What Is The Result Of -2x + 4y = 173x - 10y = -3

What Is The Result Of -2x + 4y = 173x - 10y = -3 is a question that involves solving a system of equations with multiple variables. At first glance, the equation appears complex due to its structure and the presence of multiple equal signs. To understand and find the solution, it’s essential to analyze the equations step-by-step, clarify what is being asked, and then methodically solve the system. In this article, we will explore how to interpret such equations, solve them systematically, and interpret the results, providing a comprehensive guide for students and math enthusiasts alike.

Understanding the Equation and Its Structure

Deciphering the Given Expression

The expression presented is:

-2x + 4y = 173x - 10y = -3

At first glance, this appears to be a chain of equalities, but it’s not entirely clear whether it represents one combined equation or multiple equations. Typically, in algebra, a chain of equal signs suggests multiple statements that are all equal to each other. Therefore, this expression likely indicates that:

-2x + 4y = 173x - 10y

and

173x - 10y = -3

This interpretation is common when equations are written in a chain format. To confirm, let's consider it as two separate equations:

1. -2x + 4y = 173x - 10y
2. 173x - 10y = -3

This approach allows us to analyze and solve the system step by step.

Breaking Down the System of Equations

Equation 1: Simplifying -2x + 4y = 173x - 10y

Starting with the first equation:

-2x + 4y = 173x - 10y

Bring all variables to one side:

-2x - 173x + 4y + 10y = 0

Combine like terms:

(-2x - 173x) + (4y + 10y) = 0

-175x + 14y = 0

This simplifies to:

-175x + 14y = 0

Or, dividing both sides by 7 to simplify:

-25x + 2y = 0

Express y in terms of x:

2y = 25x

=> y = (25/2) x

This relationship links x and y and will be useful when substituting into the second equation.

Equation 2: 173x - 10y = -3

Now, the second equation is:

173x - 10y = -3

Substitute y from the previous result y = (25/2) x into this equation:

173x - 10 (25/2) x = -3

Simplify:

173x - (10 25/2) x = -3

Calculate the coefficient:

10 25/2 = (10 25) / 2 = 250 / 2 = 125

So, the equation becomes:

173x - 125x = -3

Combine like terms:

(173 - 125) x = -3

48x = -3

Solve for x:

x = -3 / 48

x = -1 / 16

Now, substitute x back into the expression for y:

y = (25/2) (-1/16)

Simplify:

y = (25/2) (-1/16) = (25 -1) / (2 16) = -25 / 32

Result:

x = -1/16

y = -25/32

These are the solutions satisfying both equations.

Interpreting the Solution

What Does the Solution Represent?

The solution (x = -1/16, y = -25/32) is the point where both equations intersect. Geometrically, these equations represent lines in a coordinate plane, and their intersection point is the unique solution to the system.

Implications of the Solution

The values of x and y can be used in various contexts, such as physics, economics, or engineering, where such systems model relationships between variables. The fractional nature of the solution indicates that the variables are not necessarily whole numbers but are in rational proportion to each other.

Methods of Solving Systems of Equations

Substitution Method

This method involves solving one equation for one variable and substituting into the other. It’s particularly effective when one equation is easy to manipulate, as demonstrated above.

Elimination Method

Involves adding or subtracting equations to eliminate one variable, making it easier to solve for the other. For example, by manipulating the equations to align coefficients.

Graphical Method

Plotting both equations on the coordinate plane to see the intersection point visually. Useful for understanding the geometric interpretation but less precise for fractional solutions.

Practical Applications of Systems of Equations

Economics and Business

Systems of equations model supply and demand, cost-profit analyses, and optimization problems.

Physics and Engineering

They describe relationships between forces, velocities, and other physical quantities.

Computer Science

Algorithms often involve solving systems for resource allocation and network flows.

Summary and Final Thoughts

In conclusion, the expression **What Is The Result Of -2x + 4y = 173x - 10y = -3** can be interpreted as a system of two equations, which upon solving yields the solution x = -1/16 and y = -25/32. This process involves understanding the structure of the equations, simplifying, substituting, and solving systematically. Recognizing the geometric interpretation as the intersection of two lines enhances comprehension. Whether for academic purposes or real-world applications, mastering the techniques to solve such

systems is fundamental in mathematics.

Key Takeaways:
- Always clarify the structure of chained equations.
- Simplify equations step-by-step.
- Use substitution or elimination for systematic solving.
- Understand the geometric meaning of solutions.
- Recognize applications across various disciplines.

By practicing these methods, students and professionals can confidently tackle complex systems of equations, interpret their solutions, and apply them effectively in real-world scenarios.

Frequently Asked Questions

What type of system is represented by the equations -2x + 4y = 173 and 3x - 10y = -3?

The system consists of two linear equations, which can be classified as either consistent or inconsistent depending on whether they have a common solution.

How can I solve the system of equations -2x + 4y = 173 and 3x - 10y = -3?

You can solve the system using methods like substitution or elimination to find the values of x and y that satisfy both equations simultaneously.

Are the equations -2x + 4y = 173 and 3x - 10y = -3 dependent, independent, or inconsistent?

To determine this, solve the system. If there is a unique solution, they are independent. If infinitely many solutions exist, they are dependent. If no solution exists, they are inconsistent.

What is the solution to the system -2x + 4y = 173 and 3x - 10y = -3?

Solving the system yields the values of x and y that satisfy both equations. The exact solution can be found by elimination or substitution method.

Can the system of equations be represented graphically?

Yes, each equation represents a straight line on a graph, and their intersection point (if any) is the solution to the system.

Is the system of equations consistent? How do I check?

Yes, by solving the system. If a solution exists that satisfies both equations, the system is consistent. Otherwise, it is inconsistent.

What is the significance of the coefficients in these equations?

The coefficients determine the slope and intercepts of the lines when graphed, influencing the nature of their intersection.

Can I use matrix methods to solve this system?

Yes, you can write the system as a matrix and use methods like Gaussian elimination or Cramer's rule to find the solution.

What are common pitfalls when solving such systems?

Common pitfalls include arithmetic errors, incorrect substitution, or overlooking the possibility of no solution or infinitely many solutions.

Additional Resources

What Is The Result Of -2x + 4y = 173x - 10y = -3

Understanding the outcome of complex algebraic equations can seem daunting at first glance, especially when multiple expressions are chained together. The statement **What Is The Result Of -2x + 4y = 173x - 10y = -3** presents an intriguing challenge in algebra, prompting us to delve into the fundamentals of solving systems of equations. This article aims to decode this expression, interpret its structure, and guide you through the step-by-step process of finding the solution, all while maintaining a clear and accessible tone suitable for readers with varying levels of mathematical background.

Deciphering the Equation: Is It a System or a Chain?

Before jumping into calculations, it’s essential to understand what the given expression represents. The statement appears as:

-2x + 4y = 173x - 10y = -3

At first glance, this looks like a chain of equalities. But mathematically, what does it mean?

Interpreting the Chain of Equalities

In mathematics, when multiple expressions are linked by equal signs, they typically form a chain of equalities, such as:

a = b = c

which implies:

a = b and b = c

Applying this to our case:

-2x + 4y = 173x - 10y = -3

we interpret it as:

-2x + 4y = 173x - 10y

and

173x - 10y = -3

This interpretation allows us to treat the original statement as two separate equations:

1. -2x + 4y = 173x - 10y (Equation 1)

2. 173x - 10y = -3 (Equation 2)

This is a common approach in algebra when dealing with chained equalities. Our goal is now to solve this system of two equations with two variables, x and y.

Rewriting the System of Equations

Let's express the two equations explicitly:

Equation 1:

-2x + 4y = 173x - 10y

Bring all terms to one side to simplify:

-2x + 4y - 173x + 10y = 0

Combine like terms:

(-2x - 173x) + (4y + 10y) = 0

-175x + 14y = 0

We can rewrite this as:

-175x + 14y = 0

or equivalently,

14y = 175x

which simplifies to:

y = (175/14) x

Further simplification:

175/14 = (25 7) / (2 7) = 25/2

So,

Equation 3:

y = (25/2) x

Now, let's write Equation 2:

Equation 2:

173x - 10y = -3

Substitute y from Equation 3 into Equation 2:

173x - 10 (25/2) x = -3

Calculate:

173x - (10 25/2) x = -3

Simplify the second term:

10 25/2 = (10 25) / 2 = 250 / 2 = 125

So, the equation becomes:

173x - 125x = -3

Combine like terms:

(173 - 125) x = -3

48x = -3

Solve for x:

x = -3 / 48

Simplify:

x = -1 / 16

Now, find y using Equation 3:

y = (25/2) x

Substitute x = -1/16:

y = (25/2) (-1/16)

Calculate numerator:

25 (-1) = -25

Calculate denominator:

2 16 = 32

Thus:

y = -25 / 32

Result:

x = -1/16

y = -25/32

This pair (x, y) satisfies both equations and is the solution to our original system.

Understanding the Solution and Its Significance

The solution set:

- x = -1/16
- y = -25/32

represents the point of intersection of the lines defined by the two equations derived from the chain of equalities. This point in the coordinate plane is the unique solution to the system, assuming the lines are not parallel or coincident.

Implications of the Result

- Unique Solution: The system yields a single point, indicating the lines intersect at exactly one point.
- Mathematical Consistency: The equations are consistent, meaning they do not contradict each other.
- Real-World Applications: Such solutions often model real-world problems involving constraints, such as economics, engineering, or physics, where two conditions must be satisfied simultaneously.

Additional Considerations

While the solution process appears straightforward, several important aspects should be kept in mind:

1. Verify the Solution

Always substitute the found values back into the original equations for verification:

- For Equation 1 (rewritten as 14y = 175x):

Calculate:

Left side: 14 y = 14 (-25/32) = -350/32 = -175/16

Right side: 175 x = 175 (-1/16) = -175/16

They match, confirming the solution satisfies Equation 1.

- For Equation 2:

Calculate:

173x - 10y = 173 (-1/16) - 10 (-25/32)

Compute each term:

173 (-1/16) = -173/16

-10 (-25/32) = 250/32 = 125/16

Sum:

-173/16 + 125/16 = (-173 + 125)/16 = -48/16 = -3

Matches the right side, confirming the solution satisfies Equation 2.

2. Understanding the Nature of the Equations

Both equations represent straight lines in the Cartesian plane. The fact that they intersect at a single point signifies they are not parallel or coincident.

3. Broader Mathematical Context

This problem exemplifies how systems of linear equations are solved and how chained equalities can be unraveled into solvable components. It also highlights the importance of algebraic manipulation, substitution, and verification.

Conclusion: The Final Outcome

The initial question, **What Is The Result Of -2x + 4y = 173x - 10y = -3**, leads us through a methodical process of interpretation, algebraic manipulation, and solution verification. The resulting pair:

- x = -1/16
- y = -25/32

provides a precise intersection point that satisfies both equations derived from the chain of equalities. Such exercises underscore the beauty and power of algebra in solving real-world problems, transforming complex-looking statements into clear, numerical solutions. Whether in academic settings or practical applications, understanding how to break down and solve systems of equations remains an essential skill for anyone engaging with mathematics.

What Is The Result Of 2x 4y 173x 10y 3

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