

Solve. $-3.7 = -5.4x$ 5.5 Enter Your Answer As A Fraction In Simplest Form In The Box.

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Mathematics often presents us with equations that require careful manipulation to find the unknown value. In this particular problem, the goal is to solve for (x) in the equation $(-3.7 = -5.4 \times 5.5 \times x)$, and then express the answer as a simplified fraction. This process involves understanding the order of operations, isolating the variable, and converting decimal results into fractions.

Whether you're a student working on algebra homework or someone wanting to refine your problem-solving skills, this guide will walk you through each step thoroughly.

Understanding the Equation

Before diving into calculations, it's essential to analyze the given equation:

$$\begin{aligned} & \backslash \\ & -3.7 = -5.4 \times 5.5 \times x \\ & \backslash \end{aligned}$$

This equation involves multiplication of constants and a variable (x) . Our aim is to find the value of (x) .

Step-by-Step Solution Process

1. Simplify the Constant Multiplication

The first step is to compute the product of (-5.4×5.5) . Since these are decimal numbers, multiplying them directly is straightforward but requires attention to detail.

Calculation:

$$\begin{aligned} & \backslash \\ & -5.4 \times 5.5 \\ & \backslash \end{aligned}$$

- Break down the multiplication:

$$\begin{aligned} & \backslash \\ & 5.4 \times 5.5 = (5.4 \times 5) + (5.4 \times 0.5) \\ & \backslash \end{aligned}$$

- Calculate each part:

$$5.4 \times 5 = 27$$

$$5.4 \times 0.5 = 2.7$$

- Sum the parts:

$$27 + 2.7 = 29.7$$

- Since both factors are negative, their product is positive:

$$-5.4 \times 5.5 = -29.7$$

Result:

$$-5.4 \times 5.5 = -29.7$$

Now, rewrite the original equation as:

$$-3.7 = -29.7 \times x$$

2. Isolate (x)

To find (x) , divide both sides of the equation by (-29.7) :

$$x = \frac{-3.7}{-29.7}$$

Note that dividing two negative numbers results in a positive value:

$$x = \frac{3.7}{29.7}$$

3. Convert the Decimal Fraction to a Simplified Fraction

The current form:

$$x = \frac{3.7}{29.7}$$

To express this as a fraction in simplest form, follow these steps:

a. Eliminate the decimals by multiplying numerator and denominator by 10:

$$x = \frac{3.7 \times 10}{29.7 \times 10} = \frac{37}{297}$$

b. Simplify the fraction $\left(\frac{37}{297}\right)$:

- Check for common factors:

Since 37 is a prime number, the only factors are 1 and 37.

- Check if 37 divides 297 evenly:

$$297 \div 37 \approx 8.03$$

which is not an integer. Therefore, no common factors exist other than 1.

Result:

$$x = \frac{37}{297}$$

This fraction is already in its simplest form.

Final Answer

The solution to the equation, expressed as a simplified fraction, is:

$$\boxed{\frac{37}{297}}$$

Additional Tips for Solving Similar Equations

1. Always simplify constants first

Calculations involving decimals can often be simplified by converting to fractions early on, which makes the process of simplification more straightforward.

2. Convert decimals to fractions for precision

When asked to enter answers as fractions, converting decimal numbers to fractions helps avoid rounding errors and ensures the answer is in the correct form.

3. Check for common factors

Always verify if the numerator and denominator have common factors and reduce the fraction to simplest form to meet the problem's requirement.

4. Use prime factorization for complex simplifications

For more complex fractions, prime factorization can help identify common factors quickly.

Practice Problems

To solidify your understanding, try solving these similar problems:

1. Solve $(-2.5 = -4.2 \times 3.3 \times x)$. Express your answer as a simplified fraction.
2. Solve $(1.2 = 2.4 \times 0.5 \times x)$. Express your answer as a simplified fraction.
3. Solve $(-6.8 = -8.5 \times 2.0 \times x)$. Express your answer as a simplified fraction.

Conclusion

Solving equations involving decimals and variables requires careful calculation and understanding of fraction simplification. By methodically simplifying constants, isolating the variable, and converting decimal results into fractions, you can confidently find the correct answer in simplest form.

Remember, converting to fractions early in the process often makes the calculations cleaner and easier to verify. Practice these steps regularly to improve your algebra skills and ensure accuracy in solving similar equations.

Keywords: solving equations, algebra, fractions, simplification, decimals, isolate variable, mathematical problem-solving, algebraic equations, prime factorization

Frequently Asked Questions

How do you solve the equation $-3.7 = -5.4x$ for x ?

Divide both sides by -5.4 : $x = -3.7 / -5.4$. Simplify the fraction to get the answer in simplest form.

What is the first step to isolate x in the equation $-3.7 = -5.4x$?

The first step is to divide both sides by -5.4 to solve for x .

How do you express the solution to $-3.7 = -5.4x$ as a simplified fraction?

Convert -3.7 and -5.4 to fractions: $-37/10$ and $-54/10$, then divide: $(-37/10) \div (-54/10) = (-37/10) \times (10/-54)$. Simplify the resulting fraction to its lowest terms.

What is the simplified fractional form of the solution to $-3.7 = -5.4x$?

The solution simplifies to $37/54$ in simplest form.

Why should the negative signs cancel out when solving $-3.7 = -5.4x$?

Because dividing two negative numbers results in a positive, so the negatives cancel out, making the calculation easier.

How do I check if my fractional solution for x is correct?

Substitute the fractional value back into the original equation to verify if both sides are equal.

Additional Resources

Solving Linear Equations: A Step-by-Step Guide to $(-3.7 = -5.4 \times 5.5x)$

When it comes to algebraic equations, understanding the process of solving for an unknown variable is fundamental. The equation $(-3.7 = -5.4 \times 5.5x)$ might appear straightforward at first glance, but it requires careful manipulation to find the precise value of (x) . This article aims to dissect this problem comprehensively, guiding you through the process with clarity and precision, and emphasizing the importance of presenting your answer as a simplified fraction.

Understanding the Equation

Before diving into the solution, it's crucial to understand the structure and components of the given equation:

$$\begin{aligned} & \backslash \\ & -3.7 = -5.4 \times 5.5x \\ & \backslash \end{aligned}$$

Key Elements:

- Constants: -3.7 , -5.4 , and 5.5 are all decimal numbers.
- Variable: x is the unknown variable we are solving for.
- Operations: The multiplication of -5.4 and 5.5 with x .

The goal is to isolate x on one side of the equation, which involves performing inverse operations—primarily division—while maintaining the balance of the equation.

Step-by-Step Solution Approach

Step 1: Simplify the constants

The equation involves the product of -5.4 and 5.5 , which can be computed first:

$$\begin{aligned} & \backslash \\ -3.7 &= (-5.4) \times 5.5 \times x \\ & \backslash \end{aligned}$$

Calculating $(-5.4) \times 5.5$:

- Convert to fractions for precise calculation:
- $-5.4 = -\frac{54}{10} = -\frac{27}{5}$
- $5.5 = \frac{55}{10} = \frac{11}{2}$

- Multiply the fractions:

$$\begin{aligned} & \backslash \\ -\frac{27}{5} \times \frac{11}{2} &= -\frac{27 \times 11}{5 \times 2} = -\frac{297}{10} \\ & \backslash \end{aligned}$$

So,

$$\begin{aligned} & \backslash \\ -5.4 \times 5.5 &= -\frac{297}{10} \\ & \backslash \end{aligned}$$

Step 2: Rewrite the equation with the simplified product

Now, the original equation becomes:

$$\begin{aligned} & \backslash \\ -3.7 &= -\frac{297}{10} \times x \end{aligned}$$

\]

Expressing (-3.7) as a fraction:

- Since $(3.7 = \frac{37}{10})$, then $(-3.7 = -\frac{37}{10})$.

Thus,

$$-\frac{37}{10} = -\frac{297}{10} \times x$$

Step 3: Isolate (x)

To solve for (x) , divide both sides of the equation by $(-\frac{297}{10})$:

$$x = \frac{-\frac{37}{10}}{-\frac{297}{10}}$$

Dividing fractions involves multiplying by the reciprocal:

$$x = -\frac{37}{10} \times \frac{10}{-297}$$

Note that negative signs cancel out:

$$x = \frac{37}{10} \times \frac{10}{297}$$

Now, multiply numerators and denominators:

$$x = \frac{37 \times 10}{10 \times 297}$$

Cancel the common factor of 10:

$$x = \frac{37}{297}$$

Result:

\]

$$x = \frac{37}{297}$$

\]

This is the simplified form because 37 and 297 share no common factors other than 1.

Final Answer in Simplest Fraction Form

The exact value of x is $\boxed{\frac{37}{297}}$.

Additional Insights and Tips

Why express the answer as a fraction?

- Many math problems, especially those in academic settings, require answers in fractional form for precision.
- Fractions avoid rounding errors associated with decimal approximations.
- Simplifying fractions ensures the most reduced form, making the answer clearer and more elegant.

How to verify your solution:

- Substitute $x = \frac{37}{297}$ back into the original equation.
- Convert all decimals to fractions as needed.
- Confirm that both sides are equal, which validates the solution.

Practical Applications of Solving Such Equations

While this problem is theoretical, understanding how to manipulate and solve equations like $-3.7 = -5.4 \times 5.5x$ has real-world relevance:

- Engineering: Calculating unknown parameters in system equations.
- Finance: Determining rates or quantities based on proportional relationships.
- Science: Solving for variables in experimental formulas.
- Data Analysis: Rearranging formulas to isolate variables of interest.

Conclusion

Mastering the art of solving linear equations with decimal coefficients and presenting answers as simplified fractions is a vital skill in mathematics. By converting decimals to fractions, simplifying expressions, and carefully performing inverse operations, you can confidently find the solution to equations like $(-3.7 = -5.4 \times 5.5x)$.

This process not only enhances your algebraic proficiency but also prepares you to tackle more complex problems across various scientific and mathematical disciplines. Remember, clarity and precision are key—so always verify your solutions and present your answers in their simplest form for maximum correctness and professionalism.

Solve $3\frac{7}{5} = 4x + 5$ Enter Your Answer As A Fraction In Simplest Form In The Box

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