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**LESSON 8: Absolute-Value Equations and Inequalities**

- Absolute value
  - The absolute-value principle for equations
  - Algebraic and graphical approaches to solve absolute value equations
  - The absolute-value principle for equations with TWO absolute values
  - Principles for solving absolute-value problems
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For problems 1 through 7 below, answer the following questions in groups. You do not need to show your work. Think about it and write down your thoughts. Write down anything you think might help another student understand how you came up with your answers.

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1. Jose takes the absolute value of a number, and gets 5. What number(s) did he use?
2. Maria takes the absolute value of a number, and gets 0. What number(s) did she use?
3. John takes the absolute value of a number to get -8. What number(s) did he use?
4. Ricardo doubles the absolute value of a number to get 18. What number(s) did he use?
5. Sarai takes the absolute value of a number then subtracts 5 from the result to get -1. What number(s) did she use?
6. Melissa adds 1 to a number then takes the absolute value of the result and gets 3. What number(s) did she use?
7. Emi says that she can multiply the absolute value of a number by -4 and the result will be 20. What number(s) could she be thinking of?

LESSON 8: WRITING EQUATIONS INVOLVING ABSOLUTE VALUES

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The descriptions from the previous problems are below. Use algebraic symbols to translate the problems you just solved into equations. If you had to think through more than one step to arrive at your answers, try to write the steps using algebraic symbols as well.

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8. The absolute value of Jose's number is 5. Equation: \_\_\_\_\_

Solution(s): \_\_\_\_\_

9. The absolute value of Maria's number is 0. Equation \_\_\_\_\_

Solution(s): \_\_\_\_\_

10. The absolute value of John's number is -8. Equation: \_\_\_\_\_

Solution(s): \_\_\_\_\_

11 Ricardo doubles the absolute value of the number to get 18.  
Equation: \_\_\_\_\_

Solution(s): \_\_\_\_\_

12. Sarai takes the absolute value, then subtracts 5 from the result to get -1.  
Equation: \_\_\_\_\_

Solution(s): \_\_\_\_\_

13. When Melissa adds 1 to a number, then takes the absolute value of the result, she gets 3.  
Equation: \_\_\_\_\_

Solution(s): \_\_\_\_\_

14. Emi multiplies the absolute value of a number by -4 and the result will be 20. What number(s) could she be thinking of?

Equation: \_\_\_\_\_

Solution(s): \_\_\_\_\_

Name: \_\_\_\_\_

Class #: \_\_\_\_\_

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LESSON 8: Determine the number of solutions to the equation, and then solve the equation.

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15.  $|2b + 1| + 2 = 7$

16.3  $|8 + w| = 42$

Name: \_\_\_\_\_

Class #: \_\_\_\_\_

17.  $-3|x + 8| = 12$

18.  $-4|2m - 15| + 9 = -11$

#### OPTIONAL CHALLENGE PROBLEMS

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Determine the number of solutions to the equation and solve the equation.

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19.  $|3x + 6| = |6x - 12|$

20.  $-2|4y - 12| - 5 = 4|y + 1| + 15$