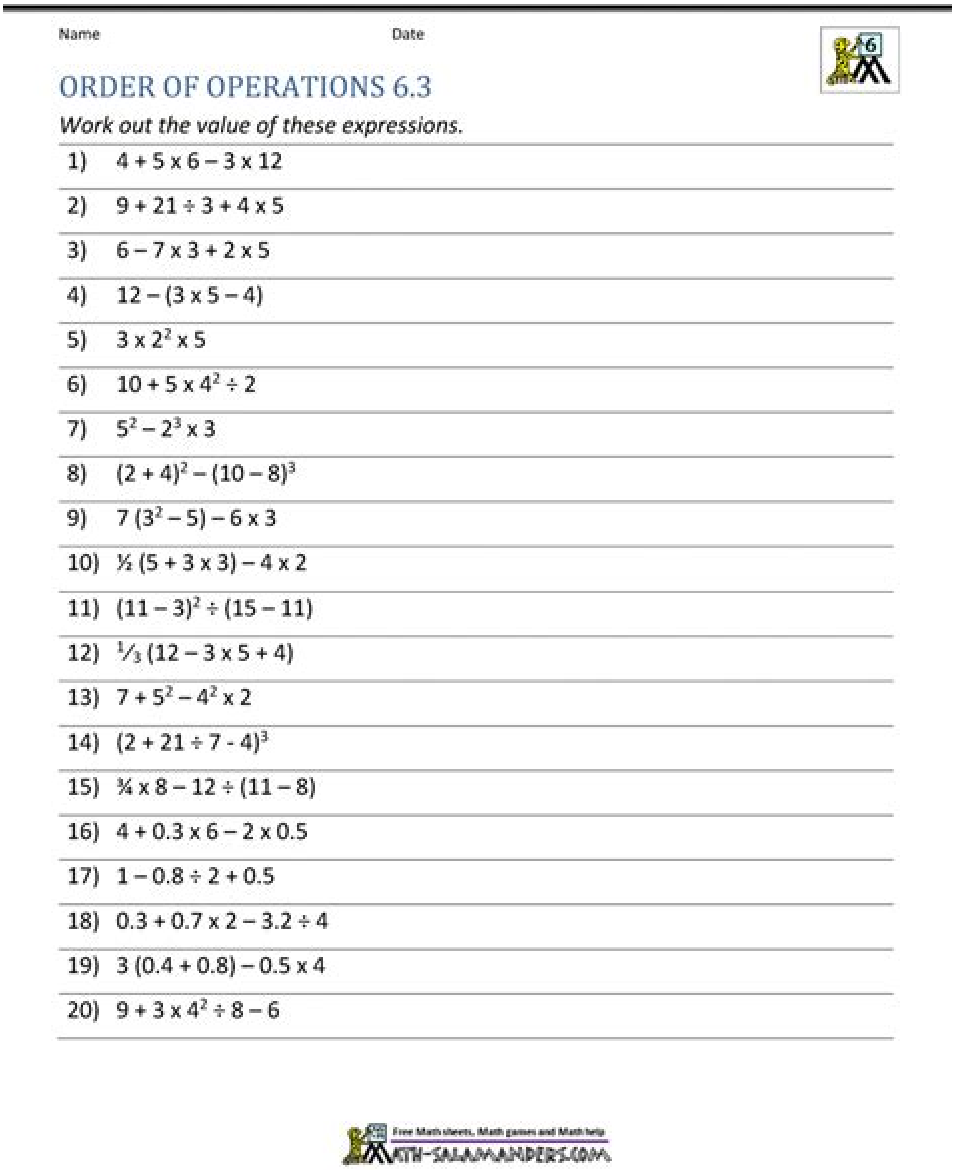
Order Of Operations 6th Grade Math



Name Date

ORDER OF OPERATIONS 6.3

Work out the value of these expressions.

1) $4 + 5 \times 6 - 3 \times 12$
2) $9 + 21 \div 3 + 4 \times 5$
3) $6 - 7 \times 3 + 2 \times 5$
4) $12 - (3 \times 5 - 4)$
5) $3 \times 2^2 \times 5$
6) $10 + 5 \times 4^2 \div 2$
7) $5^2 - 2^3 \times 3$
8) $(2 + 4)^2 - (10 - 8)^3$
9) $7\,(3^2 - 5) - 6 \times 3$
10) $\frac{1}{2}\,(5 + 3 \times 3) - 4 \times 2$
11) $(11 - 3)^2 \div (15 - 11)$
12) $\frac{1}{3}\,(12 - 3 \times 5 + 4)$
13) $7 + 5^2 - 4^2 \times 2$
14) $(2 + 21 \div 7 - 4)^3$
15) $\frac{3}{4} \times 8 - 12 \div (11 - 8)$
16) $4 + 0.3 \times 6 - 2 \times 0.5$
17) $1 - 0.8 \div 2 + 0.5$
18) $0.3 + 0.7 \times 2 - 3.2 \div 4$
19) $3\,(0.4 + 0.8) - 0.5 \times 4$
20) $9 + 3 \times 4^2 \div 8 - 6$

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Order of operations 6th grade math is a fundamental concept that every student in middle school must master to solve mathematical expressions correctly. Understanding the order in which operations should be performed is crucial for achieving accurate results in both simple calculations and complex problems. This article will delve into the order of operations, provide helpful tips, and explore various examples to ensure students grasp this essential mathematical principle.

What is the Order of Operations?

The order of operations is a set of rules that dictates the sequence in which different mathematical operations should be performed. This ensures that everyone solves mathematical expressions consistently and correctly. The order of operations can be remembered by the acronym PEMDAS, which stands for:

- **P** - Parentheses
- **E** - Exponents
- **M** - Multiplication
- **D** - Division
- **A** - Addition
- **S** - Subtraction

This acronym serves as a guideline to help students remember the proper sequence of operations: always start with calculations inside parentheses, followed by exponents, then move to multiplication and division (from left to right), and finally, perform addition and subtraction (also from left to right).

Why is the Order of Operations Important?

Understanding the order of operations is critical for several reasons:

- **Accuracy:** Applying the correct order ensures that mathematical expressions yield the same result regardless of who solves them.

- **Complex Problem Solving:** Many mathematical problems involve multiple operations, and without a clear order, students may arrive at different answers.

- **Foundation for Advanced Math:** Mastering the order of operations is essential for tackling more complex topics in algebra, geometry, and beyond.

Breaking Down the Order of Operations

Parentheses

Parentheses are used to indicate which operations should be performed first. When you see parentheses in a mathematical expression, always start by solving the calculations inside them. For example:

- In the expression \(3 \times (2 + 5)\), you would first calculate \(2 + 5\) to get \(7\), and then multiply by \(3\) to get \(21\).

Exponents

Exponents indicate powers or roots. After solving any expressions inside parentheses, the next step is to evaluate any exponents. For example:

- In the expression \(2^3 + 5\), you would first calculate \(2^3\) (which equals \(8\)) and then add \(5\)

to get 13.

Multiplication and Division

Multiplication and division are of equal precedence, which means they should be performed from left to right. For example:

- In the expression $6 \div 2 \times 3$, you should first divide 6 by 2 to get 3, and then multiply by 3 to get 9.

Addition and Subtraction

Similar to multiplication and division, addition and subtraction also have equal precedence and should be performed from left to right. For example:

- In the expression $10 - 3 + 2$, you would first subtract 3 from 10 to get 7, and then add 2 to get 9.

Examples of Order of Operations

To solidify your understanding of the order of operations, let's explore a few examples:

Example 1

Calculate $8 + 2 \times (3^2 - 1)$.

1. Solve inside the parentheses: \(3^2 - 1 = 9 - 1 = 8\).
2. Replace the parentheses in the expression: \(8 + 2 \times 8\).
3. Perform multiplication: \(2 \times 8 = 16\).
4. Finally, add: \(8 + 16 = 24\).

The answer is \(24\).

Example 2

Calculate \(4 + 6 \div 2 \times (1 + 2^2)\).

1. Start with the exponent inside parentheses: \(2^2 = 4\).
2. Now solve inside the parentheses: \(1 + 4 = 5\).
3. Replace the parentheses in the expression: \(4 + 6 \div 2 \times 5\).
4. Perform the division and multiplication from left to right:

- First, \(6 \div 2 = 3\).
- Then, \(3 \times 5 = 15\).

5. Finally, add: \(4 + 15 = 19\).

The answer is \(19\).

Tips for Remembering the Order of Operations

Here are some helpful tips that can assist 6th-grade students in remembering the order of operations:

- **Use PEMDAS:** Memorize the acronym to recall the sequence easily.

- **Practice:** Regular practice with various problems will help reinforce the concept.

- **Color Coding:** Some students find it helpful to color-code different operations when writing expressions.
- **Work Backwards:** When checking your work, try solving the expression in reverse to verify the steps.

Common Mistakes to Avoid

Students often make mistakes when applying the order of operations. Here are some common errors to be aware of:

- Ignoring parentheses and performing operations in the wrong order.
- Confusing multiplication and addition, leading to incorrect calculations.
- Forgetting to address exponents before other operations.

Conclusion

In summary, mastering the **order of operations 6th grade math** is essential for ensuring accuracy and consistency in mathematical calculations. By understanding and applying the PEMDAS rules, students can confidently tackle a variety of mathematical expressions. Regular practice, awareness of common mistakes, and utilizing helpful tips can further enhance their understanding. As students progress to higher levels of math, a solid foundation in the order of operations will serve them well for years to come.

Frequently Asked Questions

What is the order of operations in math?

The order of operations is a set of rules that dictates the sequence in which mathematical operations should be performed to ensure consistent results. It is often remembered by the acronym PEMDAS: Parentheses, Exponents, Multiplication and Division (from left to right), Addition and Subtraction (from left to right).

Why is the order of operations important?

The order of operations is important because it ensures that everyone solves mathematical expressions in the same way, leading to consistent and correct answers.

What does PEMDAS stand for?

PEMDAS stands for Parentheses, Exponents, Multiplication, Division, Addition, and Subtraction.

Can you give an example of a problem using the order of operations?

Sure! For the expression $3 + 6 \times (5 + 4) \div 3 - 7$, you first solve the parentheses: $5 + 4 = 9$. Then you multiply: $6 \times 9 = 54$. Next, divide: $54 \div 3 = 18$. After that, add and subtract in order: $3 + 18 - 7 = 14$.

What comes first in the order of operations?

Parentheses come first in the order of operations. You should always solve expressions inside parentheses before moving on to other operations.

How do you remember the order of operations easily?

You can remember the order of operations using the acronym PEMDAS, or by using phrases like 'Please Excuse My Dear Aunt Sally'.

What should you do if an expression has both multiplication and division?

If an expression has both multiplication and division, you should perform these operations from left to right, as they are of equal priority.

Is there a difference between addition and subtraction in terms of order?

No, there is no difference in priority between addition and subtraction. Like multiplication and division, you perform addition and subtraction from left to right.

What happens if you don’t follow the order of operations?

If you don’t follow the order of operations, you may arrive at an incorrect answer, as the calculations will be done in an arbitrary order rather than the intended sequence.

Can you simplify the expression 8 + 2 × (3^2 - 2) using order of operations?

Yes! First, solve the parentheses: 3^2 - 2 = 9 - 2 = 7. Then, multiply: 2 × 7 = 14. Finally, add: 8 + 14 = 22. So, the simplified expression equals 22.

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