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Absolute Value Equations Worksheet

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Part 1: Building a Foundation

What is the absolute value of -7?

Hint: Remember that absolute value represents distance from zero.

◯ -7
◯ 0
◯ 7
◯ -14

Which of the following statements about absolute value are true? (Select all that apply)

Hint: Consider the properties of absolute value.

☐ Absolute value is always positive.
☐ Absolute value represents the distance from zero.
☐ Absolute value can be negative.
☐ Absolute value is denoted by square brackets.

Explain in your own words what the absolute value of a number represents.

Hint: Think about distance and direction on a number line.

Provide the absolute values for the following numbers: -3, 0, 5.

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Hint: Calculate the absolute value for each number.

1. -3

2. 0

3. 5

Which equation represents the absolute value of x equals 4?

Hint: Look for the correct notation for absolute value.

○ x = 4
○ |x| = 4
○ x = -4
○ |x| = -4

Part 2: comprehension and Application

If |x| = 8, what are the possible values of x?

Hint: Think about the definition of absolute value.

○ 8 only
○ -8 only
○ 8 and -8
○ 0

Which of the following equations have no solution? (Select all that apply)

Hint: Consider the properties of absolute value.

☐ |x| = -5
☐ |x| = 0
☐ |x| = 3
☐ |x| = -1

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Describe how you would solve the equation |x - 2| = 5 and provide the solutions.

Hint: Think about the definition of absolute value and how to isolate x.

Solve the equation |3x + 1| = 7. What is one of the solutions for x?

Hint: Consider both positive and negative scenarios for the absolute value.

○ 2
○ -2
○ 3
○ -3

Solve the equation |x + 4| = 10. What are the solutions for x? (Select all that apply)

Hint: Remember to consider both cases for the absolute value.

☐ 6
☐ -6
☐ 14
☐ -14

A person is standing at point 0 on a number line. If they walk to a point represented by |x| = 9, where could they be standing? Provide both possible positions.

Hint: Think about the definition of absolute value and its implications.

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Part 3: Analysis, Evaluation, and Creation

Which graph represents the equation |x| = 3?

Hint: Consider the shape of the graph for absolute value equations.

◯ A line at y = 3
◯ A V-shape opening upwards at y = 3
◯ A V-shape opening downwards at y = 3
◯ A horizontal line at y = 0

Consider the equation |x - 3| + |x + 2| = 10. Which of the following x-values satisfy the equation? (Select all that apply)

Hint: Think about the values that would make the equation true.

☐ 0
☐ 1
☐ -5
☐ 3

Analyze the equation |2x - 5| = 9. Break down the steps to solve it and find the solutions.

Hint: Consider how to isolate the variable and the two cases for absolute value.

If |x| = a and a is a positive number, which statement is true?

Hint: Think about the implications of absolute value.

◯ x must be positive.
◯ x must be negative.
◯ x can be either positive or negative.
◯ x must be zero.

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Create an absolute value equation that has solutions x = 4 and x = -4. Explain your reasoning.

Hint: Think about how absolute value equations are structured.

Given the real-world scenario where a temperature gauge shows | T - 72| = 5, what are the possible temperatures? Provide both solutions and explain how you derived them.

Hint: Think about the meaning of the absolute value in this context.

1. First solution

2. Second solution

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