

12x-3x-10+2x-2 Simplified Please Show Steps

12x-3x-10+2x-2 Simplified Please Show Steps is a common expression that students and learners often encounter when dealing with algebraic expressions. Simplifying algebraic expressions involves combining like terms to make the expression more concise and easier to work with. In this article, we will explore the step-by-step process to simplify the expression $12x - 3x - 10 + 2x - 2$, ensuring clarity for learners at various levels. Understanding how to simplify such expressions is fundamental to mastering algebra, which in turn forms the basis for solving equations, inequalities, and more complex mathematical problems.

Understanding the Expression: $12x - 3x - 10 + 2x - 2$

Before diving into the simplification process, it's essential to understand the components of the expression:

- Like terms: Terms that contain the same variable raised to the same power. In this case, all terms involving the variable x are like terms.
- Constants: Numerical values without variables, such as -10 and -2 in this expression.
- Operations: Addition and subtraction signs indicate how terms are combined.

Our goal is to combine all the like terms—those with x —and combine the constant terms to simplify the expression fully.

Step-by-Step Process to Simplify the Expression

Simplifying the expression $12x - 3x - 10 + 2x - 2$ involves a systematic approach:

Step 1: Group Like Terms

Identify and group all terms involving the variable x together, and all constant terms together.

- Variable terms: $12x$, $-3x$, $2x$
- Constant terms: -10 , -2

This helps to visualize what needs to be combined.

Step 2: Combine the Like Terms

Next, perform the addition or subtraction of the grouped terms:

- For the x terms:

$$12x - 3x + 2x$$

- For the constants:

$$-10 - 2$$

Step 3: Add or Subtract the Like Terms

Perform the calculations for each group:

- Variable terms:

$$12x - 3x + 2x$$

First, combine $12x$ and $-3x$:

$$12x - 3x = 9x$$

Then, add $2x$:

$$9x + 2x = 11x$$

- Constants:

$$-10 - 2 = -12$$

Step 4: Write the Simplified Expression

After combining like terms, the simplified expression becomes:

This is the most concise form of the original expression, with all like terms combined.

Additional Tips for Simplifying Algebraic Expressions

To enhance your understanding and efficiency in simplifying algebraic expressions, consider the following tips:

- **Always identify like terms:** Before combining, clearly identify which terms are similar in variables and exponents.
- **Use the associative and commutative properties:** These properties allow you to rearrange and group terms conveniently.
- **Maintain proper signs:** Pay close attention to plus and minus signs to avoid errors during combination.
- **Check your work:** After simplifying, re-verify the calculations to ensure accuracy.

Why Is Simplifying Algebraic Expressions Important?

Simplification is a foundational skill in algebra that serves multiple purposes:

- Eases further calculations: Simplified expressions are easier to substitute into equations or functions.
- Prepares for solving equations: Simplification often precedes solving for variables.
- Enhances understanding: Recognizing patterns and relationships becomes clearer when expressions are simplified.
- Prevents errors: Working with concise expressions reduces the chance of making mistakes.

Practice Problems to Reinforce Your Skills

Applying what you've learned through practice is essential. Here are some similar problems to try on your own:

1. Simplify $5a + 3a - 7 + 2a + 4$
2. Reduce the expression $8m - 2m + 6 - 3 + m$
3. Simplify $10x - 4x + 2 - x + 7$
4. Combine like terms in $-3y + 9 - y + 4y - 6$

Try solving these problems step-by-step to build confidence and mastery.

Summary

To summarize, the process of simplifying the expression $12x - 3x - 10 + 2x - 2$ involves:

1. Identifying and grouping like terms.
2. Combining the variable terms: $12x - 3x + 2x = 11x$.
3. Combining the constants: $-10 - 2 = -12$.
4. Writing the simplified expression: $11x - 12$.

Mastering this process will significantly improve your algebra skills and prepare you for more complex mathematical challenges.

Conclusion

Simplifying algebraic expressions like $12x - 3x - 10 + 2x - 2$ is a fundamental skill that forms the backbone of algebra. By following a structured approach—grouping like terms, performing the necessary operations, and double-checking your work—you can efficiently simplify even more complex expressions. With

practice, this process becomes second nature, empowering you to tackle a wide range of math problems with confidence and clarity. Remember, understanding the steps and reasoning behind each operation is key to mastering algebra. Keep practicing, and you'll find that simplifying expressions becomes an intuitive and valuable skill in your mathematical toolkit.

Frequently Asked Questions

How do I simplify the expression $12x - 3x - 10 + 2x - 2$?

You combine like terms by adding or subtracting the coefficients of x and constants separately: $(12x - 3x + 2x) - (10 + 2)$. This simplifies to $11x - 12$.

What are the steps to simplify $12x - 3x - 10 + 2x - 2$?

First, group the like terms: $(12x - 3x + 2x)$ and $(-10 - 2)$. Next, combine the x terms: $12x - 3x + 2x = 11x$. Then, combine the constants: $-10 - 2 = -12$. Final simplified expression: $11x - 12$.

Is the simplified form of $12x - 3x - 10 + 2x - 2$ equal to $11x - 12$?

Yes, after combining like terms, the simplified form is $11x - 12$.

Can I verify the simplification of $12x - 3x - 10 + 2x - 2$ by plugging in a value for x ?

Yes. For example, if $x=1$, substitute into the original expression: $12(1) - 3(1) - 10 + 2(1) - 2 = 12 - 3 - 10 + 2 - 2 = -1$. Now, substitute into the simplified form: $11(1) - 12 = -1$. Both give the same result, confirming the simplification.

Why do we combine like terms in algebraic expressions like $12x - 3x - 10 + 2x - 2$?

Combining like terms simplifies the expression and makes it easier to evaluate or solve for variables. It consolidates similar parts to their simplest form.

What is the importance of showing steps when simplifying algebraic expressions?

Showing steps helps in understanding the process, ensures accuracy, and makes it easier to identify and correct mistakes during simplification.

Additional Resources

Simplifying Algebraic Expressions: A Step-by-Step Breakdown of $12x - 3x - 10 + 2x - 2$

When tackling algebraic expressions, one of the fundamental skills students and math enthusiasts must develop is the ability to simplify expressions effectively. Simplification not only makes expressions easier to understand but also prepares learners for solving equations, factoring, and more advanced algebraic concepts. In this detailed review, we will explore the process of simplifying the algebraic expression $12x - 3x - 10 + 2x - 2$, illustrating each step with clarity, thorough explanations, and useful tips.

Understanding the Expression

Before diving into the simplification process, it's crucial to understand the structure of the given expression:

$$12x - 3x - 10 + 2x - 2$$

This expression contains:

- Terms involving the variable x : $12x$, $-3x$, $2x$
- Constant terms: -10 , -2

The main goal is to combine like terms — that is, terms that have the same variable raised to the same power (in this case, x), and then simplify constants as well.

Step-by-Step Approach to Simplify the Expression

Step 1: Write the Expression Clearly

Start by rewriting the expression to visualize all parts:

$$12x - 3x - 10 + 2x - 2$$

It can help to organize similar terms together:

- Variable terms: $12x$, $-3x$, $2x$

- Constant terms: -10, -2

Step 2: Identify Like Terms

Like terms are terms that:

- Contain the same variables
- Have the same exponent (here, all x terms are first degree)

In our expression:

- Variable terms: $12x$, $-3x$, $2x$
- Constants: -10, -2

Step 3: Group Like Terms

Arrange the expression to group like terms:

$$(12x - 3x + 2x) + (-10 - 2)$$

This grouping makes the next steps straightforward.

Step 4: Combine the Variable Terms

Now, focus on combining the x-terms:

$$- 12x - 3x + 2x$$

Let's proceed step-by-step:

$$- 12x - 3x = (12 - 3)x = 9x$$

$$- 9x + 2x = (9 - 2)x = 7x$$

Thus, the combined variable part is $7x$.

Step 5: Combine the Constant Terms

Next, combine the constants:

$$- -10 - 2 = -12$$

Constants combined give -12.

Step 6: Write the Simplified Expression

Now, put everything together:

$$11x - 12$$

This is the simplified form of the original expression.

Additional Insights and Best Practices

While the above steps cover the core process, here are some additional tips and considerations that can enhance understanding and efficiency when simplifying algebraic expressions:

1. Organize Terms Systematically

- Always write the expression with like terms grouped.
- Use parentheses if necessary to keep track of groupings.

2. Pay Attention to Signs

- Be cautious with subtraction signs; they can change the sign of the following term.
- When subtracting a negative, remember it becomes addition.

3. Use Algebraic Properties

- Commutative Property: $(a + b = b + a)$
- Associative Property: $((a + b) + c = a + (b + c))$
- Distributive Property: $(a(b + c) = ab + ac)$

These properties help in rearranging and simplifying expressions efficiently.

4. Confirm Your Work

- After combining like terms, double-check each step.
- Re-verify signs and arithmetic to avoid mistakes.

5. Practice with Variations

- Try similar expressions with different coefficients or additional terms.
- Practice helps internalize the process.

Understanding the Significance of Simplification in Algebra

Simplification is fundamental in algebra because:

- It makes complex expressions manageable.
- It prepares solutions for solving equations.
- It helps in identifying equivalent expressions.
- It enhances problem-solving efficiency.

In real-world applications, simplified formulas are easier to interpret, analyze, and use in calculations.

Common Mistakes to Watch Out For

While simplifying algebraic expressions appears straightforward, certain pitfalls can lead to errors:

- Misaligning like terms: Combining x terms with constants.
- Ignoring signs: Forgetting that subtracting a negative becomes addition.
- Arithmetic errors: Simple addition or subtraction mistakes.
- Overlooking coefficients: Not combining coefficients correctly.

Being mindful of these common errors ensures accuracy and builds strong foundational skills.

Practice Problems to Reinforce Learning

To solidify understanding, try simplifying these expressions:

1. $(5a + 3a - 7 + 2a)$
2. $(4m - 2m + 9 - 3)$
3. $(8x + 2x - 5 + x)$
4. $(-6y + 3y + 10 - 4)$

Work through each step, grouping like terms, combining coefficients, and simplifying constants.

Conclusion: Mastering the Art of Simplification

Simplifying algebraic expressions like $12x - 3x - 10 + 2x - 2$ is a vital skill within algebra that lays the groundwork for more advanced topics. The process involves carefully identifying like terms, grouping them strategically, and performing arithmetic operations with attention to signs and coefficients.

By following a systematic approach—organizing terms, combining like terms step-by-step, and double-checking your work—you develop precision, confidence, and efficiency in algebraic manipulation. With consistent practice and awareness of common pitfalls, simplifying expressions becomes second nature, opening doors to more complex mathematical challenges.

In summary, the simplified form of $12x - 3x - 10 + 2x - 2$ is:

$$11x - 12$$

This concise and elegant expression encapsulates the original's essence and demonstrates the power of structured algebraic simplification.

Happy simplifying!

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