Known That F(x)=2x-3. If The Value Of F(m) = 5 And F(-2) = N, Then The Value Of M +n Is...

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Understanding the properties and applications of functions is fundamental in mathematics, especially in algebra. In this article, we will delve into the problem involving the linear function $F(x) = 2x - 3$, analyze given conditions, and determine the sum $M + N$. Through a comprehensive approach, step-by-step calculations, and explanations, we aim to clarify how to solve such problems effectively.

Introduction to the Function $F(x) = 2x - 3$

The function $F(x) = 2x - 3$ is a linear function, characterized by its constant rate of change, which is 2. Linear functions are of the form $y = mx + c$, where:

- m is the slope (rate of change),
- c is the y-intercept.

In this case, the slope m is 2, indicating that for every increase of 1 in x, $F(x)$ increases by 2. The y-intercept is -3, meaning the graph crosses the y-axis at $(0, -3)$.

Understanding this basic form helps in solving various algebraic problems involving the function, including finding unknown values given specific input-output pairs.

Given Conditions and Their Significance

The problem provides two key pieces of information:

- $F(m) = 5$,
- $F(-2) = N$.

Our goal is to determine the value of $M + N$.

Before proceeding to calculations, it's essential to understand what each piece of information indicates.

Interpreting $F(m) = 5$

This condition implies that when the input to the function F is m, the output is 5.

Mathematically, this can be expressed as:

$$
F(m) = 2m - 3 = 5
$$

From this equation, we can solve for m.

Interpreting $F(-2) = N$

This condition indicates that when the input is -2, the output is N.

Expressed as:

$$
F(-2) = 2(-2) - 3 = N
$$

which allows us to find N.

Step-by-Step Solution

Let's proceed to find the values of m and N, and then compute $M + N$.

1. Finding m when $F(m) = 5$

Recall the function:

$$
F(x) = 2x - 3
$$

Substitute $x = m$:

$$
2m - 3 = 5
$$

Solve for m:

$$
2m = 5 + 3
$$
$$
2m = 8
$$

\]
\[
m = \frac{8}{2} = 4
\]

Thus,

\[
m = 4
\]

2. Calculating \(N \) when \(F(-2) = N \)

Substitute \(x = -2 \):

\[
F(-2) = 2 \times (-2) - 3
\]
\[
F(-2) = -4 - 3 = -7
\]

Therefore,

\[
N = -7
\]

Calculating \(M + N \)

From the above, we have:

\[
m = 4 \quad \text{and} \quad N = -7
\]

Assuming that \(M \) corresponds to the value \(m \), the problem asks for the sum:

\[
M + N
\]

Substituting the known values:

\[
M + N = 4 + (-7) = -3
\]

Hence, the value of $M + N$ is -3.

Understanding the Solution Process

The steps involved in solving the problem are fundamental in algebra:

- Identify the given function and conditions: Recognize the form of the function and what the problem asks.
- Substitute known values: Plug the given input values into the function.
- Solve for the unknowns: Rearrange equations to find the unknown variables.
- Combine results: Compute the required sum.

This approach emphasizes the importance of understanding the function's structure and applying algebraic principles systematically.

Applications of Such Problems in Real Life

While this problem appears purely algebraic, similar reasoning applies in various real-world contexts:

- Economics: Calculating costs or revenues based on linear models.
- Physics: Determining velocity or acceleration when linear relationships exist.
- Statistics: Understanding linear relationships between variables.
- Engineering: Designing systems with predictable linear responses.

Understanding how to manipulate and interpret functions like $F(x) = 2x - 3$ is crucial for analyzing data and making informed decisions across disciplines.

Additional Practice Problems

To solidify understanding, consider attempting similar problems:

1. Given $G(x) = 3x + 2$, find x when $G(x) = 11$.
2. If $H(x) = -x + 4$, determine $H(5)$ and interpret the result.
3. For a linear function $L(x) = ax + b$, given $L(2) = 7$ and $L(5) = 16$, find a and b.

Practicing such problems enhances algebraic skills and deepens understanding of linear functions.

Conclusion

In this comprehensive analysis, we've demonstrated how to interpret and solve a problem involving a linear function $F(x) = 2x - 3$. By substituting known values and solving basic algebraic equations, we determined that:

$$
m = 4, \quad N = -7, \quad \text{and} \quad M + N = -3
$$

This process underscores the importance of understanding the structure of functions and applying systematic problem-solving techniques. Mastery of these skills is essential for students and professionals working in mathematics, sciences, and engineering. Whether working with simple linear functions or more complex models, these foundational methods provide the tools necessary for accurate analysis and decision-making.

Keywords: linear functions, algebra, solving equations, mathematical problem-solving, functions, $F(x) = 2x - 3$, value of m, value of N, sum calculation, algebraic techniques

Frequently Asked Questions

Given the function F(x) = 2x - 3, if F(m) = 5, how do you find the value of m?

Set 2m - 3 = 5, then solve: 2m = 8, so m = 4.

Using the same function, F(x) = 2x - 3, if F(-2) = N, what is the value of N?

Calculate F(-2): 2(-2) - 3 = -4 - 3 = -7, so N = -7.

What is the sum of m and N in the problem where F(m) = 5 and F(-2) = N?

From previous answers, m = 4 and N = -7, so m + N = 4 + (-7) = -3.

How do you verify the value of m when F(m) = 5 for the function F(x) = 2x - 3?

Substitute m into the function: 2m - 3 = 5. Solve for m: 2m = 8, so m = 4.

What is the final answer for the sum m + N given the function F(x) = 2x - 3, with F(m) = 5 and F(-2) = N?

The sum is m + N = 4 + (-7) = -3.

Additional Resources

Known That F(x)=2x-3. If The Value Of F(m) = 5 And F(-2) = N, Then The Value Of M + N Is...

Introduction

In the realm of algebra, understanding the behavior of functions and their values is fundamental. Today, we explore a specific linear function, $F(x) = 2x - 3$, and uncover the unknowns m and N based on given conditions. The problem states that $F(m) = 5$ and $F(-2) = N$, prompting us to find the sum $M + N$. This exercise not only reinforces core algebraic concepts but also demonstrates the logical steps involved in solving for unknown variables within functions.

Understanding the Given Function $F(x) = 2x - 3$

Before delving into the problem's specifics, it's essential to grasp the nature of the function $F(x)$.

Linear Function Characteristics

- Definition: A linear function is one where the highest power of the variable x is 1.
- Graph: It produces a straight line when graphed.
- General Form: $y = mx + c$, where:
- m is the slope (rate of change).
- c is the y-intercept (value when $x = 0$).

In our case, $F(x) = 2x - 3$ is a linear function with:

- Slope (m): 2
- Y-intercept (c): -3

This means that for every unit increase in x, the function's value increases by 2, starting from -3 when $x = 0$.

Step 1: Finding m using $F(m) = 5$

The first condition states:

$$
F(m) = 5
$$

\]

Given the function:

\[
F(x) = 2x - 3
\]

Substituting \(x = m \):

\[
2m - 3 = 5
\]

Solving for \(m \):

1. Add 3 to both sides:

\[
2m = 5 + 3
\]

\[
2m = 8
\]

2. Divide both sides by 2:

\[
m = \frac{8}{2} = 4
\]

Result: \(m = 4 \)

This tells us that when the input to the function is 4, the output is 5.

Step 2: Calculating \(N \) via \(F(-2) = N \)

The second part of the problem gives:

\[
F(-2) = N
\]

Applying the function:

\[
F(-2) = 2(-2) - 3
\]

Calculate:

$$
2 \times (-2) = -4
$$

$$
N = -4 - 3 = -7
$$

Result: $N = -7$

This means that when $x = -2$, the function yields -7.

Step 3: Computing $M + N$

Now, we have:

$$
m = 4
$$
$$
N = -7
$$

The problem asks for the sum:

$$
M + N = 4 + (-7) = -3
$$

Final Answer: -3

Additional Insights and Broader Context

Understanding how to manipulate functions and solve for unknowns is a cornerstone of algebra. This problem exemplifies key skills:

- Substitution: Replacing variables with known or unknown values.
- Solving linear equations: Isolating variables by inverse operations.
- Interpreting functions: Recognizing the significance of function notation and outputs.

Real-World Applications

Functions like $F(x) = 2x - 3$ are not just academic exercises—they model real-world phenomena such as:

- Economics: Calculating profit or loss based on units sold.
- Physics: Describing linear motion, where displacement depends directly on time.
- Statistics: Linear regression models predicting outcomes.

Understanding how to manipulate and interpret these functions allows professionals across many fields to make data-driven decisions.

Summary

In this exploration, we started with a linear function $F(x) = 2x - 3$ and worked through a series of steps to determine unknown values based on given conditions. By substituting the known values into the function, we found:

- $m = 4$ when $F(m) = 5$,
- $N = -7$ when $F(-2) = N$,
- The sum $M + N = -3$.

This exercise underscores the importance of fundamental algebraic techniques and their practical applications. Mastery of such problems enhances problem-solving skills and deepens understanding of how functions behave, which is invaluable in both academic and real-world contexts.

Final Remarks

The problem exemplifies the elegance of algebra: simple rules and operations lead to clear solutions. Whether you're tackling academic exercises or applying these concepts in professional scenarios, the ability to decode functions and solve for unknowns remains a vital skill. As you continue to explore mathematics, remember that each problem is an opportunity to strengthen your analytical toolkit, paving the way for success across disciplines.

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