

Place The Steps In The Correct Order For Solving The Equation $8 + 6 - 5 = 8x + 1 - 3x$ $-3 + 2 = 5x + 1$

Place The Steps In The Correct Order For Solving The Equation $8 + 6 - 5 = 8x + 1 - 3x$ $-3 + 2 = 5x + 1$ is a fundamental question in algebra that helps students develop critical thinking skills needed to solve linear equations efficiently. Understanding how to correctly sequence the steps involved in solving an equation ensures accuracy and builds a solid foundation for more complex mathematical problems. In this comprehensive guide, we will explore the step-by-step process to solve equations like the one presented, discuss common pitfalls, and provide tips to master this essential algebraic skill. Whether you're a student preparing for exams or a teacher looking for effective teaching strategies, mastering the correct order of steps will enhance your problem-solving prowess.

Understanding the Importance of Correct Step Order in Solving Equations

Why Is Sequencing Important?

Solving algebraic equations involves multiple operations such as addition, subtraction, multiplication, and division. Performing these operations in the wrong order can lead to incorrect answers. Proper sequencing ensures logical progression towards isolating the variable and finding its value.

Key Benefits of Correct Step Sequencing

- Ensures accuracy in solutions
- Builds problem-solving confidence
- Helps in understanding the structure of equations
- Prepares students for higher-level math topics

Breaking Down the Equation: An Example of a

Complex Linear Equation

Given the expression:

```
```plaintext
8 - 6 - 5 = 8x + 1 - 3x = -3 + 2 = 5x + 1 =
```
```

This appears to be a chain of equations, which might be a typo or intentional to demonstrate multiple steps. For clarity, let's interpret this as a typical linear equation problem involving multiple steps, such as:

```
```plaintext
8 - 6 - 5 = 8x + 1 - 3x = -3 + 2 = 5x + 1
```
```

Our goal is to find the value of x that satisfies the entire set.

Step-by-Step Guide To Solving The Equation

Step 1: Simplify Each Side of the Equation

Before applying any operations, simplify expressions by combining like terms on each side:

- Left side: $8 - 6 - 5$
- Right side: $8x + 1 - 3x$

Calculations:

- $8 - 6 = 2$
- $2 - 5 = -3$

So, the simplified left side is -3 .

For the right side:

- $8x - 3x = 5x$
- So, $8x + 1 - 3x$ simplifies to $5x + 1$

Now, the equation simplifies to:

```
```plaintext
-3 = 5x + 1
```
```

Step 2: Isolate the Variable Term

Next, we want to get all the x terms on one side and constants on the other.

Subtract 1 from both sides:

```
```plaintext
-3 - 1 = 5x + 1 - 1
```
```

Simplify:

```
```plaintext
-4 = 5x
```
```

Step 3: Solve for the Variable

Divide both sides by 5:

```
```plaintext
-4 / 5 = 5x / 5
```
```

Simplify:

```
```plaintext
x = -4/5
```
```

Solution: The value of x is -4/5.

Summary of the Correct Order of Steps

To solve equations like this effectively, follow these key steps:

1. Simplify both sides by combining like terms.
2. Isolate the variable term by moving constants to the other side.
3. Solve for the variable by dividing or multiplying as needed.
4. Check your solution by substituting back into the original equation.

Common Mistakes When Sequencing Steps in Solving Equations

1. Skipping Simplification

Neglecting to simplify expressions first can complicate calculations and lead to errors.

2. Moving Terms Incorrectly

Forgetting to perform the same operation on both sides can distort the balance of the equation.

3. Dividing Before Isolating the Variable

Attempting to divide before collecting all variable terms can cause confusion and incorrect solutions.

4. Ignoring the Order of Operations

Remember to follow PEMDAS (Parentheses, Exponents, Multiplication and Division, Addition and Subtraction) even in simple equations.

Tips for Mastering the Order of Steps in Solving Equations

- Write down each step clearly to avoid skipping or mixing steps.
- Use inverse operations to systematically isolate the variable.
- Practice with different types of equations to build confidence.
- Check your work by substituting your solution back into the original equation.
- Use visual aids such as flowcharts to understand the sequence.

Practice Problems to Reinforce Learning

1. Solve for x:
 $(3x + 4 = 16)$

2. Solve for y:

$$\backslash(2(y - 3) = 8 \backslash)$$

3. Solve for z:

$$\backslash(-5z + 2 = 3z - 10 \backslash)$$

Solutions:

1. $\backslash(3x + 4 = 16 \backslash)$

Subtract 4: $\backslash(3x = 12 \backslash)$

Divide by 3: $\backslash(x = 4 \backslash)$

2. $\backslash(2(y - 3) = 8 \backslash)$

Divide both sides by 2: $\backslash(y - 3 = 4 \backslash)$

Add 3: $\backslash(y = 7 \backslash)$

3. $\backslash(-5z + 2 = 3z - 10 \backslash)$

Add 5z to both sides: $\backslash(2 = 8z - 10 \backslash)$

Add 10: $\backslash(12 = 8z \backslash)$

Divide by 8: $\backslash(z = \frac{12}{8} = \frac{3}{2} \backslash)$

Advanced Tips for Solving Complex Equations

- Break down multi-step equations into smaller parts.
- Use substitution if the equation involves multiple variables.
- Always perform inverse operations to isolate the variable systematically.
- Verify solutions by substituting back into the original equation.

Conclusion: Master the Order to Solve Equations Effectively

Understanding the correct order of steps in solving equations is essential for accuracy and efficiency in algebra. Starting with simplifying expressions, then moving to isolating variables, and finally solving for the unknown ensures a logical progression that minimizes errors. Practice consistently with different types of equations, and always verify your solutions to develop confidence. Mastering this process not only prepares students for higher-level math but also enhances overall problem-solving skills applicable in various real-life situations.

By following these structured steps and tips, you'll be well-equipped to tackle any linear equation with clarity and precision. Remember, the key to

success in algebra is a systematic approach—place the steps in the correct order, and the solutions will follow with ease.

Frequently Asked Questions

What is the first step to simplify the equation $8 + (-6) - 5 = 8x + 1 - 3x = -3 + 2 = 5x + 1$?

Start by simplifying each side of the equation separately: perform addition and subtraction to combine like terms.

How do you combine like terms on the left side of the equation?

Calculate $8 + (-6) - 5$ to simplify the left side, which results in $8 - 6 - 5 = -3$.

What is the next step after simplifying the individual parts of the equation?

Set the simplified expressions equal to each other to establish a single equation for solving the variable.

How do you combine the terms with x on the right side of the equation?

Combine $8x$ and $-3x$ to get $5x$ on the right side.

What should you do after simplifying all parts to isolate the variable?

Bring all x terms to one side and constants to the other, then solve for x .

What is the final step to find the value of x ?

Divide both sides of the equation by the coefficient of x to determine the value of x .

What is the correct order of steps for solving the equation $8 + (-6) - 5 = 8x + 1 - 3x = -3 + 2 = 5x + 1$?

Simplify each side, set the simplified expressions equal, combine like terms, isolate the variable, and then solve for x .

Additional Resources

Solving Equations Step-by-Step: A Comprehensive Guide to Mastering Algebraic Manipulation

When it comes to algebra, solving equations is a fundamental skill that underpins advanced mathematical reasoning. Whether you're a student aiming to ace your math exams or a professional looking to strengthen your problem-solving toolkit, understanding the correct order of steps is crucial. Today, we'll dissect the process of solving a complex equation involving multiple steps, specifically:

$$8 \pm 6 - 5 = 8x + 1 - 3x = -3 + 2 = 5x + 1 =$$

This example, while seemingly complicated, can be systematically approached by following a logical sequence. Think of it as a recipe—each step builds upon the previous to reach the solution efficiently. Let's explore this process in depth.

Understanding the Equation Structure

Before diving into solving, it's essential to interpret the structure of the given expression. The notation:

$$8 \pm 6 - 5 = 8x + 1 - 3x = -3 + 2 = 5x + 1 =$$

appears to be a chain of equalities, but it's somewhat ambiguous. In algebra, such chains typically imply a series of equalities, meaning:

$$\begin{aligned} & \backslash \\ & 8 \pm 6 - 5 = 8x + 1 - 3x = -3 + 2 = 5x + 1 \\ & \backslash \end{aligned}$$

This indicates that all these expressions are equal to each other, and our goal is to find the value of x that makes all parts equal.

Important Clarification:

- The " $\pm$ " symbol suggests that either plus or minus could be used; we need to consider both cases separately.
- The chain implies multiple steps:
 1. $(8 + 6 - 5)$ or $(8 - 6 - 5)$ (depending on the sign)
 2. Equal to the expression $(8x + 1 - 3x)$
 3. Equal to $(-3 + 2)$
 4. Equal to $(5x + 1)$

Therefore, solving involves:

- Evaluating the numerical expressions
- Setting the expressions equal to each other
- Solving for x in the resulting equations

Step 1: Simplify Each Expression

The first logical step is to simplify each segment of the chain independently.

1. Simplify $(8 \pm 6 - 5)$

Case 1: Using the plus sign

$$\begin{aligned} &[\\ 8 + 6 - 5 &= 14 - 5 = 9 \\ &] \end{aligned}$$

Case 2: Using the minus sign

$$\begin{aligned} &[\\ 8 - 6 - 5 &= 2 - 5 = -3 \\ &] \end{aligned}$$

The choice of sign significantly affects the subsequent steps, so we must examine both.

2. Simplify $(8x + 1 - 3x)$

$$\begin{aligned} &[\\ 8x - 3x + 1 &= 5x + 1 \\ &] \end{aligned}$$

3. Simplify $(-3 + 2)$

$$\begin{aligned} &[\\ -3 + 2 &= -1 \\ &] \end{aligned}$$

4. The expression $(5x + 1)$ remains as is.

Step 2: Set Up Equations Based on Simplification

Now, organize the chain of equalities considering both sign options:

For the plus sign case:

$$\begin{aligned} & \backslash[\\ 9 &= 8x + 1 - 3x = -1 = 5x + 1 \\ & \backslash] \end{aligned}$$

For the minus sign case:

$$\begin{aligned} & \backslash[\\ -3 &= 8x + 1 - 3x = -1 = 5x + 1 \\ & \backslash] \end{aligned}$$

Our goal is to find the value of x that satisfies all these equalities in each scenario.

Step 3: Solve the Equations Step-by-Step

Let's proceed case by case.

Case 1: Plus Sign ($8 + 6 - 5 = 9$)

Equation 1:

$$\begin{aligned} & \backslash[\\ 9 &= 8x + 1 - 3x \\ & \backslash] \end{aligned}$$

Simplify:

$$\begin{aligned} & \backslash[\\ 9 &= (8x - 3x) + 1 = 5x + 1 \\ & \backslash] \end{aligned}$$

Subtract 1 from both sides:

$$\begin{aligned} & \backslash[\\ 9 - 1 &= 5x \rightarrow 8 = 5x \\ & \backslash] \end{aligned}$$

Solve for x :

$$\begin{aligned} & \backslash[\\ x &= \frac{8}{5} = 1.6 \\ & \backslash] \end{aligned}$$

Equation 2:

$$\begin{aligned} & \backslash[\\ -1 &= 5x + 1 \\ & \backslash] \end{aligned}$$

Subtract 1 from both sides:

$$\begin{aligned} & \backslash[\\ & -1 - 1 = 5x \rightarrow -2 = 5x \\ & \backslash] \end{aligned}$$

Solve for (x) :

$$\begin{aligned} & \backslash[\\ & x = \frac{-2}{5} = -0.4 \\ & \backslash] \end{aligned}$$

Comparison:

The same (x) value must satisfy both equations; however, here they differ: $(x = 1.6)$ and $(x = -0.4)$. Since these do not match, the chain is inconsistent for the plus sign case, meaning no single (x) satisfies all parts simultaneously.

Case 2: Minus Sign $(8 - 6 - 5 = -3)$

Equation 1:

$$\begin{aligned} & \backslash[\\ & -3 = 8x + 1 - 3x \\ & \backslash] \end{aligned}$$

Simplify:

$$\begin{aligned} & \backslash[\\ & -3 = (8x - 3x) + 1 = 5x + 1 \\ & \backslash] \end{aligned}$$

Subtract 1 from both sides:

$$\begin{aligned} & \backslash[\\ & -3 - 1 = 5x \rightarrow -4 = 5x \\ & \backslash] \end{aligned}$$

Solve for (x) :

$$\begin{aligned} & \backslash[\\ & x = \frac{-4}{5} = -0.8 \\ & \backslash] \end{aligned}$$

Equation 2:

$$\begin{aligned} & \backslash[\\ & -1 = 5x + 1 \\ & \backslash] \end{aligned}$$

Subtract 1 from both sides:

$$\begin{aligned} & \backslash[\\ & -1 - 1 = 5x \rightarrow -2 = 5x \\ & \backslash] \end{aligned}$$

Solve for (x) :

$$\backslash[$$

$$x = \frac{-2}{5} = -0.4$$

Again, the x values do not match: -0.8 and -0.4 . Therefore, no consistent solution exists in this case either.

Step 4: Interpreting the Results

The key takeaway from these calculations is that neither the plus nor minus scenario yields a single consistent value of x that satisfies all parts of the chain simultaneously. This suggests that the original expression might be a composite problem designed to test understanding rather than a straightforward equation.

However, if the goal is to find the value of x that satisfies the middle two equalities:

$$8x + 1 - 3x = -3 + 2$$

which simplifies to:

$$5x + 1 = -1$$

then:

$$5x = -2$$

$$x = -\frac{2}{5} = -0.4$$

Similarly, check whether this value satisfies the other parts.

- For $(8 \pm 6 - 5)$:
- Plus sign: 9
- Minus sign: -3
- For the chain to be meaningful, the numerical parts should match the algebraic parts; since $x = -0.4$ yields $(5x + 1 = -1)$, which matches the third part, perhaps the intended solution is $x = -0.4$.

Step 5: Finalizing the Solution

Given the above analysis, the most consistent interpretation is:

- When the initial numerical expression is (-3) (from the minus sign case), the chain aligns with $(x = -0.4)$.
- This (x) value satisfies the middle expressions, confirming the solution.

Conclusion: Correct Order of Steps in Solving the Equation

To generalize, the correct approach to solving complex chained equations involves:

1. Identify and Simplify Each Expression Separately
 - Calculate numerical expressions first.
 - Simplify algebraic expressions to their simplest form.
2. Determine the Significance of Symbols (e.g., $\pm$)
 - Consider all possible cases if the sign affects the outcome.
 - Solve each case separately to find potential solutions.
3. Set Up Equations Based on Simplified Expressions
 - Use the chain of equalities to form individual equations.
 - Recognize which parts need to be equal to each other.
4. Solve for the Variable Step-by-Step
 - Isolate the variable (x) in each equation.
 - Check for consistency across the equations.
5. Verify the Solution
 - Substitute the found value(s) back into the original expressions.
 - Ensure all parts of the chain are satisfied simultaneously.
6. Interpret the Results
 - If multiple solutions exist, analyze which are valid based on the problem context.
 - If no solution exists, conclude accordingly.

Final Thoughts

Mastering the correct order of steps to solve equations, especially complex chains, is essential for effective problem-solving.

Place The Steps In The Correct Order For Solving The Equation 8 6 5 8x 1 3x 3 2 5x 1

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