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| 7th Unit 3 –Equations  Performance Task 2 |
| ***Standard(s) Addressed:***  **7.NS.1a**. Describe situations in which opposite quantities combine to make 0.  **7.NS.1d**. Apply properties of operations as strategies to add and subtract rational numbers.  **7.EE.1** Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.  **7.EE.2** Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.  **7.EE.3** Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.  **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.  a. Solve word problems leading to equations of the form *px + q = r* and *p(x + q) = r*, where *p*, *q*, and *r* are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. |
| ***Task:***  Using Equations  1. Joy Animal Hospital offers their patients two options for pet care. Plan 1 allows you to pay for each appointment at cost for the appointment. Appointment prices usually range from $8 to $250 depending on the care your pet receives.  They now offer a new plan that allows you to pay the same amount each appointment, no matter what your pet needs. For Plan 2, each appointment costs $45. Patients new to the plan get $35 off their first appointment!  Complete the table below (based on the new plan, #2) to represent the TOTAL spent after each number of appointments.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | # of appointments | 1 | 2 | 3 | 4 | 5 | | Total cost |  |  |  |  |  |  1. Create an equation to represent the total cost, *t*, of veterinary care for Plan 2 based on the number of appointments, *a,* that your pet goes to. 2. If your pet goes to 7 appointments in two years under Plan 2, how much did you pay in all? Use the equation you created in part a to determine the cost. 3. Matilda uses Joy Animal Hospital’s Plan 2 for her pet Sparky. She reviewed her total cost for using this plan and has determined that she has spent $235. Write and solve an equation to determine how many appointments has Sparky been to. Explain each step of your solving process. 4. Yolanda brings her cat Jinx to Joy Animal Hospital and loves it! She often refers their name out to her friends. During her last conversation, she told a friend “Joy Animal Hospital has very competitive rates! We’ve been going for about 7 years and have spent a total of $715. That’s nothing compared to what we would have spent at Cat Care Hospital!” Does Yolanda use Plan 1 or Plan 2? How do you know?   2. Solve for *c*. Explain each step as you go.     1. Did you convert the fractions to decimals or did you convert the decimals to fractions? Why did you make that choice? Was it necessary to convert in that direction or just more efficient for you, meaning could a peer have converted in an opposite direction and gotten the same solution?   3. Solve for x. Explain each step as you go.     1. Did you convert the fractions to decimals or did you convert the decimals to fractions? Why did you make that choice? Was it necessary to convert in that direction or just more efficient for you, meaning could a peer have converted in an opposite direction and gotten the same solution? |
| ***Solution and Rubric:***  Using Equations  1. Joy Animal Hospital offers their patients two options for pet care. Plan 1 allows you to pay for each appointment at cost for the appointment. Appointment prices usually range from $8 to $250 depending on the care your pet receives.  They now offer a new plan that allows you to pay the same amount each appointment, no matter what your pet needs. For Plan 2, each appointment costs $45. Patients new to the plan get $35 off their first appointment!  Complete the table below (based on the new plan, #2) to represent the TOTAL spent after each number of appointments.  .   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | # of appointments | 1 | 2 | 3 | 4 | 5 | | Total cost | 10 | 10 + 45 = 55 | 55 + 45 = 100 | 100 + 45 = 145 | 145 + 45 = 190 |  1. Create an equation to represent the total cost, *t*, of veterinary care for Plan 2 based on the number of appointments, *a,* that your pet goes to.   t = 45a – 35   1. If your pet goes to 7 appointments in two years under Plan 2, how much did you pay in all? Use the equation you created in part a to determine the cost.   t = 45(7) – 35 = 315 – 35 = $280   1. Matilda uses Joy Animal Hospital’s Plan 2 for her pet Sparky. She reviewed her total cost for using this plan and has determined that she has spent $235. Write and solve an equation to determine how many appointments has Sparky been to. Explain each step of your solving process.   235 = 45a – 35 (add 35 to each side)  270 = 45a (divide by 45)  6 = a   1. Yolanda brings her cat Jinx to Joy Animal Hospital and loves it! She often refers their name out to her friends. During her last conversation, she told a friend “Joy Animal Hospital has very competitive rates! We’ve been going for about 7 years and have spent a total of $715. That’s nothing compared to what we would have spent at Cat Care Hospital!” Does Yolanda use Plan 1 or Plan 2? How do you know?   Yolanda must use Plan 1. If you use $715 as the total cost in the equation that was created…  715 = 45a – 35  750 = 45a  = a  You can’t go to  of an appointment, so you must have used a different plan where the cost wasn’t the same for all appointments.  2. Solve for *c*. Explain each step as you go.       1. Did you convert the fractions to decimals or did you convert the decimals to fractions? Why did you make that choice? Was it necessary to convert in that direction or just more efficient for you, meaning could a peer have converted in an opposite direction and gotten the same solution?   Students really could have done either way on this problem, but it would probably have been easier to convert any fractions to decimals since the decimals were relatively easy to work with.  3. Solve for x. Explain each step as you go.     1. Did you convert the fractions to decimals or did you convert the decimals to fractions? Why did you make that choice? Was it necessary to convert in that direction or just more efficient for you, meaning could a peer have converted in an opposite direction and gotten the same solution?   Student should convert to fractions since  is a repeating decimal () and  is also a repeating decimal (). Those numbers would be hard to represent and work with as decimals.   |  |  |  |  | | --- | --- | --- | --- | | 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):***  *Adapted from http://www.insidemathematics.org/assets/common-core-math-tasks/toy%20trains.pdf* |