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| Math 7 Unit 4 - Inequalities  Performance Task 1 |
| ***Standard(s) Addressed:***  **7.EE.4** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.  b. Solve word problems leading to inequalities of the form *px + q >; r* or *px + q < r*, where *p, q,* and *r* are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.* |
| ***Task:***  Inequalities and their Graphs  For each situation, write an inequality. Then pick which graph best represents the inequality. Provide a brief explanation about why the graph is the best representation of the situation.   |  |  |  | | --- | --- | --- | | 1. Poppy must be at least 56 inches (*i*) tall to ride the roller coaster. | Inequality: | Graph Letter: \_\_\_\_\_\_\_\_  Explanation: | | 2. Scarlett may spend no more than $56 on groceries (*g*) this week. | Inequality: | Graph Letter: \_\_\_\_\_\_\_\_  Explanation: | | 3. Skylar must wash 56 or more windows (*w*) to earn enough money for a new bike. | Inequality: | Graph Letter: \_\_\_\_\_\_\_\_  Explanation: | | 4. Faith bought 56 or fewer apples (*a*). | Inequality: | Graph Letter: \_\_\_\_\_\_\_\_  Explanation: |  |  |  | | --- | --- | | Graph A : |  | | Graph B : |  | | Graph C : |  | | Graph D : |  |   Part 2:  Mrs. Harper gave her seventh grade students a test on inequalities. She allowed them to show the answer in any format that they wanted to, as long as it showed the entire solution. She had no idea how many ways the students would represent their answers! Help her grade each student’s response. If the student incorrectly represented the inequality, provide a brief mathematical explanation of why the solution isn’t correct.  Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  7th Grade Math Test: Inequalities  Set up an inequality for each situation and show the solution in any way that represents all possible solutions to the inequality.  Example: The difference of twice a rational number and 4 is at most -5  2x - 4 -5   1. The difference of 8 and two times a rational number is at least -12.   Max : I solved the inequality like I would an equation and found that the best solution is the graph:    **Is Max correct? If not, use mathematical reasoning to explain why not or where Max might have made a mistake.**  Karla said: I solved the inequality algebraically by adding 8 to both sides then dividing by -2. Of course I flipped the inequality! The graph of my solutions looks like:    **Is Karla correct? If not, use mathematical reasoning to explain why not or where Karla might have made a mistake.**  Maybel said: “I used guess and check. I realized that 10 is the largest number and that the numbers smaller than 10 would also work. So, my solution set is {10, 9, 8, 7, 6 ….. }”  **Is Maybel correct? If not, use mathematical reasoning to explain why not or where Maybel might have made a mistake.**  Greg said: “I isolated the variable in the inequality by subtracting 8 from both sides, then dividing by -2. I found that n was greater than or equal to 10!    **Is Greg correct? If not, use mathematical reasoning to explain why not or where Greg might have made a mistake.**  Jonah: I kept trying numbers to see what would fit in and decided that this graph showed all of the solutions.    **Is Jonah correct? If not, use mathematical reasoning to explain why not or where Jonah might have made a mistake.** |
| ***Solution and Rubric:***  Inequalities and their Graphs  For each situation, write an inequality. Then pick which graph best represents the inequality. Provide a brief explanation about why the graph is the best representation of the situation.   |  |  |  | | --- | --- | --- | | 1. Poppy must be at least 56 inches (*i*) tall to ride the roller coaster. | Inequality: | Graph Letter: \_\_\_C\_\_\_\_  Explanation:  Poppy has to be at least 56 inches meaning she can be 56 inches or 56.1 or more. You want to include all possible values between whole numbers as well since she can be a height that is a fraction of a whole number. | | 2. Scarlett may spend no more than $56 on groceries (*g*) this week. | Inequality: | Graph Letter: \_\_\_B\_\_\_\_\_  Explanation:  Scarlett wants to spend no more than $56 which means she wants to spend $56 or less. Since you can spend values less than $56 and this could include decimals (cents) | | 3. Skylar must wash 56 or more windows (*w*) to earn enough money for a new bike. | Inequality: | Graph Letter: \_\_\_A\_\_\_\_\_  Explanation:  Since Skylar must wash at least 56 windows, she might wash 56 windows OR more. The best graph to represent that is graph A since she can’t wash 56.5 windows- only whole amounts. | | 4. Faith bought 56 or fewer apples (*a*). | Inequality: | Graph Letter: \_\_D\_\_\_\_  Explanation:  Graph D represents the situation the best since Faith bought 56 apples or less. Not including all values between whole numbers is important since she won’t be purchasing fractional pieces of an apple. |  |  |  | | --- | --- | | Graph A : |  | | Graph B : |  | | Graph C : |  | | Graph D : |  |   Part 2:  Mrs. Harper gave her seventh grade students a test on inequalities. She allowed them to show the answer in any format that they wanted to, as long as it showed the entire solution . She had no idea how many ways the students would represent their answers! Help her grade each student’s response. If the student incorrectly represented the inequality, provide a brief mathematical explanation of why the solution isn’t correct.  Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  7th Grade Math Test: Inequalities  Set up an inequality for each situation and show the solution in any way that represents all possible solutions to the inequality.  Example: The difference of twice a rational number and 4 is at most -5  2x - 4 -5  1. The difference of 8 and two times a rational number is at least -12.  Max : I solved the inequality like I would an equation and found that the best solution is the graph:    **Is Max correct? If not, use mathematical reasoning to explain why not or where Max might have made a mistake.**  Max is correct. If you solve the equation algebraically, then you get . The graph shows that 10 is included in the solution set and would include all whole numbers and rational numbers less than 10.  Karla said: I solved the inequality algebraically by adding 8 to both sides then dividing by -2. Of course I flipped the inequality! The graph of my solutions looks like:    **Is Karla correct? If not, use mathematical reasoning to explain why not or where Karla might have made a mistake.**  Karla may have set up the original inequality incorrectly or didn’t understand that the minus belonged to the 2n. By adding 8 to both sides, the right side would equal -4 instead of -20 when she divided by -2, giving her the wrong answer for the inequality.  Maybel said: “I used guess and check. I realized that 10 is the largest number and that the numbers smaller than 10 would also work. So, my solution set is {10, 9, 8, 7, 6 ….. }”  **Is Maybel correct? If not, use mathematical reasoning to explain why not or where Maybel might have made a mistake.**  Maybel is very close to the correct answer but not fully done. She must have solved the inequality correctly since she knew the starting number was 10 and that other solutions would be less than 10; however, she is forgetting that the answers include all rational numbers, NOT just the whole numbers that she listed.  Greg said: “I isolated the variable in the inequality by subtracting 8 from both sides, then dividing by -2. I found that n was greater than or equal to 10!    **Is Greg correct? If not, use mathematical reasoning to explain why not or where Greg might have made a mistake.**  Greg was very close to the correct answer but forgot to flip the inequality when he divided. This results in him having the correct starting number but having a solution set that includes all of the numbers on the opposite side of the inequality than what he should have.  Jonah: I kept trying numbers to see what would fit in and decided that this graph showed all of the solutions.    **Is Jonah correct? If not, use mathematical reasoning to explain why not or where Jonah might have made a mistake.**  Jonah must have solved the inequality correctly since he had the right number in the solution and graphed the inequality in the correct direction. He was incorrect in that he didn’t include 10 as part of the final answer (unshaded circle) and should have.   |  |  |  |  | | --- | --- | --- | --- | | 4 | 3 | 2 | 1 | | •Student demonstrates complete understanding of the mathematical concepts.  •The solutions completely address all mathematical concepts presented in the task.  •Where required, there is a clear, proficient explanation of the solution. | •Student demonstrates nearly complete understanding of mathematical concepts.  •The solutions address almost all of the mathematical concepts presented in the task. Minor errors may exist.  •Where required, there is a clear, explanation of the solution. | •Student demonstrates a vague understanding of the mathematical concepts.  •The solutions address some, but not all the mathematical concepts presented in the task.  •Where required, explanations are incomplete or not clear. | •Student demonstrates limited or no understanding of the mathematical concepts.  •The solutions do not address any of the mathematical concepts in the task.  •There is no explanation of the solution. | |
| ***Source(s):***  Part 2 adapted from:  <http://tncore.org/sites/www/Uploads/MathTasks_9.13/7thGradeTaskArc.pdf> |