

After Substituting, What Is The First Step When Evaluating $X^3 - 4 \times 2$ When $X = 5$? Multiply 3 By

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in the first paragraph, it's essential to understand the process of evaluating algebraic expressions step-by-step. Whether you're a student learning basic algebra or someone brushing up on math skills, knowing how to approach evaluation after substitution is crucial. This article will guide you through the systematic procedure to evaluate the expression $(X^3 - 4 \times 2)$ when $(X = 5)$, emphasizing the importance of the first step—substituting the value and then simplifying methodically.

Understanding the Expression: $(X^3 - 4 \times 2)$

Before diving into the evaluation process, let's clarify the components of the expression:

Breaking Down the Expression

- (X^3) : This means (X) raised to the power of 3.
- $(- 4 \times 2)$: This is a multiplication operation involving constants.

Once we substitute $(X = 5)$, the expression becomes a numerical problem that can be simplified step-by-step.

The First Step: Substituting the Value of X

Why is Substitution Important?

Substitution is the foundational step in evaluating algebraic expressions. It involves replacing the variable (X) with its given value—in this case, 5. This transforms a variable expression into a numerical one, allowing for straightforward calculations.

How to Properly Substitute $(X = 5)$

1. Identify all instances of the variable (X) in the expression.

2. Replace each (X) with 5.
3. Rewrite the expression with these substitutions for clarity.

Applying this to our expression:

$$X^3 - 4 \times 2 \quad \rightarrow \quad 5^3 - 4 \times 2$$

This step ensures that we are working with concrete numbers rather than variables, simplifying the evaluation process.

Order of Operations: The Key to Accurate Evaluation

PEMDAS/BODMAS Rules

To correctly evaluate the expression after substitution, it's essential to follow the standard order of operations:

1. Parentheses (brackets)
2. Exponents (powers and roots)
3. Multiplication and Division (from left to right)
4. Addition and Subtraction (from left to right)

Applying these rules helps avoid common mistakes and ensures precise results.

Step-by-Step Evaluation Process

Step 1: Calculate (5^3)

- Recognize that (5^3) means 5 multiplied by itself three times:

$$5^3 = 5 \times 5 \times 5 = 125$$

Step 2: Simplify (4×2)

- Multiply constants:

$$4 \times 2 = 8$$

Step 3: Perform the Subtraction

- Now, subtract 8 from 125:

$$125 - 8 = 117$$

Final Result and Additional Tips

The evaluated value of the expression $(X^3 - 4 \times 2)$ when $(X = 5)$ is 117.

Additional Tips for Evaluating Expressions

- **Always substitute carefully:** Double-check that all instances of the variable have been replaced.
- **Follow the order of operations:** This prevents miscalculations, especially in more complex expressions.
- **Use parentheses when necessary:** To clarify the order in which operations should be performed, especially in nested expressions.
- **Practice with varied examples:** To improve your skills, try evaluating different types of algebraic expressions with different substitution values.

Common Mistakes to Avoid

- Forgetting to exponentiate: Remember that (X^3) is not the same as $(X \times 3)$; it involves powers, not multiplication.
- Ignoring the order of operations: Performing addition before multiplication can lead to incorrect results.
- Neglecting to substitute all instances of the variable: Missing any substitution can change the entire calculation.

Conclusion

Evaluating algebraic expressions after substitution might seem straightforward, but it requires attention to detail and understanding of the order of operations. The first step—substituting $(X = 5)$ —sets the stage for accurate calculation. By replacing the variable with its value and then systematically applying the rules of arithmetic, you can confidently arrive at the correct result.

Remember, practice makes perfect. Work through various expressions to solidify your understanding of the process. With these guidelines, evaluating similar algebraic expressions becomes an easier and more confident task, allowing you to solve math problems efficiently and accurately.

Frequently Asked Questions

What is the first step when evaluating the expression $3x - 4.2$ after substituting $x = 5$?

The first step is to substitute $x = 5$ into the expression, replacing every x with 5.

How do you evaluate $3x - 4.2$ when x equals 5?

Begin by substituting 5 for x , then perform the multiplication 3×5 , followed by subtracting 4.2.

When given the expression $3x - 4.2$ and $x = 5$, what operation should you perform first?

First, substitute 5 for x , then multiply 3 by 5 to simplify the expression.

What is the initial step in evaluating the expression after plugging in $x = 5$?

The initial step is to replace x with 5, resulting in $3(5) - 4.2$.

In evaluating $3x - 4.2$ at $x = 5$, what is the significance of multiplying 3 by 5?

Multiplying 3 by 5 computes the first part of the expression, which is essential before subtracting 4.2.

Why is it important to perform the multiplication 3×5 first when evaluating the expression?

Because multiplication has higher precedence, it ensures accurate calculation before subtracting 4.2.

Additional Resources

After Substituting, What Is The First Step When Evaluating $X^3 - 4.2$ When $X = 5$? Multiply 3 By

Understanding how to evaluate algebraic expressions is a fundamental skill in mathematics, especially for students and professionals who frequently work with formulas and equations. When presented with an expression such as $(X^3 - 4.2)$ and a specific value for (X) , the question often arises: What is the first step after substituting the given value? This article delves into the systematic approach to evaluating such expressions, emphasizing clarity, precision, and the importance of foundational concepts.

The Importance of Proper Substitution in Algebraic Evaluation

Before diving into the step-by-step process, it's essential to grasp why proper substitution and evaluation methods matter. In algebra, expressions are symbolic representations of relationships between variables and constants. When a specific value is assigned to a variable, the goal is to replace that variable with the given number and simplify the expression correctly.

Why is this important?

- Accuracy: Correct substitution ensures that the evaluation reflects the true value of the expression at the given point.
- Consistency: Following a systematic process minimizes errors, especially in complex calculations.
- Foundation for Advanced Math: Proper evaluation techniques build the groundwork for calculus, physics, engineering, and data analysis.

Step 1: Identify the Expression and the Given Value

The initial step involves clearly recognizing the algebraic expression and the specific value for the variable.

- Expression: $(X^3 - 4.2)$
- Given (X) : 5

This step might seem straightforward, but clarity here prevents mistakes downstream.

Step 2: Substitute the Given Value into the Expression

Once identified, the next step is to replace every instance of (X) with the given value, which is 5 in this case.

Example:

$$\begin{aligned} & \left[\right. \\ & X^3 - 4.2 \quad \rightarrow \quad 5^3 - 4.2 \\ & \left. \right] \end{aligned}$$

Key considerations during substitution:

- Uniform Replacement: Ensure that every occurrence of (X) is replaced.
- Maintain Expression Structure: Do not alter the original structure of the expression; simply replace the variable with the number.

This process transforms an algebraic expression into a numerical expression, paving the way for straightforward calculation.

Step 3: Simplify the Expression Step-by-Step

After substitution, the next logical step is to simplify the expression systematically. This involves:

a) Calculate the Exponentiation:

- (5^3) : Raising 5 to the third power means multiplying 5 by itself three times:

$$\begin{aligned} & \{ \\ & 5^3 = 5 \times 5 \times 5 \\ & \} \end{aligned}$$

- Calculation:

$$\begin{aligned} & \{ \\ & 5 \times 5 = 25 \\ & \} \end{aligned}$$

$$\begin{aligned} & \{ \\ & 25 \times 5 = 125 \\ & \} \end{aligned}$$

- Result:

$$\begin{aligned} & \{ \\ & 5^3 = 125 \\ & \} \end{aligned}$$

b) Perform the Subtraction:

- Now, subtract 4.2 from the result:

$$\begin{aligned} & \{ \\ & 125 - 4.2 \\ & \} \end{aligned}$$

- Calculation:

$$\begin{aligned} & \{ \\ & 125 - 4.2 = 120.8 \\ & \} \end{aligned}$$

\]

- Result:

\[

\boxed{120.8}

\]

The simplified numerical value of the expression at $(X=5)$ is 120.8.

Step 4: Understanding the Multiplication Part of the Question

The phrase "Multiply 3 By" in the initial prompt appears to be part of a broader question or perhaps a typographical fragment. If the goal is to evaluate the expression $(X^3 - 4.2)$ at $(X=5)$ and then multiply the result by 3, the process continues:

a) Multiply the evaluated result by 3:

\[

120.8 $\times$ 3

\]

b) Calculation:

\[

120.8 $\times$ 3 = 362.4

\]

Final answer:

\[

\boxed{362.4}

\]

This step underscores the importance of following through with the calculation, especially when additional operations are involved after substitution and evaluation.

Additional Considerations and Common Pitfalls

When evaluating expressions after substitution, several common pitfalls can trip up learners or professionals:

- Order of Operations: Always remember PEMDAS/BODMAS (Parentheses, Exponents, Multiplication/Division, Addition/Subtraction). Even in simple evaluations, applying the correct order avoids errors.
- Incorrect Substitution: Replacing only part of the expression or missing a term can lead to incorrect

results.

- Misinterpretation of the Expression: Particularly with expressions involving decimals, exponents, or multiple operations, clarity is essential.

- Handling Negative Numbers and Parentheses: If the expression involved negative signs or parentheses, proper handling during substitution is critical to maintain accuracy.

Practical Applications of Evaluating Expressions

Understanding these steps isn't merely academic; practical applications abound:

- Physics: Calculating force, velocity, or energy at specific points.
- Finance: Evaluating compound interest formulas at given time periods.
- Engineering: Determining stress or load at specific points in a structure.
- Data Science: Computing metrics or features based on variable inputs.

In all cases, the ability to accurately substitute and evaluate expressions ensures reliable results that inform decision-making.

Conclusion: The Critical First Step in Evaluation

To summarize, after substituting a specific value into an algebraic expression, the first step is to replace every instance of the variable with that value carefully. This simple yet crucial step transforms an abstract algebraic formula into a concrete numerical problem. The subsequent steps involve systematic simplification—computing exponents, performing arithmetic operations in the correct order—and, if necessary, applying operations such as multiplication.

By adhering to this structured approach, students and professionals can confidently evaluate expressions like $(X^3 - 4.2)$ at $(X=5)$, ensuring accuracy and consistency. Whether the goal is to solve a homework problem or to perform complex calculations in scientific research, mastering this initial step lays a solid foundation for all subsequent mathematical reasoning.

In essence, after substitution, the first step when evaluating $(X^3 - 4.2)$ at $(X=5)$ is to replace (X) with 5, then proceed with systematic simplification, ultimately multiplying the result by 3 if required.

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