

1. Find The Value Of $3x + 4y - 10$ If $x = 3$ And $y = 52$. Find The Value $a^3 + 5a$ If $a = 23$. $6ab + 4bc$

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Understanding basic algebraic expressions and how to evaluate them is essential for students and learners aiming to strengthen their mathematical skills. In this comprehensive guide, we'll explore how to evaluate complex algebraic expressions step-by-step, focusing on the specific problems:

- Find the value of $3x + 4y - 10$ when $x = 3$ and $y = 52$
- Find the value of $a^3 + 5a$ when $a = 23$
- Evaluate the expression $6ab + 4bc$ when values for a , b , and c are provided

By mastering these types of problems, you'll improve your ability to handle algebraic expressions confidently and accurately.

Understanding Algebraic Expressions

Before diving into solving specific problems, it's crucial to understand what algebraic expressions are and how to evaluate them.

What Are Algebraic Expressions?

- Algebraic expressions are mathematical phrases that combine variables, numbers, and operations (addition, subtraction, multiplication, division).
- They represent relationships or quantities that can be evaluated when variable values are known.

Key Components of Algebraic Expressions

- Variables: Symbols representing unknown or changing quantities (e.g., x , y , a , b , c).
- Constants: Fixed numerical values (e.g., 10, 23).
- Operators: Symbols indicating operations ($+$, $-$, $\times$, $\div$).

Evaluating Algebraic Expressions

- Substitute the given values for variables.
- Follow the order of operations (PEMDAS/BODMAS).
- Simplify step-by-step to arrive at the final value.

Evaluating the First Expression: $3x + 4y - 10$

Let's start with the first problem:

"Find the value of $3x + 4y - 10$ when $x = 3$ and $y = 52$."

Step-by-Step Solution

1. Identify the given values:

- $x = 3$

- $y = 52$

2. Substitute these values into the expression:

$$3(3) + 4(52) - 10$$

3. Calculate each term:

- $3 \times 3 = 9$

- $4 \times 52 = 208$

4. Add and subtract:

$$9 + 208 - 10 = 207$$

Final Answer: The value of $3x + 4y - 10$ when $x = 3$ and $y = 52$ is 207.

Evaluating the Second Expression: $a^3 + 5a$

Next, we evaluate:

"Find the value of $a^3 + 5a$ when $a = 23$."

Step-by-Step Solution

1. Identify the given value:

- $a = 23$

2. Substitute into the expression:

$$23^3 + 5(23)$$

3. Calculate each component:

- $23^3 = 23 \times 23 \times 23$

- $5 \times 23 = 115$

4. Calculate 23^3 :

- $23 \times 23 = 529$

- $529 \times 23 = 12,167$

5. Add the results:

$$12,167 + 115 = 12,282$$

Final Answer: The value of $a^3 + 5a$ when $a = 23$ is 12,282.

Evaluating the Expression: $6ab + 4bc$

For the third problem, the expression involves multiple variables:

"Evaluate $6ab + 4bc$ when values for a , b , and c are provided."

Suppose, for illustration, the values are:

- $a = 2$

- $b = 5$

- $c = 3$

Step-by-Step Solution

1. Substitute the known values:

$$6 \times 2 \times 5 + 4 \times 5 \times 3$$

2. Calculate each term:

$$\circ 6 \times 2 \times 5 = 6 \times 10 = 60$$

$$\circ 4 \times 5 \times 3 = 4 \times 15 = 60$$

3. Add the results:

$$60 + 60 = 120$$

Final Answer: When $a = 2$, $b = 5$, and $c = 3$, the expression $6ab + 4bc$ equals 120.

Note: If you have different values for a , b , and c , replace them accordingly and follow the same steps.

Additional Tips for Solving Algebraic Expressions

To enhance your skills in evaluating algebraic expressions, consider the following tips:

1. **Always substitute the correct variable values:** Double-check the values before plugging them into the expression.
2. **Follow the order of operations:** Parentheses, Exponents, Multiplication and Division (from left to right), Addition and Subtraction (from left to right).
3. **Break down complex expressions:** Simplify in parts to avoid mistakes.

4. **Use calculators for large calculations:** Especially when dealing with exponents or large numbers.
5. **Practice regularly:** The more problems you solve, the more confident you'll become.

Common Mistakes to Avoid

While working with algebraic expressions, learners often encounter pitfalls. Be mindful of these common errors:

- **Incorrect substitution:** Mixing up variable values or substituting into the wrong part of the expression.
- **Ignoring order of operations:** Performing addition before multiplication can lead to wrong answers.
- **Miscalculations in exponents:** Remember that exponents have higher precedence than multiplication.
- **Overlooking parentheses:** They change the order of calculations significantly.

Conclusion

Mastering the evaluation of algebraic expressions is fundamental to progressing in mathematics. By understanding how to substitute values correctly, follow the order of operations, and simplify expressions systematically, learners can solve a wide variety of algebra problems with confidence. The specific examples covered—evaluating $3x + 4y - 10$, $a^3 + 5a$, and $6ab + 4bc$ —demonstrate the practical steps involved and serve as a foundation for tackling more complex algebraic challenges.

Remember, consistent practice and attention to detail are key to becoming proficient in algebra. Keep practicing similar problems, and you'll find that evaluating algebraic expressions becomes an intuitive and rewarding process.

Frequently Asked Questions

What is the value of $3x + 4y - 10$ when $x = 3$ and $y = 52$?

First, substitute the values: $3(3) + 4(52) - 10 = 9 + 208 - 10 = 207$.

How do you find the value of $a^3 + 5a$ if $a = 23$?

Calculate a^3 : $23^3 = 12,167$. Then, $5a = 5 \times 23 = 115$. Add them: $12,167 + 115 = 12,282$.

What is the value of $6ab + 4bc$ if $a = 2$, $b = 3$, and $c = 4$?

Substitute: $6(2)(3) + 4(3)(4) = 6 \times 2 \times 3 + 4 \times 3 \times 4 = 36 + 48 = 84$.

If $x = 3$ and $y = 52$, what is the simplified result of $3x + 4y - 10$?

Plugging in the values: $3 \times 3 + 4 \times 52 - 10 = 9 + 208 - 10 = 207$.

How do you compute the value of $a^3 + 5a$ for $a = 23$?

Calculate a^3 : $23^3 = 12,167$; then $5a = 115$; sum: $12,167 + 115 = 12,282$.

Calculate $6ab + 4bc$ with $a=2$, $b=3$, $c=4$.

$6 \times 2 \times 3 + 4 \times 3 \times 4 = 36 + 48 = 84$.

What is the result of the expression $3x + 4y - 10$ given specific values?

With $x=3$ and $y=52$, the expression equals 207.

Find the value of $a^3 + 5a$ when a is 23.

The value is 12,282.

Additional Resources

Find The Value Of $3x + 4y - 10$ If $X = 3$ And $Y = 52$. Find The Value $A^3 + 5a$ If $A = 23$. $6ab + 4bc$

Introduction

Mathematics serves as the backbone of logical reasoning, problem-solving, and quantitative analysis across diverse fields such as science, engineering, economics, and technology. The ability to evaluate algebraic expressions accurately—particularly when variables are assigned specific values—is fundamental not only in academic settings but also in real-world applications. This investigative article delves into a set of algebraic problems that exemplify the process of substituting

known values into expressions and performing computations systematically.

The problems under review involve expressions such as $3x \cdot 4y - 10$, $A^3 + 5a$, and $6ab + 4bc$, with specific variable assignments. Our goal is to analyze each problem in detail, elucidate the step-by-step methodology for solving them, and explore the broader implications of such calculations. By doing so, we aim to provide a comprehensive understanding of algebraic evaluation techniques, highlighting their relevance in practical contexts.

Contextualizing the Problems

Before diving into calculations, it's crucial to understand the nature of each problem:

1. Find the value of $3x \cdot 4y - 10$ if $x = 3$ and $y = 52$.
2. Find the value of $A^3 + 5a$ if $A = 23$.
3. Evaluate $6ab + 4bc$ (assuming variables a , b , c are known or need to be expressed in terms of known quantities).

While the first two problems are straightforward substitutions and calculations, the third involves multiple variables, which, unless specified, may require assumptions or further data.

Dissecting the First Expression: $3x \cdot 4y - 10$

Understanding the Expression

The expression $3x \cdot 4y - 10$ appears to be missing an operator between $3x$ and $4y$ —but based on typical algebraic notation, it is reasonable to assume the intended expression is:

$$3x \cdot 4y - 10$$

which signifies the product of $3x$ and $4y$, minus 10.

Step-by-Step Solution

Given:

- $x = 3$

- $y = 52$

Step 1: Calculate $3x$

$$3 \cdot 3 = 9$$

Step 2: Calculate $4y$

$$4 \cdot 52 = 208$$

Step 3: Compute the product $3 \times 4y$

$$9 \ 208 = 1872$$

Step 4: Subtract 10

$$1872 - 10 = 1862$$

Result:

The value of the expression is 1862.

Analyzing the Second Expression: $A^3 + 5a$

Clarifying the Expression

The problem states: Find the value $A^3 + 5a$ if $A = 23$.

Assuming A and a are the same variable, or perhaps a typographical inconsistency, it is common in algebra to denote the variable as A or a interchangeably. For clarity, we will treat A as the variable and a as the same.

Thus, the expression becomes:

$$A^3 + 5A$$

Given:

$$- A = 23$$

Step-by-Step Calculation

Step 1: Calculate A^3

$$23^3 = 23 \ 23 \ 23$$

$$\text{First, } 23 \ 23 = 529$$

$$\text{Then, } 529 \ 23:$$

$$- 529 \ 20 = 10,580$$

$$- 529 \ 3 = 1,587$$

Adding:

$$10,580 + 1,587 = 12,167$$

Step 2: Calculate $5A$

$$5 \ 23 = 115$$

Step 3: Sum the two results

$$12,167 + 115 = 12,282$$

Result:

The value of $A^3 + 5A$ when $A=23$ is 12,282.

Tackling the Third Expression: $6ab + 4bc$

Context and Variables

This expression involves three variables: a , b , and c . Without specific values, we can explore the evaluation process generally or assume certain values for demonstration.

If values are provided:

- $a = ?$
- $b = ?$
- $c = ?$

Alternatively, if these are symbolic expressions, we can analyze the structure and potential factorizations.

Hypothetical Example

Suppose:

- $a = 4$
- $b = 3$
- $c = 5$

Calculation Steps

Step 1: Calculate $6ab$

$$6 \cdot 4 \cdot 3 = 6 \cdot 12 = 72$$

Step 2: Calculate $4bc$

$$4 \cdot 3 \cdot 5 = 4 \cdot 15 = 60$$

Step 3: Sum the results

$$72 + 60 = 132$$

Result:

Given the example values, $6ab + 4bc = 132$.

Broader Implications and Applications

The Significance of Variable Substitutions

The above calculations exemplify fundamental algebraic principles—substituting known values into expressions and performing arithmetic operations systematically. Mastery of this process is vital for:

- Science and Engineering: Calculating forces, energies, or other quantities based on variable parameters.
- Economics: Evaluating profit functions or cost equations.
- Data Analysis: Computing metrics based on datasets where variables represent specific data points.

Importance in Real-World Contexts

Consider a scenario in physics where x and y might represent measurements such as displacement and velocity, or in finance where A could be an interest rate, and the expressions could model returns or costs.

The ability to evaluate complex expressions swiftly and accurately enables professionals to make informed decisions, optimize systems, and interpret data effectively.

Critical Observations and Common Pitfalls

- Operator Clarity: In algebra, missing operators can lead to misinterpretation. Explicit notation (e.g., using $\cdot$ for multiplication) helps avoid ambiguity.
- Order of Operations: Always perform calculations following PEMDAS/BODMAS principles—Parentheses, Exponents, Multiplication and Division, Addition and Subtraction.
- Variable Consistency: Ensure variables are consistently labeled and understood throughout calculations.
- Power Calculations: Large exponents, such as 23^3 , require careful computation—using calculators or stepwise multiplication to minimize errors.

Conclusion

The process of evaluating algebraic expressions with given variable values is a foundational skill with extensive applications across disciplines. This investigation has demonstrated the methodical approach necessary to substitute, compute, and interpret results accurately. Whether dealing with straightforward expressions like $3x - 4y - 10$ or more complex ones such as $A^3 + 5A$, the core principles remain consistent.

In practical and academic settings, proficiency in these techniques empowers professionals to analyze data, solve problems efficiently, and derive meaningful insights. As algebra continues to underpin advancements in technology and science, mastering these fundamental skills remains indispensable.

References

- Stewart, J. (2015). Calculus: Early Transcendentals. Cengage Learning.
- Lay, D. C. (2012). Linear Algebra and Its Applications. Pearson.
- Blitzer, R. (2019). College Algebra. Pearson Education.
- Algebraic computation tools and calculators can aid in verifying large exponent calculations and complex expressions.

This detailed review underscores the importance of methodical problem-solving in algebra, highlighting both the techniques and their practical significance.

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