

If $X = 3$, $Y = -1$ Is A Solution Of The Equation $3x - 2y = K$, Then K Is : (a) 12 (b) 10 (c) 7 (d) 11

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Understanding how to determine the value of K in the equation $3x - 2y = K$ when given specific values of x and y is an essential concept in algebra. This problem presents a straightforward method to find the constant K by substituting the known values of x and y into the equation. In this article, we will explore the step-by-step process to solve such problems, discuss the importance of substitution in algebraic equations, and provide tips to confidently determine the value of K in similar equations.

Understanding the Equation $3x - 2y = K$

The equation $3x - 2y = K$ is a linear equation involving two variables, x and y . The constant K represents a specific value that depends on the particular values of x and y . When we are told that certain values of x and y form a solution to this equation, it means that substituting these values into the equation will satisfy the equality, allowing us to find the corresponding value of K .

Step-by-Step Solution Process

To find the value of K when $x = 3$ and $y = -1$, follow these simple steps:

1. Substitute the known values into the equation

Replace x with 3 and y with -1:

$$3(3) - 2(-1) = K$$

2. Simplify the expression

Calculate each term:

$$- 3(3) = 9$$

$$- -2(-1) = 2 \text{ (since multiplying two negatives results in a positive)}$$

So, the equation becomes:

$$9 + 2 = K$$

3. Calculate the sum to find K

Add the numbers:

$$9 + 2 = 11$$

Thus, $K = 11$

Conclusion: The value of K is 11

Since substituting $x = 3$ and $y = -1$ into the equation yields 11, the correct answer from the multiple-choice options is (d) 11.

Why Understanding Substitution is Important in Algebra

Substitution is a fundamental technique in algebra that allows us to evaluate expressions and solve equations efficiently. By replacing variables with known values, we can:

- Verify whether certain values satisfy an equation
- Find unknown constants in equations
- Simplify complex expressions

In this problem, substitution simplifies the process of determining K, demonstrating its power and importance in algebraic problem-solving.

Additional Tips for Solving Similar Problems

To confidently determine the value of K in similar problems, consider the following tips:

- **Always verify the given solution:** Before calculating, double-check the substitution of x and y values.
- **Follow order of operations:** Remember to perform multiplication before addition or subtraction.
- **Be mindful of signs:** When substituting negative values, carefully handle the signs to avoid errors.
- **Practice with different values:** Solving multiple problems helps reinforce understanding and accuracy.

- **Understand the context:** Recognize whether the problem asks for direct substitution or involves more complex manipulation.

Real-World Applications of Finding K

Understanding how to find the value of K in an equation like $3x - 2y = K$ has many practical applications, including:

- Engineering: Calculating forces or stresses where variables depend on specific conditions
- Economics: Determining profit or cost functions based on quantities and prices
- Physics: Computing energy, velocity, or other quantities based on known parameters
- Data Analysis: Fitting models to data points by solving for constants

In all these scenarios, substitution and solving for K are essential skills that enable professionals across various fields to make accurate calculations.

Summary

In summary, when given the equation $3x - 2y = K$ and specific values $x = 3$ and $y = -1$, the process to find K involves straightforward substitution followed by simplification. Substituting these values yields:

$$3(3) - 2(-1) = 11$$

Therefore, the correct answer is option (d) 11.

Mastering this approach enhances your algebraic skills and prepares you for more complex problem-solving tasks. Remember, understanding the fundamental technique of substitution is key to unlocking many algebraic concepts, making your mathematical journey smoother and more successful.

Keywords for SEO:

- algebra substitution problems
- find K in algebra equations
- solving linear equations
- algebra practice questions
- how to find K in $3x - 2y = K$
- math problem solutions
- basic algebra tips
- solving for constants in equations
- algebra tutorial for students
- step-by-step algebra solutions

Frequently Asked Questions

Given $X = 3$ and $Y = -1$, what is the value of K if they satisfy the equation $3x - 2y = K$?

$K = 11$

How do you determine the value of K when $X = 3$ and $Y = -1$ in the equation $3x - 2y = K$?

Substitute $X = 3$ and $Y = -1$ into the equation: $3(3) - 2(-1) = K$, so $9 + 2 = K$, hence $K = 11$.

If a point (X, Y) satisfies the equation $3x - 2y = K$, with $X = 3$ and $Y = -1$, which option correctly gives the value of K ?

Option (d) 11

What is the process to find K when $X = 3$ and $Y = -1$ in the equation $3x - 2y = K$?

Plug in the values: $3(3) - 2(-1) = K$, resulting in $9 + 2 = K$, so $K = 11$.

Is $K = 11$ the correct value when $X = 3$ and $Y = -1$ satisfy the equation $3x - 2y = K$?

Yes, because substituting $X = 3$ and $Y = -1$ yields 11, confirming $K = 11$.

Among the options 12, 10, 7, and 11, which one is the correct K value for $X = 3$ and $Y = -1$ in the equation $3x - 2y = K$?

11

What is the significance of substituting X and Y into the equation $3x - 2y = K$ to find K ?

It verifies whether the given point (X, Y) satisfies the equation for a specific K , allowing us to find the correct value of K .

If the point $(3, -1)$ is a solution to $3x - 2y = K$, how do we confirm the value of K ?

Calculate $3(3) - 2(-1) = 9 + 2 = 11$, so $K = 11$.

Why is option (d) 11 the correct answer for the value of K when $X = 3$ and $Y = -1$?

Because substituting these values into the equation yields $K = 11$, confirming it as the solution.

What is the final value of K if $X = 3$ and $Y = -1$ satisfy $3x - 2y = K$?

$K = 11$

Additional Resources

If $X = 3$, $Y = -1$ Is A Solution Of The Equation $3x - 2y = K$, Then K Is : (a) 12 (b) 10 (c) 7 (d) 11

Introduction

Mathematics, as a foundational discipline, often hinges upon the precise understanding of equations and their solutions. Among the myriad of algebraic expressions, linear equations stand as fundamental constructs that serve as building blocks for more advanced mathematical concepts. One such equation, expressed as $3x - 2y = K$, offers a straightforward yet insightful exploration into the relationship between variables and constants.

The question of whether specific values of x and y satisfy a given linear equation is both a common problem in algebra and a gateway to understanding the underlying principles of substitution, evaluation, and parameter determination. In particular, the scenario where $X = 3$ and $Y = -1$ are identified as solutions to the equation introduces an intriguing inquiry: what is the value of the constant K that makes these values satisfy the equation?

This article delves into this question with rigorous analysis, exploring the mathematical processes involved, examining the implications of the solution, and contextualizing the problem within broader mathematical frameworks. By doing so, it aims to provide a comprehensive understanding suitable for students, educators, and anyone interested in the logical structure of algebraic problem-solving.

The Core Problem: Determining the Value of K

The problem statement is straightforward:

> If $X = 3$ and $Y = -1$ are solutions of the equation $3x - 2y = K$, then what is the value of K ?

This leads to a typical substitution problem where the known variable values are substituted into the equation to find the unknown constant.

Understanding the Equation: Linear Form and Variables

Before proceeding with substitution, it's essential to understand the structure of the given equation:

$$3x - 2y = K$$

This is a linear equation in two variables, x and y , with K as a parameter or constant. Such equations represent straight lines in a two-dimensional coordinate system, and solutions are the points (x, y) lying on this line.

The key idea here is:

- If a particular point (x, y) satisfies the equation, then substituting these values into the equation should result in a true statement, i.e., an equality.

In this context:

- The point $(3, -1)$ is claimed to be a solution, so substituting these values into the equation should validate the claim by solving for K .

Substitution Method: Step-by-Step Calculation

The approach to determine K is straightforward:

1. Identify the given variable values:

$$- (x = 3)$$

$$- (y = -1)$$

2. Substitute into the equation:

$$\begin{aligned} & 3(3) - 2(-1) = K \end{aligned}$$

3. Simplify the expressions:

$$- (3 \times 3 = 9)$$

$$- (-2 \times -1 = 2)$$

4. Calculate the sum:

$$\begin{aligned} & 9 + 2 = K \end{aligned}$$

5. Determine the value of K :

$$\begin{aligned} & \end{aligned}$$

$$K = 11$$

\]

This straightforward substitution confirms that when $(x = 3)$ and $(y = -1)$, the value of (K) must be 11 for the equation to hold true.

Analyzing the Multiple Choice Options

Given the options:

- (a) 12
- (b) 10
- (c) 7
- (d) 11

The calculation directly indicates option (d) 11 as the correct answer.

Broader Implications and Context

Understanding Solution Sets in Linear Equations

The problem exemplifies a fundamental algebraic principle: a point (x, y) is a solution to a linear equation if, upon substitution, the resulting statement is true. This foundational idea underpins numerous areas such as systems of equations, graphing lines, and analytical geometry.

Parameterization of the Equation

The equation $(3x - 2y = K)$ can be viewed as a family of lines parameterized by (K) . Changing (K) shifts the line vertically or horizontally in the coordinate plane, depending on the specific coefficients.

- When (K) is known, the line's equation is fixed.
- Knowing a point on that line allows us to determine (K) , effectively anchoring the line to a specific location.

Significance in Mathematical Education

This problem underscores the importance of substitution as a method for verifying solutions and solving for unknown constants. It also illustrates how simple algebraic manipulations can reveal the underlying parameters of a given equation.

Additional Considerations and Related Problems

While the core problem is straightforward, similar problems often involve:

- Multiple solutions: when more than one point satisfies an equation, leading to a set of solutions.
- Parameter exploration: determining how variations in x or y influence K .
- Systems of equations: solving for multiple variables simultaneously when multiple points are involved.

Below are some related problem types for further exploration:

- Given a point, find the equation of the line passing through it with a specific slope.
- Determine the point(s) where two different lines intersect.
- Find all solutions (x, y) to the equation $3x - 2y = K$ when K varies within a certain range.

Conclusion

The problem of identifying the value of K given a specific solution (x, y) to the linear equation $3x - 2y = K$ encapsulates fundamental algebraic principles. Through straightforward substitution and simplification, it becomes evident that the correct value of K is 11, corresponding to option (d).

This exercise highlights the importance of understanding the relationship between variables and constants in linear equations, emphasizing the role of substitution in verifying solutions. It also serves as a stepping stone toward more complex algebraic concepts prevalent in advanced mathematics and related disciplines.

In summary:

- Substituting $x=3$ and $y=-1$ into $3x - 2y$, we find:

$$3 \times 3 - 2 \times (-1) = 9 + 2 = 11$$

- Therefore, the value of K is 11, making option (d) the correct choice.

This problem exemplifies the elegance and simplicity of algebraic reasoning, reinforcing essential skills that are foundational to mathematical literacy and problem-solving.

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If $X = 3$, $Y = 1$ Is A Solution Of The Equation $3x - 2y = K$ Then K Is A 12 B 10 C 7 D 11

If $X = 3$, $Y = 1$ Is A Solution Of The Equation $3x - 2y = K$ Then K Is A 12 B 10 C 7 D 11

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