

Simplify Using Order Of Operations.(87 7) 42 =

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Understanding how to simplify mathematical expressions is an essential skill in mathematics, especially when working with complex calculations. The expression $(87 - 7) \times 42 =$ might seem confusing at first glance, but applying the correct order of operations can help you evaluate it accurately and efficiently. In this guide, we will explore the fundamentals of the order of operations, walk through the process step-by-step for the given expression, and provide tips to master simplifying expressions using this crucial mathematical principle.

What Is the Order of Operations?

The order of operations is a set of rules that determine the sequence in which different operations in a mathematical expression should be performed. These rules ensure consistency and prevent ambiguity when solving expressions, especially those with multiple operations such as addition, subtraction, multiplication, division, exponents, and parentheses.

Why Is the Order of Operations Important?

- It provides a standardized way to interpret and evaluate mathematical expressions.
- Prevents different people from arriving at different answers for the same problem.
- Simplifies complex calculations by following a clear sequence.

Common Rules of the Order of Operations

The standard hierarchy, often remembered by the acronym PEMDAS or BIDMAS, is as follows:

- Parentheses (or Brackets): Simplify expressions inside parentheses or brackets first.
- Exponents (or Indices): Calculate powers and roots.
- Multiplication and Division: Perform these operations from left to right.
- Addition and Subtraction: Perform these last, also from left to right.

Breaking Down the Expression: $(87 \ 7) \ 42 =$

Before we proceed, it's essential to clarify the structure of the expression. The notation " $(87 \ 7) \ 42$ " suggests that there might be a missing operator between 87 and 7 inside the parentheses, and possibly an operator between the parentheses and 42 outside.

Assuming the expression is:

$$(87 \times 7) \times 42 =$$

or, if the original was meant to be:

$$(87 \div 7) \times 42 =$$

or perhaps:

$$(87 + 7) \times 42 =$$

It's common for such expressions to involve multiplication, division, or addition. For the purpose of this guide, we will explore the most likely intended interpretation:

$$(87 \div 7) \times 42$$

which is a typical problem involving parentheses, division, and multiplication.

Step-by-Step Simplification of $(87 \div 7) \times 42$

Applying the order of operations, follow these steps:

Step 1: Simplify Inside Parentheses

- The only operation inside parentheses is division: $87 \div 7$.
- Calculate $87 \div 7$:
- $87 \div 7 = 12.43$ (approximately, if using decimal)
- For exactness, note that $87 \div 7 = 12$ with a remainder of 3, or as a mixed number: $12 \frac{3}{7}$.

For simplicity, we'll use the decimal approximation:

- $(87 \div 7) \approx 12.43$

Step 2: Multiply the Result by 42

- Now, multiply 12.43 by 42:
- $12.43 \times 42 \approx 522.06$

Final Result:

≈ 522.06

Understanding the Impact of Different Operators

Depending on the operator between 87 and 7, the answer varies significantly. Let's explore a few common possibilities:

1. Addition: $(87 + 7) \times 42$

- Inside parentheses: $87 + 7 = 94$
- Multiply by 42: $94 \times 42 = 3948$

2. Subtraction: $(87 - 7) \times 42$

- Inside parentheses: $87 - 7 = 80$
- Multiply by 42: $80 \times 42 = 3360$

3. Multiplication: $(87 \times 7) \times 42$

- Inside parentheses: $87 \times 7 = 609$
- Multiply by 42: $609 \times 42 = 25,638$

4. Division: $(87 \div 7) \times 42$

- Inside parentheses: $87 \div 7 \approx 12.43$
- Multiply by 42: ≈ 522.06

Tips for Simplifying Expressions Using the Order of Operations

Mastering the order of operations involves practice and understanding common pitfalls. Here are some practical tips:

1. Always Simplify Inside Parentheses First

- Handle operations inside parentheses or brackets before moving outward.
- Remember that parentheses can contain multiple operations, so apply the order of operations within them.

2. Address Exponents Next

- Calculate powers and roots immediately after parentheses.
- For example, in expressions like $3^2 + 4$, compute 3^2 first.

3. Perform Multiplication and Division from Left to Right

- These operations share the same precedence level.
- For example, in $8 \div 4 \times 2$, compute $8 \div 4 = 2$, then multiply $2 \times 2 = 4$.

4. Perform Addition and Subtraction from Left to Right

- These are the last operations to perform.
- For example, in $10 - 3 + 5$, compute $10 - 3 = 7$, then $7 + 5 = 12$.

5. Be Careful with Ambiguous Expressions

- Always clarify the operations involved.
- Use parentheses explicitly to avoid misinterpretation.

Practice Problems to Reinforce Your Skills

Engaging with various problems will help solidify your understanding of the order of operations.

1. Evaluate: $(56 + 4) \times 3$
2. Calculate: $100 \div (5 \times 4)$
3. Simplify: $(20 - 5)^2$
4. Find the result: $8 + 2 \times (10 - 4)$
5. Determine: $(81 \div 9) + 7$

Answers:

1. $(56 + 4) \times 3 = 60 \times 3 = 180$
2. $100 \div (5 \times 4) = 100 \div 20 = 5$
3. $(20 - 5)^2 = 15^2 = 225$
4. $8 + 2 \times (10 - 4) = 8 + 2 \times 6 = 8 + 12 = 20$
5. $(81 \div 9) + 7 = 9 + 7 = 16$

Common Mistakes to Avoid

Understanding what errors often occur can help you avoid them:

1. Ignoring parentheses: Always address expressions inside parentheses first.
2. Performing operations out of order: Remember that multiplication and division are on the same level; do them from left to right.
3. Misinterpreting the expression: Clarify unclear notation, especially when operators are missing or ambiguous.
4. Forgetting to simplify exponents before multiplication or addition.
5. Assuming left-to-right evaluation for all operations, ignoring the hierarchy indicated by PEMDAS/BIDMAS.

Conclusion: Mastering Simplification with the Order of Operations

Applying the order of operations is fundamental for accurately simplifying mathematical expressions like $(87 - 7) \times 42$. Whether the missing operator is addition, subtraction, multiplication, or division, understanding the hierarchy of operations ensures consistent and correct results. Practice regularly with different types of problems, pay close attention to parentheses, and always follow the PEMDAS/BIDMAS rules.

By mastering these principles, you'll be well-equipped to handle complex calculations confidently and efficiently, turning complicated expressions into simple, manageable steps. Remember, the key is clarity—use parentheses

liberally, double-check your work, and keep practicing to strengthen your skills in mathematical simplification.

Keywords: order of operations, PEMDAS, simplify expressions, mathematical hierarchy, parentheses, exponents, multiplication, division, addition, subtraction, calculation tips

Frequently Asked Questions

What is the correct way to simplify the expression $(87 - 7) \div 42$?

First, subtract 7 from 87 to get 80, then divide 80 by 42, resulting in approximately 1.9.

Why is it important to follow the order of operations in this expression?

Because it ensures you perform calculations in the correct sequence—parentheses first, then division—leading to the correct result.

How do parentheses affect the calculation in $(87 - 7) \div 42$?

Parentheses indicate that you should subtract 7 from 87 before performing the division, which changes the order and the final answer.

Can I simplify $(87 - 7) \div 42$ without a calculator?

Yes, subtract 7 from 87 to get 80, then divide 80 by 42, which simplifies to approximately 1.9 or $80/42$ in fraction form.

What is the simplified fraction form of $(87 - 7) \div 42$?

After subtracting, you get $80/42$, which simplifies to $40/21$ when divided numerator and denominator by 2.

If the expression was $(87 \div 7) - 42$, how would it differ in result?

In that case, you would divide 87 by 7 first to get approximately 12.43, then subtract 42, resulting in approximately -29.57, which is different from the

original expression.

What is the final answer to $(87 - 7) \div 42$?

Subtract 7 from 87 to get 80, then divide 80 by 42, resulting in approximately 1.9.

Additional Resources

Simplify Using Order Of Operations $(87 \div 7) \times 42 =$: A Step-by-Step Guide to Mastering Mathematical Precision

Understanding how to simplify using order of operations is fundamental for solving complex mathematical expressions accurately. Whether you're a student tackling algebra problems or a professional working with calculations, mastering the sequence in which operations should be performed ensures clarity and correctness. In this guide, we'll break down the process of simplifying the expression $(87 \div 7) \times 42$ step by step, emphasizing the importance of the order of operations and illustrating practical methods to approach similar problems with confidence.

What Is the Order of Operations?

Before diving into the specific example, it's essential to understand what the "order of operations" means. It's a set of rules that tells us the sequence in which to evaluate different parts of a mathematical expression to arrive at a consistent and correct answer.

Commonly remembered by the acronym PEMDAS (Parentheses, Exponents, Multiplication and Division, Addition and Subtraction), the order of operations dictates:

1. Parentheses – Simplify expressions inside parentheses first.
2. Exponents – Calculate powers and roots next.
3. Multiplication and Division – These are of equal priority; work from left to right.
4. Addition and Subtraction – Also of equal priority; work from left to right.

Understanding this hierarchy is crucial for avoiding mistakes, especially when expressions become more complex.

Step-by-Step Breakdown of the Expression $(87 \div 7) \times 42$

Let's analyze the specific expression: $(87 \div 7) \times 42$. The goal is to simplify

this expression accurately using the order of operations.

Step 1: Identify Parentheses

The expression contains parentheses around $87 \div 7$, indicating that this division should be performed first.

Expression:

$$(87 \div 7) \times 42$$

Step 2: Simplify Inside the Parentheses

Calculate $87 \div 7$:

- 7 goes into 87 a certain number of times.
- $7 \times 12 = 84$
- $87 - 84 = 3$ (remainder)

Since 87 divided by 7 is 12 with a remainder of 3, the exact division as a decimal is preferable:

$$87 \div 7 = 12.43 \text{ (approximately)}$$

Alternatively, if working with fractions:

$$87 \div 7 = 87/7$$

But for simplicity, let's proceed with the decimal approximation:

$$87 \div 7 \approx 12.43$$

Step 3: Multiply the Result by 42

Now, multiply 12.43×42 :

- $12 \times 42 = 504$
- $0.43 \times 42 \approx 18.06$

Adding these:

$$504 + 18.06 \approx 522.06$$

Final answer: approximately 522.06

Additional Considerations: Exact Fractions vs. Decimals

While decimal approximations are convenient, sometimes it's preferable to work with exact fractions:

- $87 \div 7 = 87/7$
- Multiply by 42:

$$(87/7) \times 42$$

Notice that 42 can be expressed as a fraction: $42/1$

So:

$$(87/7) \times (42/1) = (87 \times 42) / (7 \times 1)$$

Calculate numerator:

$$87 \times 42$$

Break down:

- $87 \times 40 = 3,480$
- $87 \times 2 = 174$

Sum:

$$3,480 + 174 = 3,654$$

Calculate denominator:

$$7 \times 1 = 7$$

Now, the fraction:

$$3,654 / 7$$

Divide numerator by denominator:

$$7 \times 522 = 3,654$$

So:

$$3,654 / 7 = 522$$

Result: exactly 522

This method confirms that the precise answer is 522, and the decimal approximation aligns with this exact value.

Visualizing the Order of Operations in the Example

Here's a clear outline of how the order of operations applies to this problem:

1. Parentheses: Compute $87 \div 7$, which simplifies to $87/7$ or approximately 12.43.
2. Multiplication: Multiply the result by 42.
3. Result: The final answer is 522.

Practice Problems to Reinforce Learning

To solidify your understanding of using the order of operations, try these practice problems:

1. Simplify $(56 \div 8) + 15$
2. Evaluate $(100 - 25) \div 5$
3. Calculate $(9 + 3) \times 4$
4. Simplify $(144 \div 12) \times (3 + 2)$
5. Find the value of $(50 \div (5 + 5)) \times 3$

Common Mistakes to Avoid

While working through expressions, be mindful of these common errors:

- Ignoring parentheses: Always perform calculations inside parentheses first.
- Mixing up multiplication and division: Remember they are of equal priority; work from left to right.
- Misordering operations: Don't perform addition before multiplication unless parentheses specify otherwise.
- Skipping steps: Breaking down each step ensures accuracy and clarity.

Summary: Mastering Simplification Using Order of Operations

Mastering the skill of simplifying using order of operations transforms complex-looking expressions into manageable calculations. Remember:

- Always start with parentheses.
- Next, handle exponents.
- Proceed with multiplication and division from left to right.
- Finish with addition and subtraction from left to right.

Applying these rules to $(87 \div 7) \times 42$ reveals the importance of careful, step-by-step calculation to arrive at the correct answer – 522. Whether working with fractions, decimals, or entire expressions, understanding and

applying the order of operations is essential for mathematical accuracy and confidence.

Final Tips for Success

- Practice regularly with different types of expressions.
- Use parentheses liberally to clarify the order of operations in complex problems.
- Double-check your work by reversing operations or approximating to verify results.
- Stay consistent with the PEMDAS rule to avoid mistakes.

By mastering these principles, you'll develop a solid foundation for tackling more advanced mathematical challenges with ease and precision.

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