Multi Step Equations Integers Answer Key

Solving Multi-Step Equations - Integers

Solve the given equations.

1. $\dfrac{8x - 2}{8x + 2} = \dfrac{2}{4}$

2. $\dfrac{x}{3} + \dfrac{x}{2} = 5$

3. $6(2x + 2) = 3(4x + 1) - 2(2x + 2)$

4. $4(5x + 3) + 3(-4x - 4) = -48$

5. $36 = 2(r + 6) + 4(r + 4)$

6. $0 = 10(n - 4) - 6(n - 4)$

7. $-7(m - 1) + 3(2m - 1) = 8$

8. $7x + 3(-4x - 5) = -65$

9. $6x - 2(x - 5) = 46$

10. $-14 + 6b + 7 - 2b = 1 + 5b$

Multi step equations integers answer key are essential tools in mastering algebra, particularly when it comes to solving equations that involve multiple operations. These equations often require a systematic approach to isolate the variable and determine its value. This article will delve into the intricacies of multi-step equations, provide a comprehensive answer key to various problems, and offer strategies for solving them effectively.

Understanding Multi-Step Equations

Multi-step equations are algebraic expressions that require more than one step to solve for the variable. These equations can involve a combination of addition, subtraction, multiplication, and division. The goal is to isolate the variable on one side of the equation.

Key Concepts

1. Variables: Symbols that represent unknown values (e.g., x, y).
2. Constants: Known values in the equation (e.g., -3, 5).
3. Coefficients: Numbers that multiply the variable (e.g., in 4x, 4 is the coefficient).
4. Operations: Mathematical actions performed on the variables and constants (addition, subtraction, multiplication, division).

Order of Operations

To successfully solve multi-step equations, it is crucial to understand the order of operations, often remembered by the acronym PEMDAS:

- Parentheses
- Exponents
- Multiplication and Division (from left to right)
- Addition and Subtraction (from left to right)

Steps to Solve Multi-Step Equations

To solve multi-step equations, follow these systematic steps:

1. Simplify both sides of the equation: This includes combining like terms and removing parentheses.

2. Move the variable terms to one side: Use addition or subtraction to get all variable terms on one side and constant terms on the other.

3. Isolate the variable: Divide or multiply to solve for the variable.

4. Check your solution: Substitute the value back into the original equation to ensure it holds true.

Examples of Multi–Step Equations

Below are several examples of multi-step equations followed by their solutions.

Example 1

Solve: $3x + 5 = 20$

Solution Steps:

1. Subtract 5 from both sides:

$3x = 20 - 5$

$3x = 15$

2. Divide both sides by 3:

$x = \frac{15}{3}$

$x = 5$

Example 2

Solve: $4(x - 2) = 12$

Solution Steps:

1. Distribute 4:

$(4x - 8 = 12)$

2. Add 8 to both sides:

$(4x = 12 + 8)$

$(4x = 20)$

3. Divide by 4:

$(x = \frac{20}{4})$

$(x = 5)$

Example 3

Solve: $(2x + 3 = 5x - 9)$

Solution Steps:

1. Subtract $(2x)$ from both sides:

$(3 = 5x - 2x - 9)$

$(3 = 3x - 9)$

2. Add 9 to both sides:

$(3 + 9 = 3x)$

$(12 = 3x)$

3. Divide by 3:

$(x = \frac{12}{3})$

$(x = 4)$

Example 4

Solve: $(7 - 2(x + 3) = 1)$

Solution Steps:

1. Distribute -2:

$$7 - 2x - 6 = 1$$

2. Combine like terms:

$$1 - 2x = 1$$

3. Subtract 1 from both sides:

$$-2x = 0$$

4. Divide by -2:

$$x = 0$$

Answer Key for Multi–Step Equations

Here is a compiled answer key for various multi-step equations:

1. Equation: $3x + 5 = 20$

Answer: $x = 5$

2. Equation: $4(x - 2) = 12$

Answer: $x = 5$

3. Equation: $2x + 3 = 5x - 9$

Answer: $x = 4$

4. Equation: $7 - 2(x + 3) = 1$

Answer: $x = 0$

5. Equation: $5x - 3 = 2x + 9$

Answer: $x = 4$

6. Equation: $6 - 2(3x - 4) = 4$

Answer: $x = 1$

7. Equation: $9 + 4x = 3(2x + 5)$

Answer: $x = 1$

8. Equation: $10 - 3(x - 1) = 2x + 5$

Answer: $x = 1$

9. Equation: $8x + 4 = 2(5x + 6)$

Answer: $x = 2$

10. Equation: $3(x + 4) = 2(x - 5) + 27$

Answer: $x = 5$

Tips for Solving Multi-Step Equations

To enhance your skills in solving multi-step equations, consider the following tips:

- Practice regularly: The more you practice, the more confident you will become in solving equations.
- Check your work: Always substitute your answer back into the original equation to verify its correctness.
- Use graphing: Graphing the equations can provide a visual understanding of where the solutions lie.
- Study different types of equations: Familiarize yourself with various forms of equations, such as linear and quadratic equations, to broaden your problem-solving skills.
- Work with a partner: Discussing problems and solutions with peers can offer new insights and strategies.

Conclusion

In conclusion, mastering multi-step equations integers answer key is a vital aspect of algebra that sets the foundation for higher-level mathematics. By understanding the concepts, practicing diligently, and utilizing systematic approaches, students can enhance their problem-solving abilities and gain confidence in their mathematical skills. With the right strategies, solving complex equations becomes a manageable and rewarding task.

Frequently Asked Questions

What is a multi-step equation involving integers?

A multi-step equation is an equation that requires more than one step to solve, often involving operations such as addition, subtraction, multiplication, and division with integer values.

How do you solve a multi-step equation with integers?

To solve a multi-step equation, isolate the variable by performing inverse operations on both sides of the equation, simplifying step by step until the variable is alone.

Can you provide an example of a multi-step equation with integers?

Sure! An example is $3x + 5 = 20$. To solve, first subtract 5 from both sides ($3x = 15$), then divide by 3 ($x = 5$).

What common mistakes should be avoided when solving multi-step equations with integers?

Common mistakes include forgetting to apply operations to both sides of the equation, miscalculating integer operations, and not properly combining like terms.

Why is it important to practice multi–step equations with integers?

Practicing multi-step equations helps reinforce algebraic concepts, improves problem-solving skills, and builds a strong foundation for more complex mathematics.

Where can I find answer keys for multi–step equations involving integers?

Answer keys for multi-step equations can often be found in math textbooks, online educational resources, or by using math problem-solving websites and apps.

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