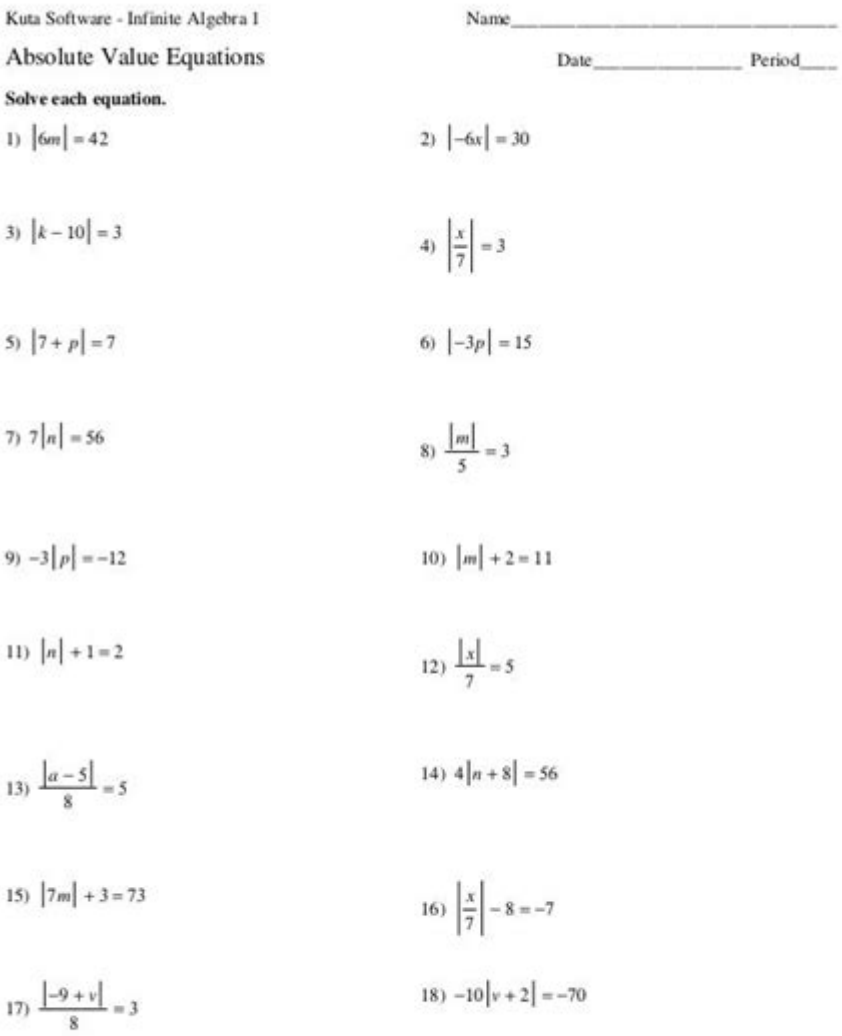
14 Solving Absolute Value Equations Answer Key



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Solve each equation.

1) $|6m| = 42$

2) $|-6x| = 30$

3) $|k - 10| = 3$

4) $\left|\frac{x}{7}\right| = 3$

5) $|7 + p| = 7$

6) $|-3p| = 15$

7) $7|n| = 56$

8) $\frac{|m|}{5} = 3$

9) $-3|p| = -12$

10) $|m| + 2 = 11$

11) $|n| + 1 = 2$

12) $\frac{|x|}{7} = 5$

13) $\frac{|a - 5|}{8} = 5$

14) $4|n + 8| = 56$

15) $|7m| + 3 = 73$

16) $\left|\frac{x}{7}\right| - 8 = -7$

17) $\frac{|-9 + v|}{8} = 3$

18) $-10|v + 2| = -70$

14 solving absolute value equations answer key is a vital resource for students and educators alike. Absolute value equations can appear daunting at first, but with the right approach and understanding, they can be tackled with ease. In this article, we will explore the fundamentals of absolute value equations, step-by-step methods for solving them, and provide a comprehensive answer key to 14 different absolute value equations. By the end, you'll have a solid grasp of how to handle these equations confidently.

Understanding Absolute Value

Before diving into solving absolute value equations, it’s crucial to understand what absolute value

means.

Definition of Absolute Value

The absolute value of a number is its distance from zero on the number line, regardless of direction. It is denoted by two vertical bars. For example:

- |5| = 5
- |-5| = 5
- |0| = 0

This means that the absolute value function returns a non-negative value.

Properties of Absolute Value

1. Non-negativity: The absolute value of any number is always greater than or equal to zero.
2. Symmetry: The absolute value function is symmetric about the y-axis.
3. Triangle Inequality: $|a + b| \leq |a| + |b|$ for all real numbers a and b.

Formulating Absolute Value Equations

Absolute value equations can be expressed in the form of |A| = B, where A is an algebraic expression and B is a non-negative number.

Types of Absolute Value Equations

1. Simple Equations:
- Example: |x| = 3
- This results in two separate equations: x = 3 and x = -3.

2. Complex Equations:
- Example: |2x - 1| = 5
- This leads to two equations: 2x - 1 = 5 and 2x - 1 = -5.

3. Equations with a Variable Inside:
- Example: |x + 4| = 2
- This results in x + 4 = 2 and x + 4 = -2.

Steps to Solve Absolute Value Equations

To solve absolute value equations, follow these steps:

1. Isolate the Absolute Value: Ensure the absolute value expression is isolated on one side of the equation.
2. Set Up Two Cases: Create two equations based on the definition of absolute value.
3. Solve Each Case: Solve both equations derived from the absolute value expression.
4. Check for Extraneous Solutions: Substitute the solutions back into the original equation to ensure they are valid.

14 Solving Absolute Value Equations Answer Key

Here, we present 14 absolute value equations along with their solutions.

1. Equation: $|x| = 4$
Solutions: $x = 4, x = -4$

2. Equation: $|x - 3| = 5$
Solutions: $x = 8, x = -2$

3. Equation: $|2x + 1| = 7$
Solutions: $x = 3, x = -4$

4. Equation: $|x/2| = 6$
Solutions: $x = 12, x = -12$

5. Equation: $|3x - 9| = 0$
Solutions: $x = 3$

6. Equation: $|x + 5| = 2$
Solutions: $x = -3, x = -7$

7. Equation: $|4x - 8| = 12$
Solutions: $x = 5, x = -1$

8. Equation: $|x^2 - 4| = 0$
Solutions: $x = 2, x = -2$

9. Equation: $|x - 1| = |x + 3|$
Solutions: $x = -1, x = 2$

10. Equation: $|x + 2| = 5x - 3$
Solutions: $x = 1, x = -1$

11. Equation: $|x - 4| = 2x + 1$
Solutions: $x = 3, x = -5$

12. Equation: $|2x - 3| = 7$
Solutions: $x = 5, x = -2$

13. Equation: $|x^2 - 1| = 3$
Solutions: $x = 2, x = -2, x = 4, x = -4$

14. Equation: |x + 1| + |x - 1| = 4
Solutions: x = 2, x = -2

Common Mistakes to Avoid

When solving absolute value equations, students often make several common mistakes:

- Ignoring the Two Cases: Failing to create both equations from the absolute value.
- Not Checking Solutions: Skipping the verification step, which can lead to including extraneous solutions.
- Misinterpreting Absolute Values: Confusing the absolute value function with standard linear equations.

Practice Problems

To further enhance understanding, here are some practice problems. Solve the following equations and verify your answers:

1. |x + 3| = 6
2. |3x - 2| = 4
3. |x/3 - 1| = 2
4. |5 - x| = 3x + 1

Tips for Success:
- Write each step clearly, and take your time to understand each part of the equation.
- Use a number line to visualize absolute values if necessary.
- Practice regularly to build confidence in solving these types of equations.

Conclusion

In summary, mastering the 14 solving absolute value equations answer key is essential for students aiming to excel in algebra. By grasping the definition of absolute value, following a systematic approach to solving these equations, and practicing regularly, students can develop strong problem-solving skills. Remember, the key to mastering absolute value equations lies in understanding their properties and practicing consistently. With diligence and effort, you can tackle any absolute value equation that comes your way!

Frequently Asked Questions

What is the general form of an absolute value equation?

The general form of an absolute value equation is |x - a| = b, where 'a' is a constant and 'b' is a non-

negative number.

How do you solve the equation |x + 3| = 5?

To solve |x + 3| = 5, you set up two equations: x + 3 = 5 and x + 3 = -5. Solving these gives x = 2 and x = -8.

What steps should be taken to isolate the absolute value in an equation?

To isolate the absolute value, you need to perform operations such as adding, subtracting, multiplying, or dividing both sides of the equation by the same non-zero number, making sure to keep the absolute value expression on one side.

What should you do if the absolute value equation has no solution?

If an absolute value equation has no solution, it typically means that the value inside the absolute value cannot equal a negative number. For example, |x| = -3 has no solution since absolute values cannot be negative.

Can you provide an example of a complex absolute value equation?

An example of a complex absolute value equation is |2x - 1| + 3 = 7. To solve it, first isolate the absolute value: |2x - 1| = 4, then set up the equations 2x - 1 = 4 and 2x - 1 = -4, leading to solutions x = 2.5 and x = -1.5.

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