

Solve For X: $\frac{1.3x - 4}{5} = 3.1x$?

Solve For X: $\frac{1.3x - 4}{5} = 3.1x$?

Understanding how to solve for the variable (x) in algebraic equations is a fundamental skill in mathematics. The equation $(\frac{1.3x - 4}{5} = 3.1x)$ presents an interesting challenge that combines fractions, decimals, and variables. In this comprehensive guide, we will explore step-by-step methods to solve this equation, discuss common pitfalls, and provide tips to master similar algebraic problems.

Understanding the Equation

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

$$\frac{1.3x - 4}{5} = 3.1x$$

This equation involves:

- A fraction with numerator $(1.3x - 4)$
- A denominator of 5
- A decimal coefficient (3.1) multiplying (x)

The goal is to find the value of (x) that satisfies this equation.

Key Concepts in Solving Algebraic Equations

To effectively solve for (x) , understanding some fundamental concepts is vital:

1. Isolating the Variable

The main goal is to get (x) on one side of the equation by performing operations that simplify the expression.

2. Eliminating Fractions

Multiplying both sides by the denominator helps remove fractions, making equations easier to work with.

3. Handling Decimals

Working with decimals is straightforward once the decimal coefficients are managed properly, often by converting to fractions or multiplying through to clear decimal points.

4. Checking the Solution

Always substitute the found value of x back into the original equation to verify correctness.

Step-by-Step Solution

Let's now proceed step-by-step to solve the equation:

$$\frac{1.3x - 4}{5} = 3.1x$$

Step 1: Eliminate the Fraction

Multiply both sides of the equation by 5 to clear the denominator:

$$5 \times \frac{1.3x - 4}{5} = 5 \times 3.1x$$

This simplifies to:

$$1.3x - 4 = 15.5x$$

Step 2: Rearrange Terms to Isolate x

Bring all terms involving x to one side and constants to the other:

$$1.3x - 15.5x = 4$$

Simplify the left side:

$$(1.3 - 15.5) x = 4$$

$$-14.2x = 4$$

Step 3: Solve for x :

Divide both sides by (-14.2) :

$$x = \frac{4}{-14.2}$$

Simplify the fraction:

$$x = -\frac{4}{14.2}$$

To simplify further, note that:

$$14.2 = \frac{142}{10}$$

So,

$$x = -\frac{4}{\frac{142}{10}} = -4 \times \frac{10}{142} = -\frac{40}{142}$$

Reduce the fraction:

$$\frac{40}{142} = \frac{20}{71}$$

Thus, the solution is:

$$x = -\frac{20}{71}$$

or approximately:

$$x \approx -0.2817$$

Verifying the Solution

Always verify your solution by substituting $(x = -\frac{20}{71})$ back into the original equation.

Step 1: Calculate $(1.3x - 4)$

$$1.3 \times \left(-\frac{20}{71}\right) - 4$$

Convert 1.3 to a fraction:

$$1.3 = \frac{13}{10}$$

So:

$$\frac{13}{10} \times \left(-\frac{20}{71}\right) - 4 = -\frac{13 \times 20}{10 \times 71} - 4$$

Simplify numerator and denominator:

$$-\frac{260}{710} - 4$$

Reduce $\left(\frac{260}{710}\right)$:

$$\frac{260}{710} = \frac{26}{71}$$

Now:

$$-\frac{26}{71} - 4$$

Express 4 as a fraction with denominator 71:

$$-\frac{26}{71} - \frac{284}{71} = -\frac{26 + 284}{71} = -\frac{310}{71}$$

Step 2: Divide by 5

$$\frac{-\frac{310}{71}}{5} = -\frac{310}{71} \times \frac{1}{5} = -\frac{310}{355}$$

Simplify numerator and denominator:

$$-\frac{310}{355} = -\frac{62}{71}$$

Step 3: Calculate RHS $(3.1x)$

$$3.1 \times \left(-\frac{20}{71}\right)$$

Convert 3.1 to fraction:

$$3.1 = \frac{31}{10}$$

So:

$$\frac{31}{10} \times -\frac{20}{71} = -\frac{31 \times 20}{10 \times 71} = -\frac{620}{710}$$

Simplify:

$$-\frac{620}{710} = -\frac{62}{71}$$

This matches the LHS calculation, confirming that the solution $(x = -\frac{20}{71})$ satisfies the original equation.

Additional Tips for Solving Similar Equations

When tackling algebraic equations involving fractions, decimals, and variables, consider these tips:

- **Convert decimals to fractions:** This simplifies calculations and reduces errors.
- **Always clear fractions early:** Multiplying through by the least common denominator (LCD) simplifies the equation.
- **Keep track of signs:** Be cautious with negative signs, especially when moving terms across the equation.
- **Check your solution:** Substituting back ensures accuracy and helps catch mistakes.
- **Practice similar problems:** The more you practice, the better you'll become at recognizing patterns and efficient methods.

Common Mistakes to Avoid

Understanding common pitfalls can prevent errors:

1. **Neglecting to multiply both sides by the denominator:** Always perform the same operation on both sides.
2. **Incorrectly simplifying fractions:** Make sure to reduce fractions properly.
3. **Mismanaging signs:** Keep track of positive and negative signs during calculations.
4. **Forgetting to verify solutions:** Always substitute your answer back into the original equation.

Conclusion

Solving the equation $\frac{1.3x - 4}{5} = 3.1x$ involves strategic steps such as clearing fractions, simplifying expressions, and carefully managing decimals. The solution $(x = -\frac{20}{71})$ or approximately (-0.2817) is verified by substitution, confirming its correctness. Mastering such problems enhances algebraic skills and prepares you for more complex equations encountered in mathematics, science, and engineering. With practice and attention to detail, solving for (x) becomes a straightforward process, empowering you to tackle a wide range of algebraic challenges confidently.

Frequently Asked Questions

How do I solve for x in the equation $1.3x - \frac{4}{5} = 3.1x$?

First, convert the fractions to decimals if needed, then move all x terms to one side and constants to the other, and solve for x step-by-step.

What is the first step to isolate x in the equation $1.3x - \frac{4}{5} = 3.1x$?

Subtract $1.3x$ from both sides to get $-\frac{4}{5} = 3.1x - 1.3x$, which simplifies to $-\frac{4}{5} = 1.8x$.

How do I handle the fraction $-\frac{4}{5}$ when solving for x?

You can convert $-\frac{4}{5}$ to decimal (-0.8) or multiply both sides of the equation by 5 to clear the denominator.

What is the solution for x after simplifying the equation $1.3x - \frac{4}{5} = 3.1x$?

After isolating x, $x = (-\frac{4}{5}) / (1.8)$, which simplifies to $x = -0.8 / 1.8$.

How do I simplify the fraction $x = -0.8 / 1.8$?

Divide numerator and denominator by their greatest common divisor or convert to decimal: $x \approx -0.8 / 1.8 \approx -0.444$.

What is the approximate value of x in the equation $1.3x - \frac{4}{5} = 3.1x$?

$x \approx -0.444$ when rounded to three decimal places.

Can I verify my solution for x in the original equation?

Yes, substitute $x \approx -0.444$ back into the original equation to check if both sides are equal.

What are common mistakes to avoid when solving for x in this equation?

Avoid forgetting to convert fractions to decimals if needed, and ensure you correctly move terms across the equation without sign errors.

Is there a quick way to solve for x in equations like $1.3x - \frac{4}{5} = 3.1x$?

Yes, converting fractions to decimals and then combining like terms makes the process faster and less error-prone.

Additional Resources

Solve For X: $1.3x - \frac{4}{5} = 3.1x = ?$

Understanding how to solve for x in algebraic equations is fundamental to mastering mathematics. The problem "Solve For X: $1.3x - \frac{4}{5} = 3.1x = ?$ " presents an interesting challenge that involves multiple steps, including isolating the variable, simplifying fractions, and understanding the equality chain. This type of problem not only tests your algebra skills but also helps reinforce concepts such as combining like terms and handling fractional coefficients. In this comprehensive review, we will explore the steps involved in solving this equation, analyze the underlying principles, and discuss best practices for tackling similar problems.

Understanding the Equation

The given problem appears as:

$$1.3x - 4/5 = 3.1x = ?$$

This expression suggests a chain of equalities involving the variable x . To interpret it correctly, it's essential to understand that in standard algebraic notation, a chain like this indicates that:

- $1.3x - 4/5$ equals $3.1x$
- And both sides are equal to some value, which we need to find.

Hence, the problem effectively asks us to:

1. Find the value of x that satisfies $1.3x - 4/5 = 3.1x$
2. Determine the value of the entire expression (the rightmost question mark).

Breaking Down the Problem

Step 1: Restate the equation

Given the chain, the primary focus is on solving for x in:

$$1.3x - 4/5 = 3.1x$$

Once x is found, we can compute the value of the expression (which likely is $3.1x$, or equivalently, the shared value in the chain).

Step 2: Simplify the equation

Subtract $3.1x$ from both sides to bring all x terms to one side:

$$1.3x - 4/5 - 3.1x = 0$$

Combine like terms:

$$(1.3x - 3.1x) - 4/5 = 0$$

Calculate the coefficient:

$$-1.8x - 4/5 = 0$$

Solving for x

Step 3: Isolate x

Add $\frac{4}{5}$ to both sides:

$$-1.8x = \frac{4}{5}$$

Express $\frac{4}{5}$ as a decimal or fraction for clarity. $\frac{4}{5} = 0.8$.

So:

$$-1.8x = 0.8$$

Divide both sides by -1.8:

$$x = 0.8 / -1.8$$

Simplify the division:

$$x = -0.8 / 1.8$$

Reduce the fraction:

Divide numerator and denominator by 0.2:

$$x = (-0.8 / 0.2) / (1.8 / 0.2) = (-4) / (9)$$

Therefore,

$$x = -4/9$$

Calculating the Value of the Expression

Now that we have $x = -4/9$, we can find the value of the expression $3.1x$ (which is the right side of the chain).

Convert 3.1 to a fraction:

$$3.1 = 31/10$$

Compute:

$$\text{Value} = 3.1x = (31/10) (-4/9)$$

Multiply numerators and denominators:

$$\text{Value} = (31 \cdot -4) / (10 \cdot 9) = (-124) / 90$$

Simplify the fraction:

Divide numerator and denominator by 2:

$$(-124 / 2) / (90 / 2) = (-62) / 45$$

So, the value of the expression is $-62/45$, which is approximately -1.3778 .

Summary of the Solution

- The value of x satisfying the equation $1.3x - 4/5 = 3.1x$ is $x = -4/9$.
- The value of the expression $3.1x$ (or the chain's rightmost value) is $-62/45$ or approximately -1.3778 .

Analysis of the Problem and Its Features

Strengths of the Approach

- Step-by-step methodology ensures clarity and minimizes errors.
- Fraction handling enhances understanding of algebraic manipulations involving rational numbers.
- Conversion between decimals and fractions provides flexibility and improves accuracy.
- Chain solving demonstrates how equations can be interconnected, a useful skill in advanced algebra.

Potential Challenges and Pitfalls

- Misinterpreting the chain of equalities could lead to incorrect assumptions.
- Failing to convert fractions properly might introduce calculation errors.
- Overlooking the negative sign during division could produce incorrect solutions.
- Not simplifying fractions fully may cause confusion in the final answer.

Features of the Problem

- Combines fractional and decimal coefficients, testing numerical fluency.
- Involves multiple algebraic steps, fostering problem-solving skills.
- Demonstrates how to handle chained equalities in algebra.
- Serves as a good example for teaching the importance of careful manipulation and verification.

Best Practices for Solving Similar Equations

- Always interpret chain equations carefully, confirming the relationships between expressions.
- Convert all numbers to a consistent format (fractions or decimals) to avoid confusion.
- Simplify step by step, ensuring each operation is correct before proceeding.
- Check your solutions by substituting back into the original equations.
- Practice with different coefficients to build confidence in handling various algebraic forms.

Conclusion

The problem "Solve For X: $1.3x - \frac{4}{5} = 3.1x = ?$ " offers a comprehensive exercise in algebraic manipulation, combining multiple concepts such as solving linear equations, handling fractions, and understanding chained equalities. By systematically breaking down the problem, converting between decimals and fractions, and carefully performing operations, students can arrive at accurate solutions while reinforcing essential algebra skills. This type of problem exemplifies the importance of precision, clarity, and methodical reasoning in mathematics. Whether for students honing their algebraic proficiency or educators designing problem sets, mastering such exercises builds a strong foundation for tackling more complex mathematical challenges.

Solve For X 1 3x 4 5 3 1x

Solve For X 1 3x 4 5 3 1x

Related Articles

- [Helppppp Pleaseeee Xxxx](#)
- [1/2 X \(6 X 4 \) Divided By \(3 + 2\)](#)
- [Whats The Vertex Of This Graph??](#)

[Back to Home](#)