

Subtract The Polynomials $(3x + 2x + 5) - (4x + 3x + 4)$

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Introduction

Polynomials are fundamental algebraic expressions that consist of variables, coefficients, and exponents. Understanding how to manipulate polynomials—particularly addition and subtraction—is essential for mastering algebra. Many students find polynomial subtraction challenging because it involves careful combination of like terms and correct sign management.

In this article, we will explore how to subtract polynomials, using the specific example:

Subtract the polynomials $(3x + 2x + 5)$ and $(4x + 3x + 4)$, and analyze the multiple-choice options provided:

- A: $-7x + 5x - 9$
- B: $7x - x - 9$
- C: $x - x - 9$
- D: $-x + 5x - 1$

We will break down each step, explain the process in detail, and provide tips to help you confidently perform polynomial subtraction. Whether you're a beginner or looking to reinforce your skills, this guide aims to clarify the process and improve your understanding.

Understanding Polynomials

What Is a Polynomial?

A polynomial is a mathematical expression consisting of variables and coefficients, combined using addition, subtraction, and multiplication, with non-negative integer exponents. Examples include:

- $3x + 2$
- $4x^2 - 5x + 7$
- 6

Components of a Polynomial

- Terms: Individual parts separated by + or - signs.
- Coefficients: Numerical factors multiplying the variables.
- Variables: Symbols like x, y, z.
- Exponents: Powers to which variables are raised.

Like Terms

To perform addition or subtraction, you must combine like terms—terms that have the same variables raised to the same powers. For example:

- $3x$ and $5x$ are like terms.
- $2x^2$ and $7x^2$ are like terms.
- $4x$ and $3y$ are NOT like terms.

How to Subtract Polynomials

Step 1: Write the Polynomials Clearly

Ensure both polynomials are written with like terms aligned. For our example:

- First polynomial: $3x + 2x + 5$
- Second polynomial: $4x + 3x + 4$

Step 2: Arrange Terms in Standard Form

Combine like terms within each polynomial to simplify:

- First polynomial: $3x + 2x + 5 = (3x + 2x) + 5 = 5x + 5$
- Second polynomial: $4x + 3x + 4 = (4x + 3x) + 4 = 7x + 4$

Step 3: Subtract the Second Polynomial from the First

The operation is:

$$\begin{array}{l} \backslash \\ (5x + 5) - (7x + 4) \\ \backslash \end{array}$$

Remember to distribute the negative sign across the second polynomial:

$$\begin{aligned} & \backslash [\\ & 5x + 5 - 7x - 4 \\ & \backslash] \end{aligned}$$

Step 4: Combine Like Terms

Group the x-terms and constants:

- x-terms: $5x - 7x = -2x$
- Constants: $5 - 4 = 1$

Resulting polynomial:

$$\begin{aligned} & \backslash [\\ & -2x + 1 \\ & \backslash] \end{aligned}$$

Analyzing the Multiple-Choice Options

Now, let's compare the final simplified result $(-2x + 1)$ to the options provided:

- A: $-7x + 5x - 9$
- B: $7x - x - 9$
- C: $x - x - 9$
- D: $-x + 5x - 1$

Simplify Each Option

Option A: $-7x + 5x - 9$

- Combine x-terms: $-7x + 5x = -2x$
- Constant: -9

Final: $-2x - 9$

Option B: $7x - x - 9$

- Combine x-terms: $7x - x = 6x$
- Constant: -9

Final: $6x - 9$

Option C: $x - x - 9$

- Combine x -terms: $x - x = 0$
- Constant: -9

Final: -9

Option D: $-x + 5x - 1$

- Combine x -terms: $-x + 5x = 4x$
- Constant: -1

Final: $4x - 1$

Comparison to Our Result

Our computed answer: $-2x + 1$

None of the options exactly match $-2x + 1$. However, the closest is Option A, which simplifies to $-2x - 9$.

This suggests that perhaps the original question or options may have some inconsistencies or typographical errors. Alternatively, the initial polynomials might have been incorrectly transcribed or misinterpreted.

Important Tips for Polynomial Subtraction

- Always combine like terms after subtraction.
- Distribute the negative sign across the entire second polynomial before combining.
- Simplify constants and coefficients step-by-step.
- Check your work by substituting a value for x to verify the result.

Common Mistakes to Avoid

- Misaligning like terms: Always group terms with the same variables and exponents.
- Ignoring the negative sign: Distribute it carefully across all terms in the second polynomial.
- Forgetting to combine like terms: This can lead to incorrect final answers.
- Not simplifying completely: Always reduce the polynomial to its simplest form.

Practice Problems for Mastery

1. Subtract $(2x^2 + 3x + 4) - (x^2 + x + 1)$
2. Subtract $(5x - 2) - (3x + 4)$
3. Subtract $(x^3 + 2x^2 - x) - (x^3 - x^2 + 3)$

Solutions:

$$1. (2x^2 + 3x + 4) - (x^2 + x + 1) = (2x^2 - x^2) + (3x - x) + (4 - 1) = x^2 + 2x + 3$$

$$2. (5x - 2) - (3x + 4) = (5x - 3x) + (-2 - 4) = 2x - 6$$

$$3. (x^3 + 2x^2 - x) - (x^3 - x^2 + 3) = (x^3 - x^3) + (2x^2 + x^2) + (-x - 3) = 0 + 3x^2 - x - 3$$

Conclusion

Subtracting polynomials involves a systematic approach: write expressions clearly, align like terms, distribute the negative sign carefully, and then combine like terms. Practice with different polynomial expressions to build confidence and accuracy.

Remember, always double-check your work, especially signs and coefficients, to avoid common mistakes. With consistent practice, polynomial subtraction will become an easier and more intuitive part of your algebra toolkit.

Final Note

If you encounter questions similar to the initial example and find discrepancies in options or results, revisit the original expressions, ensure correct transcription, and follow the step-by-step method outlined here. Mastery of polynomial subtraction is foundational for progressing in algebra and tackling more advanced mathematical concepts.

Happy studying!

Frequently Asked Questions

How do you subtract the polynomials $(3x + 2x + 5)$ and $(4x + 3x + 4)$?

First, combine like terms in each polynomial: $(3x + 2x + 5)$ becomes $(5x + 5)$, and $(4x + 3x + 4)$ becomes $(7x + 4)$. Then, subtract the second polynomial from the first: $(5x + 5) - (7x + 4) = (5x - 7x) + (5 - 4) = -2x + 1$.

What is the result of subtracting $(4x + 3x + 4)$ from $(3x + 2x + 5)$?

Simplify each: $(3x + 2x + 5) = 5x + 5$, and $(4x + 3x + 4) = 7x + 4$. Now, subtract: $(5x + 5) - (7x + 4) = -2x + 1$.

Which option correctly simplifies $(3x + 2x + 5) - (4x + 3x + 4)$?

The correct answer is $-2x + 1$, but this option is not listed; among the options, the closest is D: $-x + 5x - 1$, which simplifies to $4x - 1$, so none are exactly correct.

How do you identify the correct answer for subtracting these polynomials?

Combine like terms in each polynomial first, then perform subtraction. Simplify the result to match one of the given options.

What is the importance of combining like terms before subtracting polynomials?

It simplifies the subtraction process, making it easier to combine coefficients of similar variables and constants accurately.

Why might the options provided in the question be confusing?

Because some options are written in a way that doesn't clearly show the simplified form or combines terms incorrectly, leading to potential confusion.

Can you verify if any of the options match the correct subtraction result?

Yes, the correct result is $-2x + 1$. None of the options exactly match this, indicating a possible mistake in the options or the question.

What is the best way to approach solving polynomial subtraction problems quickly?

Group like terms first, perform the subtraction on coefficients, and then simplify. Practice helps improve speed and accuracy.

What is the simplified form of the expression A: $-7x + 5x - 9$?

Combine like terms: $-7x + 5x = -2x$, so the expression simplifies to $-2x - 9$.

Additional Resources

Subtract The Polynomials $(3x + 2x + 5) (4x + 3x + 4)$: A Comprehensive Investigation

In the realm of algebra, polynomial operations form the cornerstone of many advanced mathematical concepts. Among these, polynomial subtraction is both fundamental and essential for developing a deeper understanding of algebraic manipulation. Today, we delve into a detailed exploration of subtracting polynomials, focusing on the specific problem:

Subtract The Polynomials $(3x + 2x + 5) (4x + 3x + 4)$

This problem involves multiple layers: simplifying the polynomials first, understanding the subtraction process, and analyzing the potential solutions or options provided.

Understanding the Structure of the Given Polynomials

Before engaging in subtraction, it is crucial to interpret the polynomials correctly.

Step 1: Simplify Each Polynomial

Given the expressions:

- First polynomial: $(3x + 2x + 5)$
- Second polynomial: $(4x + 3x + 4)$

Let's simplify each:

First Polynomial:

$$3x + 2x + 5 = (3x + 2x) + 5 = 5x + 5$$

Second Polynomial:

$$4x + 3x + 4 = (4x + 3x) + 4 = 7x + 4$$

Resulting simplified polynomials:

- $P(x) = 5x + 5$

- $Q(x) = 7x + 4$

Performing Polynomial Subtraction

The core operation is:

$$P(x) - Q(x) = (5x + 5) - (7x + 4)$$

Step 2: Distribute the negative sign

Subtract each term in $Q(x)$ from $P(x)$:

$$(5x + 5) - 7x - 4$$

This simplifies to:

$$(5x - 7x) + (5 - 4) = -2x + 1$$

Result:

The difference of the two polynomials is $-2x + 1$.

Analyzing the Multiple Choice Options

The question provides four options:

A: $-7x + 5x - 9$

B: $7x - x - 9$

C: $x - x - 9$

D: $-x + 5x - 1$

Let's analyze each option to see which matches our derived result, $-2x + 1$.

Option A: $-7x + 5x - 9$

Simplify:

$$-7x + 5x - 9 = (-7x + 5x) - 9 = -2x - 9$$

Does this match $-2x + 1$? No, because the constant term differs (-9 vs. $+1$).

Option B: $7x - x - 9$

Simplify:

$$7x - x - 9 = (7x - x) - 9 = 6x - 9$$

Does this match? No, since our result is $-2x + 1$.

Option C: $x - x - 9$

Simplify:

$$x - x - 9 = 0 - 9 = -9$$

No, clearly different from $-2x + 1$.

Option D: $-x + 5x - 1$

Simplify:

$$-x + 5x - 1 = (-x + 5x) - 1 = 4x - 1$$

Again, not matching $-2x + 1$.

Conclusion: Correct Answer and Clarification

Based on our calculations, the subtraction of the simplified polynomials yields $-2x + 1$, which does not directly match any of the options provided.

However, perhaps the options are misprinted or misaligned with the question. Let's consider whether any of the options, after further simplification, could equal $-2x + 1$.

- Option A: $-7x + 5x - 9 = -2x - 9$ (not matching)
- Option B: $6x - 9$ (not matching)
- Option C: -9 (not matching)
- Option D: $4x - 1$ (not matching)

Therefore, none of the options exactly match the correct subtraction result.

Possible Misinterpretations and Clarifications

Given the discrepancy, it's essential to revisit the original problem statement:

> Subtract The Polynomials $(3x + 2x + 5) - (4x + 3x + 4)$ A: $-7x + 5x - 9$ B: $7x - x - 9$ C: $x - x - 9$ D: $-x + 5x - 1$ please Helpppp Asap

It appears that the problem may involve some typographical errors or formatting issues. The options seem to be expressions possibly related to the problem, perhaps from multiple-choice options for a different question.

Deep Dive: Polynomial Operations and Common Mistakes

To ensure a comprehensive understanding, let's explore common pitfalls and best practices in polynomial subtraction.

Common Mistakes in Polynomial Subtraction

- Misinterpreting the expression: Ensuring the correct grouping and understanding of polynomials before operation.
- Incorrect simplification: Failing to combine like terms properly.
- Distribution errors: Forgetting the negative sign when subtracting entire polynomials.
- Ignoring negative signs: Leading to incorrect results.
- Misreading options: Overlooking the importance of precise constants and coefficients.

Best Practices for Polynomial Subtraction

- Always simplify each polynomial first by combining like terms.
- Write the subtraction explicitly and distribute the negative sign carefully.
- Combine like terms systematically.
- Double-check constants and coefficients after simplification.
- Verify the final answer by substituting a sample value for x to see if the original polynomials and the answer align.

Implications and Educational Significance

Understanding polynomial subtraction is pivotal in algebra, impacting concepts such as polynomial division, factoring, and solving equations. Mastery of this operation enhances problem-solving skills and prepares students for more complex topics like calculus and algebraic functions.

This analysis underscores the importance of clarity in problem statements and options, as well as the necessity of meticulous calculation.

Final Remarks: Recommendations for Learners and Educators

- For learners: Practice simplifying polynomials thoroughly before subtraction. Use step-by-step approaches to avoid errors.
- For educators: Ensure problem statements are free of typographical errors. Encourage students to verify their solutions by substitution or alternative methods.

Summary

- The simplified form of the given polynomials is $5x + 5$ and $7x + 4$.
- Their difference is $-2x + 1$.
- The provided options do not exactly match this result, indicating a possible misprint or formatting issue in the original question.
- A thorough understanding of polynomial operations and careful calculation are essential for accurate algebraic manipulation.

In conclusion, mastering polynomial subtraction requires attention to detail, systematic approach, and verification. This investigation emphasizes that, with diligent practice, students can confidently perform these operations and tackle more advanced algebraic challenges.

Helpppp Asap — if further clarification is needed, revisit the problem statement carefully, ensure correct interpretation, and verify calculations step-by-step.

Subtract The Polynomials $3x^2 + 5x + 4$ A $7x^2 + 5x + 9$ b $7x^2 + 9x + 9$ c $9x^2 + 9x + 5$ 1please Helppppp Asap

Subtract The Polynomials $3x^2 + 5x + 4$ A $7x^2 + 5x + 9$ b $7x^2 + 9x + 9$ c $9x^2 + 9x + 5$ 1please Helppppp Asap

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