Item 1

Using the class data shown in **Table 1**, complete the following frequency table.

Table 1. Class Pet Votes

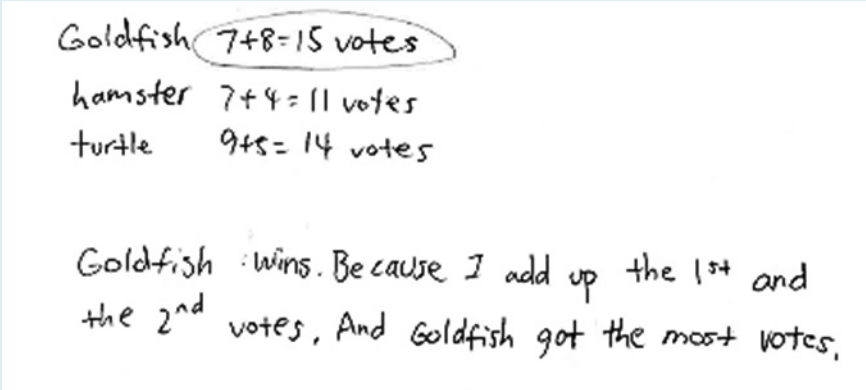| Student	1st Choice	2nd Choice	Student	1st Choice	2nd Choice
1	Turtle	Hamster	11	Turtle	Hamster
2	Goldfish	Hamster	12	Turtle	Goldfish
3	Goldfish	Turtle	13	Hamster	Turtle
4	Hamster	Turtle	14	Hamster	Goldfish
5	Goldfish	Turtle	15	Turtle	Goldfish
6	Turtle	Goldfish	16	Goldfish	Turtle
7	Hamster	Goldfish	17	Turtle	Goldfish
8	Turtle	Goldfish	18	Turtle	Goldfish
9	Goldfish	Hamster	19	Turtle	Hamster
10	Goldfish	Hamster	20	Goldfish	Hamster

Student Response to Item 1

Pet	Total 1st Choice Votes	Total 2nd Choice Votes
Goldfish	7	8
Hamster	4	7
Turtle	9	5

Analysis of Response to Item 1

The response earns full credit, 1 point. The student correctly interpreted the data table and entered all correct values in the frequency table. The student's response demonstrates an understanding of the context and that the student both interpreted the representation of the data and successfully translated it into a frequency table.

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Item 2	Create your own method for using the votes to decide a winner. Explain your method using the information from **Table 1** to determine the winning pet.
Student Response to Item 2	Goldfish 7+8=15 votes hamster 7+4=11 votes turtle 9+5=14 votes Goldfish wins. Because I add up the 1st and the 2nd votes, And Goldfish got the most votes.
Analysis of Response to Item 2	The response earns full credit, 2 points. The student clearly described his/her method and explained which pet is the winner based on this method. This student's method was to add the 1st and 2nd choice votes together to determine the winner. This student has clearly communicated his/her understanding of the context by creating a mathematical model and interpreting the results in context.

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Item 3

Your teacher wants to use a point system to select the winning pet. She wants each pet to get a certain number of points for each 1st choice vote and a certain number of points for each 2nd choice vote.

Your teacher decides to use these rules for her point system:

- Points need to be positive whole numbers

- Points for a 1st choice vote have to be greater than or equal to the points for a 2nd choice vote.

Determine point values for the 1st and 2nd choice that would result in the **turtle winning**. Use words and numbers to explain how this point system results in the turtle winning.

Student Response to Item 3
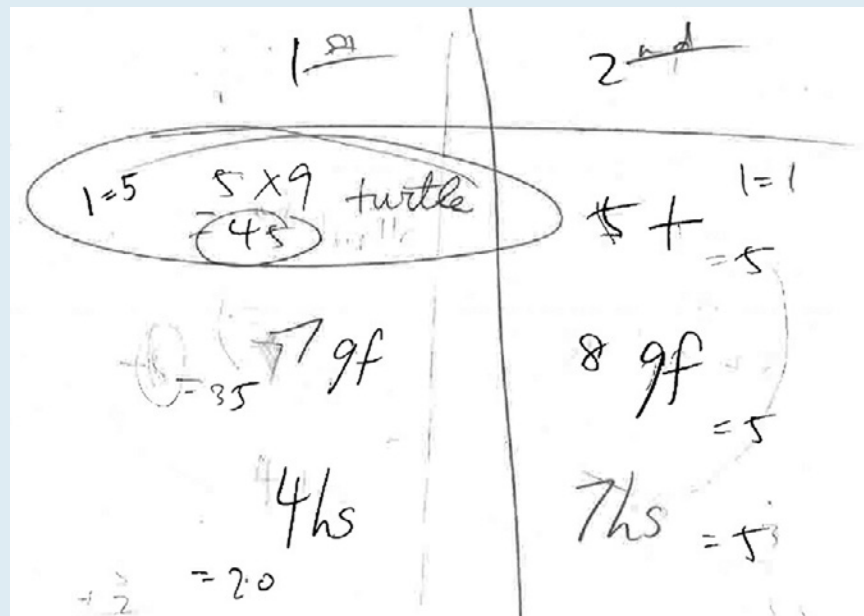
Analysis of Response to Item 3

This response earns a partial credit of 1 point. While the student created a point system that met the requirements and could have led to a full-credit response, the point system is not fully described or explained. The student did not interpret the results in context.

Item 4	Your classmate claims that there is **no** point system that could result in the goldfish winning. Do you agree or disagree with your classmate?
	Use words and numbers to explain your reasoning.

| Student Response to Item 4 | I agree, because no matter how or what number times it, no matter whether it's 1st choice or 2nd choice, goldfish won't win,

 9 × 4 = 36 turtle   7 × 4 = 28 gf   9 × 4 = 16 ws |
| --- | --- |

Analysis of Response to Item 4	This response shows evidence that the student has at least a partial understanding of the prompt. However, the response does not include a scoring method that results in the goldfish winning. The student agreed with the claim and provided as evidence one attempt where only 1st choice votes were multiplied by 4. This response does not show evidence of the student's ability to challenge a claim by defining a point system to achieve the desired outcome and defending it. There are significant omissions indicating a lack of comprehension regarding the practices essential to this task. This response earns no credit, 0 points.

| Item 5	Your principal surprises you by buying your class a turtle. He brings the turtle to your class along with a sheet from the pet store titled "Turtle Tank Rules."

The rules state:

- Tank walls must be at least 1 foot tall so the turtle can't climb out.

- There must be at least 400 square inches of floor space for the turtle to walk around on.

Your teacher says the volume of the tank must be smaller than 5000 cubic inches so it doesn't take up too much room in the classroom.

Give the dimensions of a tank that would work for your new turtle. Use words and numbers to explain how your tank satisfies the "Turtle Tank Rules" and your teacher's requirement.

Student Response to Item 5

> **Volume of a rectangular prism = length x width x height**
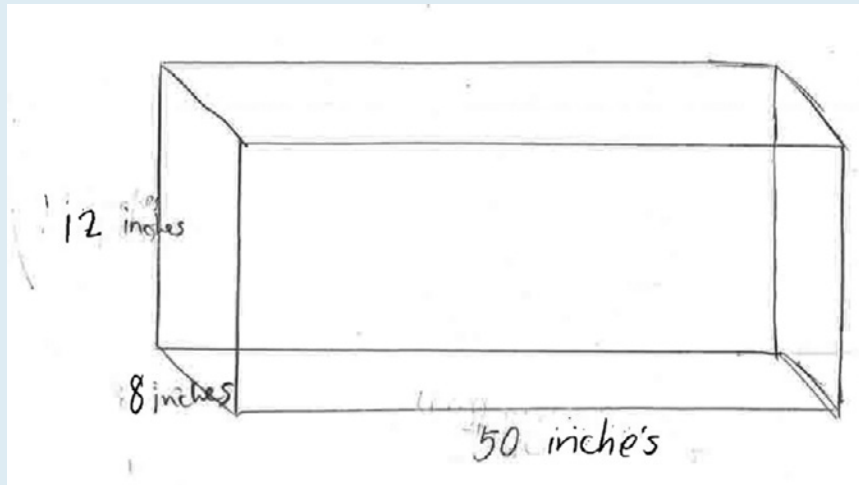
Analysis of Response to Item 5

This response earns partial credit, 1 point. The student provided dimensions that satisfy all three constraints of height, base area, and volume, but did not provide an explanation as to why these dimensions meet the requirements. The response shows evidence of the student's ability to manipulate numbers and interpret results within the context to satisfy all constraints, but the response does not include evidence of the student's ability to construct chains of reasoning to justify the solutions proposed. Therefore, this student has partially demonstrated the practices essential to this task.

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Overview of Student's Performance

This student demonstrated an ability to interpret data in context and a facility with numerical manipulations. The responses show his/her ability to interpret the data and translate it to another format and to understand the context to determine a winning pet. The student's attempts to design under constraints, as evidenced in his/her numerical calculations and solutions in items 2, 3, and 5, were largely successful in that the numbers evidenced an understanding of the requirements. Particularly interesting was how, in item 2, the student noted the goldfish as the winner, but in item 4 s/he said the goldfish could not win. It is likely the student did not recognize one point per vote as a "point system."

This EL student enjoys working with numbers but tends to be "writing-resistant." While s/he will spend time working with the numbers to achieve the desired outcomes, s/he lacks confidence in his/her written work. This is evident in the responses to the performance task. While the responses were initially comprehensive, they became less and less complete as the student worked through the task. For most items, the student demonstrated persistence in manipulating the numbers to achieve the desired result through guessing and testing, but did not provide the written descriptions, explanations, or justifications to support the work. The student would benefit from experiences that strengthen his/her responses—in the communication of thinking and justifications for models used, interpretations made, and solutions proposed. In item 3, the student created a model and applied it, but never communicated his/her reasoning or justifications for those choices. In item 5, the student provided a numerical answer with no explanation or justification.

Next Steps

This student would benefit from opportunities to engage in Mathematical Practice (MP) 1 (Make sense and persevere in solving problems) and MP 3 (Construct viable arguments and critique the reasoning of others). Suggested instructional supports would include working with a partner or group to create and defend models, interpretations, and solutions. This would increase the student's language exposure and allow opportunities to develop thinking verbally prior to writing responses down. The student would also benefit from support with close reading to ensure s/he attends to all attributes of a prompt, as the student's work shows understanding of the mathematical concepts and an ability to design within constraints, but is missing the necessary written descriptions, explanations, and justifications of reasoning and choices made.

The concept of allowing students multiple ways to represent thinking, express understanding, and engage with content is outlined by Universal Design for Learning (UDL) to ensure productive access and engagement for all students. Use of collaborative pairs or groups in conjunction with the opportunities previously stated would be a means of engagement that optimizes relevance and minimizes threat. Additional supports to assist this student in areas where support is needed would include elements of UDL's Representation strategies. Depending on current performance and assistive technologies available, the student could be allowed to dictate or type responses that describe his/her thinking processes.

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