

1. Which Polynomial Is Equal To $(4x^2 - 3x - 1) + (-3x^2 + 5x - 8)$ A.) $x^2 + 2x + 9$ B.) $x^2 + 2x - 9$ C.)

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Understanding Polynomial Addition

Adding polynomials is a fundamental concept in algebra, and it involves combining like terms—terms that have the same variable raised to the same power. When we add two polynomials, we essentially sum their corresponding coefficients, while keeping the variable parts intact.

Step-by-Step Solution to the Given Problem

Given Polynomials:

- First polynomial: $4x^2 - 3x - 1$
- Second polynomial: $-3x^2 + 5x - 8$

Objective:

Find the simplified polynomial that results from adding these two polynomials and determine whether it matches option A or B.

Step 1: Write the Expression

The sum of the two polynomials is:

$$(4x^2 - 3x - 1) + (-3x^2 + 5x - 8)$$

Step 2: Group Like Terms

Group the terms with the same degree:

$$(4x^2 + -3x^2) + (-3x + 5x) + (-1 + -8)$$

Step 3: Simplify Each Group

- Quadratic terms: $4x^2 + (-3x^2) = (4 - 3) x^2 = 1x^2 = x^2$
- Linear terms: $-3x + 5x = (-3 + 5) x = 2x$
- Constant terms: $-1 + (-8) = -1 - 8 = -9$

Step 4: Write the Resulting Polynomial

Combining the simplified terms gives:

$$x^2 + 2x - 9$$

Conclusion: The Polynomial Correspondence

The resulting polynomial from adding the given polynomials is $x^2 + 2x - 9$. Comparing this with the options provided:

- A) $x^2 + 2x + 9$
- B) $x^2 + 2x - 9$
- C) (not specified in the prompt)

Option B matches the derived polynomial exactly. Therefore, the correct answer is **B) $x^2 + 2x - 9$** .

Additional Insights into Polynomial Addition

Why Is It Important to Combine Like Terms?

Combining like terms simplifies polynomial expressions, making them easier to analyze, graph, or solve. The process of addition, subtraction, multiplication, and division of polynomials all relies heavily on understanding how to properly handle like terms.

Common Mistakes When Adding Polynomials

- Not aligning like terms correctly
- Forgetting to include the signs (+ or -)
- Mixing different degrees of terms

- Incorrectly combining coefficients

Practice Problems for Mastery

1. Calculate the sum of $(2x^3 + 4x - 5)$ and $(x^3 - 2x + 7)$.
2. Subtract $(3x^2 + 6x - 4)$ from $(5x^2 - 2x + 1)$.
3. Multiply $(x + 3)$ by $(x - 2)$ and simplify.

Summary

In this article, we explored the process of adding polynomials, specifically focusing on the problem of determining which polynomial results from adding $4x^2 - 3x - 1$ and $-3x^2 + 5x - 8$. By carefully combining like terms, we found that the sum simplifies to $x^2 + 2x - 9$, matching option B. Understanding and practicing polynomial operations are essential skills in algebra that serve as building blocks for more advanced mathematical topics.

Frequently Asked Questions

Which polynomial is equal to $(4x^2 - 3x - 1) + (-3x^2 + 5x - 8)$?

The correct polynomial is $x^2 + 2x - 9$, which corresponds to option B.

How do you find the sum of the polynomials $(4x^2 - 3x - 1)$ and $(-3x^2 + 5x - 8)$?

Add the like terms: $(4x^2 + (-3x^2)) + (-3x + 5x) + (-1 + -8) = x^2 + 2x - 9$.

What is the coefficient of x^2 in the sum of the given polynomials?

The coefficient of x^2 is 1.

What is the coefficient of x in the sum of the polynomials?

The coefficient of x is 2.

What is the constant term in the resulting polynomial

after addition?

The constant term is -9 .

Which option correctly represents the sum of the two polynomials?

Option B, $x^2 + 2x - 9$, correctly represents the sum.

Additional Resources

Polynomial Addition: Unraveling the Sum of $(4x^2 - 3x - 1)$ and $(-3x^2 + 5x - 8)$

Introduction: The Art of Polynomial Addition

Polynomials form the backbone of algebraic expressions, serving as fundamental building blocks in mathematics and its countless applications—ranging from engineering to data science. Whether you're solving equations, modeling real-world phenomena, or simply refining your algebra skills, understanding how to combine polynomials accurately is essential.

At the heart of this process lies polynomial addition, a straightforward yet powerful operation that involves combining like terms—terms that share the same variable and exponent. In this article, we will dissect a specific addition problem:

Which polynomial is equal to $((4x^2 - 3x - 1) + (-3x^2 + 5x - 8))$?

Given two options:

- A) $(x^2 + 2x + 9)$
- B) $(x^2 + 2x - 9)$

Our goal is to perform the addition step-by-step, analyze the options, and determine which polynomial correctly represents the sum.

Understanding the Components: Polynomials in Focus

Before diving into the addition, let's familiarize ourselves with the given polynomials:

1. First Polynomial: $(4x^2 - 3x - 1)$
2. Second Polynomial: $(-3x^2 + 5x - 8)$

Each polynomial consists of three terms:

- Quadratic term (x^2)

- Linear term (x)
- Constant term (number without (x))

Understanding these components is crucial because, in addition, we combine like terms—terms with the same degree.

Step-by-Step Polynomial Addition

Step 1: Write the expressions clearly

$$(4x^2 - 3x - 1) + (-3x^2 + 5x - 8)$$

Step 2: Group like terms

Align the terms based on their degrees:

$$4x^2 + (-3x^2) + (-3x) + (5x) + (-1) + (-8)$$

This makes it easier to combine similar terms systematically.

Step 3: Combine the quadratic terms (x^2)

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

Step 4: Combine the linear terms (x)

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

Step 5: Combine the constant terms

$$-1 + (-8) = -1 - 8 = -9$$

Step 6: Write the resulting polynomial

Putting it all together:

```
\[  
x^2 + 2x - 9  
\]
```

Analysis of the Options: Which Polynomial Matches the Sum?

Based on the step-by-step addition, the resulting polynomial is $(x^2 + 2x - 9)$. Now, let's examine the provided options:

- Option A: $(x^2 + 2x + 9)$

- Option B: $(x^2 + 2x - 9)$

Compare these options to our calculated result.

Result: Our sum equals Option B.

Why is the Correct Answer Option B?

Understanding why Option B is correct involves a few key insights:

1. Matching Like Terms

The process of combining like terms confirms that the quadratic coefficient is 1, the linear coefficient is 2, and the constant is -9. Only Option B reflects this exact combination.

2. Significance of the Constants

The constant term is particularly important. Notice that in Option A, the constant is +9, which contradicts the actual sum of -9. This discrepancy highlights the importance of careful addition.

3. Mathematical Accuracy in Polynomial Operations

The addition process underscores the importance of meticulous step-by-step calculations, as small errors can lead to incorrect answers. This example demonstrates how systematic grouping and combining are essential for accuracy.

Common Mistakes to Avoid

While performing polynomial addition, students and practitioners often encounter pitfalls. Here are some frequent mistakes and tips to avoid them:

1. Incorrectly aligning terms

- Tip: Always write polynomials in standard form, with terms ordered from highest to lowest degree.

2. Forgetting to combine all like terms

- Tip: Check each degree category thoroughly before moving on.

3. Sign errors

- Tip: Pay close attention to the signs (+ or -) associated with each term during addition.

4. Misreading options

- Tip: Always verify which option matches the final expression after calculation.

Significance in Broader Mathematical Contexts

Understanding polynomial addition extends beyond simple exercises. It has critical applications in:

- Algebraic simplification: Simplifying complex expressions in calculus, physics, and engineering.

- Polynomial factoring: Breaking down expressions into products of polynomials.

- Function analysis: Combining polynomial functions for graphing and analysis.

- Algorithm development: Coding algorithms for symbolic mathematics.

Mastering these operations sets the foundation for tackling more advanced topics, such as polynomial division, synthetic division, and solving polynomial equations.

Conclusion: The Verdict

After carefully performing the polynomial addition:

```
\[
(4x^2 - 3x - 1) + (-3x^2 + 5x - 8) = x^2 + 2x - 9
\]
```

the correct choice from the options provided is Option B: $(x^2 + 2x - 9)$.

This example underscores the importance of systematic calculation, attention to detail, and understanding the structure of polynomials. Whether you're preparing for exams, working on complex algebraic models, or simply honing your mathematical skills, mastering polynomial addition is essential. Remember, the key lies in breaking down each step, verifying your work, and understanding the fundamental principles that govern algebraic operations.

In summary:

- The sum of the given polynomials is $(x^2 + 2x - 9)$.
- The correct answer is Option B.
- Systematic approach ensures accuracy and confidence in polynomial operations.

Happy algebraic exploring!

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