Subtract 7x^2-5x+3 - (2x^2+7x-4)

Subtract 7x^2-5x+3 - (2x^2+7x-4): A Step-by-Step Guide to Polynomial Subtraction

Polynomial subtraction is a fundamental concept in algebra that helps students and math enthusiasts understand how to manipulate algebraic expressions effectively. One common problem is subtracting one polynomial from another, especially when they contain similar terms. In this article, we will explore how to subtract the polynomial *7x^2 - 5x + 3* from *2x^2 + 7x - 4*, focusing on the expression:

Subtract 7x^2 - 5x + 3 - (2x^2 + 7x - 4)

Understanding how to approach this problem will reinforce your algebra skills and prepare you for more complex polynomial operations.

Breaking Down the Polynomial Subtraction Process

When subtracting polynomials, the key is to distribute the negative sign across the second polynomial and then combine like terms. Let's delve into the step-by-step process.

Step 1: Write the Expression Clearly

Start by writing the subtraction problem explicitly:

```
(7x^2 - 5x + 3) - (2x^2 + 7x - 4)
```

This makes it clear which polynomial is being subtracted from which.

Step 2: Distribute the Negative Sign

The subtraction sign before the second polynomial means you need to subtract each term inside the parentheses:

```
7x^2 - 5x + 3 - 2x^2 - 7x + 4
```

Note that subtracting the entire second polynomial is equivalent to changing the signs of each term within it.

Step 3: Combine Like Terms

Now, group the terms with the same variables and exponents:

```
(7x^2 - 2x^2) + (-5x - 7x) + (3 + 4)
```

This simplifies the process of combining similar terms.

Step-by-Step Simplification

Let's perform each operation carefully.

1. Simplify the Quadratic Terms

1. 7x^2 minus 2x^2 equals 5x^2:

```
7x^2 - 2x^2 = 5x^2
```

2. Simplify the Linear Terms

1. -5x minus 7x equals -12x:

```
-5x - 7x = -12x
```

3. Simplify the Constant Terms

1. 3 plus 4 equals 7:

```
3 + 4 = 7
```

Final Result of the Subtraction

Putting all the simplified parts together, the resulting polynomial after subtraction is:

```
5x^2 - 12x + 7
```

This is the simplified form of the original expression, representing the difference between the two polynomials.

Importance of Proper Polynomial Subtraction in Algebra

Understanding how to subtract polynomials, such as *7x^2 - 5x + 3* minus *2x^2 + 7x - 4*, is crucial for mastering algebraic operations. This skill lays the foundation for solving more complex equations, including polynomial division, factoring, and solving polynomial equations.

Applications of Polynomial Subtraction

- Solving algebraic equations involving multiple polynomial expressions.
- Calculating differences between functions in calculus.
- Analyzing the change between data sets modeled by polynomial functions.
- Performing polynomial division and factorization tasks.

Tips for Effective Polynomial Subtraction

To excel at subtracting polynomials, keep the following tips in mind:

1. Always Distribute the Negative Sign Correctly

Make sure to apply the negative sign across all terms of the polynomial being subtracted. Forgetting this step can lead to incorrect results.

2. Organize Like Terms Clearly

Grouping similar terms makes the process more straightforward and reduces errors.

3. Practice with Different Polynomial Expressions

The more you practice subtracting various polynomials, the more comfortable you'll become with identifying and combining like terms efficiently.

Additional Examples of Polynomial Subtraction

Let's look at a couple of other examples to reinforce the concept.

Example 1:

Subtract *3x^3 + 2x - 1* from *5x^3 - 4x + 6*:

```
(5x^3 - 4x + 6) - (3x^3 + 2x - 1)
```

Distribute the negative sign:

```
5x^3 - 4x + 6 - 3x^3 - 2x + 1
```

Combine like terms:

```
(5x^3 - 3x^3) + (-4x - 2x) + (6 + 1) = 2x^3 - 6x + 7
```

Example 2:

Subtract *2x^2 + 3x - 5* from *-x^2 + 4x + 2*:

```
(-x^2 + 4x + 2) - (2x^2 + 3x - 5)
```

Distribute the negative sign:

```
-x^2 + 4x + 2 - 2x^2 - 3x + 5
```

Combine like terms:

```
(-x^2 - 2x^2) + (4x - 3x) + (2 + 5) = -3x^2 + x + 7
```

These examples demonstrate the consistent application of the subtraction process across different polynomial expressions.

Conclusion: Mastering Polynomial Subtraction for Algebra Success

Subtracting polynomials like *7x^2 - 5x + 3* and *2x^2 + 7x - 4* is a fundamental algebra skill that builds your understanding of manipulating algebraic expressions. The key steps involve distributing the negative sign across the polynomial being subtracted, grouping like terms, and carefully combining these terms to arrive at the simplified result.

Remember, practicing polynomial subtraction with various expressions will enhance your confidence and proficiency in algebra. Whether you're solving equations, analyzing functions, or preparing for higher-level math courses, mastering this skill is essential.

To summarize:

- Always distribute the negative sign correctly.
- Group and combine like terms systematically.
- Practice with different polynomial expressions to improve your skills.
- Recognize the importance of polynomial subtraction in broader mathematical contexts.

With consistent practice and attention to detail, you'll find polynomial subtraction becomes a straightforward and valuable tool in your algebra toolkit.

Frequently Asked Questions

How do I subtract the polynomials 7x^2 - 5x + 3 and 2x^2 + 7x - 4?

To subtract, distribute the negative sign across the second polynomial and combine like terms: (7x^2 - 5x + 3) - (2x^2 + 7x - 4) becomes 7x^2 - 5x + 3 - 2x^2 - 7x + 4. Then, combine like terms to get (7x^2 - 2x^2) + (-5x - 7x) + (3 + 4) = 5x^2 - 12x + 7.

What is the simplified result of subtracting 2x^2 + 7x - 4 from 7x^2 - 5x + 3?

The simplified result is 5x^2 - 12x + 7.

What are the steps to subtract two polynomials like 7x^2 - 5x + 3 and 2x^2 + 7x - 4?

First, write the problem as (7x^2 - 5x + 3) - (2x^2 + 7x - 4). Next, distribute the negative sign over the second polynomial: 7x^2 - 5x + 3 - 2x^2 - 7x + 4. Finally, combine like terms to get the simplified polynomial: 5x^2 - 12x + 7.

Can you explain how to handle subtraction of polynomials with multiple terms?

Yes, subtract each corresponding term by subtracting their coefficients: for example, subtract the x^2 terms, the x terms, and the constants separately, then combine the results to form the simplified polynomial.

Is the subtraction of 7x^2 - 5x + 3 and 2x^2 + 7x - 4 a straightforward

process?

Yes, it involves distributing the negative sign to the second polynomial and then combining like terms, which is a straightforward algebraic process.

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

Combining like terms simplifies the polynomial to its most reduced form, making it easier to interpret and use in further calculations.

What is the final answer when subtracting 2x^2 + 7x - 4 from 7x^2 - 5x + 3?

The final answer is 5x^2 - 12x + 7.

Additional Resources

Subtract 7x^2 - 5x + 3 - (2x^2 + 7x - 4): A Step-by-Step Guide to Mastering Polynomial Subtraction

When working with algebra, understanding how to subtract polynomials like 7x^2 - 5x + 3 - (2x^2 + 7x - 4) is a fundamental skill that opens the door to solving more complex equations and real-world problems. This process involves combining like terms and carefully managing signs to ensure accuracy. Whether you're a student brushing up on algebra or someone looking to deepen your mathematical understanding, mastering polynomial subtraction is essential. This guide will walk you through the entire process, from understanding polynomial structure to executing a precise subtraction.

Understanding the Components of a Polynomial

Before diving into the subtraction process, it's crucial to understand what a polynomial is and how it’s structured.

What Is a Polynomial?

A polynomial is an algebraic expression that consists of variables, coefficients, and exponents, combined using addition, subtraction, and multiplication. For example, 7x^2 - 5x + 3 is a polynomial consisting of three terms:

- The quadratic term: 7x^2

- The linear term: -5x
- The constant term: 3

Like Terms

In polynomial operations, like terms are terms that have the same variables raised to the same powers. When subtracting polynomials, combining these like terms correctly is the key to simplifying the expression.

In the example 7x^2 - 5x + 3 - (2x^2 + 7x - 4), the like terms are:

- Terms involving x^2: 7x^2 and 2x^2
- Terms involving x: -5x and 7x
- Constant terms: 3 and -4

The Step-by-Step Process of Polynomial Subtraction

Subtracting polynomials can seem intimidating at first, but it becomes straightforward once you understand the process. The key steps include:

1. Rewrite the expression, removing parentheses and paying attention to signs.
2. Distribute the negative sign across the polynomial inside the parentheses.
3. Combine like terms by adding or subtracting their coefficients.

Let's apply this process step-by-step to our specific example: 7x^2 - 5x + 3 - (2x^2 + 7x - 4).

Step 1: Rewrite the Expression

Start with the original expression:

7x^2 - 5x + 3 - (2x^2 + 7x - 4)

Notice the parentheses. To simplify, we need to distribute the negative sign across the second polynomial.

Step 2: Distribute the Negative Sign

Distributing the negative sign means changing the signs of each term inside the parentheses:

- The $2x^2$ becomes $-2x^2$
- The $7x$ becomes $-7x$
- The -4 becomes $+4$ (because minus times minus equals plus)

Now, the expression looks like:

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

Step 3: Group Like Terms

Next, organize the expression by grouping similar terms:

- Quadratic terms: $7x^2$ and $-2x^2$
- Linear terms: $-5x$ and $-7x$
- Constant terms: 3 and $+4$

Expressed as:

$(7x^2 - 2x^2) + (-5x - 7x) + (3 + 4)$

Step 4: Combine Like Terms

Now, combine the coefficients of each group:

- Quadratic terms: $7x^2 - 2x^2 = 5x^2$
- Linear terms: $-5x - 7x = -12x$
- Constants: $3 + 4 = 7$

Putting it all together, the simplified polynomial is:

$5x^2 - 12x + 7$

Final Result

The subtraction $7x^2 - 5x + 3 - (2x^2 + 7x - 4)$ simplifies to $5x^2 - 12x + 7$.

Additional Tips for Polynomial Subtraction

While the example above is straightforward, here are some tips to help you master polynomial subtraction in more complex scenarios:

- Always distribute the negative sign carefully: Forgetting to change the signs inside parentheses is a common mistake.
- Line up like terms vertically: When working on paper, writing terms in columns based on their degree helps prevent errors.
- Double-check your signs: After combining, verify that all signs are correct.
- Practice with different polynomials: The more varied your practice, the better you'll become at quickly identifying like terms and managing signs.

Practice Problems for Mastery

Try subtracting these polynomials to reinforce your understanding:

1. $(3x^3 + 4x^2 - x) - (x^3 - 2x^2 + 5)$
2. $(6x^4 - 3x^2 + 2) - (2x^4 + x^2 - 7)$
3. $(5x^2 + 8x - 9) - (3x^2 - 4x + 2)$

Remember to distribute the negative sign, organize like terms, and combine carefully!

Conclusion

Subtracting polynomials like $7x^2 - 5x + 3 - (2x^2 + 7x - 4)$ may initially seem complex, but breaking the process into manageable steps makes it accessible for learners at all levels. Understanding how to distribute the negative sign correctly, identify like terms, and combine coefficients is essential for accurate polynomial operations. With practice, you'll develop confidence and speed in solving these types of problems, laying a strong foundation for advanced algebra and mathematical problem-solving.

Mastery of polynomial subtraction not only enhances your algebra skills but also prepares you for tackling calculus, physics, engineering, and many other STEM fields where polynomial expressions are prevalent. Keep practicing, stay attentive to signs, and soon you'll find polynomial subtraction becomes second nature!

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