

1.5(q-4)-2=4 What Is Q

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Understanding the equation $1.5(q-4)-2=4$ is a fundamental step in mastering algebraic concepts involving linear equations and variables. Many students and learners encounter such equations during their studies, and solving for the variable 'q' can seem challenging at first glance. This article provides a comprehensive guide to understanding the equation, the steps involved in solving for 'q', and the broader context of algebraic problem-solving. Whether you're a beginner or looking to reinforce your skills, this detailed exploration aims to clarify the process and ensure you grasp the underlying principles.

What Does the Equation $1.5(q-4)-2=4$ Represent?

Before diving into the solution, it's essential to understand what the equation signifies.

Breaking Down the Equation

The equation:

```plaintext

$1.5(q - 4) - 2 = 4$

```

contains the following components:

- A coefficient of 1.5 multiplying the expression $(q - 4)$
- A subtraction of 2
- An equals sign leading to the value 4

This structure indicates a linear relationship involving the variable 'q'. The goal is to isolate 'q' on one side of the equation to understand its value.

Why Is Solving for 'Q' Important?

Solving for variables like 'q' helps in various real-world applications:

- Calculating unknown quantities in physics or engineering
- Budgeting and financial calculations
- Analyzing data trends
- Developing problem-solving skills in mathematics

Understanding how to manipulate and solve equations like $1.5(q-4)-2=4$ is foundational for advanced mathematical concepts.

Step-by-Step Solution to Find 'Q'

Let's explore how to solve the equation systematically.

Step 1: Write Down the Equation

Start with the original:

```
```plaintext
1.5(q - 4) - 2 = 4
```
```

Step 2: Eliminate the Constant Term on the Left

Add 2 to both sides to cancel out the -2:

```
```plaintext
1.5(q - 4) = 4 + 2
```
```

Simplifies to:

```
```plaintext
1.5(q - 4) = 6
```
```

Step 3: Isolate the Expression with 'Q'

Divide both sides by 1.5 to solve for (q - 4):

```
```plaintext
q - 4 = 6 / 1.5
```
```

Calculate:

```
```plaintext
q - 4 = 4
```
```

Step 4: Solve for 'Q'

Add 4 to both sides:

```
```plaintext
q = 4 + 4
```
```

Simplifies to:

```
```plaintext
q = 8
```
```

Final Answer

The solution to the equation $1.5(q-4)-2=4$ is:

```
```plaintext
q = 8
```
```

Key Concepts in Solving Linear Equations

Understanding this process involves grasping several fundamental algebraic principles:

1. Distributive Property

- Used when multiplying a coefficient outside a parentheses:
- $a(b + c) = ab + ac$

2. Combining Like Terms

- Simplifies expressions by adding or subtracting similar terms.

3. Inverse Operations

- Addition and subtraction, multiplication and division are inverse operations used to isolate variables.

4. Maintaining Balance

- Whatever operation you do to one side of the equation, you must do to the other to keep the equation balanced.

Common Mistakes and How to Avoid Them

When solving equations like $1.5(q-4)-2=4$, learners often make the following errors:

1. Forgetting to Apply Operations to Both Sides

- Always perform the same operation on both sides to preserve equality.

2. Miscalculating Fractions or Decimals

- Carefully perform division and multiplication, especially with decimals.

3. Incorrectly Distributing or Combining Terms

- Double-check distribution and combining like terms to avoid errors.

4. Skipping Steps

- Follow each step methodically to ensure accuracy.

Practical Applications of Solving Equations Like $1.5(q-4)-2=4$

Equations of this form are common in various fields:

1. Physics

- Calculating unknown quantities such as velocity, force, or mass.

2. Economics and Finance

- Determining unknowns like interest rates or investment returns.

3. Engineering

- Solving for parameters in design calculations.

4. Computer Science

- Algorithm development often involves solving linear equations.

Additional Examples of Similar Equations

Practicing with similar equations can reinforce understanding:

1. $2.5(x + 3) - 5 = 10$

2. $4(2y - 1) + 3 = 15$

3. $0.75(z - 2) = 1.5$

Each example follows a similar process: distribute, combine, isolate, and solve.

Conclusion: Mastering the Art of Solving Linear Equations

The equation $1.5(q-4)-2=4$ illustrates fundamental algebraic techniques that are essential for higher-level mathematics and everyday problem-solving. By systematically applying the steps—adding or subtracting constants, dividing to isolate the variable, and carefully performing calculations—you can confidently solve for unknowns like 'q'. Mastery of these concepts enhances critical thinking and analytical skills, opening doors to more complex mathematical challenges and real-world applications.

Remember, practice makes perfect. Regularly solving similar equations will strengthen your understanding and improve your accuracy. Whether you're a student, educator, or lifelong learner, grasping the process behind solving equations like $1.5(q-4)-2=4$ is a valuable skill that underpins much of mathematics and science.

Keywords for SEO Optimization:

- How to solve $1.5(q-4)-2=4$
- Solve for q in algebraic equations
- Linear equations solving steps
- Algebra tutorial for beginners
- Understanding equations with variables
- Step-by-step algebra solutions
- Solving for unknowns in equations
- Basic algebra practice problems
- Equation solving techniques

Frequently Asked Questions

How do you solve the equation $1.5(q - 4) - 2 = 4$ for q ?

First, distribute 1.5 to $(q - 4)$: $1.5q - 6 - 2 = 4$. Combine like terms: $1.5q - 8 = 4$. Then, add 8 to both sides: $1.5q = 12$. Finally, divide both sides by 1.5: $q = 12 / 1.5 = 8$.

What is the value of q in the equation $1.5(q - 4) - 2 = 4$?

q equals 8.

Can you walk me through solving $1.5(q - 4) - 2 = 4$ step-by-step?

Certainly. First, distribute 1.5: $1.5q - 6 - 2 = 4$. Next, combine constants: $1.5q - 8 = 4$. Then, add 8 to both sides: $1.5q = 12$. Finally, divide both sides by 1.5: $q = 12 / 1.5 = 8$.

Is the solution $q = 8$ correct for the equation $1.5(q - 4) - 2 = 4$?

Yes, substituting $q = 8$ back into the original equation confirms it satisfies the equation, so $q = 8$ is correct.

What steps are involved in solving for q in the equation $1.5(q - 4) - 2 = 4$?

Step 1: Distribute 1.5 to $(q - 4)$. Step 2: Simplify the expression to get $1.5q - 6 - 2 = 4$. Step 3: Combine like terms: $1.5q - 8 = 4$. Step 4: Add 8 to both sides: $1.5q = 12$. Step 5: Divide both sides by 1.5 to find q : $q = 8$.

What is the importance of verifying your solution in equations like $1.5(q - 4) - 2 = 4$?

Verifying ensures that the value found for q actually satisfies the original equation, confirming the correctness of your solution.

How do I check if $q = 8$ solves the equation $1.5(q - 4) - 2 = 4$?

Substitute $q = 8$ into the original equation: $1.5(8 - 4) - 2 = 4$. Calculate inside parentheses: $1.5(4) - 2 = 4$. Then, multiply: $6 - 2 = 4$. Since 4 equals 4, $q = 8$ is correct.

Additional Resources

$1.5(q-4)-2=4$ What Is Q: A Comprehensive Exploration of the Algebraic Puzzle

When encountering the expression $1.5(q-4)-2=4$, many learners and enthusiasts find themselves intrigued by the simplicity yet subtlety of solving for the variable q . This algebraic problem not only serves as an excellent exercise in fundamental algebra but also offers insights into how variables are manipulated within equations. Understanding what q represents and how to isolate it requires a structured approach, which this article aims to provide. From deciphering the problem statement to exploring various methods of solution, we will delve into every aspect to clarify the meaning and solution of what q signifies in this context.

Understanding the Equation: Breaking Down the Problem

Before jumping into solving the equation, it's crucial to understand what is being asked. The equation:

$$1.5(q-4) - 2 = 4$$

is a linear algebraic expression involving a single variable, q . The goal is to find the value of q that satisfies this equation. The phrase "What is q " signifies the core question: "What value of q makes this equation true?"

The problem involves several components:

- A coefficient multiplying the parentheses: 1.5
- A binomial expression inside the parentheses: $(q-4)$
- A constant being subtracted: -2
- An equality with a constant: 4

Recognizing each component allows us to understand how the variable q interacts with the constants and coefficients. It also sets the stage for applying algebraic principles for solving.

Step-by-Step Solution of the Equation

Step 1: Distribute the Coefficient

The first step in solving $1.5(q-4)-2=4$ is to distribute 1.5 across the parentheses:

$$\begin{aligned} 1.5 \ q &= 1.5q \\ 1.5 \ (-4) &= -6 \end{aligned}$$

Thus, the equation transforms into:

$$1.5q - 6 - 2 = 4$$

Step 2: Combine Like Terms

Combine the constants on the left side:

$$-6 - 2 = -8$$

Now, the simplified equation reads:

$$1.5q - 8 = 4$$

Step 3: Isolate the Variable Term

Add 8 to both sides to isolate the term with q:

$$\begin{aligned} 1.5q - 8 + 8 &= 4 + 8 \\ \text{which simplifies to:} \end{aligned}$$

$$1.5q = 12$$

Step 4: Solve for q

Divide both sides by 1.5 to solve for q:

$$q = 12 / 1.5$$

Calculating:

$$q = 8$$

Final Answer: $q = 8$

Interpreting the Solution: What Does q Equal?

The solution $q=8$ indicates that when q is 8, the original equation holds true. To verify, substitute $q=8$ back into the original expression:

Original equation: $1.5(q-4) - 2 = 4$

Substitute $q=8$:

$$1.5(8-4) - 2 = 4$$

$$1.5 \cdot 4 - 2 = 4$$

$$6 - 2 = 4$$

$$4 = 4$$

Since both sides are equal, the solution $q=8$ is verified.

Significance of the Variable q in Context

In algebra, variables like q are placeholders for unknown quantities. Solving for q helps in understanding relationships within the equation and can be applied to real-world problems where variables represent measurable quantities. In this particular case, q could symbolize:

- A quantity in a problem involving proportional relationships
- A variable representing an unknown value in a geometric or physical context
- An element of a larger algebraic system requiring determination

Understanding what q is allows learners to extend their algebra skills into more complex applications involving multiple variables or constraints.

Features and Characteristics of the Equation

Features:

- Linear Equation: The equation involves no exponents or products of variables, making it straightforward to solve.
- Single Variable: Focused solely on q , simplifying the solution process.
- Distributive Property Usage: Demonstrates the importance of distributing coefficients across parentheses.
- Verifiable Solution: The solution can be easily checked by substitution.

Pros:

- Easy to understand and solve, ideal for beginners.
- Reinforces key algebraic principles such as distribution, combining like terms, and solving for variables.
- Offers a clear example of equation manipulation.

Cons:

- Might appear trivial to advanced learners, lacking complexity.
- Does not involve multiple steps or advanced techniques like factoring or quadratic solutions.
- Limited in demonstrating the use of algebra in more complex or real-world scenarios.

Alternative Approaches to Solving for q

While the standard algebraic method is most efficient here, alternative approaches can enhance understanding:

- Graphical Method: Plotting the function $y = 1.5(q-4)^{-2}$ and identifying where $y=4$, which visually confirms the solution $q=8$.
- Inverse Operations: Using inverse operations systematically to isolate q without distributing first.
- Mental Math: Recognizing that $12/1.5$ simplifies to 8 directly, saving time.

These methods reinforce algebraic thinking and demonstrate versatility in problem-solving.

Common Mistakes to Avoid

When solving equations like $1.5(q-4)^{-2}=4$, learners should watch out for:

- Incorrect Distribution: Forgetting to distribute 1.5 across the parentheses.
- Sign Errors: Mismanaging negative signs during subtraction.
- Incorrect Addition or Subtraction: Failing to perform inverse operations correctly.
- Dividing by the wrong coefficient: Ensuring division is performed by the entire coefficient 1.5, not just part of it.

Being mindful of these pitfalls ensures accurate solutions and enhances overall problem-solving skills.

Broader Implications and Applications

Understanding how to solve equations like $1.5(q-4)^{-2}=4$ extends beyond mere computation:

- Foundational Skill: Essential for progressing to more complicated algebraic topics such as inequalities, systems of equations, and quadratic equations.
- Real-World Modeling: Variables often represent unknowns in scientific, engineering, financial, or statistical models.
- Critical Thinking: Developing systematic approaches cultivates logical reasoning and analytical skills.

In educational settings, mastering such basic equations builds confidence and prepares students for advanced mathematics and problem-solving in various disciplines.

Conclusion: The Essence of "What Is Q"

The question "What is q" in the context of the equation $1.5(q-4)-2=4$ encapsulates the core of algebra: finding unknowns through systematic manipulation. The solution $q=8$ demonstrates the power of elementary algebraic techniques and highlights the importance of understanding each step involved in solving an equation. Whether viewed as a simple exercise or as a stepping stone toward more complex mathematical concepts, this problem embodies the fundamental principles that underpin algebraic reasoning.

By dissecting the problem, applying distribution, combining like terms, and performing inverse operations, we see how variables like q serve as tools to explore relationships and discover unknown values. The clarity in the solution process underscores the significance of mastering basic algebra, which remains a vital skill across numerous academic and real-world applications.

In summary, "What is q" in this context is not just about finding a number; it's about understanding the process of algebraic reasoning, recognizing the features of equations, and developing problem-solving confidence that transcends the specific problem at hand.

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