Algebra 1 (CCSP)

Section 2.7: Solving Absolute-Value Inequalities

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**: Students will be able to solve inequalities in one variable involving absolute-value

 expressions.

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| **Main Idea** | **Notes** |
| **Exploration:** | 2.7 Exploration: Solving Absolute-Value Inequalities |
| **Introduction:** | When an inequality contains an absolute-value expression, you can rewrite it as a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |
| **Absolute-Value Inequalities Involving <** | The inequality $\left|x\right|<5$ is all real numbers whose distance from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is less than \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ units.The solutions are all numbers between \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ AND \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ AND \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_So… $\left|x\right|<5$ can be rewritten as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.The solution to the inequality $\left|x\right|<a$ is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ AND \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_The same is true for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |
| **Example 1: Solving and Graphing Absolute Value Inequalities****Example 1 (Continued): Solving and Graphing Absolute Value Inequalities** | Solve each inequality and graph the solution.1. $\left|x\right|+3<12$

1. $\left|x+4\right|\leq 2$

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| **Absolute-Value Inequalities Involving >** | The inequality $\left|x\right|>5$ is all real numbers whose distance from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is greater than \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ units.The solutions are all numbers less than \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ OR greater than \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ OR \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_So… $\left|x\right|>5$ can be rewritten as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.The solution to the inequality $\left|x\right|>a$ is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ OR \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_The same is true for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, |
| **Example 2: Solving and Graphing Absolute Value Inequalities****Example 2: Solving and Graphing Absolute Value Inequalities** | Solve each inequality and graph the solution.1. $\left|x\right|+14\geq 19$

1. 3 + $\left|x+2\right|>5$

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| **Good Way to Remember:** | GOOD WAY TO REMEMBER:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Homework:** | 2.7 ExercisesExamples: 20 – 31(Do these problems on a separate piece of paper. Show all of your work for credit) |
| **Example 3: Absolute Value Inequalities in the Real-World** | Some fire extinguishers contain pressurized water. The water pressure should be 162.5 psi, but it is acceptable for the pressure to differ from this value by at most 12.5 psi.Write and solve an absolute-value inequality to find the range of acceptable pressures. Graph the solutions. |
| **Special Cases:** | When solving an absolute-value inequality:If you get a statement that is true for ALL values of the variable, the solution is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.If you get a FALSE statement, the solution is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |
| **Example 4: Solving and Graphing Absolute Value Inequalities** | Solve each inequality and graph the solution.1. $\left|x+4\right|-5>-8$

$b) \left|x-2\right|+9<7$   |
| **Writing Absolute Value Inequalities from the Graph:** | Steps for Writing the Absolute-Value Inequality for a Graph:Step 1: Find the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the two \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.Step 2: Find the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the midpoint to the “endpoints.”Step 3: If it is an AND, use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for an open circle and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for a closed circle.  If it is an OR, use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for an open circle and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_for a closed circle.Step 4: Write the Inequality as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Or use: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Example 5: Writing Absolute Value Equations for Graphs** | Write an absolute-value inequality for each graph. |
| **Exit Ticket:** | DESCRIBE how the solutions of 7│x│≤ 21 are different from the solutions of 7│x│< 21 . ( Do this on a separate piece of paper. I will collect this for a grade) |
| **Homework:**  | 2.7 Additional Practice Problems Worksheet |