Algebra 2 (Honors)

Section 1.6: Solving Inequalities

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

**Objectives**: Students will be able to solve and graph linear inequalities.

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| **Main Idea** | **Notes** |
| **Vocabulary: Inequality** | What is an inequality? |
| **Example 1: Writing Inequalities** | Write an inequality for the following:   1. To qualify for the police force, a candidate must be at least 66 in. and not more than 78 in. tall. 2. To make the honor roll, you must have a GPA equal to or higher than 3.0. 3. Children under 12 pay half price. |
| **Vocabulary:**  **Addition and Subtraction Properties of Inequalities**  **Vocabulary: Multiplication and Division Properties of Inequality** | Addition:  If \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  If \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  Subtraction:  If \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  If \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  The same is true for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  **Let c be a positive number and d be a negative number.**  Multiplication:  If \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  If \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  Division:  If \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  If \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  The same is true for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  **IMPORTANT: What do you have to do when you multiply or divide by a negative number when solving an inequality?** |
| **Example 2: Writing and Solving Inequalities for Real World Situations**  **Example 3: Writing and Solving Inequalities** | T-Mobile charges $35.00 per month and $0.35 per minute for long distance calls. The length of the call is rounded up to the closest minute. Verizon charges $75.00 per month with no long distance charges. For how many minutes will it cost less to use T-Mobile?  Solve the inequality -2s + 4 < 3s – 11 |
| **Vocabulary: Graphing Inequalities on a number line**  **Example 4: Graphing Inequalities in One Variable**  **Example 5: Solve and Graph the Inequality** | Recall graphing inequalities on a number line:       1. Graph *x* < 4      1. Graph *x* ≥ 2     Solve and graph the inequality.  3t – 1 ≥ -2t + 9 |
| **Practice:**  **Practice** | * + 1. The revenue (money earned) from selling x units of a product is R = 54x. The cost of producing x units is C = 40x + 868. In order to obtain a profit, the revenue must be greater than the cost.        1. Write an inequality in one variable to describe this relationship.        2. How many units of the product must be sold to earn a profit?     2. The perimeter of a rectangle with length *x* and width *y* cannot exceed 200 feet. Write a linear inequality to describe the restriction.   For questions 3 – 8, solve and graph each inequality. Use a number line to graph the inequalities. |
| **Review: Graphing a Linear Equation** | Recall the steps to graph a linear equation:  Slope-Intercept Form:  1. Plot the y-intercept at (0, b)  2. Use your slope to find another point.  3. Draw your line.    Standard Form:  **Graph** |
| **Vocabulary: Linear Inequality**  **Example 6: Solutions of Linear Inequalities** | What is a Linear Inequality?  *An ordered pair (x, y) is a* ***solution*** if it is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**  Which ordered pair is a solution of ***5x - 2y ≤ 6***?  A. (0, -3)  B. (5, 5)  C. (1, -2)   1. (3, 3) |
| **Vocabulary:**  **Graphing Linear Inequalities**  **Example 7: Graph the Inequality**  **On Your Own:**  **Example 8: Graph the Inequality**  **On Your Own:**  **Practice:** | Graphing a linear inequality is very similar to graphing a linear equation. However, linear inequalities may have solid or dashed lines and have shading on one side of the line.  Examples of what they look like:    Steps to Graphing a Linear Inequality:  1) Solve the inequality for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  2) Change the inequality to an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and graph.  3) If the inequality is < or >, the line is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  If the inequality is ≤ or ≥, the line is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  4) Shade the correct area using a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  Graph the inequality 3 - *x* > 0    Graph y < 6    Sketch a graph of x + y < 3    Graph 4x – 2y < 7      2) |
| **Example 9: Write the Inequality Represented by the Graph**  **Example 10: Using the Graphs of Inequalities to Solve Real World Problems** | Write the Inequality Represented by the Graph:    Step 1: Write the equation of the boundary line  Step 2: Is this line dashed or solid? What are the possible inequality symbols that could work?  Step 3: Test a point in the shaded area for both inequality symbols. Which one works?  Step 4: Write the final inequality.  Sue wants to buy CDs and DVDs.  She has $28 to spend.  The CDs cost $7 each and the DVDs cost $14 each.  What are the possible combinations of CDs and DVDs she can buy?  Solution Hint: Write the inequality and graph it. All whole number coordinate pairs in the shaded region represent the combinations she can buy.  Step 1: Find the inequality.  Step 2: Graph the inequality.    Step 3: Write down all the possible combinations of CDs and DVDs Sue can buy without going over $28. |
| **Homework:** |  |