 8$$

Result: When $x=0$, $F(0) = 8$

Summary of Calculated Values

Here are the evaluated results for the function $F(x) = 10x + 8$:

- $F(7) = 78$
- $F(-8) = -72$
- $F(0) = 8$

These values are essential in understanding how the function behaves at

different points and can be used to graph the function or solve related problems.

Additional Insights and Applications

Understanding how to evaluate functions like $F(x) = 10x + 8$ has broad applications in mathematics, science, and real-world problem-solving.

Applications of Linear Functions

- Modeling real-world scenarios: Calculating total cost based on units purchased.
- Predicting outcomes: Estimating future values based on current trends.
- Graphing functions: Visualizing relationships between variables.

Key Points to Remember

- Always substitute the x-value directly into the function.
- Simplify carefully, following the order of operations.
- Recognize the importance of the slope and intercept in understanding the function's graph.

Common Mistakes to Avoid

When evaluating functions, be cautious of the following pitfalls:

- Incorrect substitution: Ensure the x-value is correctly placed in the function.
- Misapplication of order of operations: Multiply before adding or subtracting.
- Sign errors: Pay attention to negative signs during calculations.
- Forgetting to simplify fully: Always perform the final arithmetic to get the exact value.

Practice Problems to Master Function Evaluation

Enhance your understanding with these practice tasks:

1. Evaluate $F(3)$ for $F(x) = 10x + 8$.
2. Find $F(-5)$ when $F(x) = 10x + 8$.
3. Determine $F(10)$.

Solutions:

1. $F(3) = 10(3) + 8 = 30 + 8 = 38$
2. $F(-5) = 10(-5) + 8 = -50 + 8 = -42$
3. $F(10) = 10(10) + 8 = 100 + 8 = 108$

Conclusion

Evaluating the function $F(x) = 10x + 8$ at specific points is a fundamental skill in algebra that involves simple substitution and arithmetic. By understanding the structure of the linear function, you can quickly determine the value of $F(x)$ for any x -value. Remember, practicing these calculations enhances your confidence and prepares you for more advanced topics like graphing, solving equations, and analyzing functions.

With this comprehensive guide, you now know exactly how to find $F(7)$, $F(-8)$, and $F(0)$, along with tips to avoid common errors. Continue practicing with different functions to strengthen your algebraic skills and deepen your understanding of mathematical relationships.

Keywords for SEO Optimization:

- Evaluate linear functions
- $F(x) = 10x + 8$
- How to evaluate functions
- Calculating $F(7)$, $F(-8)$, $F(0)$
- Algebra tutorials
- Linear function evaluation
- Math practice problems
- Understanding functions in algebra

By mastering the evaluation of functions like $F(x) = 10x + 8$, you build a solid foundation for success in mathematics and related fields.

Frequently Asked Questions

What is the value of $f(7)$ for the function $F(x) =$

$10x + 8$?

$$f(7) = 10(7) + 8 = 70 + 8 = 78.$$

How do you find $f(-8)$ for the function $F(x) = 10x + 8$?

$$f(-8) = 10(-8) + 8 = -80 + 8 = -72.$$

What is the value of $f(0)$ for the function $F(x) = 10x + 8$?

$$f(0) = 10(0) + 8 = 0 + 8 = 8.$$

What type of function is $F(x) = 10x + 8$?

It is a linear function with a slope of 10 and a y-intercept of 8.

How is the function $F(x) = 10x + 8$ evaluated at a specific point?

By substituting the given x-value into the function and simplifying.

What is the general method to find $F(x)$ for any given x ?

Plug the value of x into the formula and perform the multiplication and addition.

Why is understanding linear functions like $F(x) = 10x + 8$ important?

They help in modeling real-world situations involving constant rates of change.

Additional Resources

Given The Function $F(x) = 10x + 8$, Find Each Of The Following. $f(7) = f(-8) = f(0) =$

Understanding and evaluating functions is a fundamental aspect of algebra and mathematics at large. When presented with a specific function – in this case, $F(x) = 10x + 8$ – the task often involves calculating the function's value at various points or inputs. These inputs, known as arguments or independent variables, are substituted into the function to determine the corresponding output. In this article, we will explore how to evaluate the function $F(x) =$

$10x + 8$ at specific points: $x = 7$, $x = -8$, and $x = 0$. We'll delve into the process step-by-step, clarify the underlying concepts, and explore the significance of these calculations in broader mathematical contexts.

Understanding the Function $F(x) = 10x + 8$

Before jumping into calculations, it's essential to understand the structure and nature of the function provided.

Linear Functions and Their Characteristics

The function $F(x) = 10x + 8$ is an example of a linear function, characterized by its form $y = mx + b$, where:

- m is the slope of the line, indicating its steepness.
- b is the y-intercept, the point where the line crosses the y-axis.

In our specific function:

- $m = 10$, meaning the function increases by 10 units for each 1-unit increase in x .
- $b = 8$, meaning the graph of the function crosses the y-axis at the point $(0, 8)$.

This linear function graphs as a straight line, and understanding its slope and intercept provides insights into how the output changes with x .

Why Evaluate the Function at Specific Points?

Evaluating the function at specific points helps to:

- Understand the behavior of the function at different x -values.
- Plot the function accurately on a graph.
- Solve real-world problems where the input corresponds to a real quantity, and the output corresponds to a related measurement or value.

In our context, calculating $F(7)$, $F(-8)$, and $F(0)$ allows us to see how the function responds to positive, negative, and zero inputs.

Calculating the Function at $x = 7$

Let's begin by evaluating $F(7)$. This involves substituting $x = 7$ into the function formula.

Step-by-Step Calculation

1. Write the original function:

$$F(x) = 10x + 8$$

2. Substitute $x = 7$:

$$F(7) = 10 \cdot 7 + 8$$

3. Perform multiplication:

$$10 \cdot 7 = 70$$

4. Add 8:

$$70 + 8 = 78$$

Result:

$$F(7) = 78$$

This means that when the input is 7, the output of the function is 78. The function scales the input by a factor of 10 and then shifts it upward by 8.

Calculating the Function at $x = -8$

Next, we evaluate $F(-8)$, which involves substituting a negative value into the function.

Step-by-Step Calculation

1. Original function:

$$F(x) = 10x + 8$$

2. Substitute $x = -8$:

$$F(-8) = 10 \cdot (-8) + 8$$

3. Perform multiplication:

$$10 \cdot (-8) = -80$$

4. Add 8:

$$-80 + 8 = -72$$

Result:

$$F(-8) = -72$$

Here, the negative input results in a negative output, reflecting the linear decrease of the function as x decreases.

Calculating the Function at $x = 0$

Finally, we evaluate $F(0)$. This is often the simplest calculation in linear functions because the variable term drops out.

Step-by-Step Calculation

1. Original function:

$$F(x) = 10x + 8$$

2. Substitute $x = 0$:

$$F(0) = 10 \cdot 0 + 8$$

3. Perform multiplication:

$$10 \cdot 0 = 0$$

4. Add 8:

$$0 + 8 = 8$$

Result:

$$F(0) = 8$$

This confirms that the y-intercept of the line is at $(0, 8)$, which is consistent with the function's structure.

Summary of Results

To recap, the evaluation of $F(x) = 10x + 8$ at the specified points yields:

- $F(7) = 78$
- $F(-8) = -72$

- $F(0) = 8$

These results demonstrate how the function responds to different inputs, with positive inputs leading to larger outputs, negative inputs producing negative outputs, and zero input returning the y-intercept value.

Broader Significance and Applications

While the calculations above are straightforward, their significance extends far beyond simple algebra exercises.

Real-World Contexts

Linear functions like $F(x) = 10x + 8$ are often used to model real-world scenarios, such as:

- Financial calculations: determining total cost based on a per-unit price plus fixed fees.
- Physics: calculating distance traveled at a constant speed.
- Business: estimating revenue based on units sold plus base profit.

Knowing how to evaluate the function at specific points enables professionals and students to make predictions, optimize processes, and analyze trends effectively.

Graphical Interpretation

Plotting the function based on these points allows visualization of its behavior. The points (7, 78), (-8, -72), and (0, 8) can be plotted on a coordinate plane to see the straight line extending in both directions. This visual aid can clarify how the function increases at a constant rate and helps in understanding concepts like slope and intercept more intuitively.

Conclusion

Evaluating the function $F(x) = 10x + 8$ at specific points provides a clear window into its behavior and properties. By substituting different values for x , we observe how the output responds, illustrating the linear relationship between input and output. Whether for academic purposes, practical applications, or visual understanding, mastering the process of evaluating functions at various points is essential in the toolkit of anyone studying mathematics or working in fields that rely on quantitative analysis. The simplicity of linear functions makes them an excellent starting point for

building more complex mathematical understanding, laying the foundation for advanced topics like calculus, statistics, and data modeling.

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