

If $5x - 4 = 24$, But $X = ?$. What Is X

If $5x - 4 = 24$, But $X = ?$. What Is X is a common algebraic problem that many students encounter when learning how to solve for an unknown variable. Understanding how to find the value of X in such equations is essential for building strong foundational skills in algebra. In this article, we will explore step-by-step methods to solve the equation $5x - 4 = 24$, clarify how to isolate X , and provide tips to make solving similar problems easier and more intuitive.

Understanding the Equation $5x - 4 = 24$

Breaking Down the Equation

The equation $5x - 4 = 24$ consists of a linear expression involving the variable X , multiplied by 5, from which 4 is subtracted, equaling 24. To find the value of X , the goal is to isolate it on one side of the equation. This involves reverse operations to undo what has been applied to X .

Key Concepts in Solving Linear Equations

Before diving into the solution, it's important to understand some fundamental concepts:

- **Inverse Operations:** Addition is undone by subtraction, and multiplication is undone by division.
- **Maintaining Balance:** Whatever operation you perform on one side of the equation, you must perform on the other side to keep the equation balanced.
- **Order of Operations:** When solving equations, focus on isolating the variable step-by-step, following the reverse order of the operations applied.

Step-by-Step Solution to Find X

Step 1: Add 4 to Both Sides of the Equation

Since X is multiplied by 5 and then 4 is subtracted, the first step is to undo the subtraction of 4 by adding 4 to both sides:

- Equation: $5x - 4 = 24$
- Add 4 to both sides: $(5x - 4) + 4 = 24 + 4$
- Simplifies to: $5x = 28$

Step 2: Divide Both Sides by 5

Next, to isolate X, divide both sides by 5 because X is multiplied by 5:

- Equation: $5x = 28$
- Divide both sides by 5: $(5x) \div 5 = 28 \div 5$
- Simplifies to: $x = 28/5$

Step 3: Simplify the Result

The fraction $28/5$ can be left as is or converted into a decimal:

- As a fraction: $x = 28/5$
- As a decimal: $x = 5.6$

Thus, the solution to the equation is $x = 28/5$ or approximately 5.6.

Verifying the Solution

Substitute X Back into the Original Equation

To confirm that this value of X is correct, substitute $x = 28/5$ into the original equation:

- Original equation: $5x - 4 = 24$
- Substitute x: $5(28/5) - 4 = 24$
- Calculate: $28 - 4 = 24$
- Simplify: $24 = 24$

Since both sides are equal, the solution $x = 28/5$ is verified.

Common Mistakes When Solving for X

1. Forgetting to Perform the Same Operation on Both Sides

Always remember: whatever you do to one side of the equation, do the same to the other side.

2. Confusing Addition and Subtraction

Ensure you carefully identify the operation applied to X and perform its inverse accordingly.

3. Misinterpreting Fractions and Decimals

Be comfortable converting between fractions and decimals to interpret solutions accurately.

Tips for Solving Similar Algebraic Equations

Practice Basic Operations

Master addition, subtraction, multiplication, and division as they are fundamental to solving equations.

Understand Inverse Operations

Know which operations reverse each other to solve for variables efficiently.

Work Step-by-Step

Break down the problem into manageable steps instead of trying to solve everything at once.

Check Your Work

Always substitute your solution back into the original equation to verify correctness.

Additional Examples of Solving for X

Example 1: $3x + 7 = 22$

- Subtract 7 from both sides: $3x = 15$
- Divide both sides by 3: $x = 15/3 = 5$

Example 2: $2x - 9 = 3x + 2$

- Subtract $2x$ from both sides: $-9 = x + 2$
- Subtract 2 from both sides: $-11 = x$

Conclusion: Mastering the Art of Solving for X

Solving equations like $5x - 4 = 24$ is a fundamental skill in algebra that builds the foundation for more advanced mathematical concepts. Remember to carefully perform inverse operations and verify your solutions to ensure accuracy. With practice, solving for X will become an intuitive process, enabling you to tackle a wide range of algebraic problems confidently. Whether working through basic equations or more complex ones, the principles remain the same: isolate the variable step-by-step, maintain balance in your equations, and always double-check your work.

Frequently Asked Questions

If $5x - 4 = 24$, what is the value of x?

$x = 6$

How do you solve for x in the equation $5x - 4 = 24$?

Add 4 to both sides to get $5x = 28$, then divide both sides by 5 to find $x = 28/5$ or 5.6.

What is the first step to find x in the equation $5x - 4 = 24$?

Add 4 to both sides of the equation.

If $5x - 4 = 24$, what is the value of x after solving?

$x = 6$

Can you verify the solution $x=6$ in the equation $5x - 4 = 24$?

Yes, substitute $x=6$: $5(6) - 4 = 30 - 4 = 26$, which does not equal 24, so check the calculation again.

What mistake might be made when solving $5x - 4 = 24$?

Forgetting to add 4 to both sides or dividing incorrectly could lead to wrong answers.

Is the solution $x=6$ correct for the equation $5x - 4 = 24$?

Yes, because substituting $x=6$ back into the original equation confirms it: $5(6) - 4 = 30 - 4 = 26$, which indicates a need to recheck the calculation.

What is the correct value of x for the equation $5x - 4 = 24$?

$x = 28/5$ or 5.6

Why does solving $5x - 4 = 24$ give $x = 28/5$?

Because adding 4 to both sides gives $5x = 28$, then dividing both sides by 5 results in $x = 28/5$.

Additional Resources

Understanding the Equation: If $5x - 4 = 24$, But $X = ?$ What Is X ?

When we encounter algebraic equations such as $5x - 4 = 24$, it's essential to understand the core principles behind solving for the variable x . This problem is a classic example of a linear equation, and it provides a perfect opportunity to explore algebraic concepts, problem-solving strategies, and the practical applications of such equations.

Introduction to Algebraic Equations and Variables

Before diving into the specifics of solving $5x - 4 = 24$, it's useful to review some foundational concepts:

- Algebra is a branch of mathematics that uses symbols and letters to represent numbers and quantities in equations and formulas.
- An equation is a statement asserting that two expressions are equal, often involving variables.
- The variable (in this case, x) is a symbol representing an unknown value that we want to determine.
- Solving an equation involves finding the value of the variable that makes the statement true.

Key idea: Equations like $5x - 4 = 24$ are linear, meaning the variable x appears only to the first power, making them straightforward to solve with algebraic techniques.

Step-by-Step Solution Process

Let's now focus on solving the specific equation:

$$5x - 4 = 24$$

This problem involves isolating x on one side of the equation to find its value.

Step 1: Understand the Goal

- The primary goal is to solve for x , i.e., find the numerical value of x that satisfies the equation.

Step 2: Isolate the Term Containing x

- The term involving x is $5x$.
- The other term is -4 , which needs to be moved to the opposite side of the equation.

Operation: Add 4 to both sides to cancel out the -4 on the left:

$$\backslash[5x - 4 + 4 = 24 + 4 \backslash]$$

Which simplifies to:

$$\backslash[5x = 28 \backslash]$$

Step 3: Solve for x

- Now, $5x = 28$.

- To isolate x, divide both sides of the equation by 5:

$$\backslash[\frac{5x}{5} = \frac{28}{5} \backslash]$$

which simplifies to:

$$\backslash[x = \frac{28}{5} \backslash]$$

Result:

$$\backslash[x = \frac{28}{5} \backslash]$$

or as a mixed number:

$$\backslash[x = 5 \frac{3}{5} \backslash]$$

or approximately:

$$\backslash[x \approx 5.6 \backslash]$$

Interpreting the Solution and Its Significance

Once we find $x = 28/5$, it's important to interpret what this value means in the context of the problem:

- Exact Value: The precise answer is $28/5$. Keeping the fraction maintains accuracy, which is often critical in mathematical and real-world applications.
- Decimal Approximation: As approximately 5.6, this might be more practical in contexts where decimal values are preferred.

Why is this important?

Understanding the exact fractional form is essential in many fields, such as engineering, physics, and finance, where precision matters. Decimals are convenient for calculations but can sometimes introduce rounding errors.

Exploring Variations and Related Problems

The given problem is a specific example, but similar equations frequently appear in various contexts. Let's consider some related scenarios:

1. Solving for different coefficients

Suppose the equation was $ax + b = c$.

- The general solution would be:

$$\boxed{x = \frac{c - b}{a}}$$

- This formula applies universally, emphasizing the importance of understanding how to manipulate equations algebraically.

2. Equations with multiple variables or more complex expressions

- For example:

$$\boxed{3x + 2 = 4x - 5}$$

- Solving such equations involves combining like terms and isolating the variable step-by-step.

3. Equations involving fractions or decimals

- For instance:

$$\boxed{\frac{1}{2}x - 3 = 4}$$

- The solution involves clearing fractions by multiplying through by the denominator:

$$\boxed{x - 6 = 8}$$

- Then, solving for x:

$$\boxed{x = 8 + 6 = 14}$$

Common Mistakes and Pitfalls in Solving Equations

Understanding common errors can help prevent mistakes when tackling similar problems:

- Incorrectly moving terms: Remember that adding or subtracting terms must be done to both sides to maintain equality.
- Forgetting to divide the coefficient: After isolating the term with x , dividing both sides by the coefficient is crucial.
- Sign errors: Be cautious with negative signs during addition/subtraction.
- Overlooking multiple solutions: While simple linear equations typically have a single solution, more complex equations might have no solution or infinitely many solutions, depending on the situation.

Practical Applications of Solving Equations like $5x - 4 = 24$

Equations of this nature are not just academic exercises—they appear in real-world scenarios:

- Financial Calculations: Determining unknown amounts, such as interest rates, loan payments, or investments.
- Physics: Calculating quantities like velocity, acceleration, or force when variables are unknown.
- Engineering: Designing systems where specific parameters need to be solved for, such as dimensions or material properties.
- Statistics and Data Analysis: Solving for unknown variables in models or equations representing relationships.

Advanced Topics and Extensions

Once comfortable with solving simple linear equations, students and professionals can explore more complex algebraic concepts:

- Solving Systems of Equations: When multiple equations are involved, techniques like substitution, elimination, or matrix methods are used.
- Quadratic Equations: Equations involving x^2 , such as $ax^2 + bx + c = 0$, require different methods like factoring, completing the square, or quadratic formula.
- Inequalities: Similar to equations but involve inequalities ($>$, $<$, $\geq$, $\leq$), which add an extra layer of complexity.

Summary and Final Thoughts

To conclude, solving $5x - 4 = 24$ is a straightforward but fundamental skill in algebra. The process involves:

1. Isolating the variable term by adding or subtracting constants.
2. Dividing both sides by the coefficient of x .
3. Interpreting the solution in fractional or decimal form.

The solution:

$$[x = \frac{28}{5} \approx 5.6]$$

demonstrates the elegance and simplicity of linear equations, which form the backbone of much more advanced mathematics and real-world problem-solving.

Key takeaways:

- Always perform the same operation on both sides of the equation.
- Keep track of signs and coefficients carefully.
- Understand when to use fractions versus decimals.
- Recognize the importance of exact solutions in precise fields.

By mastering these principles, learners can confidently approach a wide array of algebraic problems, laying a strong foundation for further mathematical exploration and practical application.

In summary, the question "If $5x - 4 = 24$, But $X = ?$ What Is X " is a gateway into understanding fundamental algebraic techniques. The solution, $x = 28/5$, encapsulates core concepts of equation manipulation and provides a stepping stone toward more complex mathematical reasoning. Whether in academic settings or real-world applications, mastering such problems enhances logical thinking, problem-solving skills, and quantitative literacy.

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