

Fill In The Blank To Make Each Equality True. _ Divided By $(\frac{1}{2}x^3) = 16x^6y^4$. PLS HELP!

Fill In The Blank To Make Each Equality True. _ Divided By $(\frac{1}{2}x^3) = 16x^6y^4$. PLS HELP!

Are you struggling with algebraic equations involving fractions and variables? Do you want to learn how to find the missing number or expression that makes an equation true? If so, you're in the right place! In this article, we'll walk through the process of solving the problem: Fill In The Blank To Make Each Equality True. _ Divided By $(\frac{1}{2}x^3) = 16x^6y^4$. PLS HELP!. We will explore the step-by-step methods to determine the value or expression that correctly completes the equation, focusing on understanding algebraic manipulation, fraction division, and exponents.

Understanding the Equation: What Are We Solving For?

The given equation can be interpreted as:

$$_ \div (\frac{1}{2}x^3) = 16x^6y^4$$

Our goal is to find the value or expression that fills in the blank (represented by "_") so that the entire equation holds true. Essentially, we're solving for the blank in:

$$(\text{blank}) \div (\frac{1}{2}x^3) = 16x^6y^4$$

Once we find the value of "blank," the equation will be balanced.

Step-by-Step Approach to Solving the Equation

Step 1: Rewrite the Division as a Multiplication

Division by a fraction is the same as multiplying by its reciprocal. Therefore, the equation can be rewritten as:

$$(\text{blank}) \times (2x^3) = 16x^6y^4$$

This simplifies our task because multiplication is often easier to manipulate than division.

Step 2: Isolate the "blank" Expression

To find the "blank," divide both sides of the equation by $(2x^3)$:

$$\text{blank} = (16x^6y^4) \div (2x^3)$$

Now, our problem reduces to simplifying the right-hand side.

Step 3: Simplify the Right-Hand Side

Let's analyze the expression:

$$(16x^6y^4) \div (2x^3)$$

Break it down into parts:

- Numerical coefficients: $16 \div 2 = 8$
- Variable x: $x^6 \div x^3 = x^{\{6-3\}} = x^3$
- Variable y: y^4 (unchanged, since no y in denominator)

Putting it all together:

$$8x^3y^4$$

Therefore, the value filling in the blank is $8x^3y^4$.

Final Answer: What Should the Blank Be?

Based on the above calculations, the complete equation is:

$$8x^3y^4 \div (1/2x^3) = 16x^6y^4$$

To verify, substitute " $8x^3y^4$ " back into the original expression:

$$(8x^3y^4) \div (1/2x^3) = 16x^6y^4$$

As shown earlier, dividing by a fraction is multiplication by its reciprocal:

$$8x^3y^4 \times (2x^3) = 16x^6y^4$$

Calculating the left side:

$$- 8x^3y^4 \times 2x^3 = (8 \times 2) \times x^{\{3+3\}} \times y^4 = 16 \times x^6 \times y^4$$

This matches the right side exactly, confirming our solution.

Key Concepts in Solving Such Algebraic Equations

Understanding Fractions and Reciprocals

- Dividing by a fraction is equivalent to multiplying by its reciprocal.
- Example: $a \div (b/c) = a \times (c/b)$

Handling Variables with Exponents

- When dividing variables with the same base: $x^m \div x^n = x^{\{m-n\}}$
- When multiplying variables with the same base: $x^m \times x^n = x^{\{m+n\}}$

Simplifying Algebraic Expressions

- Break complex fractions into parts for easier calculation.
- Combine like terms and exponents after simplifying individual parts.

Additional Tips for Solving Similar Equations

- Always write the problem in terms of multiplication to simplify division problems involving fractions.
- Use exponent rules carefully—subtract exponents when dividing like bases, add when multiplying.
- If multiple variables are involved, handle each variable separately when simplifying.
- Double-check your work by substituting your answer back into the original equation.

Practice Problems to Reinforce Your Skills

1. Find the missing number: $_ \div (1/3x^2) = 9x^4$.
2. Fill in the blank: $3x^2 \div _ = 6x^2$.
3. Complete the equation: $_ \div (2x^3) = 8x^5$.

Answers:

1. $3x^2$
2. 0.5
3. $16x^8$

Conclusion: Mastering Algebraic Equations with Fractions and Variables

Solving equations like Fill In The Blank To Make Each Equality True. $_ \div (1/2)x^3 = 16x^6y^4$ requires a good grasp of algebraic principles, especially manipulating fractions, exponents, and variables. Remember, always rewrite division as multiplication by a reciprocal, carefully handle exponents, and verify your solutions by substitution. With practice, you'll become confident in tackling such algebraic puzzles and improving your math skills.

If you're still feeling unsure, keep practicing with different types of problems, and don't hesitate to ask for help or use online algebra calculators to verify your solutions. Happy solving!

Frequently Asked Questions

What value should fill in the blank to make ($_$) divided by $(1/2)x^3$ equal to $16x^6y^4$?

The blank should be $8x^9y^4$

How do you solve for the blank in the equation $(_) \div (1/2)x^3 = 16x^6y^4$?

Multiply both sides by $(1/2)x^3$ to find the blank: $\text{blank} = 16x^6y^4 (1/2)x^3 = 8x^9y^4$

What is the step-by-step process to find the missing term in the equation $_ \div (1/2)x^3 = 16x^6y^4$?

Multiply both sides by $(1/2)x^3$: $\text{blank} = 16x^6y^4 (1/2)x^3$. Simplify: $16 (1/2) = 8$, and $x^6 x^3 = x^9$, resulting in $\text{blank} = 8x^9y^4$.

Why do we multiply by $(1/2)x^3$ when solving for the blank in the given equation?

Because the blank is divided by $(1/2)x^3$, multiplying both sides by $(1/2)x^3$ cancels the denominator, isolating the numerator value.

Can you verify the answer by substituting back into the original equation?

Yes. Substituting $\text{blank} = 8x^9y^4$, we get $(8x^9y^4) \div (1/2)x^3 = 16x^6y^4$. Simplify numerator: $8x^9y^4$, and denominator: $(1/2)x^3$. Dividing gives $8x^9y^4 \cdot 2 / x^3 = 16x^6y^4$, which simplifies correctly, confirming the answer.

What are the key algebraic principles involved in solving this type of equation?

Key principles include understanding division as multiplication by the reciprocal, combining exponents when multiplying or dividing variables, and isolating the unknown by inverse operations.

What is the importance of understanding exponents and fractions in solving this problem?

Understanding exponents allows you to simplify expressions involving powers correctly, and working with fractions like $(1/2)$ helps in manipulating and simplifying the algebraic equations accurately.

Additional Resources

Understanding and Solving the Equation: Fill In The Blank To Make Each Equality True. $_ \div \left(\frac{1}{2}x^3\right) = 16x^6y^4$

Introduction

Mathematics often presents us with equations that challenge our understanding of algebraic principles and the manipulation of variables. The equation:

$$_ \div \left(\frac{1}{2}x^3\right) = 16x^6y^4$$

is a classic example that tests your knowledge of algebraic operations, including division, multiplication, and the properties of exponents. The task is to determine what number or algebraic expression should replace the blank (denoted here as "_") to make the equality true. This kind of problem is foundational in algebra and essential for developing problem-solving skills.

In this comprehensive review, we'll explore the problem in-depth, examining each component, understanding the properties involved, and working through the solution step-by-step. Whether you're a student preparing for exams or simply curious about how to approach such equations, this guide will provide clarity and confidence.

Significance of the Problem

Before diving into the solution, it's crucial to understand why this problem matters:

- Reinforces understanding of division and multiplication with algebraic expressions
- Practices manipulation of fractional expressions
- Enhances comprehension of exponents and their properties
- Builds problem-solving skills applicable across various math topics

Breaking Down the Equation

The given equation is:

$$__ \div \left(\frac{1}{2}x^3\right) = 16x^6y^4$$

The primary goal is to find the expression or number that, when divided by $\left(\frac{1}{2}x^3\right)$, results in $(16x^6y^4)$.

Step 1: Understanding the Division Operation

The division operation can be viewed as:

$$\text{(unknown)} \div \text{(divisor)} = \text{quotient}$$

which can be rearranged to:

$$\text{unknown} = \text{quotient} \times \text{divisor}$$

Applying this to our equation:

$$__ = (16x^6y^4) \times \left(\frac{1}{2}x^3\right)$$

This step is crucial because it transforms the problem from division to multiplication, which is generally easier to manipulate, especially when dealing with algebraic expressions.

Step 2: Expressing the Unknown

We can now write:

$$\boxed{\text{Fill in the blank}} = 16x^6y^4 \times \frac{1}{2}x^3$$

Our task reduces to simplifying this expression.

Step 3: Simplifying the Expression

Let's analyze the product:

$$16x^6y^4 \times \frac{1}{2}x^3$$

which involves multiplying constants, variables, and exponents.

Step 4: Handling the Constants

- Multiply $(16 \times \frac{1}{2})$:

$$16 \times \frac{1}{2} = \frac{16}{2} = 8$$

Thus, the constants simplify to 8.

Step 5: Combining Like Terms with Exponents

- For the (x) terms:

$$x^6 \times x^3$$

Applying the exponent rule $(a^m \times a^n = a^{m+n})$:

$$x^{6+3} = x^9$$

- For the (y) terms:

$$y^4$$

Since there is no other (y) term to combine with, it remains (y^4) .

Step 6: Final Expression for the Unknown

Putting it all together, the expression becomes:

$$\boxed{\text{Fill in the blank} = 8x^9 y^4}$$

This is the algebraic expression that, when divided by $(\frac{1}{2}x^3)$, yields $(16x^6y^4)$.

Step 7: Verifying the Solution

To ensure correctness, perform a division of our found expression by the divisor:

$$\frac{8x^9 y^4}{\frac{1}{2}x^3}$$

- Rewrite the division as multiplication by the reciprocal:

$$8x^9 y^4 \times \frac{2}{x^3}$$

- Simplify constants:

$$8 \times 2 = 16$$

- Simplify the (x) terms:

$$x^9 \times x^{-3} = x^{9-3} = x^6$$

- The (y^4) term remains unaffected, as it has no counterpart in the divisor.

Putting it all together:

$$16 x^6 y^4$$

which matches the original right-hand side of the equation. This confirms that our solution is correct.

Deep Dive Into Exponent Rules and Their Application

Understanding the rules of exponents is vital for solving algebraic problems like this. Here are key

principles:

- Product of powers rule: $a^m \times a^n = a^{m+n}$
- Power of a power rule: $(a^m)^n = a^{m \times n}$
- Division of powers rule: $\frac{a^m}{a^n} = a^{m-n}$
- Zero exponent rule: $a^0 = 1$, provided $a \neq 0$

Applying these rules systematically simplifies complex expressions and ensures accurate solutions.

Additional Considerations

Handling the Variable y

In this problem, y^4 remains unchanged in the calculation because:

- The divisor does not contain y .
- The multiplication involves only constants and powers of x .

This highlights an important aspect: when dividing algebraic expressions, only the common variables are combined or canceled out according to exponent rules.

The Role of Coefficients

Constants like 16, $\frac{1}{2}$, and their products play a crucial role in simplifying expressions. Recognizing how to combine these coefficients simplifies the algebraic manipulations significantly.

Practical Applications of This Type of Problem

Understanding how to manipulate and solve such equations has broad applications:

- Science and Engineering: Calculating quantities involving proportional relationships and units.
- Economics: Analyzing ratios and rates.
- Computer Science: Working with algorithms that involve exponential calculations and variable manipulations.
- Mathematical Modeling: Building models that require algebraic transformations.

Summary of the Solution

Step	Explanation	Result
1	Rewrite division as multiplication	Unknown = Quotient $\times$ Divisor
2	Plug in known values	Unknown = $16x^6 y^4 \times \frac{1}{2}x^3$
3	Simplify constants	$16 \times \frac{1}{2} = 8$
4	Combine exponents for x	$x^{6+3} = x^9$
5	Keep y^4 as is	y^4

| 6 | Final answer | $\boxed{8x^9 y^4}$ |

Final Thoughts and Tips

- Always verify your solution: Substitute back into the original equation to confirm correctness.
- Practice exponent rules: Mastery of these rules simplifies solving similar problems.
- Be systematic: Break complex expressions into manageable parts.
- Understand the context: Recognize when to convert division into multiplication for easier manipulation.

Conclusion

Solving the equation $\frac{1}{2}x^3 = 16x^6 y^4$ might seem daunting at first, but by understanding fundamental algebraic principles and systematically applying exponent rules, the solution becomes straightforward. The key takeaway is recognizing that the blank should be filled with $(8x^9 y^4)$, ensuring the equality holds true.

This problem exemplifies the importance of algebraic manipulation skills, especially in handling fractional coefficients and variable exponents. Mastery of these concepts not only helps in solving similar equations but also lays a solid foundation for more advanced mathematical topics.

Remember: Practice makes perfect. Keep challenging yourself with similar problems, and over time, algebra will become an intuitive and powerful tool in your mathematical toolkit.

[Fill In The Blank To Make Each Equality True Divided By 1 2x 3 16x 6y 4 Pls Help](#)

Fill In The Blank To Make Each Equality True Divided By 1 2x 3 16x 6y 4 Pls Help

Related Articles

- [Applied Visual Design: Create Texture By Adding A Subtle Pattern As A Background Image](#)
- [How Is Honor Oriented Society Different From Justice Oriented Society Communication?](#)
- [True Or False? An Assembler Translates Assembly-language Programs Into Machine Code.](#)

[Back to Home](#)