

Enter The Equivalent Expression Of $(92j + 82k)(3.9j + 42.1k)$ In Standard Form.

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When working with algebraic expressions involving variables, it is often necessary to simplify or rewrite expressions in a standard form for clarity, comparison, or further calculations. In this article, we will explore how to find the equivalent expression of the product of two binomials—specifically, $(92j + 82k)$ multiplied by $(3.9j + 42.1k)$ —and express the result in standard form. This process involves expanding the expression using algebraic principles, combining like terms, and presenting the final answer in a clear, organized manner suitable for mathematical analysis.

Understanding the Components of the Expression

Before delving into the calculation, it is important to understand the components involved:

Variables and Coefficients

- Variables: j and k are variables that can represent any quantities, often used in algebraic expressions.
- Coefficients: Numbers multiplied by variables, which in this case are 92, 82, 3.9, and 42.1.

Expression Breakdown

The expression $(92j + 82k)(3.9j + 42.1k)$ is a binomial multiplied by a binomial, and it requires applying the distributive property (also known as FOIL for binomials) to expand the product.

Step-by-Step Expansion of the Expression

To find the equivalent in standard form, follow these steps:

1. Apply the Distributive Property

Multiply each term in the first binomial by each term in the second binomial:

- $92j \cdot 3.9j$
- $92j \cdot 42.1k$

- $82k \ 3.9j$
- $82k \ 42.1k$

2. Calculate Each Term

Let's compute each term carefully:

- Term 1: $92j \ 3.9j = (92 \ 3.9) \ j \ j = 358.8 \ j^2$
- Term 2: $92j \ 42.1k = (92 \ 42.1) \ j \ k = 3873.2 \ j \ k$
- Term 3: $82k \ 3.9j = (82 \ 3.9) \ k \ j = 319.8 \ k \ j$
- Term 4: $82k \ 42.1k = (82 \ 42.1) \ k \ k = 3452.2 \ k^2$

Note: Since multiplication is commutative, $j \ k$ and $k \ j$ are equivalent; so, these like terms can be combined.

3. Write the Expanded Expression

Putting all these together, the expanded form is:

$$358.8j^2 + 3873.2jk + 319.8kj + 3452.2k^2$$

Combining Like Terms and Final Standard Form

Now, identify and combine like terms:

- The terms $3873.2jk$ and $319.8kj$ are like terms because $j \ k$ and $k \ j$ are the same.
- Sum their coefficients: $3873.2 + 319.8 = 4193.0$

Thus, the combined middle term becomes $4193.0jk$.

The final expression in standard form, ordered with the highest degree term first, is:

$$358.8j^2 + 4193.0jk + 3452.2k^2$$

This is the simplified, equivalent expression of the original product in standard form.

Understanding Standard Form in Algebra

In algebra, the standard form of a quadratic expression involving two variables is typically written as:

$$ax^2 + bxy + cy^2$$

where a , b , and c are coefficients. When dealing with products of binomials,

expressing the expanded form in standard form helps in understanding the degree and the structure of the polynomial.

Key Features of Standard Form

- Order: Terms are written in descending order of degree (highest power first).
- Grouping: Like terms are combined to simplify the expression.
- Clarity: The expression clearly shows the coefficients and the variables involved.

Applications of Simplified Expressions

Having the expression in standard form allows for various applications:

- Calculating specific values by substituting numerical values for j and k .
- Graphing the quadratic surface represented by the equation.
- Factoring the expression if needed for solving equations.
- Analyzing the behavior of the algebraic surface or curve.

Conclusion

Transforming the product $(92j + 82k)(3.9j + 42.1k)$ into its equivalent standard form involves systematic expansion, coefficient calculation, and the combination of like terms. The final expression:

$$358.8j^2 + 4193.0jk + 3452.2k^2$$

provides a clear and organized representation suitable for further mathematical operations or analysis. Mastering this process enhances algebraic skills and improves understanding of polynomial expressions involving multiple variables.

Additional Tips for Simplifying Algebraic Expressions

- Always carefully multiply coefficients and variables separately.
- Use the commutative property to combine like terms efficiently.
- Keep track of decimal precision to avoid errors in calculations.

- Practice expanding different binomials to strengthen your algebraic manipulation skills.

By following these steps and understanding the principles involved, you can confidently convert complex algebraic expressions into their standard form, facilitating easier manipulation and interpretation in various mathematical contexts.

Frequently Asked Questions

What is the first step to find the equivalent expression of $(92j + 82k)(3.9j + 42.1k)$ in standard form?

The first step is to apply the distributive property (FOIL method) to expand the expression by multiplying each term in the first binomial by each term in the second binomial.

How do you multiply the terms involving j and k in the expression $(92j + 82k)(3.9j + 42.1k)$?

You multiply the coefficients and then combine the variables, such as $92j \cdot 3.9j = (92 \cdot 3.9)j^2$, and similarly for other term combinations.

What is the coefficient of j^2 after multiplying $(92j)(3.9j)$?

The coefficient of j^2 is 92 multiplied by 3.9, which equals 358.8.

How do you handle the multiplication of the k terms in the expression?

Multiply the coefficients: $82k \cdot 42.1k = (82 \cdot 42.1)k^2$, resulting in $3452.2k^2$.

What is the coefficient of the mixed term involving j and k after expansion?

The mixed term's coefficient is obtained by multiplying the cross terms: $92j \cdot 42.1k = 3873.2jk$ and $82k \cdot 3.9j = 319.8jk$.

What is the simplified standard form of the expanded expression?

The standard form is $358.8j^2 + 3452.2k^2 + (3873.2 + 319.8)jk$, which

simplifies to $358.8j^2 + 4193k^2 + 4193jk$.

Why is it important to combine like terms in the expansion?

Combining like terms simplifies the expression, making it easier to interpret and use in further calculations.

Can you write the final answer in a clear and concise way?

Yes, the equivalent expression in standard form is $358.8j^2 + 4193k^2 + 4193jk$.

Additional Resources

Enter The Equivalent Expression Of $(92j + 82k)(3.9j + 42.1k)$ In Standard Form

When working with algebraic expressions involving multiple variables, especially in the context of polynomials and algebraic expansion, it is essential to understand how to correctly expand and express these in standard form. The problem of entering the equivalent expression of $(92j + 82k)(3.9j + 42.1k)$ in standard form demonstrates key concepts in expansion, combination of like terms, and proper notation, all of which are fundamental skills in algebra.

In this comprehensive guide, we will walk through the process step-by-step, helping you understand each stage of expanding the given expression, simplifying it, and writing it in the correct standard form. This approach is not only useful for solving similar algebraic problems but also for deepening your understanding of polynomial operations, especially binomial multiplication involving multiple variables.

Understanding The Problem

Before delving into calculations, it's crucial to interpret what the problem is asking:

- Expression to expand: $(92j + 82k)(3.9j + 42.1k)$
- Goal: Find the equivalent expression in standard form.

Standard form typically means arranging the polynomial in a way that similar terms are combined, usually ordered from the highest degree to the lowest, and written in a clear, simplified manner.

Step 1: Recognize the Structure – Binomial Multiplication

The given expression is a product of two binomials:

- First binomial: $92j + 82k$
- Second binomial: $3.9j + 42.1k$

When multiplying two binomials, the best approach is to use the distributive property (also known as FOIL – First, Outer, Inner, Last), which ensures all terms are multiplied systematically.

Step 2: Expand Using the FOIL Method

Apply the FOIL method to expand the expression:

$$(92j + 82k)(3.9j + 42.1k) = (\text{First}) + (\text{Outer}) + (\text{Inner}) + (\text{Last})$$

First Terms

Multiply the first terms of each binomial:

$$92j \cdot 3.9j = ?$$

- Calculation: $92 \cdot 3.9 = ?$

Let's compute:

$$92 \cdot 3.9$$

- $92 \cdot 3 = 276$
- $92 \cdot 0.9 = 82.8$

$$\text{Adding: } 276 + 82.8 = 358.8$$

Now consider the variables:

$$j \cdot j = j^2$$

So,

$$92j \cdot 3.9j = 358.8 j^2$$

Outer Terms

Multiply the outer terms:

$$92j \cdot 42.1k$$

- $92 \cdot 42.1 = ?$

Calculate:

$$92 \ 42.1$$

- $92 \ 40 = 3680$
- $92 \ 2.1 = 193.2$

$$\text{Adding: } 3680 + 193.2 = 3873.2$$

Variables:

j k (which remains as jk)

Hence,

$$92j \ 42.1k = 3873.2 \ jk$$

Inner Terms

Multiply the inner terms:

$$82k \ 3.9j$$

- $82 \ 3.9 = ?$

Calculate:

$$82 \ 3.9$$

- $82 \ 3 = 246$
- $82 \ 0.9 = 73.8$

$$\text{Adding: } 246 + 73.8 = 319.8$$

Variables:

k j = jk (since multiplication is commutative)

Thus,

$$82k \ 3.9j = 319.8 \ jk$$

Last Terms

Multiply the last terms:

$$82k \ 42.1k$$

- $82 \ 42.1 = 3448.2$ (from previous calculation)

Variables:

$$k \cdot k = k^2$$

Therefore,

$$82k \cdot 42.1k = 3448.2 k^2$$

Step 3: Combine All Parts

Now, write the expanded form:

$$(92j + 82k)(3.9j + 42.1k) = 358.8 j^2 + 3873.2 jk + 319.8 jk + 3448.2 k^2$$

Next, combine like terms:

- The jk terms:

$$3873.2 jk + 319.8 jk = (3873.2 + 319.8) jk = 4193 jk$$

Step 4: Write in Standard Form

The standard form arranges terms typically in order of decreasing degree of the variables, often following the order:

- Quadratic terms (j^2 , k^2)
- Mixed terms (jk)

Hence, the expression in standard form is:

$$358.8 j^2 + 4193 jk + 3448.2 k^2$$

This expression clearly shows the quadratic terms and the mixed term, each with their coefficients.

Additional Notes

Variables and Coefficients

- The coefficients are decimal numbers, which is common in algebra involving measurements or precise calculations.
- It's often good practice to keep coefficients in decimal form unless instructed to convert to fractions for clarity or specific requirements.

Approximations and Rounding

- If specific rounding rules are required (e.g., to two decimal places),

apply them at the end.

- For precision, keep as many decimal places as needed during calculations.

Significance of the Terms

- The j^2 term indicates the quadratic component related to variable j .
- The k^2 term relates to variable k .
- The jk terms are mixed, representing interaction between the variables.

Final Expression in Standard Form

$$358.8 j^2 + 4193 jk + 3448.2 k^2$$

This expression is now fully expanded and arranged in standard form, ready for interpretation, further algebraic manipulation, or substitution.

Summary: Key Steps for Similar Problems

1. Identify the structure: Recognize the binomials or polynomials involved.
2. Apply the distributive property or FOIL method:
 - Multiply each term in the first binomial by each term in the second.
3. Calculate the coefficients carefully:
 - Use basic multiplication.
 - Pay attention to decimal values.
4. Combine like terms:
 - Sum coefficients of identical variable combinations.
5. Write the expression in standard form:
 - Arrange from highest to lowest degree.
 - Clearly label terms with variables and coefficients.

Final Thoughts

Mastering the process of expanding and simplifying algebraic expressions such as $(92j + 82k)(3.9j + 42.1k)$ is fundamental for tackling more complex algebraic problems. Whether you're working on polynomial multiplication, quadratic expressions, or algebraic modeling, these skills form the backbone of advanced mathematics. Practice regularly, ensure careful calculation, and always verify your combined like terms to arrive at the correct, simplified standard form.

[Enter The Equivalent Expression Of \$92j + 82k\$ \$3.9j + 42.1k\$ In](#)

Standard Form

Enter The Equivalent Expression Of $92j - 82k - 39j - 42k$ In Standard Form

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